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Transforming management in the era of post-globalization and agentic economy

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Sinergie SIMA Management Conference

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Foreword

The annual Sinergie-SIMA Management Conference is more than an opportunity to present and discuss research findings. It is a moment in which our scientific community comes together to reflect on the transformations affecting firms and organizations and, at the same time, on the evolution of management as a discipline.

The 2026 Conference, hosted by the University of Pavia and entitled Transforming Management in the Era of Post-Globalization and Agentic Economy, invited us to consider this double transformation. We are experiencing profound changes whose direction, scope, and consequences are often difficult to anticipate. Understanding them is already a demanding task. Management must then translate them into organizational choices, processes, and practices that work in concrete contexts.

A significant part of managerial work has traditionally consisted of collecting information, synthesizing it, and transforming it into reports, scenarios, forecasts, and decisions. Artificial intelligence does not "know everything", but it greatly increases the capacity to process information. As a result, managerial value no longer resides primarily in access to information or in routine analysis, but in the ability to steer how knowledge is generated, filtered, integrated, and critically interpreted. Managers are therefore called upon to become even more critical interpreters. They must recognize ambiguities, balance conflicting objectives, and assess organizational constraints, as well as the reputational, social, political, and institutional implications of different courses of action. Information may be increasingly abundant and accessible, but judgment and responsibility cannot be delegated to a technological system.

The nature of coordination is also changing. Management has always involved coordinating people, organizational units, and processes. Today, alongside people, there are data, algorithms, platforms, and artificial agents. Human teams are increasingly becoming hybrid systems. The challenge is to design work architecture in which human and artificial intelligence can cooperate effectively, without people losing control, competence, or responsibility. Technology should strengthen human capabilities. It should not reduce the human contribution to the passive execution of technologically generated instructions or subject individuals and organizations to an unsustainable acceleration of productivity expectations.

The limits of these technologies are not yet fully understood, nor is their medium- and long-term impact on organizations and society. What is already clear, however, is that the way artificial intelligence enters organizations changes decision-making processes and redistributes responsibilities, competencies, and power. Management, therefore, does not disappear. It changes its nature. If the nature of management changes, the responsibility of our scientific community must also evolve. We must examine whether the concepts and theories we use to interpret organizations remain adequate. We must investigate how technologies transform work, coordination, authority, and accountability. We must also reflect on the contributions that management studies can make to firms, institutions, and society in a period of rapid, sometimes contradictory change. The "SIMA Manifesto degli studi di management" was developed in this spirit: not as a definitive answer, but as a platform for discussion. It invites us to question what matters today for our discipline, whether the categories we use to interpret emerging phenomena are still appropriate, and what relationship management scholars intend to build with firms, institutions, and society.

The papers collected in these Proceedings provide tangible evidence of the vitality and diversity of our community. They represent different theoretical perspectives, methodological approaches, and fields of inquiry. Together, they demonstrate the ability of management research to address complex questions with rigor, openness, and responsibility. They also reflect a community capable of bringing together research and teaching, senior and younger scholars, international engagement, and dialogue with firms and institutions. This ability to connect different dimensions of academic life is one of the distinctive strengths of the Sinergie-SIMA Conference. A scientific conference truly fulfills its purpose when it is not merely a program of scheduled sessions, but becomes a space inhabited by its community: a space in which papers are presented and discussed, questions are raised, different perspectives are compared, relationships are developed, and new collaborations begin. Attention must be devoted to younger scholars. Their ideas, questions, and research trajectories are essential to the future of our discipline. Creating opportunities for their development, supporting their participation in the scientific community, and encouraging research that combines academic quality with practical relevance are central responsibilities for SIMA.

I would like to express my sincere gratitude to Sinergie Italian Journal of Management, the University of Pavia, the Conference Chairs, the scientific and organizing committees, the Chairs of the tracks and SIMA thematic groups, the reviewers, and all those who contributed to the organization of the Conference and to the preparation of this volume. Above all, I thank the authors and participants who presented their work, discussed papers, raised questions and animated the many opportunities for exchange. Their engagement made the Conference the expression of a living scientific community.

A conference ends well when it does not close a discussion but leaves participants eager to continue it. I hope that these Proceedings will carry forward the ideas, questions, relationships, and new possibilities for joint work that emerged in Pavia and will strengthen the capacity of management research to understand and responsibly shape the transformations of our time.

Beatrice Luceri, President of Italian Society of Management (SIMA)

Editorial Note

To the reader,

This volume contains the short papers presented at the Sinergie-SIMA 2026 Management Conference, hosted by the University of Pavia on 28 and 29 May 2026. The Conference, entitled *Transforming Management in the Era of Post-Globalization and Agentic Economy*, provided an opportunity to discuss the transformations affecting organizations, managerial practices, and management research.

The conference program included contributions related to:

- the main Conference theme;
- the research areas represented by the SIMA thematic groups;
- management case studies.

The diversity of the subjects addressed, theoretical perspectives adopted, and the methodological approaches employed reflected the breadth and vitality of the Sinergie-SIMA scientific community.

The Conference call invited the submission of both short and long papers. Overall, the editorial team received 315 submissions, consisting of 249 short papers and 66 long papers.

All submissions underwent the peer-review process established for the Conference. Short and long papers were evaluated by 245 reviewers, selected from the Sinergie and SIMA scientific communities on the basis of their expertise in the subjects addressed.

The submissions were assessed according to the following criteria:

- clarity of the research aims;
- appropriateness and rigor of the methodological approach;
- originality and innovativeness of the contribution;
- theoretical and practical relevance;
- clarity of communication;
- quality and significance of the bibliographical foundations.

For the short and long papers, the evaluation followed the peer review process, with a double-blind review performed by, respectively, one and two referees - university lecturers and experts about the topic - selected from among members of the SIMA community. At the end of the evaluation process, the authors received the reviewers' reports and incorporated their observations into the presentation and discussion of their work at the Conference.

The evaluation process resulted in the acceptance of 296 papers. The present volume contains 216 short papers whose authors authorized their publication.

All the contributions included in the volume were presented and discussed during the Conference and are made available online through the Sinergie-SIMA Management Conference portal (*https://www.sijmsima.it/*). The papers collected here should be understood not only as individual research contributions, but also as evidence of the questions, perspectives, and developing research trajectories that characterized the scientific debate in Pavia.

We wish to thank the authors for entrusting their work to the Conference; the reviewers for the quality and care of their assessments; the track and thematic group Chairs for coordinating the evaluation and discussion processes; and all participants for contributing to an open and constructive scientific exchange.

We hope that this volume will support the further development of the research presented during the Conference and contribute to the wider debate on the transformation of management and organizations.

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Long papers

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Human-Centered AI and Entrepreneurship Education: Insights from a Gioia Method Study

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Abstract

Frame of the research. *Entrepreneurship Education (EE) has evolved toward theory-informed, design-oriented architectures, yet the integration of Human-Centered Artificial Intelligence (HCAI) remains underexplored. As EE embraces AI-enabled pedagogies, a critical gap persists in understanding how HCAI can shape program design to foster responsible entrepreneurial leaders.*

Purpose of the paper. *This study aims to examine how HCAI can be conceptually and practically integrated into Entrepreneurship Education Programs (EEPs).*

Methodology. *An exploratory qualitative design was employed, using a Gioia methodology analysis of 119 open-ended survey responses from students enrolled in a Master's program in Human-Centered Artificial Intelligence in Germany. Data were inductively coded and iteratively theorized to develop a grounded framework.*

Results. *Findings reveal that HCAI could shape EEPs through three interdependent pillars that can generate a Holistic Entrepreneurship Education Program Architecture (HEEPA): Integrated Learning Architecture; Institutionalization of Ethics and Collaborative and Enabling Learning Ecosystem.*

Research limitations. *Single-case, cross-sectional design limits generalizability; long-term effects on entrepreneurial behavior and venture outcomes remain untested.*

Managerial implications. *Universities must move beyond additive AI modules toward pedagogical redesign where ethics-by-design and human agency shape curricula, assessment, and governance. Policymakers should invest in translational infrastructures, interdisciplinary networks, and ethical governance frameworks.*

Originality of the paper. *The study advances EE theory by reconceptualizing HCAI not merely as a tool or topic, but as a transformative design logic for holistic, ethically grounded program architecture.*

Keywords: *Human-centered AI; entrepreneurship education; GIOIA methodology*

1. Introduction

Entrepreneurship Education (EE) has matured from an experience driven "craft" to a theory informed, design-oriented field where program architecture, learning processes, and outcomes are explicitly modelled and assessed. Its scope now extends beyond venture creation to include broader capabilities, opportunity recognition, experimentation, coordination, and responsible decision making, delivered through diverse pedagogical configurations and institutional settings (Passarelli and Bongiorno, 2025). Scholars have emphasized the need to clarify what EE develops (mindsets, competencies, behaviours), how learning is activated (didactic logics, processes), and when programs yield meaningful outcomes (Fayolle and Gailly, 2008).

In parallel, EE has become an increasingly technology-rich field; digital platforms, serious games, simulations, and blended formats have scaled experiential learning, enabled iterative practice, and supported more flexible participation across cohorts and geographies. Some systematic evidence suggests that online and blended entrepreneurship education has grown as a distinct stream, with educational technologies like Web 2.0, cloud computing, and AI used to support learning by doing mechanisms (experimentation, feedback, reflection, social interaction). Moreover, devices such as laptops, tablets, and smartphones now mediate entrepreneurial knowledge development.

Many studies have been developed, which adopted different technologies in online and blended EE such as Web 2.0 (Jones & Iredale, 2009), cloud computing (Holinska et al., 2019; Ratten, 2013),

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digital technology (Rippa & Secundo, 2019), Massive Open Online Courses (MOOCs) (Al-Atabi & DeBoer, 2014; Vitiello et. Al., 2017; Cirulli et al., 2016; Resei et al., 2018; Vorbach et al., 2019), and Serious Games (SGs) (Protopsaltis et al., 2014; Romero & Usart, 2013). Moreover, there is a rapid diffusion of Artificial intelligence, particularly generative AI (GenAI) and Large Language Models (LLMs). Specifically, AI is entering EE in at least two complementary ways. First, it becomes part of the entrepreneurial domain itself, in fact entrepreneurs increasingly build, integrate, or compete with AI-enabled products, services, and business models, implying that foundational AI literacy (e.g., data, ML basics, model limitations, deployment constraints) is becoming strategically relevant for opportunity evaluation and venture execution. Second, AI becomes part of the pedagogical toolkit, supporting ideation, business modelling, market analysis, prototyping, communication, and reflective learning (Stewart et al, 2025; Gong et al., 2025; Zulfiqar et al., 2025; Somià & Vecchiarini, 2023).

The concept of Artificial Intelligence (AI) has evolved significantly since its emergence as a formal scientific field in the mid-20th century. What began as a philosophical inquiry into whether machines can emulate human thinking has matured into a diverse, multidisciplinary domain with applications across sectors. Definitions of AI are not static; they reflect technological paradigms, theoretical models, and societal expectations of their time. The earliest definitions of AI focused on mimicking human thought, as exemplified by the "Turing Test" and Haugeland's "machines with minds". (Haugeland, 1985; Turing, 1950). By 2025, AI definitions have incorporated socio-technical dimensions such as trust, accountability, and ethical alignment. Definition proposed by the OECD, UNESCO, and embedded in the European Union, stresses human-centeredness, transparency, and legal compliance (EU, 2024).

In this framework, the concept of HCAI has been emerging. The main idea of HCAI applications is to be able to use AI-based tools to improve human performance while preserving human values (Jörs & De Luca, 2025). Human-Centered Artificial Intelligence (HCAI) provides a rigorous conceptual anchor for addressing this challenge. Shneiderman's HCAI framework advances a two-dimensional design logic that seeks high levels of automation while preserving high levels of human control, with the explicit goal of producing AI systems that are reliable, safe, and trustworthy while enhancing human performance and agency (Shneiderman, 2020). This perspective is especially relevant in entrepreneurship because startups typically operate under resource scarcity and high uncertainty, conditions that may incentivize design shortcuts and over-automation, often with substantial downstream costs. Automatically, this becomes central to entrepreneurship education, that get ready future founders and equips them to avoid over-automation, preserve human judgment where it matters, and reduce downstream technical, ethical, and reputational costs.

Despite growing research on AI in Management and Entrepreneurship Education (Moheno et al., 2024; Dissanayake et al., 2025; Gong et al., 2025), studies explicitly linking HCAI and EE remain scarce (Alfredo et al., 2024; Schmager et al., 2025). Addressing this gap, the study examines how to conceptualize HCAI's role in EE. The paper reviews EE the literature, emphasizing interdisciplinary integration, learner centered design, and emotional well-being; then it analyses HCAI integration by identifying the research gap, and attempt to state the research question. Then, it proposes a qualitative empirical analysis and explains the main findings. The paper concludes with implications, limitations, and future research directions.

2. Main issues in Entrepreneurship Education Literature

According to Passarelli and Bongiorno (2025), Entrepreneurship Education (EE) is increasingly shaped by cross-disciplinary integration with pedagogy, psychology, ethics, and neuroscience, moving away from "one-size-fits-all" toward learner-centered, mixed-knowledge curricula (Landström et al., 2022; Kazakeviciute et al., 2016; Vázquez-Parra et al., 2022). Psychology enhances problem-solving and creativity (Xie et al., 2022), pedagogy supports context-tailored course design (Guerrero et al., 2020), and an emerging neuroscience stream links neurocognitive mechanisms to

entrepreneurial skill development (Moore et al., 2021; Lanivich et al., 2024; Wang et al., 2021). This multidisciplinary turn foregrounds diversity, neurodiversity, culture, race, gender, as a design requirement for more "ergonomic" EE programs (Brieger & Gielnik, 2021; Lanivich et al., 2024).

A second pillar concerns emotional intelligence and well-being. Emotional intelligence, perceiving, using, understanding, regulating emotions, is central to EE effectiveness, influencing engagement, creativity, and decision-making (Aly et al., 2021; Lackéus, 2014; Keller & Kozlinska, 2019; Zampetakis & Moustakis, 2010; Foo, 2011; Omorede et al., 2015). This supports aligning EE with learners' diverse needs, motivations, and backgrounds (Mwasalwiba, 2010; OECD & Lackéus, 2015; Maritz & Brown, 2013; Duval-Couetil & Long, 2014; Matricano, 2024b; Hahn et al., 2020; Liao et al., 2022; Fayolle & Gailly, 2015; Bauman & Lucy, 2021).

Implementation depends on educators combining technical competence with affective and relational qualities (Frenzel et al., 2009), and on teaching designs integrating venture topics (finance, BMC, planning, innovation, IPR, marketing) with action-oriented methods (action learning, cases, design thinking, testimonials) while addressing ethics and social responsibility (Samuel & Rahman, 2018; Duval-Couetil & Long, 2014; Sirelkhatim & Gangi, 2015; Rasmussen & Sørheim, 2006; Linton & Klinton, 2019; Béchard & Grégoire, 2005; Igwe et al., 2021). EE requires enabling ecosystems, infrastructure, support, experiential opportunities, that also support well-being (Clark et al., 2021; Belitski & Heron, 2017; Bischoff et al., 2018; Jones et al., 2020; Enrique et al., 2024; Arranz et al., 2017).

Emerging directions for EE (Pittaway & Cope, 2007; Haase & Lautenschläger, 2011; Fayolle & Gailly, 2015; Fellnhofer, 2019; Ratten & Jones, 2021; Matricano, 2024) include: (1) customizing programs through adaptive, iterative designs, diagnostics, core modules, electives, mentorship, supported by AI-driven platforms; (2) strengthening universities' ecosystem role as anchors for incubators, research centers, and networks fostering venture creation and responsible innovation (Etzkowitz, 2003); and (3) deepening attention to ethics, as new technologies (AI, IoT) and graduates' societal impact demand greater scrutiny (Lindner, 2018; Tesfayohannes & Driscoll, 2010; Vallaster et al., 2019).

3. Human centered Artificial Intelligence (HCAI) in Entrepreneurship Education

In recent years, the rapid advancement of AI technologies has profoundly reshaped entrepreneurship education, enabling more personalized, adaptive, and innovative learning experiences. Recent studies suggest that EE is gradually moving toward interdisciplinary integration, practice-oriented instruction, and greater use of digital technologies (Xu, 2024). Universities now integrate incubators, competitions, MOOCs, VR, and AR to enhance practical training and accessibility (Anjum et al., 2020; Thottoli et al., 2024). Nevertheless, EE still faces challenges: theoretical overload, weak hands-on learning, mentor shortages (Hameed & Irfan, 2019; Kraus et al., 2019), and underdeveloped assessment systems (Bolzani & Luppi, 2021; Scroccaro et al., 2025). These gaps underscore the need to investigate how emerging technologies, particularly HCAI, can help address such gaps and potentially support the effectiveness of EE.

HCAI aims to enhance human performance while preserving human values. It pursues two parallel goals: empowerment, keeping humans meaningfully "in the loop" to ensure safety, autonomy, and self-determination, and ethical compliance, embedding fairness, accountability, interpretability, and transparency as first-order design constraints. HCAI also emphasizes reliability, safety, and trustworthiness. In smart education, HCAI reasserts a humanistic mandate by embedding values from the outset, acting as a catalyst for learning, inclusion, and accessibility. Achieving this potential, however, requires a paradigm shift in educational programs to support effective human–AI collaboration, one that prioritizes the development of metacognitive capacities (e.g., critical judgment, calibration of trust, and anti-overreliance) alongside technical competence, rather than focusing primarily on generic communication principles (Le Dinh et al.,2025).

According to the literature review proposed by Le Dinh et al, 2025, HCAI is conceptualized unevenly across disciplines. Operationalizing it demands genuine interdisciplinary integration around pillars such as human capability, controllability, autonomy, calibrated trust, learner-centered design, and information literacy. Importantly, "more AI" does not automatically yield "new pedagogy"; without intentional redesign, AI often amplifies existing instructional logics.

While numerous studies examine AI in EE (Gong et al., 2025) and HCAI in education broadly (Le Dinh et al., 2025), the specific role of HCAI in EE remains underexplored. To address this gap, we attempt to answer the following question: *Which role does Human-Centered AI (HCAI) play in Entrepreneurship Education Programs (EEPs) for shaping a new generation of responsible leaders?*

4. Qualitative analysis

4.1 Research setting: the case of Master's Program in HCAI in Germany

Despite there are some international programs on Human Centered Artificial Intelligence[4], we focus on the first international master program that link Human-Centered AI education to Entrepreneurship Education. Specifically, we concentrated on the Master's Program in Human-Centered Artificial Intelligence at Otto-von-Guericke University Magdeburg. The program trains AI professionals with an emphasis on ethics, human-centered design, and responsible entrepreneurship. In fact, it is an interdisciplinary program that integrates technical proficiency with a deep understanding of social and ethical implications, preparing graduates to develop AI solutions that are safe, fair, and provide entrepreneurial projects that generate benefits to society. At the beginning of the program, most of the students had an initial project idea that would like to explore. A set of venture ideas across multiple sectors (creative AI, mobility, social media, trust & safety, accessibility, education, health, energy, industry, data, and fintech), focused on applying human-centered AI to solve real problems.

Tab. 1: Students' entrepreneurial ideas

Sector	Idea
Music / Creative AI	Personalized music recommendation based on emotional context
	AI-generated soundscapes for immersive experiences
	Adaptive AI music composition
Mobility / Infrastructure	Advanced mobility (flying cars, hoverboards)
	Improved rail network in Germany with separated passenger vs freight transport
Social media	Startup/platform changing how people interact with social media
	Gen AI for social media + regulation / compliance
Trust & Safety	Fake news detection
Accessibility	AI-driven assistive technologies (e.g., intelligent voice assistants)
	Real-time translation tools for the hearing impaired
	Accessibility tools for digital content consumption
Education	Startup selling tech products for students
	AI platforms for personalized learning experiences
	Personalized AI learning assistants / adaptive tutors
Ethics & Governance	Ethical AI governance dashboard (audits fairness / accountability / explainability)
Fairness in HR	Bias-resistant AI for recruitment (fair resume screening / interviews)
Healthcare HCAI	Human-centered AI-assisted diagnostic tool supporting doctor–patient interaction

[4] Stanford Institute for Human-Centered AI; Human-Computer Interaction Institute at Carnegie Mellon University; Joint Master's Degree in Human-Centered Artificial Intelligence at Universities of Milan; European Laboratory for Learning and Intelligent Systems (ELLIS) with units in Alicante, Delft, Helsinki; Oxford Institute for Ethics in AI; Human-Centered Artificial Intelligence Lab at Seoul National University; Master in Human-Centered Artificial Intelligence (HCAIM): a joint program by TU Wien (Austria), Université Paris-Saclay (France), and Politecnico di Milano (Italy).

Mental health	Mental health detection and prevention
	Ethical recommendation systems to promote well-being/resilience and positive behavior
Energy / IoT	Predictive maintenance + energy optimization for renewables
Business Intelligence	AI-powered market research tool (competitor analysis + trend prediction)
	Business intelligence dashboard with AI for real-time visualization & decisions
Industrial	AI add-ons for industrial tools (Oracle PLM, Enovia, SAP)
	Migrating legacy applications into human-centric AI applications
MedTech	Early detection of cancer
Data Cloud	Scalable cloud-based data solutions for SMEs
	Shortening / optimizing data pipelines
FinTech	FinTech startup for financial decision support (behavioral finance)
Smart city and Smart mobility payments	AI-driven traffic signal systems
	Auto-generated toll payments based on miles traveled

Source: our elaboration

The program follows a staged learning pathway. First, it builds a shared foundation in human-centered and responsible AI, blending technical literacy with ethical practice, privacy, security, and user-centered design. Second, students deepen their expertise through specialized topics, explainability, fairness, discrimination, and research data management for reproducibility and responsible sharing. Third, the curriculum shifts from instruction to application via the incubator-style "Innovation Experience." Here, students attend targeted entrepreneurship seminars (e.g., business models, business planning, canvas design), submit project proposals, and iterate through mentoring and feedback while developing prototypes in collaboration with external stakeholders. The incubator offers a distinctive environment for transforming ideas into impactful AI solutions, combining creativity, hands-on support, and access to industry expertise. The pathway concludes with a public Demo Day, where students present outcomes to partners, strengthening professional readiness and building bridges to industry, research, or venture creation in human-centered AI.

Fig. 1: HCAI program pathway



Source: our elaboration

4.2 Gioia Methodology: research design and analysis

We adopted an exploratory qualitative design to investigate how HCAI can be integrated into Entrepreneurship Education Programs (EEPs), focusing on students' perspectives to uncover the logics by which HCAI shapes program architecture. Data come from a qualitative survey of students enrolled in the program and interested in the Innovation Experience Incubator. Exploratory inquiry is suited to emerging constructs and theory elaboration rather than hypothesis testing (Eisenhardt, 1989; Miles et al., 2018). Our approach is abductive, iterating between empirical material and extant literature to refine interpretation (Langley, 1999; Pratt, 2009).

Data analysis followed the Gioia Methodology (Gioia et al., 2013). We selected this approach because it offers a structured framework for examining complex, interpretive phenomena, capturing participants lived experiences while foregrounding reflection and contextual influence. Its inductive, data-driven nature is especially valuable where existing theories may not fully explain diverse educational practices. Compared to unstructured case designs without systematic coding, the Gioia method ensures greater rigor (Magnani & Gioia, 2023). It grounds theory in real-world experiences, traces processes and change over time, and is thus particularly suited to studying skill development, mindset evolution, and identity formation in EE.

Analysis followed three stages (Magnani & Gioia, 2023): (a) developing first-order (informant-centered) codes, second-order (theory-centered) themes, and aggregate dimensions; (b) constructing a grounded theoretical representation through constant data comparison; and (c) presenting findings via a data-driven narrative supported by second-order themes and first-order quotations. This rigorous approach to evidence collection and coding aligns with the standards of qualitative research.

4.3 Main steps and results

The application of Gioia methodology included the following stages (Darcis et al., 2024). The research process began with the theorization stage, where a matching between two broad streams of literature is proposed (Entrepreneurship Education and HCAI).

The results include general issues referring to learning mechanisms, affective and psychological layer, governance standards of HCAI, career orientation and the perceived support from the context. Stemming from the literature, a survey was created.

Tab. 2: Leading themes and survey

Theoretical issues	**Key literature anchors**	**Survey item(s)**
Learning mechanisms	Neck & Greene (2011); Pittaway & Cope (2007); Ratten & Jones (2021); Rasmussen & Sørheim (2006); Kolb (1984) Aly et al. (2021); Lackéus (2014); Mayer & Salovey (1995); Frenzel et al. (2009) Passarelli & Bongiorno (2025); Fayolle & Gailly (2015); Mwasalwiba (2010); OECD & Lackéus (2015)	What learning methods do you prefer? Which practical experiences would you include in the program (i.e. internships)? What learning methods do you prefer? Which features of the program are most relevant to you? Which areas of HCAI interest you the most?
Knowledge and skills	Xie et al. (2022); Schön (1983); Bandura (1997) Landström et al. (2022); Kazakeviciute et al. (2016); Vázquez-Parra et al. (2022); Neck & Greene (2011); Sirelkhatim & Gangi (2015)	What specific skills do you hope to acquire during the program? Which industries do you think will be most impacted by AI in the next 10 years?
Application domains	Isenberg (2010); Fellnhofer (2019)	Are you interested in specific applications of HCAI? Which areas of HCAI interest you the most?
Career orientation and employability outcomes	Duval-Couetil & Long (2014); Maritz & Brown (2013)	What career opportunities do you hope to achieve through the program? What are your long-term professional goals? Do you have initial project ideas or entrepreneurial ambitions?

Leadership and AI governance capability	OECD AI Principles (2019); NIST AI RMF (2023); Heifetz (1994) Shneiderman (2020); ISO 9241-210 (Human-centered design); Parasuraman et al. (2000)	What leadership skills do you think are most important for managing AI-driven workplaces? If you were to lead a team where AI plays a significant role, what would be your biggest concern? If you were to lead a team where AI plays a significant role, what would be your biggest concern?
Ethics issues	Béchard & Grégoire (2005); Igwe et al. (2021); OECD AI Principles (2019)	Which aspects of ethical AI and its practical application do you find most relevant?
External Support	Guerrero et al. (2020); Etzkowitz (2003); Belitski & Heron (2017); Bischoff et al. (2018); Clark et al. (2021); Spigel (2017); Stam (2015) Lindner (2018); Tesfayohannes & Driscoll (2010); Acemoglu & Restrepo (2019)	How interested are you in participating in projects within the incubator? What support would you expect from the incubator? How important is networking with industry experts and professionals? How do you think the program will impact wages, job security, inclusivity and inequality? If you were to lead a team where AI plays a significant role, what would be your biggest concern?

Source: our elaboration

All questions were open-ended, enabling students to express perspectives without predefined categories and capturing values, experiences, and behaviors not easily obtained through other methods (Darcis et al., 2024). An invitation email was sent to program participants; those interested completed an online survey. We collected 119 responses, all included in the study.

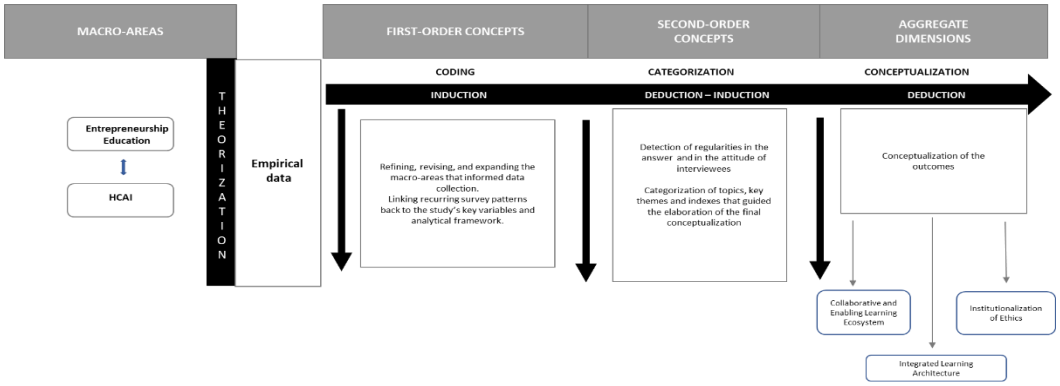
Data were analyzed following Gioia et al. (2013). Each author independently interpreted all answers to ensure validity and accuracy. The dataset comprised unstructured textual responses on career expectations, desired skills, long-term goals, ethical concerns, learning preferences, entrepreneurial intentions, and support needs. The survey served both as outreach and as a needs-assessment tool to align program development with student expectations.

Coding phase followed an inductive approach, linking raw data to theory (EE and HCAI). Independent coding ensured data triangulation.

Categorization phase employed a deductive-inductive process. First, open coding generated first-order terms close to participants' language. Through constant comparison and iterative discussion, these were clustered into second-order themes reflecting researcher-centric interpretation and theoretical sensemaking.

Conceptualization phase used a deductive approach to extract aggregate dimensions. This yielded three higher-order pillars of program architecture, Integrated Learning Architecture, Institutionalization of Ethics, Collaborative and Enabling Learning Ecosystem, which reaggregated second-order categories and were reconnected to key macro-challenges for EE in the HCAI era (Stutz & Sachs, 2018).

Fig. 2: Different phases of Gioia Methodology



Source: our elaboration

This process provides the Gioia data structure as an audit trail from raw evidence to theory (Gioia et al., 2013; Corbin & Strauss, 2015). Throughout the analysis, we used prior theory as sensitizing concepts, guiding attention without forcing pre-existing categories onto the data, until a stable structure emerged (Pratt, 2009). To enhance trustworthiness, we maintained an explicit chain of evidence linking representative quotations to first-order terms, second-order themes, and aggregate dimensions, and we iteratively refined the coding scheme through theme-based comparison and reconciliation (Miles et al., 2018). We also conducted reflexive checks to ensure that theoretical framing (e.g., HCAI, ethics-by-design, ecosystem embeddedness) informed interpretation without displacing informant-centric meanings (Gioia et al., 2013).

4.4 Connecting data and theory

The resulting model is a Holistic Entrepreneurship Education Program Architecture, that reflects a grounded yet theoretically connected account of how respondents understand the design principles, ethical infrastructure, and ecosystem conditions required to educate responsible HCAI-oriented entrepreneurial leaders (Gioia et al., 2013; Eisenhardt,1989; Langley,1999; Pratt,2009; Corbin & Strauss,2015; Miles et al.,2018). Systematic evidence in the literature shows the need of new learning contents (Passarelli & Bongiorno, 2025; Fayolle & Gailly, 2015; Mwasalwiba, 2010; Lackéus, 2014), that match technical topics with managerial tools: *«I expect sessions on entrepreneurship and project management. I hope to acquire both technical and soft skills required to build responsible and scalable AI systems. »*

Moreover, a sustained shift toward innovative teaching methods that privilege practice, action, and iterative learning over purely conceptual transmission emerges (Neck & Greene, 2011). Some suggested methods include: workshops, lectures, collaborative group works, project-based learning, case studies / real world problem solving, individual work / projects, interactive discussions, peer learning, seminars / conferences, internships, prototyping, guided tutorials, industry exposure, hackathons. Students show a strong preference for real-world, experience-based courses: *«I prefer a combination of hands-on learning and real-world problem solving. I find that practical experience helps solidify theoretical concepts. I appreciate a balanced approach that includes both structured lessons and opportunities for independent research and exploration. »*

The empirical analysis indicates a reorientation toward capability development, drawing on experiential, project-based, and competency-based designs that emphasize learning-by-doing and iterative action (Adesola et al., 2019; Heinonen & Ilonen, 2025; Klapper & Farber, 2016; Boldureanu et al., 2020; Westhead & Solesvik, 2016). Thus, the "about/for/through" typology appears particularly influential because it clarifies whether a course prioritizes conceptual understanding, preparation for entrepreneurial tasks, or practice-based enactment of entrepreneurial processes, through HCAI, supporting constructive choices about pedagogy and assessment. Consistent with this framing, programs should increasingly adopt interdisciplinary curricula, problem and challenge-based formats, team-based venture work, and design thinking to develop opportunity recognition, innovation behaviors, and execution capability (Baron & Tang, 2011; Linton & Klinton, 2019). Evidence indicates also the necessity of a student-centered design and the implementation of a real-world problem solving that tends to yield stronger entrepreneurial competence development and sustained engagement than lecture-dominant formats (Eustachio et al., 2025). Moreover, also the ecosystem-embedded learning (Gibb, 2002; Kazakeviciute et al., 2016; Rae, 2010) appears relevant. These challenges are amplified as EE expands beyond business schools into engineering and science contexts, where generic entrepreneurship modules may misalign with discipline-specific learning needs and with the development of cross-functional collaboration, managerial judgement, and innovation-oriented soft skills (Amalia & von Kortzfleisch, 2021). Collectively, these results position EE curriculum design not as a matter of content listing, but as a coherence problem, aligning new technologies, learning activities, technologies, new teaching methods requiring systematic yet context-sensitive design approaches and evaluation strategies capable of capturing both learning processes and sustained capability development, embedding an ethical approach (Nabi et al., 2017;

Ratten & Jones, 2021).

Respondents conceptualize skills development as a dual competence stack (Bandura, 1997). On one side, they emphasize socio-emotional and relational capabilities (emotional awareness, communication, teamwork, and "being more human"), suggesting that effective AI work requires interpersonal and human-centered sensitivity. On the other side, they highlight problem-solving, analytical reasoning, and applied machine learning skills aimed at addressing real-world problems. Together, these accounts portray an HCAI-ready profile where technical mastery is inseparable from human-facing competence: *«I want to strengthen my technical skills in areas like machine learning, natural language processing, and human-computer interaction. But just as importantly, I hope to develop a deeper understanding of ethics in AI, like how to identify bias in data, design fair algorithms, and build systems that are transparent and explainable. I'm really looking to become someone who can create AI that's not just powerful, but also responsible and user-focused. I hope to acquire Problem solving skills, analytical skills, logical thinking and applications to solve real world problems with AI. »*

The integration of HCAI into venture creation process stimulates also a concrete curriculum design challenge; thus, programs must prepare students not only to innovate with HCAI, but to do so in ways that anticipate problems, calibrate trust, and sustain legitimacy under increasing scrutiny (Shneiderman, 2020).

The result shows another aspect related to interdisciplinary. Responders see it as a purposeful integration of domains (Passarelli and Bongiorno, 2025) (Ethics, education, healthcare, entrepreneurship, finance, marketing, law, policy-making, communication), that lead human-centered, explainable, and responsible AI: *«On the long run the interdisciplinary nature of the program, especially its emphasis on ethics, transparency, and user-centered AI, aligns well with my interests in building explainable AI systems and personalized recommender technologies. I would like to see more opportunities for interdisciplinary collaboration with fields like psychology, sociology, and ethics, enabling a deeper understanding of human factors in AI design. »* Respondents have a strong attention to the "human aspects". Specifically, they articulate an anthropocentric view of HCAI in which model accuracy is necessary but insufficient. They emphasize transparency and accountability as prerequisites for trust, and they frame ethical alignment with human values as a core design requirement. In parallel, they describe human–AI collaboration as an augmentation logic, where AI should support rather than replace human decision-making, thereby preserving human agency. This orientation implies curricular needs that integrate AI foundations with ethics/policy and human factors (including emotions and trust dynamics), positioning trust as a designable outcome rather than a by-product: *«I believe it's crucial to not only develop accurate models but also ensure they are transparent, accountable, and aligned with human values. Course should cover not only AI and AI ethics and policies aspects but also human aspects, like Human emotions and its alignment with AI. I believe the integration of explainable AI and the development of robust, ethical AI frameworks for real-world applications are often. »*

The analysis highlights the ethics-by-design traditions where the values including fairness, privacy, autonomy, and inclusion should be systematically translated into design requirements through conceptual, empirical, and technical investigations, rather than appended as standalone discussions (Béchard & Grégoire, 2005; Igwe et al. ,2021; OECD AI Principles, 2019).

Open-ended responses focus also on the external support: *«From the incubator, I would expect a supportive environment that offers both mentorship and practical resources to help bring ideas to life. This includes access to experienced advisors, both academic and industry experts, who can guide the development of ethically sound and user-focused AI solutions. »*, specifically, they reveal a consistent expectation that the university incubator should function as a full-stack enablement platform rather than a symbolic entrepreneurship space. Participants repeatedly describe the need for mentorship (from both industry experts and researchers) to guide project development, troubleshoot technical and organizational barriers, and navigate uncertainty during early-stage innovation work. In parallel, they emphasize access to technical resources, notably computing infrastructure,

specialized tools, and datasets, as a prerequisite for building and testing HCAI solutions.

Respondents also frame the incubator as a broker of social capital, expecting structured networking opportunities that connect them with potential collaborators, investors, and external stakeholders. Beyond technical and relational resources, they explicitly request support for funding and business development (e.g., fundraising guidance, venture development support), as well as financial and legal assistance, implicitly pointing to needs around intellectual property, compliance, contracts, and venture formalization (Bandera and Thomas, 2017). Finally, several accounts indicate a demand for capability-building formats such as workshops on entrepreneurship, project management, and ethical AI practices, suggesting that students interpret incubator participation as professional formation oriented toward real-world implementation: *«I would expect the incubator to offer mentorship from experts, access to tools and resources, networking opportunities and help with funding and business development to support my ideas or projects. I would expect the incubator to provide mentorship from industry experts and researchers to guide project development and help navigate challenges. Access to technical resources and tools, such as computing infrastructure and datasets, would be crucial. I expect support with networking opportunities to connect with potential collaborators, investors, and stakeholders is also important.»*

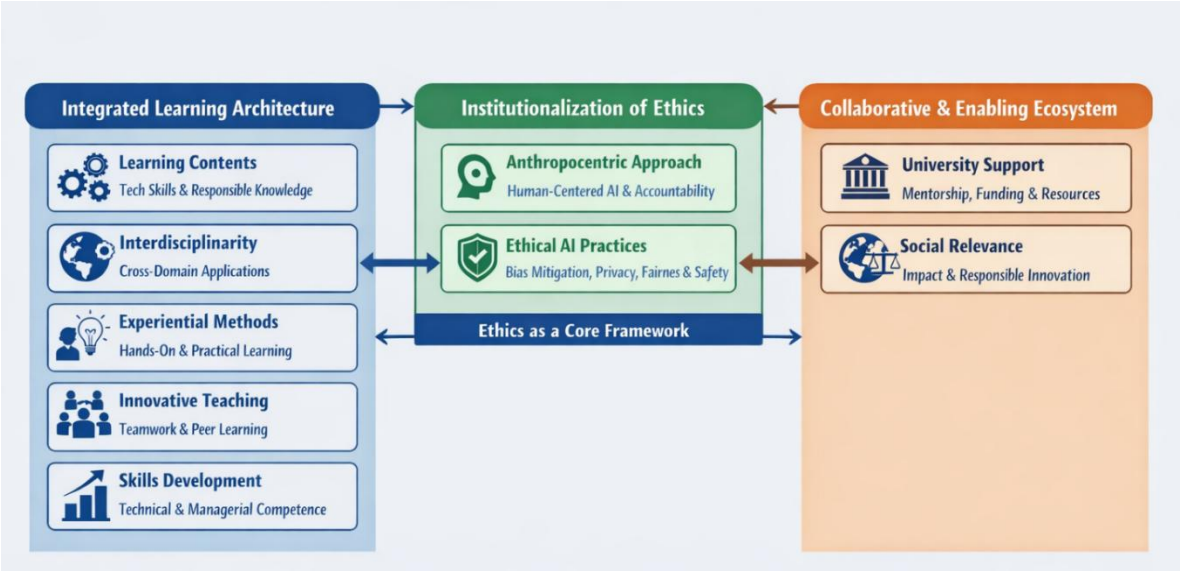
These support expectations are closely tied to participants' longer-term aspirations. While some respondents' position incubator participation as a pathway to collaborate with innovative firms on applied AI and digital engineering projects, others explicitly articulate a future goal of founding ventures that address societal challenges. This connection indicates that students envision the incubator as an institutional mechanism that reduces resource scarcity, accelerates learning-by-doing, and strengthens legitimacy through industry exposure and partnerships: *«I aim to collaborate with innovative companies, contributing to impactful AI and digital engineering projects. In the long term, I aspire to start my own venture focused on creating technology solutions that address societal challenges and improve lives.»*

Alongside support expectations, the data also highlight a strong social relevance orientation in how respondents frame HCAI applications. Participants frequently identify healthcare, education, and public policy as priority domains, emphasizing that these contexts directly affect people's lives and therefore require human-centered design choices. They associate HCAI's value with improvements in decision-making quality, accessibility, and personalized support, portraying human-centered AI not merely as a technical approach but as a societal commitment to usability, inclusion, and meaningful impact. Taken together, these responses suggest that an HCAI-ready program and its incubator ecosystem are evaluated by students through a dual lens: the availability of institutional and ecosystem resources that enable project execution and venture formation, and the degree to which projects can be oriented toward tangible human and societal outcomes: *«I am especially interested in the application of human-centered AI in healthcare, education, and public policy. These fields have a direct impact on people's lives. I believe that AI systems designed with a human-centered approach can improve decision-making, accessibility, and personalized support.»*

5. Discussion

The qualitative analysis shows that Human-Centered AI (HCAI) plays a crucial role in Entrepreneurship Education Programs (EEPs) by creating a Holistic Entrepreneurship Education Program Architecture (HEEPA) for shaping a new generation of responsible leaders. HEEPA is a structure built on three main pillars (Aggregate Dimensions): *Integrated Learning Architecture, Institutionalization of Ethics, and Collaborative and Enabling ecosystem*.

Fig. 3: HEEPA Architecture



Source: our elaboration

In line with the Gioia findings, the constructs grouped under the *Integrated Learning Architecture* pillar are reflected in five second-order categories: learning contents, interdisciplinarity, experiential methods, innovative teaching, and skills development, which collectively portray an "HCAI-ready" EEP as a coherent learning architecture rather than a mere bundle of courses (Passarelli & Bongiorno, 2025; Fayolle & Gailly, 2015; Landström et al., 2022; Neck & Greene, 2011; Kolb, 1984; Schön, 1983; Bandura, 1997; Pittaway & Cope, 2007; Rasmussen & Sørheim, 2006; Guerrero et al., 2020; Spigel, 2017). Respondents describe a deliberate alignment between content, pedagogy, and professional formation. The curriculum is anchored in a robust technical and conceptual base, while simultaneously integrating responsibility-related knowledge and entrepreneurial tools. In this framing, "being HCAI-ready" entails the capacity to work with both the capabilities and the constraints of AI systems. Interdisciplinarity is emphasized through application arenas where trade-offs and contextual complexity become visible. Pedagogically, respondents privilege experiential and practice-based formats that resemble real innovation work, implying that HCAI competence develops through iterative cycles of problem framing, design choices, testing, and evaluation under constraints. They also stress that innovative teaching extends learning beyond individual mastery into relational and collective processes. Finally, skills development is described as a "professional stack" that bridges technical implementation and managerial responsibility, positioning the EEP as a pipeline for translating, governing, and operationalizing AI in organizational settings.

The second pillar, *Institutionalization of Ethics*, is grounded in ethics-by-design priorities and human-centeredness (OECD AI Principles, 2019; Igwe et al., 2021; Shneiderman, 2020; ISO 9241-210; Parasuraman et al., 2000). Two second-order categories dominate respondents' accounts. The Anthropocentric approach foregrounds, and a strong concern with avoiding overreliance. The focus is not simply usability, but safeguarding human agency and judgment while maintaining alignment with responsibility expectations. The Application of Ethical AI translates this orientation into concrete requirements, treating ethics as an engineering and governance challenge as much as a philosophical one. Accordingly, respondents argue that it is insufficient to add a standalone "AI ethics" module to an otherwise technical curriculum: ethics must function as an infrastructure and a guiding logic shaping design, evaluation, legitimation, and responsibility allocation, particularly in relation to GenAI and cognitive offloading risks.

Finally, constructs associated with the *Collaborative and Enabling Learning Ecosystem* pillar, ecosystem embeddedness and institutional resources, as well as social relevance in terms of labor

impacts, inequality, and policy, align with the Gioia categories of university support and social relevance (Etzkowitz, 2003; Belitski & Heron, 2017; Clark et al., 2021; Lindner, 2018; Tesfayohannes & Driscoll, 2010; Acemoglu & Restrepo, 2019). Respondents emphasize that capability-building requires institutional scaffolding treated as integral to the learning-to-implementation pipeline rather than peripheral support. Social relevance is framed as an explicit orientation toward impact and long-term consequences. In this view, an HCAI-ready EEP is evaluated not only by technical outputs or entrepreneurial intent, but by its capacity to generate solutions that are legitimate, accountable, and aligned with public value.

Within this perspective, "HCAI" is treated as a pedagogical design rather than simply "using AI tools" in class. The core idea is that HCAI can work as an ethical learning enactor in EEPs.

6. Conclusions

The paper advances the discourse on Entrepreneurship Education (EE) by proposing and empirically grounding a framework for integrating Human-Centered Artificial Intelligence (HCAI). It demonstrates that HCAI's role extends beyond being a mere pedagogical tool or a subject domain; it acts as a transformative design logic for constructing holistic educational architectures. The resulting model, the Holistic Entrepreneurship Education Program Architecture (HEEPA), posits that educating responsible, AI-savvy entrepreneurial leaders requires the simultaneous and interdependent development of three pillars: Integrated Learning Architecture, Institutionalization of Ethics and Collaborative and Enabling Learning Ecosystem The paper argues that "HCAI readiness" in entrepreneurship is not achieved by adding AI modules to existing courses but by re-engineering programs where ethical reasoning and human control are enacted through entrepreneurial practice itself. This approach ensures that the next generation of entrepreneurs is equipped not only to build with AI but to do so in a manner that is trustworthy, accountable, and aligned with broader societal well-being, thereby fulfilling the core promise of human-centered innovation (Matricano, Vesci, Passarelli, 2026).

7. Implications, limitations and further research

The analysis yields critical insights and implications for universities and policymakers, while positioning HCAI as a new frontier for entrepreneurship education research.

Graduates increasingly need HCAI-enabled capabilities, data analysis, intelligent marketing, AI-supported finance, and strategic decision-making. Embedding HCAI in EEPs can strengthen innovative capacity and translate ideas into testable solutions (Chen et al., 2024; Somià & Vecchiarini, 2024, 2023), support core entrepreneurial routines (Thanasi-Boçe & Hoxha, 2024), and reinforce transversal competencies: communication, teamwork (Benhayoun & Lang, 2021; Samanthi & Gooneratne, 2023), leadership (Xu et al., 2022), lifelong learning (Akhtar et al., 2024; Dimes & De Villiers, 2021, problem-solving (Kurtzke & Setkute, 2021), reflective and critical thinking (Dimes & De Villiers, 2021; Bell & Bell, 2023; Brabete et al., 2024; Sollosy & McInerney, 2022), relationship management and analytical/creative thinking (Cardon et al., 2024). This demands curricula that intentionally couple technical, entrepreneurial, and ethical outcomes within a multidisciplinary architecture. Crucially, integration is not merely tool-additive: it requires pedagogical redesign where human agency and ethics-by-design shape learning activities, assessment, and project governance.

For policymakers, advancing HCAI-ready EE requires investment beyond curricula: strengthening university incubators and translational hubs (computing, data, prototyping, mentoring), funding interdisciplinary networks linking students with firms, public institutions, and civil society, and developing ethical governance frameworks (standards, audit, regulation) embeddable in education

and scalable to real-world deployment. Practical instruments, targeted grants, industry–university vouchers, challenge-based pilots, ethics-by-design incentives, can lower barriers and operationalize HCAI principles beyond the classroom, fostering innovation that is both competitive and socially legitimate.

The study has limitations that also open promising directions for future research. The qualitative single-case design (specific HCAI program in Germany) limits generalizability; learner perceptions were captured at one point in time, leaving long-term effects on entrepreneurial behavior, venture outcomes, and ethical practice untested. Future research should adopt longitudinal, cross-cultural designs with larger, more diverse samples across educational stages and national contexts to systematically compare perceptions, trace capability development, and evaluate sustained impacts on ethical reasoning, venture creation, and professional practice.

Appendix 1: Different phases of Gioia analysis

Aggregate dimension: **Integrated Learning Architecture**		
2nd order	***1st order***	***Raw data***
Learning Contents	*UI/UX design, social impact assessment, different AI models, prompt engineering, real life applications, LLMs modelling, gen AI, risk analysis and management, bias detection, Canvas, design thinking, Project Management, bridging technical AI and business intelligence, IP, Using AI in Product development via Agile methodologies, Risk management, decision support, Interdisciplinary and Economic thinking, Investing strategies*	*I expect sessions on entrepreneurship and project management* *I hope to acquire both technical and soft skills required to build responsible and scalable AI systems.*
Experiential methods	*Workshops* *Lectures* *Collaborative group works* *Project-based learning* *Case studies / Real world problem solving* *Individual work / projects* *Interactive discussions* *Peer learning* *Seminars / Conferences* *Internships* *Prototyping* *Guided tutorials* *Industry exposure* *Hackathons* *Weekly assignments* *Visual cues* *Interactive simulations* *Lab sessions* *Collaborative group works, peer learning, interactive discussions*	*I prefer a combination of hands-on learning and real-world problem solving.* *I find that practical experience, such as coding exercises and case studies, helps solidify theoretical concepts.* *I appreciate a balanced approach that includes both structured lessons and opportunities for independent research and exploration.* *I prefer collaborative work and discussions also enhance my understanding.* *I value diverse perspectives and peer learning.*
Skills development	*Importance of human emotions, soft skills, Team work and communication skills*	*Skills needed to be more like a human being and less like a compulsive instinctive creature.* *I hope to acquire Problem solving skills, analytical skills, logical thinking, machine learning methods and applications to solve real world problems with AI.*
Interdisciplinarity	*Ethics, education, healthcare, entrepreneurship, finance, marketing, law, policy-making, communication*	*On the long run the interdisciplinary nature of the program, especially its emphasis on ethics, transparency, and user-centered AI, aligns well with my interests in building explainable AI*

		systems and personalized recommender technologies. *I would like to see more opportunities for interdisciplinary collaboration with fields like psychology, sociology, and ethics, enabling a deeper understanding of human factors in AI design.*
Aggregate dimension: **Institutionalization of Ethics**		
2nd order	***1st order***	***Raw data***
Anthropocentric approach	*Human-AI trust, AI and emotional intelligence, human-AI collaboration*	*I believe it's crucial to not only develop accurate models but also ensure they are transparent, accountable, and aligned with human values.* *I'm also fascinated by how AI can be designed to collaborate with people—augmenting rather than replacing human decision-making.* *These areas of HCAI excite me because they focus on building systems that earn user trust and have a meaningful, ethical impact on society.* *Course should cover not only AI and AI ethics and policies aspects but also human aspects, like Human emotions and its alignment with AI, etc*
Ethical AI practices	*Impact assessment, explainable AI, practical implementation, transparency and fairness, inclusion, compliance with AI principles*	*I believe the integration of explainable AI and the development of robust, ethical AI frameworks for real-world applications are often underestimated.* *Some aspects should be emphasized to ensure transparency, fairness, and trust in AI systems.*
Aggregate dimension: **Collaborative and enabling Ecosystem**		
2nd order	***1st order***	***Raw data***
University support	*Mentorship, networking opportunities, access to technologies and resources, funding opportunities, financial and legal assistance, internship and collaboration with firms*	*I would expect the incubator to offer mentorship from experts, access to tools and resources, networking opportunities and help with funding and business development to support my ideas or projects.* *I would expect the incubator to provide mentorship from industry experts and researchers to guide project development and help navigate challenges. Access to technical resources and tools, such as computing infrastructure and datasets, would be crucial.*

		I expect support with networking opportunities to connect with potential collaborators, investors, and stakeholders is also important. *I aim to collaborate with innovative companies, contributing to impactful AI and digital engineering projects. In the long term, I aspire to start my own venture focused on creating technology solutions that address societal challenges and improve lives.*
Social relevance	*Consciousness, social responsibility, practical applications*	*I am especially interested in the application of human-centred AI in healthcare, education, and public policy. These fields have a direct impact on people's lives.* *I believe that AI systems designed with a human-centred approach can improve decision-making, accessibility, and personalized support*

Source: our elaboration

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Strategic Sensing under VUCA Conditions: A Critical Reflection on Forecasting, Anchoring Bias, and Agentic AI

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Abstract

Frame of the research. Contemporary organizations increasingly operate under persistent VUCA conditions, where volatility, uncertainty, complexity and ambiguity undermine predictive approaches to strategy. Despite advances in analytics and artificial intelligence, organizations continue to experience delayed adaptation, interpretive rigidity and systematic decision biases, particularly in relation to forecasting practices and strategic sensing.
Purpose of the paper. This paper critically examines how the emergence of agentic AI reconfigures the relationship between forecasting systems, anchoring mechanisms and strategic sensing under persistent VUCA conditions, challenging dominant assumptions that advanced AI primarily improves prediction or mitigates cognitive bias.
Methodology. The study adopts a theory-informed critical reflection approach, integrating and problematizing insights from strategic management, dynamic capabilities, behavioural strategy, forecasting research and emerging literature on agentic AI to develop a diagnostic conceptual framework.
Results. The paper conceptualizes strategic sensing as a hybrid human–AI and tension-filled process in which agentic systems become constitutive elements of sensing. Rather than eliminating anchoring, agentic AI redistributes and reshapes cognitive and algorithmic constraints, generating persistent tensions between prediction and interpretation, speed and reflection, autonomy and control, and learning and lock-in.
Research limitations. As a critical reflection, the study does not provide empirical validation or causal testing and focuses on organizational-level strategic sensing, leaving broader institutional and regulatory dimensions unaddressed.
Managerial implications. Managers are encouraged to rethink decision architectures and governance arrangements, focusing less on predictive optimization and more on preserving interpretive flexibility and collective sensemaking within hybrid human–AI sensing systems.
Originality of the paper. The paper offers a novel reframing of forecasting and agentic AI as interpretive infrastructures shaping strategic meaning, rather than as purely technical solutions to uncertainty.

Keywords: *Strategic sensing, Agentic artificial intelligence, VUCA environments, Anchoring bias, Dynamic capabilities, Strategic Sensemaking*

1. Introduction

Management research has long conceptualized forecasting as a technical support function aimed at informing decision-makers through probabilistic estimates of future outcomes (Trapero et al., 2010; Fahiminia et al., 2022). Within this paradigm, strategy has traditionally been framed as the deliberate effort of organizations to secure long-term advantage by committing to coherent courses of action and resisting short-term pressures (Adner, 2017). Classical definitions emphasize positioning and internal coherence: Porter (1996), for instance, defines strategy as the creation of a unique and valuable position grounded in a system of interlocking activities. Such analytical conceptions implicitly assume environments characterized by relative stability, interpretable cause–effect relationships, and uncertainty that can be progressively reduced through improved analysis.

These assumptions have become increasingly untenable. Contemporary competitive environment is marked by demand volatility, technological disruption, geopolitical instability, and recurrent external shocks, conditions under which uncertainty is not episodic but structural. The concept of VUCA, volatility, uncertainty, complexity, and ambiguity, has emerged as a dominant framework to capture this shift (Green et al., 2019; Sari et al., 2023). Under uncertain and volatile

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conditions, future states are unstable, non-linear, and subject to sudden regime shifts, limiting the strategic value of forecasting when it is treated solely as a predictive exercise.

In response, management research has emphasized agility, adaptability, and learning-oriented cultures as key organizational responses to complex environments. Transformational leadership has been proposed as a mechanism to foster collective sensemaking and adaptability (Malik, 2023), while organizational agility and flexible structures are viewed as prerequisites for timely strategic adjustment (Zhang, 2024; Kayyali, 2025; Kaivo-oja and Lauraéus, 2018). Yet, despite unprecedented access to data, computational power, and advanced analytics, firms continue to experience systematic forecasting failures, delayed strategic responses, and persistent decision biases.

This paradox suggests that the core challenge is not the absence of information or analytical sophistication, but the way in which forecasts are interpreted, anchored, and incorporated into strategic reasoning. Recent advances in artificial intelligence, particularly the emergence of agentic AI, further complicate this landscape. While agentic systems promise autonomy, adaptive learning, and continuous environmental interaction (Hossaini and Seilani, 2025; Raptis et al., 2025), their implications for strategic sensing under VUCA conditions remain under-theorized.

Accordingly, this paper does not ask whether agentic AI improves forecasting accuracy or resolves cognitive bias. Instead, it critically examines how the introduction of agentic AI reconfigures the relationship between forecasting, anchoring mechanisms, and strategic sensing under persistent ambiguous conditions.

Despite the growing literature on dynamic capabilities, behavioural strategy, and artificial intelligence, these streams have largely evolved in parallel. Dynamic capabilities research has remined predominantly human-centric, focusing on managerial cognition or organizational routines (Teece, 2018), while forecasting research has emphasized predictive accuracy over interpretive effects (Trapero et al., 2010). At the same time, emerging studies on agentic AI have primarily focused on performance, autonomy, and governance without fully integrating these systems into theories of strategic capability (Hosseini and Seilan, 2025).

This paper contributes by bridging these streams and advancing a critical reframing of strategic sensing as a hybrid human-AI process, in which forecasting systems and agentic AI jointly shape interpretation under VUCA conditions.

2. VUCA and the Limits of Predictive Strategy

The VUCA framework captures environments in which volatility, uncertainty, complexity, and ambiguity jointly undermine linear planning and predictive control (Green et al., 2019). Unlike traditional risk-based settings, VUCA environments are characterized by unstable distributions, non-stationary dynamics, and weak or delayed feedback loops (Sari et al., 2023). In such contexts, additional data or more sophisticated models do not necessarily improve strategic sensing, as the underlying structure of the environment itself is subject to change.

This poses a fundamental challenge to traditional strategic frameworks, which treat uncertainty as a temporary obstacle to be managed through analysis, forecasting, and optimization. Even adaptive and learning-oriented approaches often retain an implicit belief that improved sensing will eventually converge toward more accurate representations of the future (Mintzberg, 1994; Wolf and Floyd, 2017). Ambiguous conditions problematize this belief by rendering the future partially indeterminate and endogenously shaped by strategic action itself.

In response, management research has increasingly focused on organizational agility and adaptive capacity as strategic imperatives. Transformational leadership (Malik, 2023), flexible organizational structures (Kayyali, 2025), and learning-oriented cultures (Kaivo-oja and Lauraéus, 2018) are frequently proposed as mechanisms to cope with volatility and uncertainty. However, these prescriptions often overlook the cognitive processes through which uncertainty is interpreted and

acted upon, implicitly assuming that better leadership or culture will translate into better strategic sensing.

Under these conditions, the problem of strategy shifts from predicting future states to continuously revising interpretations of evolving environments. It is precisely within this shift that the role of forecasting, cognition, and AI must be reconsidered.

3. Forecasting, Strategic Capabilities, and Anchoring Bias

Within strategic management, forecasting is typically associated with the *sensing* component of dynamic capabilities (Teece, 2007; 2018). Forecasts are expected to support strategic decision-making by identifying trends, anomalies, and emerging opportunities (Nguyen et al., 2021). However, behavioural strategy research highlights a critical tension: forecasts do not merely inform decisions; they also structure cognition.

Anchoring bias leads decision-makers to rely disproportionately on initial information or reference points, adjusting insufficiently as new data emerge (Furnham et al., 2012; Rastogi et al., 2020). Under VUCA conditions, this bias is amplified rather than attenuated, as ambiguity and complexity increase reliance on simplified mental models (Dhakal and Lamsal, 2023). Emotional states further influence anchoring, affecting how individuals interpret and update forecasts (Jung and Young, 2019).

Importantly, predicting systems themselves can become sources of anchoring (Campbell and Sharpe, 2009; Kusev et al., 2018). When their outputs are treated as authoritative representations of the future, they reinforce cognitive rigidity and delay strategic revision (Kusev et al., 2018). In this sense, forecasting is not a neutral input into strategic capabilities, but an active force shaping sensemaking and interpretation. Rather than enabling adaptation, forecasts may contribute to lock-in, particularly when organizations operate under persistent uncertainty (Campbell and Sharpe, 2009).

This tension becomes particularly critical when forecasting systems are embedded in increasingly automated and AI-driven decision environments, where anchors may be reinforced not only cognitively but also algorithmically.

4. The Emergence of Agentic AI: A Qualitative Shift

Recent advances in artificial intelligence introduce a qualitative shift in this dynamic. Agentic AI systems, distinct from generative AI, which primarily produces outputs in response to promts, are characterized by autonomous goal pursuit, adaptive learning, and continuous interaction with their environment (Hossaini and Seilani, 2025; Raptis et al., 2025). Unlike traditional decision-support or generative AI systems, agentic AI does not operate episodically in response to managerial queries; it persistently monitors signals, updates internal representations, and initiates actions. For istance, in data-intensive organizational settings, agentic systems can continuously monitor multiple streams of internal and external signals, dynamically prioritize emerging patterns, and trigger revisions in strategic attention without direct human intervention.

These properties have profound implications for strategic sensing. Forecasting systems endowed with agentic capabilities no longer function solely as informational inputs; they actively shape the temporal structure of decision-making by sustaining attention, prioritizing signals, and prompting revisions of strategic interpretations (Garg, 2025).

However, recent research cautions against solutionist interpretations of agentic AI. Under VUCA conditions, future states remain partially unknowable and subject to endogenous change. As Townsend et al. (2024) argue, attempts to render such futures fully computable risk overlooking the irreducible uncertainty inherent in complex adaptive systems. Within this context, agentic AI may

externalize, multiply, or accelerate anchoring mechanisms rather than eliminate them, producing new forms of *algorithmic anchoring* (Carter and Liu, 2025) and interpretive lock-in.

5. Strategic Sensing as a Hybrid, Tension-Filled Process

Strategic sensing under persistent VUCA conditions can be conceptualized as a circular, non-linear and hybrid process in which human interpretation and agentic AI jointly construct strategic meaning (Figure 1). The circular structure reflects the absence of a stable decision endpoint and emphasizes that, in volatile, uncertain, complex and ambiguous environments, strategic sensing unfolds as a continuous process of interpretation rather than as a sequence of analytical steps leading to optimized choices.

At the core of the framework lies strategic sensing as a hybrid human–AI capability. Human interpretation and agentic AI are represented as co-present and interconnected components of the same sensing process, rather than as separate or hierarchical actors. This representation reflects the growing interdependence between managerial judgment, experience and sensemaking on the one hand, and autonomous monitoring, adaptive learning and signal prioritization performed by agentic systems on the other (Hossaini and Seilani, 2025; Raptis et al., 2025; Garg, 2025). Strategic sensing therefore emerges from their continuous interaction, not from the substitution of human cognition with artificial agency.

In this context, forecasting models and foresight practices are positioned as inputs that feed the strategic sensing process rather than as mechanisms that directly generate strategic decisions. Forecasting systems, whether statistical or machine-learning-based, provide structured expectations about possible future developments, supporting the sensing component of dynamic capabilities (Teece, 2007; 2018; Nguyen et al., 2021). Foresight and sensemaking practices complement these analytical inputs by fostering interpretive revision, alternative framing and collective reflection on emerging futures (Fergnani, 2022). Their role is therefore not to reduce uncertainty, but to sustain the continuous reconstruction of strategic meaning under conditions in which environmental change remains partially indeterminate.

Anchoring mechanisms are a transversal field permeating both human interpretation and agentic AI. They do not disappear in hybrid sensing systems, but are redistributed across human and algorithmic components. Behavioural research demonstrates that decision-makers tend to rely excessively on initial forecasts and historical reference points (Furnham et al., 2012; Rastogi et al., 2020; Dhakal and Lamsal, 2023), while emotional states further shape how anchors are adopted and revised (Jung and Young, 2019). At the same time, agentic systems may introduce algorithmic reference points that stabilize expectations and prioritization schemes, potentially generating new forms of algorithmic anchoring and interpretive lock-in (Townsend et al., 2024). In this regard, anchoring can be visualized as a persistent cognitive and computational constraint that operates and can be nourished across the entire sensing process.

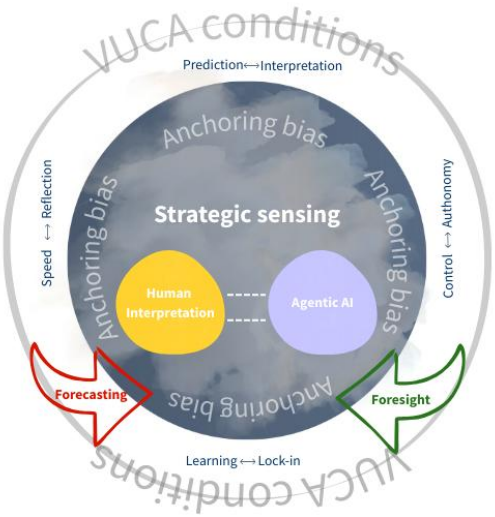


Figure 1 - Strategic sensing under VUCA conditions as a hybrid, tension-filled process.

The figure conceptualizes strategic sensing as a circular and non-linear hybrid human–AI process embedded in persistent VUCA conditions (volatility, uncertainty, complexity and ambiguity). Human interpretation and agentic AI jointly construct strategic meaning within a shared sensing core, while forecasting models and foresight practices feed the process as complementary analytical and interpretive inputs rather than as direct drivers of strategic decisions. Anchoring mechanisms, both human and algorithmic, permeate the entire sensing process, reshaping the locus of cognitive constraint rather than eliminating bias. The framework highlights four persistent tensions that structure hybrid strategic sensing under VUCA conditions: prediction versus interpretation, speed versus reflection, autonomy versus control, and learning versus lock-in.

The framework highlights four persistent tensions that structure hybrid strategic sensing under VUCA conditions:

1. **Prediction versus interpretation**. While forecasting systems are designed to improve predictive representations of the future, strategic sensing increasingly depends on the ability to reinterpret signals, anomalies and deviations as they unfold. The strategic value of forecasting thus lies less in accuracy and more in its capacity to stimulate interpretive revision;
2. **Speed versus reflection**. Agentic AI enables continuous monitoring and rapid updating of expectations, but accelerated sensing cycles may limit opportunities for deliberate reflection and collective sensemaking. Under persistent uncertainty, faster sensing does not necessarily translate into more adaptive strategy;
3. **Autonomy versus control**. Agentic systems increasingly initiate monitoring, prioritization and alerting activities without direct human intervention. While this autonomy expands organizational sensing capacity, it simultaneously raises questions about managerial oversight, accountability and the governance of interpretive processes;
4. **Learning versus lock-in**. Hybrid sensing systems may support adaptive learning by enabling recursive updating and exposure to weak signals. However, both human and algorithmic anchors may stabilize dominant interpretations, producing path dependencies and reinforcing existing strategic frames.

Taken together, these tensions indicate that agentic AI does not resolve the fundamental challenges of strategic sensing under VUCA conditions. Instead, it reshapes the temporal structure, cognitive architecture and governance of sensing processes. Strategic capability therefore lies not in eliminating uncertainty or bias, but in sustaining interpretive openness in the presence of persistent human and algorithmic anchors and in managing the tensions that inevitably emerge within hybrid human–AI sensing systems (Fergnani, 2022; Mussweiler et al., 2000).

6. Theoretical implication

This critical reflection contributes to management and strategy research by challenging three deeply embedded assumptions concerning forecasting, strategic capabilities and the role of artificial intelligence under persistent VUCA conditions.

First, the paper questions the dominant treatment of forecasting as a primarily predictive and instrumental input to strategic decision-making. By conceptualizing forecasts as interpretive artefacts that actively structure managerial attention, expectations and sensemaking processes, it shifts the analytical focus from accuracy and model performance to the cognitive and organizational effects of forecasting systems (Trapero et al., 2010; Fahiminia et al., 2022). This perspective complements and extends existing forecasting research by foregrounding how analytical outputs participate in the construction of strategic meaning rather than merely supporting it.

Second, the paper problematizes the largely human-centric orientation of dynamic capabilities theory by reinterpreting strategic sensing as a hybrid and distributed capability emerging from the continuous interaction between human judgement and agentic systems. While dynamic capabilities research has traditionally emphasized managerial cognition and organizational routines as the primary foundations of sensing, seizing and transforming (Teece, 2018; Eisenhardt and Martin, 2017), the framework developed here highlights how artificial agency becomes constitutive of sensing processes themselves, thereby calling for a reconsideration of how strategic capabilities are conceptualized and theorized in digitally augmented organizations.

Third, the paper challenges prevailing managerial and technological narratives that portray agentic AI as a means to overcome uncertainty and mitigate cognitive biases. Building on recent critiques of computable futures and algorithmic rationality (Townsend et al., 2024), it advances a more ambivalent view of agentic systems, showing how they may simultaneously enable continuous environmental monitoring and reinforce new forms of cognitive and algorithmic anchoring under VUCA conditions. In doing so, the paper contributes to a more critical and theoretically grounded understanding of artificial intelligence in strategy, moving beyond solution-oriented accounts toward an interpretation of AI as a structural component of contemporary strategic sensemaking.

7. Practical implication

Rather than offering prescriptive guidance, this paper encourages managers to critically reflect on how contemporary decision architectures shape strategic interpretation under persistent VUCA conditions. In particular, it draws attention to the often-overlooked role of forecasting systems as cognitive infrastructures that build expectations, stabilize reference points, and channel managerial attention, thereby functioning as powerful anchoring devices rather than neutral analytical supports.

The increasing integration of agentic AI further transforms this landscape by redistributing not only analytical tasks, but also responsibility for monitoring, prioritization, and the timing of strategic attention. As autonomous systems continuously filter signals and trigger revisions, managerial agency is reconfigured rather than simply augmented. Managers are therefore confronted with new forms of interpretive dependence on algorithmic systems, which may remain largely opaque while exerting substantial influence on what is perceived as relevant, urgent, or plausible.

From a practical perspective, the central managerial challenge is not to improve predictive performance, but to deliberately design decision architectures and governance arrangements that preserve spaces for interpretive questioning, collective sensemaking, and the contestation of dominant analytical frames. Under conditions in which both human and algorithmic anchors coexist, maintaining strategic flexibility requires organizations to actively monitor how forecasts and agentic systems shape attention, suppress alternative interpretations, and contribute to emerging forms of strategic lock-in.

In this sense, managerial practice under VUCA conditions increasingly revolves around the governance of hybrid human–AI sensing systems, rather than the optimization of individual analytical tools. The practical relevance of agentic AI therefore lies less in its capacity to deliver better predictions and more in how it reshapes the organization's ability to continuously revise assumptions, sustain interpretive plurality, and remain responsive to unfolding uncertainty. In this perspective, managers may critically reflect on their current decision architectures by asking to what extent do their forecasting system act as anchor rather than inputs; how does agentic AI shape what is perceived as relevant or urgent in their organisation; and where do they preserve space for interpretive questioning and strategic revision.

8. Conclusion and Future Research

Under persistent VUCA conditions, the central strategic challenge is not to predict the future more accurately, but to sustain the organizational capacity to continuously revise interpretations as environments evolve. This paper has argued that forecasting systems, long treated as neutral supports to managerial judgment, actively participate in the construction of strategic meaning and may operate as powerful anchoring devices that stabilize expectations even when environmental conditions call for revision.

The emergence of agentic AI fundamentally reshapes this landscape. By continuously monitoring, prioritizing, and recombining signals, agentic systems become constitutive elements of strategic sensing rather than external analytical tools. However, this transformation does not resolve the indeterminacy of complex environments. Instead, it redistributes cognitive and interpretive constraints across hybrid human–AI systems and introduces new forms of algorithmic anchoring and strategic lock-in.

Future research should therefore move beyond evaluating the performance effects of artificial intelligence or the accuracy of forecasting models, and instead examine how different configurations of human and agentic systems shape interpretive processes, attention dynamics, and learning trajectories over time. In particular, empirical studies in high-frequency and uncertainty-intensive settings, such as hospitality, mobility, retail, and digital platforms, could investigate how hybrid sensing architectures influence the emergence, persistence, and revision of strategic frames, as well as the dynamics of anchoring and adaptation under VUCA conditions. Such work would advance a more realistic and theoretically grounded understanding of strategic adaptation in organizations increasingly shaped by agentic technologies.

As a theory-informed critical reflection, this paper does not aim to provide empirical validation or to establish causal relationships between agentic AI, forecasting practices, and strategic outcomes. Its purpose is to problematize dominant assumptions and to clarify conceptual tensions that emerge when strategic sensing is increasingly performed by hybrid human–AI systems under persistent ambiguous and volatile conditions.

Accordingly, the framework developed in this study should be interpreted as a diagnostic and analytical device rather than as a prescriptive or predictive model. While the arguments are grounded in established streams of research in strategic management, behavioural strategy, forecasting and artificial intelligence, future empirical research is required to examine how the proposed tensions manifest across organizational settings, technological configurations and governance arrangements.

Finally, this paper focuses on organizational-level strategic sensing and does not explicitly address broader institutional, regulatory or ethical dimensions of agentic AI, which represent important complementary avenues for future inquiry.

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Long papers

Track: Entrepreneurship



Configuring Entrepreneurial Ecosystems: Evidence from a Ten Pillar Cluster Analysis

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Abstract

Frame of the research. *Entrepreneurial ecosystems are increasingly recognized as complex systems shaped by the interaction of multiple interdependent dimensions. However, empirical research often adopts linear or pillar-by-pillar approaches, providing limited insight into how these dimensions combine into distinct ecosystem configurations at the regional level.*

Purpose of the paper. *This paper aims to identify and interpret configurations of entrepreneurial ecosystems by examining how key ecosystem pillars co-occur across different ecosystem configuration. Specifically, it addresses whether entrepreneurial ecosystems can be meaningfully classified into distinct regional types based on the joint presence and consolidation of their core dimensions.*

Methodology. *The study analyzes a dataset of NUTS2 regions using ten ecosystem pillars capturing structural, institutional, financial, and cultural conditions. A clustering analysis is employed to derive a typology of entrepreneurial ecosystems, complemented by v-tests, mean comparisons, and standard deviations to assess both inter-cluster differentiation and intra-cluster variability.*

Results. *The analysis identifies three distinct ecosystem configurations, each characterized by specific combinations of ecosystem pillars. The clusters differ not only in their average levels of ecosystem development, but also in the degree of internal consolidation of individual dimensions. More mature ecosystems display the simultaneous presence of multiple enabling conditions, while softer dimensions such as entrepreneurial culture remain more heterogeneous even in advanced contexts.*

Research limitations. *The study relies on cross-sectional data and does not capture dynamic transitions between ecosystem configurations over time.*

Managerial implications. *The proposed typology supports place-based policy design by highlighting that regions face different structural constraints and opportunities depending on their ecosystem configuration.*

Originality of the paper. *The paper contributes to the literature by adopting a configurational, region-level perspective and by providing a ten-pillar, cluster-based typology of entrepreneurial ecosystems.*

Keywords: *entrepreneurial ecosystems; cluster analysis; regional development; ecosystem pillars; NUTS2; regional policy*

1. Introduction

Entrepreneurial activity differs significantly depending on the territorial context in which it develops. Even within the same national context, regions show wide differences in terms of institutional quality, available resources, infrastructure, and modes of interaction between different economic actors.

Entrepreneurship is therefore no longer analyzed exclusively at the level of the individual enterprise, but rather the structural and relational conditions rooted in the territories are analyzed (Boschma, 2005; Stam, 2015; Autio et al., 2018).

In this context, the concept of entrepreneurial ecosystem is necessary to interpret how regional environments enable or constrain entrepreneurial activity over time. Entrepreneurial ecosystems are structured sets of interdependent actors, resources, and institutions, whose joint functioning influences a territory's ability to generate and sustain entrepreneurship in an innovative and growth-oriented way (Mason & Brown, 2014; Acs et al., 2017; Malecki, 2018; Queissner et al., 2025). Therefore, entrepreneurial output is not the result of isolated individual factors but arises from the alignment and interaction of multiple elements of the ecosystem in specific territorial contexts.

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The different dimensions of the ecosystem - such as institutions, finance, human capital, knowledge production, infrastructure, culture, networks, leadership, demand conditions, and intermediary services - do not act in isolation but influence each other through joint reinforcement processes (Isenberg, 2010; Stam & Van de Ven, 2021; Leendertse et al., 2022a). Their ability to support entrepreneurial activity within specific regional contexts therefore depends on how these dimensions intertwine and combine (Stam, 2015; Autio et al., 2018; Theodoraki et al., 2022).

Regions support entrepreneurship through different combinations of the same fundamental elements of the ecosystem, in relation to different institutional structures and local coordination mechanisms (Brown & Mason, 2017; Spigel & Harrison, 2018; Filip & Setzer, 2025).

Nevertheless, much of the empirical research on entrepreneurial ecosystems is still based on additive-linear approaches, in which ecosystems are measured through synthetic indices or by analyzing the marginal effects of individual dimensions on entrepreneurial outputs (Acs et al., 2017; Szerb et al., 2019; Bosma et al., 2020; Hess et al., 2025). Although these approaches have contributed significantly to advances in the measurement and comparability of ecosystems, they offer limited insight into how ecosystem elements coexist and consolidate. As a result, there is still a lack of systematic understanding of the possibility of describing entrepreneurial ecosystems as distinct configurations, characterized by specific combinations and degrees of consolidation of their fundamental dimensions.

Therefore, the objective of this article is to analyze whether European NUTS2 regions can be classified into distinct ecosystem types based on the joint presence and alignment of ten key ecosystem pillars and a ecosystem output. Using cluster analysis, the study identifies configurations of entrepreneurial ecosystems and analyzes both the differentiation between clusters and their internal coherence.

In this way, the paper offers three main contributions. First, it reinforces a configurational interpretation of entrepreneurial ecosystems, showing that performance emerges from the alignment of complementary dimensions rather than from isolated individual strengths. Second, it proposes an empirical typology of regional entrepreneurial ecosystems, providing a structured framework for interpreting ecosystem heterogeneity across regions. Finally, it generates relevant insights for the design of place-based policies, highlighting how regions face different constraints and opportunities depending on the specific configuration of their ecosystem.

The rest of the article is organized as follows. The next section presents the literature on entrepreneurial ecosystems and their regional bases. This is followed by a section dedicated to methodology and data. The next section illustrates the results of the cluster analysis, while the final section discusses the implications of the results and outlines possible directions for future research.

2. Literature Review

Regional economic systems differ markedly in their capacity to support entrepreneurial activity, reflecting variations in institutional arrangements, resource endowments and patterns of interaction among local actors. Such heterogeneity has been documented across territories and is increasingly analysed through approaches that emphasise the structural conditions embedded in specific places, rather than firm-level or individual-level explanations (Boschma, 2005; Audretsch & Belitski, 2017; Filip & Setzer, 2025). From this perspective, entrepreneurial outcomes emerge from place-specific configurations shaped by historical trajectories and contextual conditions (Prokop & Thompson, 2023).

Within this analytical framework, the entrepreneurial ecosystem has been conceptualised as a structured set of actors, resources and institutional arrangements that collectively shape a territory's capacity to generate and sustain entrepreneurial activity over time (Mason & Brown, 2014; Malecki, 2018; Lado et al., 2024). Ecosystems are not defined solely by the intensity of new firm creation, but by their ability to support forms of entrepreneurship characterised by innovation, growth potential

and integration into wider markets (Acs et al., 2017; Brown & Mason, 2017). Accordingly, entrepreneurial ecosystems are understood as configurations of interdependent elements whose joint functioning influences entrepreneurial outcomes.

The main components of entrepreneurial ecosystems operate through interrelated mechanisms rather than in isolation. Institutional and governance arrangements shape the regulatory environment and influence incentives and expectations faced by economic actors (North, 1990; Acs et al., 2017), while cultural orientations affect attitudes towards risk, failure and entrepreneurial success and contribute to the social legitimacy of entrepreneurship over time (Isenberg, 2010; Welter, 2011; Kibler et al., 2017; Stam & Van de Ven, 2021). Relational networks among entrepreneurs, organisations and support actors facilitate information flows, access to complementary resources and learning processes, shaping opportunity recognition and coordination dynamics (Stam, 2015; Spigel, 2017; Spigel & Harrison, 2018; Wurth et., 2022).

Access to financial resources, the availability of human capital and the presence of knowledge bases further influence ecosystem functioning by affecting the emergence, selection and growth of entrepreneurial initiatives (Lerner, 2009; Acs et al., 2017; Florida, 2019). In more developed ecosystems, coordination among actors is often supported by forms of distributed leadership exercised by experienced entrepreneurs, intermediary organisations and institutional actors, contributing to the coherence of ecosystem dynamics (Brown & Mason, 2017; Feld, 2020; Kuckertz et al., 2020). The effectiveness of these elements depends on their interaction within specific territorial contexts rather than on their isolated presence.

Regions represent a particularly relevant level at which entrepreneurial ecosystems take shape and evolve. Even within the same national setting, regions exhibit substantial differences in institutional quality, infrastructural endowments, knowledge bases and access to markets, resulting in distinct ecosystem structures and development trajectories (Stam, 2015; Autio et al., 2018; Theodoraki et al., 2022; Queissner et al., 2025, Hess et al., 2025). Consequently, regional entrepreneurial ecosystems are not expected to converge towards a single model but instead display a plurality of configurations reflecting place-specific conditions (Komlós et al., 2025).

The outcomes associated with entrepreneurial ecosystems extend beyond firm entry rates and are increasingly assessed in terms of the quality and sustainability of entrepreneurial activity. Innovative and growth-oriented ventures provide an indication of favourable ecosystem conditions (Stam, 2015; Acs et al., 2017; Audretsch et al., 2024), while longer-term effects materialise through broader regional dynamics such as productivity, employment and economic growth (Audretsch et al., 2006; Belitski & Desai, 2016). In advanced economies, start-up rates alone offer limited insight into ecosystem performance, whereas the characteristics of entrepreneurial activity play a more informative role (Shane, 2009; Mason & Brown, 2017; Candeias & Sarkar, 2024).

To the best of our knowledge, empirical research on entrepreneurial ecosystems has largely relied on additive and linear approaches, operationalizing ecosystems through composite indices or by examining the marginal effects of individual dimensions. While these approaches have enhanced measurement and comparability, they provide limited insight into how ecosystem elements co-occur and consolidate into internally coherent configurations characterized by specific combinations and degrees of consolidation. Building on this perspective, this study addresses the following research question:

R.Q: Are there recognizable configurations of entrepreneurial ecosystems, and what distinguishes them in terms of combinations and consolidation of their key dimensions?

3. Methodology and data

3.1 Methodology

Cluster analysis is a multivariate statistical technique used to identify homogeneous groups of observations based on similarities measured across multiple variables considered simultaneously

(Romesburg, 1984; Johnson & Wichern, 2002). The method belongs to the class of unsupervised procedures, as it does not require a predefined classification of the units of analysis (McLachlan, 1992; Punj & Stewart, 1983).

The objective of cluster analysis is to identify latent types or structures within heterogeneous populations, without imposing causal relationships or functional models a priori (Punj & Stewart, 1983; Ketchen & Shook, 1996). This approach is consistent with a configurational approach, in which phenomena are interpreted as the result of combinations of characteristics rather than the additive effects of individual variables (Meyer et al., 1993; Ketchen et al., 1997).

The application of cluster analysis requires the definition of a distance measure, the selection of a clustering algorithm and the determination of the number of clusters to be extracted (Romesburg, 1984; Johnson & Wichern, 2002). These choices affect the internal consistency and stability of the solutions obtained and must therefore be evaluated in relation to the exploratory objective of the analysis (Ketchen & Shook, 1996; Hair, 2009).

Among hierarchical clustering methods, Ward's method is designed to minimise intra-cluster variance at each stage of the aggregation process, producing compact and well-separated groups (Ward, 1963). The resulting clusters are interpreted as ideal types or analytical configurations, useful for describing and comparing distinct profiles, without attributing to them a normative or causal meaning that exceeds the exploratory nature of the method (Ketchen et al., 1997; Fiss, 2007).

3.2 Data collection

To explore the differences between entrepreneurial ecosystems in terms of internal composition and outcomes, we used the dataset “Regional metrics for entrepreneurial ecosystems in Europe” developed by Leendertse et al. (2022b), which operationalizes entrepreneurial ecosystems at the NUTS-2 regional level according to the framework proposed by Stam and Van de Ven (2021). Within this framework, ecosystems are described through a set of ten interrelated elements—including institutions, finance, intermediaries, infrastructure, knowledge, human capital, leadership, networks, demand, and culture—captured through standardized statistical indicators (Leendertse et al., 2022a).

Rather than assessing the isolated effect of individual elements, the clustering procedure is employed to identify recurring configurations of ecosystem components across regions. This approach allows regions to be grouped based on similarities in the joint distribution of ecosystem elements, thereby highlighting distinct ecosystem profiles. The dataset further includes measures of entrepreneurial output, proxied by the presence of innovative startups and unicorn firms, which enable an examination of how different ecosystem configurations are associated with varying levels of productive entrepreneurship. Detailed information on indicator selection and data construction (Tab. 1) is provided by Leendertse et al. (2022a), ensuring transparency and replicability of the analytical framework.

Tab 1. Operationalization of the indicators of EE elements and output

Elements	*Description*	*Empirical indicators*	*Data source*
Formal institutions	The rules of the game in society	Two composite indicators measuring the overall quality of government (consisting of scores for corruption, accountability, and impartiality) and the ease of doing business	Quality of Government Survey (QOG) and the World Bank Doing Business Report
Entrepreneurship culture	The degree to which entrepreneurship is valued in a region	A composite measure capturing the regional entrepreneurial culture, consisting of entrepreneurial motivation, cultural and social norms, importance to be innovative, and trust in others	Global Entrepreneurship Monitor (GEM) and European Social Survey (ESS)

Elements	*Description*	*Empirical indicators*	*Data source*
Networks	The connectedness of businesses for new value creation	Percentage of SMEs that engage in innovative collaborations as a percentage of all SMEs in the business population	Regional Innovation Scoreboard (RIS)
Physical Infrastructure	Transportation infrastructure and digital infrastructure	Four components in which the transportation infrastructure is measured as the accessibility by road, accessibility by railway and number of passenger flights and digital infrastructure is measured by the percentage of households with access to internet	Regional Competitiveness Index (RCI)
Finance	The availability of venture capital and access to finance	Two components: The average amount of venture capital per capita and the percentage of SMEs that is credit constrained	Invest Europe and European Investment Bank (EIB)
Leadership	The presence of actors taking a leadership role in the ecosystem	The number of coordinators on H2020 innovation projects per capita	Community Research and Development Information Service (CORDIS)
Talent	The prevalence of individuals with high levels of human capital, both in terms of formal education and skills	Four components: The percentage of the population with tertiary education, the percentage of the working population engaged in lifelong learning, the percentage of the population with an entrepreneurship education, the percentage of the population with e-skills	Eurostat and the Global Entrepreneurship Monitor (GEM)
New Knowledge	Investments in new knowledge	Intramural R&D expenditure as a percentage of Gross Regional Product	Eurostat
Demand	Potential market demand	Three components: disposable income per capita, potential market size expressed in GRP, potential market size in population. All relative to EU average.	Regional Competitiveness Index (RCI)
Intermediate services	The supply and accessibility of intermediate business services	Two components: the percentage of employment in knowledge-intensive market services and the number of incubators/accelerators per capita	Eurostat and Crunchbase
Output	Entrepreneurial output	The number of Crunchbase firms founded in the past five years per capita	Crunchbase
	Unicorn output	The absolute number of unicorns in the region founded in the last ten years	CB Insights and Dealroom

Source: Leendertse et al. (2022a)

3 Results

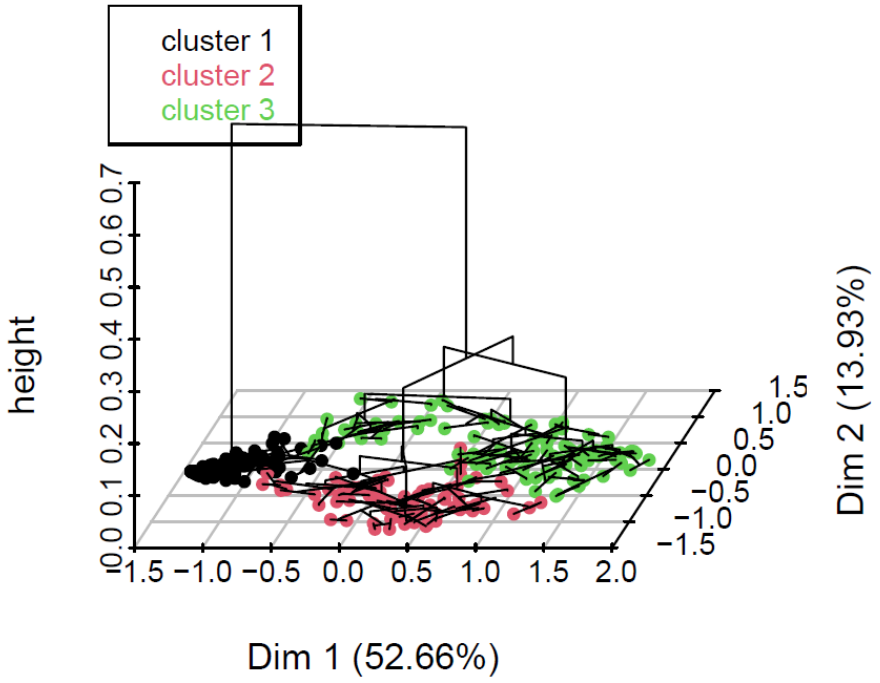
Figure 1 shows the results of the cluster analysis applied to the entrepreneurial ecosystems analyzed at the NUTS 2 regional level, projected into the space defined by the first two dimensions obtained from the dimensional reduction of the data. Each point corresponds to an ecosystem and is colored according to the cluster to which it belongs, allowing the structure of the groups and the relative distances between the observations to be viewed simultaneously. The coordinates of the points are derived from standardized variables; consequently, zero represents the overall average of the system, and positive and negative values indicate deviations from this reference.

The clusters show an orderly separation along the first dimension, which explains more than half of the overall variability (52.66%) and reflects systematic differences in the overall level of

contribution of ecosystems to the observed dynamics. Cluster 1 (black), identified by negative values, groups ecosystems that have levels below the global average for all the variables considered, indicating a limited capacity to simultaneously activate the components of the system. At the opposite extreme, cluster 3 (green), positioned on positive values, aggregates ecosystems that consistently exceed the global average, suggesting more structured configurations and a greater overall intensity of the activities observed. The clearly distinguishable intermediate cluster 2 (red) occupies a central position along the main gradient and is characterized by a mixed profile, in which above- and below-average dimensions coexist, indicating ecosystems with partially developed mechanisms and functioning that are not yet fully integrated.

The second dimension, which explains a smaller proportion of variance (13.93%), helps to differentiate ecosystems within clusters, highlighting differences in profile composition at the same overall level. The dispersion of points along this axis indicates that ecosystems belonging to the same cluster can be located at similar levels of the main gradient through different combinations of the variables analyzed, suggesting heterogeneous modes of organization and specialization.

Fig. 1: Hierarchical tree on the factor map

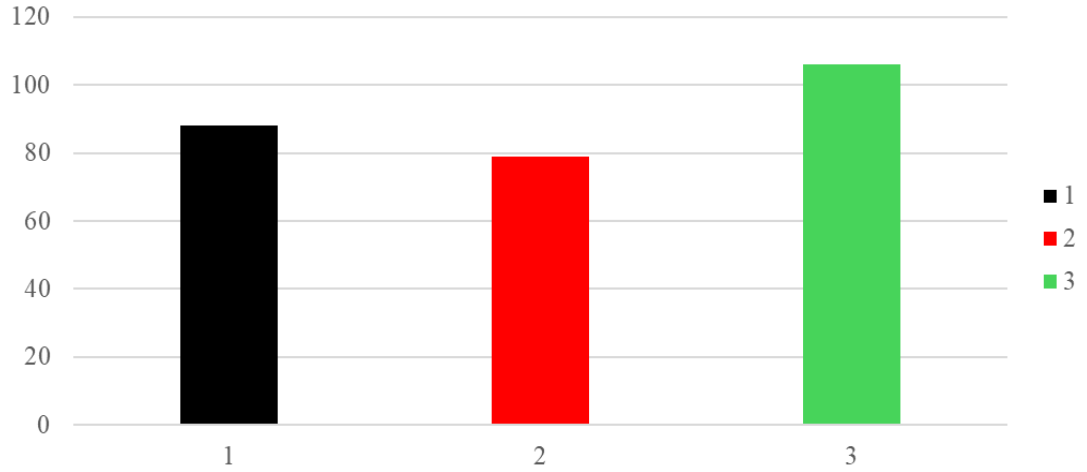


Source: own elaboration

The distribution of countries across clusters provides additional insight into the prevalence of different ecosystem configurations. Cluster 3 emerges as the most populated group, comprising 106 countries, suggesting that relatively mature and well-functioning entrepreneurial ecosystems are not exceptional cases but represent a widely observed configuration within the sample. By contrast, Cluster 2 is the least numerous, with 79 countries, indicating that intermediate ecosystem configurations—characterized by partial alignment of ecosystem pillars—are comparatively less common. Cluster 1 occupies an intermediate position in terms of size, with 88 countries, reflecting the broad diffusion of less developed or structurally constrained ecosystem configurations.

Importantly, these differences in cluster size should not be interpreted as a ranking of performance, but rather as evidence of the relative diffusion of distinct ecosystem types. The fact that the most advanced configuration is also the most populated underscores the coexistence of multiple development paths and suggests that mature ecosystems can emerge across a wide range of contexts, while intermediate configurations may represent more transitory or less stable arrangements.

Fig. 2: Number of European regions in clusters



Source: own elaboration

Tables 2, 3, and 4 show the results of the cluster description procedure using the v-test. The v-test measures the standardized distance between the mean of the variable in the cluster and the overall mean. High absolute values indicate a strong discriminating ability of the variable in defining the cluster. As regards the sign, a negative sign indicates that the variable is under-represented in the cluster, while a positive sign indicates that the variable is over-represented in the cluster. The test also allows to calculate the mean in category, which represents the average level of the variable in the cluster, compared with the overall mean, which is the average for the entire sample. In addition, the sd in category was also calculated to assess the internal heterogeneity of the cluster, and the overall sd, which provides a benchmark of overall variability.

Cluster 1 is characterized by negative and highly significant values across all variables, with v-tests ranging from -7.3 to -11.3. This is a systemically weak cluster, in which no pillar of the entrepreneurial ecosystem reaches levels close to the sample average. The means in category are extremely low for all variables (generally between 0.04 and 0.12), while the overall means are consistently around four to five times higher. This gap indicates a generalized structural deficit.

In particular, the pillars related to finance (v = -11.31) and physical infrastructure (v = -10.90) show the highest deviations, and their respective means in category (0.05 and 0.08) are drastically lower than the overall means (0.44 and 0.49, respectively). This indicates ecosystems with limited access to capital and insufficient infrastructure, conditions that prevent any scaling dynamics.

For the pillars related to formal institutions, culture, and demand, the v-tests are very similar (≈ -10), suggesting that ecosystem fragility is not only economic but also institutional and cultural, with markets that are not very receptive to innovation and high-growth entrepreneurship. This is also confirmed by entrepreneurial output (v = -9.24), which is consistently low: the absence of startups and unicorns is not an anomaly, but the systemic consequence of other shortcomings.

At the same time, dynamics related to human capital (v = -10.85) and knowledge (v = -8.81) are strongly underrepresented, and the combination of low means (-10.85 and -8.81, respectively) and category sd lower than the overall sd indicates that the weakness is homogeneous, not due to a few extreme cases. Consistently, the Networks variable has a negative v-test (−8.99) and an extremely low average (0.08), highlighting ecosystems characterized by weak relationships and poor interaction between actors.

The intermediate variable shows a similar pattern (v-test = −8.44), with a cluster average of 0.126 compared to an overall average of 0.428. This signals the almost total absence of organizational infrastructures supporting entrepreneurship, such as incubators, accelerators, and intermediaries.

It follows that Cluster 1 represents immature, peripheral ecosystems lacking self-reinforcing mechanisms, where no single dimension can compensate for the others. In terms of policy, it is not a question of ‘activating’ entrepreneurship, but of building the minimum basic conditions.

Tab. 2: Cluster 1 variables – Weak and immature ecosystems

Variable	***v.test***	***mean in category***	***overall mean***	***sd in category***	***overall sd***
Leadership	-7.320031	0.11897524	0.3858363	0.23824650	0.4146792
Intermediate	-8.440468	0.12622504	0.4278930	0.19387139	0.4065393
Knowledge	-8.808509	0.10643251	0.4221297	0.21527247	0.4076694
Networks	-8.990008	0.07459084	0.3952372	0.17098758	0.4057011
Crunchbase_output	-9.238477	0.10114095	0.4366765	0.17472972	0.4131218
Culture	-10.216203	0.08637938	0.4633107	0.15774548	0.4196745
Demand	-10.262397	0.07627814	0.4460406	0.12676319	0.4098396
Formal_institutions	-10.641533	0.04251393	0.4370279	0.06009461	0.4216946
Talent	-10.850554	0.07355314	0.4607278	0.14317204	0.4058774
Physical_infrastructure	-10.902683	0.05470484	0.4445661	0.12498241	0.4067397
Finance	-11.314341	0.07568793	0.4882173	0.17773130	0.4147300

Source: own elaboration

Cluster 2 includes those ecosystems that are structured but have low entrepreneurial activation and show clear internal polarization with positive and significant values for structural and institutional variables and negative and significant values for leadership, intermediaries, and output. This cluster represents ecosystems that are potentially favorable but unable to transform resources into entrepreneurial results.

The variables culture, formal institutions, and finance have high positive v-tests (6.35, 6.04, and 5.77, respectively). The means in category are all above 0.67, compared to an overall mean between 0.43 and 0.49. The sd in category is often similar to or lower than the overall sd, indicating a favorable cultural environment, functioning institutions, and good access to financial resources.

As for the pillars of talent, demand, and physical infrastructure, these are also significantly above average, but with more moderate v-tests (4.26, 4.20, and 3.62, respectively). These dimensions provide an enabling foundation but are not sufficient to generate autonomous growth dynamics. Instead, the pillars of leadership (v = -6.92), intermediate (v = -4.51), and output (v = -5.24) constitute the bottleneck of the cluster. Cluster averages are drastically lower than overall means, with low internal variability, a sign that the deficiency is structural. Leadership shows an extremely low cluster mean in categories (0.11) compared to the overall mean (0.39), with a low standard deviation, indicating a systematic lack of leading actors. Similarly, the weakness of the intermediate variable (mean in category 0.25 compared to overall mean 0.43) signals the absence of intermediaries capable of stimulating and supporting entrepreneurial initiatives.

Overall, cluster 2 represents potentially strong ecosystems, but characterized by a lack of entrepreneurial activity. This is a classic case of a “latent ecosystem” in which the conditions are present, but there is a lack of leading players, intermediaries, and coordination mechanisms capable of activating the system.

Tab. 3: Cluster 2 variables – Institutional ecosystems with little dynamism

Variable	***v.test***	***mean in category***	***overall mean***	***sd in category***	***overall sd***
Culture	6.351064	0.7165680	0.4633107	0.3113486	0.4196745
Formal_institutions	6.044524	0.6792217	0.4370279	0.3450051	0.4216946
Finance	5.772475	0.7156906	0.4882173	0.2925845	0.4147300
Talent	4.261354	0.6250685	0.4607278	0.3319863	0.4058774
Demand	4.201899	0.6096704	0.4460406	0.3674583	0.4098396
Physical_infrastructure	3.620074	0.5844723	0.4445661	0.3423875	0.4067397
Networks	2.661178	0.4978220	0.3952372	0.3759957	0.4057011
Intermediate	-4.510725	0.2536514	0.4278930	0.3226392	0.4065393
Crunchbase_output	-5.243905	0.2308337	0.4366765	0.2448495	0.4131218
Leadership	-6.920816	0.1131443	0.3858363	0.1385935	0.4146792

Source: own elaboration

Cluster 3 represents mature, coherent, high-performance ecosystems, showing positive and highly significant values across all variables, with v-tests reaching extremely high values (up to 13.7). It is the only cluster in which all pillars of the ecosystem are simultaneously above average. The mean in category values are consistently higher than the overall mean values, while the sd in category values are often high, suggesting internal heterogeneity compatible with complex and mature ecosystems.

The output variable has the highest v-test (13.74), with a Mean in category of 0.8686, almost double the Overall mean (0.44). The sd in category (0.24) is lower than the Overall sd (0.41), indicating that high entrepreneurial output is widely shared within the cluster and not driven by a few extreme cases. This result signals a structured and widespread capacity to generate new businesses and high-growth companies.

The dimensions leadership (v = 13.46), and intermediate (v = 12.29) are the most discriminating variables. The means in category exceed 0.80, compared to overall means below 0.44, indicating ecosystems strongly characterized by the presence of leading players and intermediary infrastructures.

The pillars knowledge, talent, and networks have v-tests between 6 and 8, with the sd in category often higher than the overall sd, suggesting internal heterogeneity, typical of complex and dynamic ecosystems.

For the Demand variable, the v-test is equal to 5.93, with a mean in category of 0.63 compared to an overall mean of 0.45. The sd in category (0.39) is slightly lower than the Overall sd (0.41), suggesting that the presence of receptive markets is a widespread characteristic, but not perfectly uniform.

Even the 'context' variables (such as demand, finance, and institutions) are significantly above average, indicating that entrepreneurial performance is achieved thanks to their consistency with the rest of the system. In this cluster, dimensions related to finance, formal institutions, and entrepreneurial culture are all significantly overrepresented compared to the sample average, outlining a favorable but not perfectly homogeneous context. In particular, the Finance variable has a v-test of 5.48, with a mean in category of 0.66, significantly higher than the overall mean (0.49). The category sd (0.38), which is lower than the Overall sd, indicates that access to financial resources is not only high but also relatively uniform within the cluster, suggesting the presence of developed financial markets that are widely accessible to ecosystem actors.

The formal institutions variable also shows a positive and significant v-test (4.58), with a mean in category of 0.58 compared to an overall mean of 0.44. In this case, the sd in category (0.41) is very similar to the overall sd (0.42), indicating that the quality of the institutional context is higher overall in the cluster, while maintaining a level of internal variability comparable to that observed in the entire sample. Finally, entrepreneurial culture presents a positive but more moderate v-test (3.89), with a mean in category of 0.59, higher than the overall mean (0.46). The category sd (0.42), slightly higher than the overall sd, indicates greater heterogeneity in the spread of attitudes favorable to entrepreneurship. This indicates that, within the cluster, entrepreneurial culture is less uniformly distributed than other dimensions and may represent a component of internal differentiation rather than a fully consolidated and homogeneous factor.

In summary, cluster 3 represents mature ecosystems, in which there are strong self-reinforcing dynamics between the various pillars, capable of attracting resources and talent. Here, the simultaneous presence of conditions that favor entrepreneurial output signals a fully functioning ecosystem, in which the different dimensions reinforce each other.

Tab. 4: Cluster 3 variables – Advanced and high-performance ecosystems

Variable	***v.test***	***mean in category***	***overall mean***	***sd in category***	***overall sd***
Crunchbase_output	13.738954	0.8686456	0.4366765	0.2405954	0.4131218
Leadership	13.459492	0.8106142	0.3858363	0.2940393	0.4146792
Intermediate	12.291463	0.8081935	0.4278930	0.2721562	0.4065393
Knowledge	7.902045	0.6673003	0.4221297	0.3642585	0.4076694
Physical_infrastructure	7.087234	0.6639548	0.4445661	0.3699197	0.4067397
Talent	6.440550	0.6596753	0.4607278	0.3754438	0.4058774
Networks	6.145215	0.5849795	0.3952372	0.4062888	0.4057011
Demand	5.931832	0.6310627	0.4460406	0.3884981	0.4098396
Finance	5.479264	0.6611625	0.4882173	0.3784217	0.4147300
Formal_institutions	4.580910	0.5840459	0.4370279	0.4144106	0.4216946
Culture	3.887794	0.5874864	0.4633107	0.4237129	0.4196745

Source: own elaboration

4 Conclusion and discussion

Cluster analysis addresses the question of whether entrepreneurial ecosystems can be meaningfully grouped into distinct configurations, revealing systematic patterns of coexisting dimensions and highlighting the existence of qualitatively different types of ecosystems. Leendertse et al. (2022b), the authors of the dataset used, perform a cluster analysis primarily as a robustness check for the Entrepreneurial Ecosystem Index, demonstrating that the resulting clusters largely mirror the index ranking and its geographical distribution. Our study takes a conceptually different approach. Rather than interpreting clusters as ordinal levels of performance, we conceptualize them as distinct structural profiles of entrepreneurial ecosystems. Deliberately moving away from spatial visualizations, which tend to reinforce well-known patterns such as the dominance of capital regions over rural areas and can lead to deterministic geographical interpretations, our analysis focuses on the underlying mechanisms that shape the functioning of the ecosystem. The clustering procedure is then used to separate geographical location from business performance and to identify heterogeneous combinations of ecosystem elements that transcend geographical boundaries. This perspective allows us to highlight qualitative differences in ecosystem configurations that remain hidden in one-dimensional indices.

The results clearly show that regional entrepreneurial ecosystems are not distributed along a linear continuum of development, but are organized into distinct systemic configurations, characterized by different levels of activation capacity and alignment between the pillars of the ecosystem.

From this perspective, the clusters identified do not simply represent different levels of performance, but different organizational models. The ecosystems in cluster 1 have negative values for all ecosystem pillars, reflecting systemically weak configurations in which the widespread lack of resources, infrastructure, institutions, and human capital limits the activation of entrepreneurial dynamics. The weakness is homogeneous and transversal to all dimensions considered, indicating the absence of compensatory mechanisms, so that no pillar appears capable of independently sustaining the system or triggering strengthening processes. This suggests that, in these contexts, high-growth entrepreneurship cannot be stimulated through isolated sectoral interventions but requires the simultaneous construction of minimum conditions for systemic functioning.

At the opposite end of the spectrum, cluster 3 represents consolidated and successful ecosystems characterized by the simultaneous presence of all pillars at above-average levels. In these contexts, entrepreneurial performance appears to be a phenomenon emerging from mutually reinforcing dynamics between actors and resources. The high presence of leadership mechanisms and intermediary infrastructures indicates that coordination and the ability to provide support services to entrepreneurship play an essential role in transforming structural potential into entrepreneurial output. The relative internal heterogeneity observed in some dimensions, such as knowledge, networks, and

talent, is consistent with the complex nature of advanced ecosystems, in which different specializations and multiple development trajectories coexist. Rather than signaling fragility, this heterogeneity represents a source of resilience and adaptability.

Particularly interesting is the intermediate configuration identified in cluster 2, which cannot be interpreted simply as a transitional stage between weak and strong ecosystems. These ecosystems have favorable structural and institutional conditions—in terms of culture, institutions, finance, talent, and infrastructure—but low levels of entrepreneurial activation and a marked lack of leadership and intermediaries. This combination suggests the existence of "latent" ecosystems, in which resources are available but are not effectively mobilized. The absence of leading actors and coordination mechanisms prevents the transformation of potential into concrete results, highlighting that the development of the ecosystem does not depend exclusively on the availability of resources, but also on the capacity for orchestration and collective activation.

The distribution of cases in clusters offers further insights for interpretation. The fact that the most advanced cluster is also the most populated indicates that mature and functional ecosystems are not isolated exceptions, but relatively widespread configurations. This data suggests that ecosystem maturity can emerge in heterogeneous territorial contexts and is not necessarily limited to a few highly developed areas. At the same time, the smaller size of the intermediate cluster may indicate that latent configurations are less stable over time, tending to evolve towards more coherent models or regress in the absence of activation mechanisms. This reinforces the idea that ecosystem development is a dynamic and non-linear process, influenced by the interaction between structural conditions and coordination capabilities.

The analysis has both academic and practical implications. From a theoretical point of view, the results confirm the usefulness of a configurational approach to the study of entrepreneurial ecosystems, in which performance is interpreted as the outcome of the alignment between complementary pillars. Consistent with the existing literature, empirical evidence suggests that the presence of individual favorable conditions is not sufficient to generate sustained entrepreneurial dynamics in the absence of systemic coherence. In particular, the role of leadership and intermediation dimensions emerges as crucial in linking structural resources to entrepreneurial outputs, indicating the need to integrate variables related to ecosystem governance and coordination capacity among actors into future analyses. Furthermore, the identification of a cluster characterized by strong structural endowment, but low entrepreneurial activation invites us to distinguish conceptually between the potential capacity and actual capacity of the ecosystem. This distinction opens new research perspectives on the mechanisms through which resources are mobilized and transformed into entrepreneurial activities, as well as on the factors that facilitate or hinder these processes.

From a managerial and policy perspective, the results highlight the importance of differentiated strategies depending on the ecosystem configuration. In weaker ecosystems, interventions should focus on building basic conditions – infrastructure, access to resources, and knowledge – rather than on initiatives aimed at the growth of isolated startups. In latent ecosystems, on the other hand, the priority is to strengthen coordination and support mechanisms and the ability to activate existing resources. In mature contexts, policies should aim to maintain and improve entrepreneurial dynamics, promoting diversification, innovation, international openness, and system resilience.

Overall, the results suggest that regional entrepreneurial development policies cannot be uniform but must be adapted to the specific configuration of the regional ecosystem. A one-size-fits-all approach risks being ineffective if it does not consider the structural differences and operating mechanisms that characterize each context.

In summary, the results highlight the existence of three clearly distinguishable systemic configurations of entrepreneurial ecosystems, in which the maturity of an ecosystem emerges as the result of cumulative dynamics and mutual reinforcement between structural resources, institutions, networks, and leading actors.

Despite adopting a configurational interpretation of clusters, the analysis remains constrained by

the static and aggregate nature of the underlying dataset, which limits the ability to capture the temporal evolution and causal dynamics of entrepreneurial ecosystem configurations. Moreover, the reliance on secondary indicators may only partially reflect informal or micro-level interactions within ecosystems.

Future research could extend this approach by examining how ecosystem configurations evolve over time and by linking specific configurational profiles to entrepreneurial outcomes such as resilience, innovation quality, or growth trajectories. Additionally, integrating micro-level or qualitative data could further enrich the understanding of the mechanisms through which different ecosystem configurations emerge and consolidate across contexts.

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Determining the Characteristics of Private Debt Targets: Evidence from Italy

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Abstract

Research on private debt has examined funds, contracts and returns; much less is known about the firms that receive direct-lending finance. This paper moves the analysis to the borrower side through a population-level study of Italian private debt transactions. It combines more than ten million Italian firm-year observations for 2013-2023 with proprietary deal data from the Italian Association of Private Equity, Venture Capital and Private Debt (AIFI), and estimates logit selection models to identify the characteristics associated with first-time private debt funding. The estimates reveal a sharply bounded borrower profile. Private debt investors favour larger, moderately profitable and moderately riskier firms with intermediate asset tangibility, while avoiding firms that are persistently loss-making, wholly intangible, highly collateralised or excessively risky. The evidence is consistent with private debt operating not as a simple substitute for bank lending but as a specialised contracting arrangement for firms whose risks are non-standard yet contractible: too opaque, growth-oriented or insufficiently collateralised for the lowest-cost bank segment, but sufficiently large and cash-generative to bear the fixed costs of due diligence, covenant design and monitoring.

Keywords: *Private debt; direct lending; non-bank finance; borrower selection; firm characteristics; alternative credit; Italy; middle-market firms.*

1. Introduction

Following the Global Financial Crisis (GFC), regulatory tightening and shifts in investor demand have driven a structural reallocation of corporate credit from banks to non-bank intermediaries (Ivashina and Scharfstein, 2010; Chernenko, Erel and Prilmeier, 2022; Erel and Inozemtsev, 2025). Private debt (PD) funds - the principal vehicle through which institutional capital now lends directly to companies - have grown to roughly $1.34 trillion of assets under management in the US and approximately $2 trillion globally by mid-2024 (Cai and Haque, 2024; Berrospide et al., 2025), an expansion unmatched by any other major asset class in the post-GFC era. The literature, however, has studied this asset class largely from the supply side, characterising fund-level returns, fee structures and contracting practices (Cumming and Fleming, 2013; Munday et al., 2018; Böni and Manigart, 2022; Block et al., 2024; Buchner et al., 2024). The demand side - which firms borrow from PD funds, and how those firms differ from the broader corporate population - remains far less developed. The firm-level evidence that does exist is concentrated almost exclusively on US middle-market borrowers, the great majority of whom are private-equity-sponsored (Chernenko, Erel and Prilmeier, 2022; Jang, 2024; Haque, Mayer and Stefanescu, 2025; Davydiuk, Marchuk and Rosen, 2024).

The argument developed here is that this evidence base leaves open the more general theoretical question: in which segment of the corporate credit market does private debt operate, and under what conditions? Private debt is not merely an alternative source of bank-like finance. It is a specialised contracting arrangement that becomes valuable where standard collateral-based banking and public

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debt markets are incomplete. Direct lenders extend credit to firms that are too informationally opaque, insufficiently collateralised or moderately risky for standardised bank lending, yet sufficiently large, cash-generative and monitorable to support bespoke covenants, due diligence and post-investment monitoring. This characterisation brings together four strands of theory - credit rationing under information asymmetry (Stiglitz and Weiss, 1981), collateral as a screening device (Bester, 1985; Besanko and Thakor, 1987), delegated monitoring under fixed costs (Diamond, 1984; Holmström and Tirole, 1997), and substitution between regulated and unregulated intermediaries (Chernenko, Erel and Prilmeier, 2022; Avalos, Doerr and Pinter, 2025) - into a coherent set of predictions about the private debt borrower.

Italy provides a particularly informative bank-dependent setting in which to test this account. Italian corporate finance remains strongly bank-based, and the corporate sector is dominated by private, owner-managed and informationally opaque firms whose profile is precisely that for which credit-rationing theory predicts the largest misallocation of bank credit (Petersen and Rajan, 1994; Detragiache, Garella and Guiso, 2000; Aristei and Gallo, 2017). Until 2012, the Italian Banking Law reserved corporate lending to authorised credit institutions. A deliberate decade-long sequence of legislative interventions then opened channels for direct non-bank lending. Recent cross-country evidence by Avalos, Doerr and Pinter (2025) shows that private credit grows fastest in the institutional environments Italy exemplifies: stringent banking regulation, low policy rates and a less efficient banking sector. Because Italy is not a mature, sponsor-driven market like the US or the UK, its borrower profile is not an artefact of leveraged-buyout selection. It therefore provides a useful test of whether the borrower-selection observed in mature private-credit markets reflects a general response to credit-market frictions or is specific to particualr institutional environments.

The empirical design combines the universe of Italian companies in Orbis - more than ten million firm-year observations over 2013-2023 - with a proprietary dataset of direct-lending transactions sourced through AIFI. Logit selection models with non-linear specifications test six theoretically grounded hypotheses on the size, profitability, cash-flow stability, asset tangibility, default risk and sectoral profile of PD recipients.

The paper makes three contributions. First, it shifts the empirical analysis of private debt from fund-level performance to borrower-level selection in a major Eurozone economy and, to the best of current knowledge, provides one of the first population-level analyses not dominated by sponsor-backed transactions. Second, it develops and tests a theory-led account of private debt as a specialised contracting response to credit-market frictions. PD investors target precisely the firms that credit-rationing and collateral models predict will be underserved by competitive bank markets - moderately risky, intermediate-tangibility, mid-sized firms with positive but moderate profitability - and avoid both ends of the quality distribution. The non-linear specifications recover relations that linear models miss. Third, the paper distinguishes between mechanism generalisation, which is portable across markets because it follows from general credit-market frictions, and institutional generalisation, which depends on country-specific legal, regulatory and market structures. The comparison between Italy and the US, UK, German and French markets clarifies which findings are likely to be relevant across jurisdictions and which are institutionally contingent.

The remainder of the paper is organised as follows. Section 2 sets out the background to private debt, the institutional and regulatory context of the Italian market, the theoretical framework and the resulting hypotheses. Section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 concludes with policy and research implications.

2. Private debt: background and literature

2.1 Background

Private debt is the institutional channel through which non-bank investors lend directly to private and mid-market companies. The instruments are bespoke rather than standardised. Loans are privately negotiated, tailored to the borrower's cash-flow profile and growth plans, and held to maturity by the originating fund or a small club of co-investors. The contrast with bank lending lies less in price than in contracting flexibility: private debt funds are willing to invest the underwriting effort required to size, structure and monitor loans that do not fit a standardised template (McGeown, Power and Shinnick, 2025).

The borrower base differs across markets. In the US and the UK, the great majority of recorded direct-lending transactions are private-equity-sponsored, typically associated with leveraged buyouts, dividend recapitalisations and unitranche refinancings (Block et al., 2024; Buchner et al., 2024; Davydiuk, Marchuk and Rosen, 2024). In bank-dependent continental markets, direct lending is used more widely for growth finance: acquisition-led expansion, capital expenditure, or investment in intangibles that are difficult to pledge as collateral. The common feature is that the borrower needs finance whose structure or purpose lies outside the conventional collateral-and-cash-flow template that banks underwrite at scale.

Policy interest in private debt rests on the same observation. In bank-centred economies, the contraction of post-Basel bank lending to SMEs and lower-rated mid-market firms has left a financing gap that public capital alone cannot fill (British Business Bank, 2020, 2025; Patalano and Roulet, 2020). Private debt offers a route through which institutional capital can reach this segment, provided the underwriting and monitoring costs of bespoke contracts are recoverable in the deal. Whether private debt actually reaches the borrowers it is theoretically best placed to serve is therefore an empirical question, not a definitional one.

The Italian market provides an unusually informative testbed for that question. Italian corporate finance has been heavily bank-dependent for decades, the underlying SME population is large and informationally opaque, and the legal framework for direct non-bank lending was constructed deliberately, in stages, between 2012 and 2024. The remainder of Section 2 sets out the institutional and regulatory background (2.2), the four credit-market frictions that motivate the analysis (2.3), and the resulting hypotheses on borrower selection (2.4).

2.2 Institutional and regulatory context: Italy and international comparators

The Italian private debt market did not emerge in an institutional vacuum. It developed within a corporate-finance system historically dominated by banks, private ownership and relationship lending, and was accelerated by reforms that progressively opened legal channels for non-bank credit. This context matters for the empirical analysis. Firms that obtain private debt in Italy are not selected from the same financial ecosystem as US or UK sponsor-backed borrowers. They are selected from a bank-dependent economy in which informational opacity, collateral constraints and regulatory pressure on banks create a specific space for alternative credit. This section sets out the institutional features of Italian corporate finance, the regulatory architecture through which private debt became possible, and the main differences between Italy and the larger private credit markets of the US, UK, Germany and France.

2.2.1 Structural features of the Italian corporate-finance system

Italy provides a particularly revealing setting in which to examine the emergence of private debt. Its corporate sector has long been organised around bank finance, private ownership and relationship lending. The overwhelming majority of Italian firms are SMEs: among approximately 200,000 organised companies with more than ten employees, fewer than 500 are listed on a regulated exchange. Family-owned and owner-managed firms dominate the corporate population, and many

exhibit the informational opacity typical of private-company finance. They publish more limited accounts than listed firms, are rarely externally rated, and have historically relied on close, long-standing relationships with one or two local banks (Aristei and Gallo, 2017; Detragiache, Garella and Guiso, 2000).

This structure has given Italian corporate finance a markedly bank-centred character. Bank credit accounts for the great majority of Italian corporate liabilities, at levels substantially above those observed in the US and above the European average (Equita and Luiss, 2024; ECB, 2024; Cai and Haque, 2024). The historical fragmentation of the banking system, including the importance of mutual and cooperative banks, reinforced this pattern by sustaining relationship-based lending technologies in which soft information, local knowledge and repeated interaction substituted for arm's-length credit assessment (Petersen and Rajan, 1994; Berger and Udell, 2006).

The capacity of this bank-centred system to meet corporate financing needs has, however, been weakened by two related developments. The first is regulatory. Post-Basel III capital requirements and, for Italian banks, the implementation of IFRS 9 have raised the cost of holding lower-rated and SME exposures on bank balance sheets. The effect has been to make credit to informationally opaque and higher-risk firms more expensive for banks to originate and retain (Cortés et al., 2020; Ricci, Soggia and Trimarchi, 2023). The second is structural. Consolidation within the Italian banking sector has reduced the number of relationship-lending counterparties available to firms, particularly in local markets where access to finance had traditionally depended on repeated interaction with local lenders.

Italy therefore brings together, in concentrated form, several conditions under which credit-rationing theory predicts a role for non-bank finance: a large population of private SMEs, substantial informational opacity, heavy dependence on bank lending, and a banking sector facing tighter capital and provisioning constraints. Recent cross-country evidence is consistent with this interpretation. Avalos, Doerr and Pinter (2025) show that private credit expands most strongly in systems marked by stringent bank regulation, low policy rates and less efficient banking sectors. From the perspective of credit-rationing and relationship-lending theory, Italy is not a marginal case. It is a setting in which the residual demand for non-bank credit should be especially pronounced (Stiglitz and Weiss, 1981; Petersen and Rajan, 1994).

2.2.2 The Italian regulatory architecture for non-bank lending

The Italian case is also distinctive because the emergence of private debt has been closely connected to regulatory change. Until 2012, the Italian Banking Law - the Testo Unico Bancario, Legislative Decree No. 385/1993 - reserved corporate lending primarily to authorised credit institutions. Legal channels through which non-bank lenders could provide credit directly to Italian companies were therefore highly constrained. The private debt market did not develop simply as a spontaneous market response to investor demand; it was enabled by legislative reforms that progressively opened the supply of non-bank credit.

The first important step was the Decreto Sviluppo - Decree-Law No. 83/2012 - usually referred to as the Minibond Reform. This reform removed important obstacles to bond issuance by unlisted SMEs, including by extending to non-listed issuers a more favourable tax treatment previously associated with listed companies: deductibility of interest subject to the relevant thin-capitalisation rules, exemption from withholding tax on certain cross-border interest payments, and access to the substitute-tax regime for security issuance costs (Gervasoni, 2014). The 2014 Decreto Competitività - Decree-Law No. 91/2014 - broadened the range of eligible instruments, allowed insurance companies and securitisation vehicles to subscribe to direct loans, and clarified the regulatory treatment of private credit funds.

The decisive shift came with Decree-Law No. 18/2016, which formally authorised European Alternative Investment Funds to grant loans directly to Italian companies under the supervision of the Bank of Italy, subject to leverage and risk-spreading requirements. Subsequent reforms reinforced the institutional base of the market. The 2017 PIR regime - Piani Individuali di Risparmio - channelled

retail savings into qualifying investment vehicles, including private debt funds. More recently, the EU ELTIF 2.0 reform, applicable from January 2024, has reduced some of the regulatory frictions associated with the cross-border distribution of long-term investment funds and lowered minimum-investment thresholds.

Taken together, these reforms created the institutional conditions for a market that had previously been only weakly developed. Direct-lending volumes recorded by AIFI rose from approximately €0.5 billion in 2016 to €4.96 billion in 2024 (AIFI, 2025). Public and quasi-public investors have also played an important role. Cassa Depositi e Prestiti, Mediocredito Centrale and SACE have acted, in different ways, as anchor investors or supporting institutions in the development of private credit channels, performing a role comparable to that played by the European Investment Fund in the broader European SME finance architecture (Kraemer-Eis et al., 2022).

2.2.3 International comparators

The Italian market is best understood in comparative perspective. It differs from the US and UK private credit markets not only in scale, but also in structure, institutional origin and borrower profile.

The US private credit market is much larger and more mature. At approximately $1.34 trillion of assets under management by mid-2024, it is at least an order of magnitude larger than the Italian market (Berrospide et al., 2025). It is also closely connected to the private-equity ecosystem. A substantial share of US direct lending takes the form of unitranche loans to private-equity-sponsored borrowers, often in connection with leveraged buyouts, dividend recapitalisations and other sponsor-led transactions. Block et al. (2024) and Jang (2024) report that much of the surveyed direct-lending market involves PE-sponsored firms, while Haque, Mayer and Stefanescu (2025) show that the typical US private debt borrower is larger, more highly levered and more often loss-making than the typical bank borrower. The Italian market is different. AIFI transaction data point to a materially less sponsor-driven market, with senior and amortising facilities, together with minibond-style instruments, playing a more visible role than in mature unitranche-dominated markets.

The UK occupies an intermediate position. It is the second-largest private credit market in Europe and, like the US, is heavily connected to private equity. The Deloitte UK and European Private Debt Deal Tracker shows that the great majority of recorded transactions are associated with PE-backed assets, and that unitranche structures dominate transaction counts. At the same time, the UK has used public-policy institutions to push private credit further down the firm-size distribution. The British Business Bank's fund-of-funds model has channelled capital into managers willing to lend below the natural commercial floor of the larger unitranche market, thereby addressing the smaller end of the SME finance gap more directly than would be expected from purely commercial fund allocation (British Business Bank, 2025).

Germany and France offer further points of comparison. Germany shares with Italy a large SME and mid-market corporate base, but its financing system has also been shaped by the Schuldscheindarlehen tradition, which has historically provided an alternative private-placement channel for larger Mittelstand firms. France sits between Italy and the UK. Its market has been shaped by the Loi PACTE, the role of Bpifrance as an anchor investor, and a more developed euro-PP market.

Italy is therefore distinctive in three respects. First, the depth of bank dependence and the scale of the private SME sector create substantial latent demand for non-bank credit. Second, the supply of private debt has been opened largely through explicit legislative reform rather than through the organic development of a sponsor-led private-credit ecosystem. Third, the market is more oriented towards non-sponsored growth finance for mid-market industrial firms than towards the LBO-driven structures that dominate much of the US and UK evidence. The Italian borrower profile is therefore not an artefact of sponsor selection, making Italy an informative setting in which to test whether the borrower-selection patterns identified in mature private-credit markets reflect general contracting responses to credit-market frictions or market-specific institutional arrangements.

2.3 Credit-market frictions, contracting arrangements, and private debt borrower selection

Private debt is best understood as a specialised contracting arrangement that emerges when standard banking and public-debt markets are incomplete. The four mechanisms below - drawn from credit-rationing, collateral, intermediation and contracting theory - together identify a bounded intermediate segment of the corporate credit market and characterise the firm-level profile of borrowers within it. The hypotheses in Section 2.4 are observable implications of these four mechanisms.

Mechanism	Theoretical foundation	Implication for PD borrower selection
(i) Credit rationing under information asymmetry	Stiglitz and Weiss (1981); Petersen and Rajan (1994); Berger and Udell (1998, 2006)	Banks ration credit where borrower quality is hard to observe and risk cannot be fully priced through standardised lending. The marginal rationed borrower is riskier and more opaque than the marginal funded borrower but is not in distress. PD borrowers should accordingly be riskier and less standard than bank-only borrowers, but not at the distress end of the distribution.
(ii) Collateral and asset tangibility	Bester (1985); Besanko and Thakor (1987); Lian and Ma (2021)	Collateral acts as a separating mechanism in equilibrium credit contracts: highly collateralised firms can be served cheaply by banks, while firms with no pledgeable collateral cannot be screened at all. The residual demand that PD funds can profitably serve consists of borrowers with *intermediate* tangibility — sufficient to provide downside protection, insufficient to be priced by collateral-based lenders.
(iii) Transaction costs and monitoring scale economies	Diamond (1984); Holmström and Tirole (1997); Williamson (1988)	Bespoke due diligence, structuring, and post-investment covenant monitoring involve fixed costs that must be amortised across the loan. PD borrowers should therefore be sufficiently large to make this monitoring economic, but not so large that cheaper bank syndication or public debt-market alternatives dominate.
(iv) Cash-flow contracting	Lian and Ma (2021); Block et al. (2024); Jang (2024); Holmström and Tirole (1997)	Direct lenders underwrite repayment capacity using forward-looking cash-flow assessment, covenants, and intensive monitoring rather than relying solely on collateral. PD borrowers should therefore have positive and stable operating cash flows; persistently loss-making firms should be systematically avoided.

The unifying model is that PD funds finance contractible but non-standard borrowers: firms whose risks can be priced, structured, monitored and controlled through private contracts, but which fall outside the standardised template of bank or public-debt markets. The four mechanisms above each contribute one dimension to this characterisation, and the empirical hypotheses test their joint implications.

A small but rapidly growing empirical literature has begun to test components of this model, almost exclusively on US data and overwhelmingly on PE-sponsored transactions. Chernenko, Erel and Prilmeier (2022) show that US firms borrowing from non-banks are systematically those for which bank lending has become more regulated and constrained - namely, more highly levered, less profitable and more reliant on intangible assets. Loumioti (2022) shows that direct lenders step in

when bank-loan and securitised-debt issuance weakens, providing credit to borrowers with limited financing alternatives. Davydiuk, Marchuk and Rosen (2024) document that Business Development Companies - the principal US vehicle for retail private credit - substitute for traditional lenders along the dimensions where bank regulation bites hardest. Jang (2024) and Jang, Kim and Sufi (2025) show, using regulatory data, that direct lenders impose stricter protective covenants than banks and serve borrowers more concentrated in intangible-capital industries. Avalos, Doerr and Pinter (2025) extend this finding cross-country: in the BIS sample, private credit grows fastest in countries with stringent banking regulation, low policy rates and a less efficient banking sector. Cai and Haque (2024) document that US private debt borrowers pay a meaningful spread premium over comparable syndicated leveraged-loan borrowers, consistent with the higher contracting and monitoring intensity of direct lending. Recent FDIC research (Haque, Mayer and Stefanescu, 2025) reconciles substitution and complementarity: PD substitutes for banks' riskier term loans while complementing banks' provision of liquidity through credit lines.

European evidence is sparse but qualitatively consistent. Block et al. (2024) survey European GPs and report a strong preference for medium-cyclicality manufacturing and for borrowers with low-to-medium profitability and stable cash flows; Buchner et al. (2024) document the role of PE sponsorship in European deal flow; McGeown, Power and Shinnick (2025) provide Irish SME evidence consistent with non-bank lending acting as a substitute for SME bank debt. The British Business Bank's (2025) interim evaluation of UK debt funds documents a strong concentration of PD activity in mid-sized firms and a heavy emphasis on cash-flow predictability among fund managers.

What this evidence base has yet to do is test the four mechanisms jointly in a setting where firm-level data on the entire borrower population are available, the sample is not dominated by sponsor-backed transactions, and the institutional environment provides identifying variation in the supply of non-bank credit. The Italian setting allows all three. Wilson, Amini and Wright (2022) provide a methodological precedent in private equity by using a similarly structured population sample to characterise the equilibrium private-equity target. The present paper extends this profiling approach to private debt and connects the resulting estimates to the four-mechanism framework above.

2.4 Private debt targets: the development of hypotheses

The four mechanisms in Section 2.3 jointly characterise the equilibrium PD borrower as contractible but non-standard. This characterisation is translated into six testable hypotheses on size, profitability, cash-flow stability, asset tangibility, default risk and sectoral composition. Each hypothesis is mapped to the underlying mechanism and allows for a non-linear specification: the mechanisms imply floor and ceiling effects, because firms below the relevant floor are uneconomic to monitor or impossible to screen, while firms above the ceiling are better served elsewhere. Most predicted relations are therefore inverted-U shaped rather than monotone.

H1 (Size) - mechanism (iii). Delegated-monitoring theory (Diamond, 1984; Holmström and Tirole, 1997) implies that the fixed costs of due diligence, structuring and ongoing covenant monitoring create a minimum efficient borrower size below which the per-loan profitability of the intermediary is negative. At the upper end, large firms have alternative access to syndicated bank credit and public bond markets, which intermediate at lower marginal cost because information-production costs are lower.

> **H1.** The probability of receiving private debt financing increases with firm size over the SME and middle-market range, attenuating for very large firms with access to cheaper bank-syndication or public-debt alternatives.

H2 (Profitability) - mechanisms (i) and (iv). Pecking-order theory (Myers and Majluf, 1984) predicts that highly profitable firms self-finance and avoid information-sensitive external financing.

Conversely, persistently loss-making firms cannot credibly service debt at any feasible interest rate, and credit-rationing models (Stiglitz and Weiss, 1981) imply that they are rationed out of the lender's optimal contract. The substitution result of Chernenko, Erel and Prilmeier (2022) sharpens this prediction in the PD-versus-bank context: PD lenders may accept moderately profitable borrowers that banks reject, but they cannot price persistent losses any more than banks can.

> **H2.** The probability of PD financing displays an inverted-U relation with profitability: PD lenders avoid both persistently loss-making firms and the most profitable firms, which self-finance or borrow more cheaply elsewhere. A binary loss indicator should carry a strong negative effect.

H3 (Cash-flow stability) - mechanism (iv). In Holmström and Tirole's (1997) model of intermediated finance, the lender's ability to substitute monitoring for collateral relies on the borrower's pledgeable income: the share of cash flows that can credibly be committed to debt service. Volatile cash flows reduce pledgeable income and tighten the borrowing constraint (Lian and Ma, 2021). Cash-flow-based lending therefore favours borrowers with stable, predictable cash flows, in contrast to asset-based bank lending, which is anchored on collateral values.

> **H3**. The probability of PD financing decreases with the volatility of operating cash flows; PD lenders prefer firms with a stable, predictable cash-flow record.

H4 (Asset tangibility) - mechanism (ii). The role of asset tangibility in PD selection is the paper's sharpest test of the contractible-but-non-standard logic. In the classical collateral-as-screening framework (Bester, 1985; Besanko and Thakor, 1987), collateral acts as a separating device: high-tangibility borrowers can be priced cheaply by banks, while borrowers with no pledgeable collateral cannot be screened at all and are excluded from every contract that requires partial security. Lian and Ma (2021) document that, even in the US, only around 20% of non-financial corporate debt is collateralised by physical assets and roughly 80% is cash-flow-based, with the cash-flow share rising systematically with size and away from asset-heavy sectors. PD funds - characterised by Block et al. (2024), Jang (2024), and Haque, Mayer and Stefanescu (2025) as predominantly cash-flow lenders - therefore find their natural niche at intermediate tangibility: high enough to provide downside protection in covenant negotiations and recoveries, but low enough that traditional collateral-based lenders do not undercut them. Both extremes are unattractive. Zero-tangibility firms cannot be partially secured at all, while asset-heavy firms in real estate, construction and asset finance are well served by traditional secured bank lending.

> **H4.** The probability of PD financing is highest among firms with intermediate levels of asset tangibility. The relation is inverted-U shaped: firms with no tangible assets lack sufficient downside protection and are systematically excluded, while highly collateralised firms are more easily served by traditional bank credit. A binary indicator for zero tangible assets should carry a strong negative effect.

H5 (Default risk) - mechanism (i). Stiglitz and Weiss's (1981) credit-rationing equilibrium predicts that, at the bank's threshold interest rate, the marginal rationed borrower has higher default risk than the marginal funded borrower. Non-bank intermediaries that substitute monitoring for the bank's collateral- and reputation-based screening can in principle serve some, but not all, of the rationed segment: beyond a certain default-risk threshold, the cost of expected restructuring and renegotiation outweighs the lender's monitoring premium, and even direct lenders decline. Chernenko, Erel and Prilmeier (2022) and Jang (2024) provide direct empirical support: PD borrowers are significantly riskier than bank-only borrowers but cluster well below the distress thresholds occupied by special-situations and turnaround capital.

H5. The probability of PD financing is non-linear in firm default risk: PD lenders accept moderately higher default risk than banks but decline beyond the point at which risk ceases to be contractible through pricing and covenants.

H6 (Sector) - mechanisms (iii) and (iv). The combination of cash-flow-based lending and intensive monitoring favours sectors with predictable, contractually anchored revenue streams and limited exposure to the working-capital cycle, while disfavouring sectors with high cyclicality, long real-estate investment cycles or asset-substitution problems. Williamson's (1988) corporate-finance and asset-specificity arguments imply that sectors with general-purpose, redeployable assets are more easily served by both bank and non-bank lenders, while sectors with specialised assets benefit disproportionately from the bespoke contracting that PD provides.

H6. Sectoral composition systematically influences the probability of PD financing, with PD more likely in sectors where cash flows are predictable and bespoke monitoring can substitute for collateral, and less likely in sectors naturally served by asset-backed bank lending or exposed to high cyclicality.

3. Method and research design

To identify the market segment pursued by private debt lenders, the paper estimates how firm characteristics affect the probability of receiving PD funding, allowing for non-linearities in profitability, cash flow, size, asset tangibility and default risk. The approach is designed to distinguish the firms most likely to attract private debt from the broader Italian corporate population, and to assess whether their profile is consistent with the contractible-but-non-standard borrower described in Section 2.

3.1 Data and sample

The empirical analysis constructs a dataset containing firm-level information and private debt deal data for companies in Italy. The firm population is taken from the Orbis historical database and covers all available Italian company-year observations from 2013 to 2023, extracted from the December 2024 bulk dataset. In addition to accounting data, the dataset includes industry classification, location and company status.

The key additional element is information on private debt transactions. Because private debt deals are often not publicly disclosed, the paper uses an anonymised proprietary dataset of direct-lending transactions held by AIFI. AIFI compiles these records through an annual survey of member and non-member private debt funds active in Italy, and supplements them with deals identified from commercial databases and the trade press. The dataset therefore captures close to the full universe of direct-lending transactions in Italy over the sample period.

From an initial sample of more than 500 private debt transactions, the analysis is restricted to firms receiving their first private debt financing. Multiple tranches relating to the same deal are consolidated, and observations with missing tax codes are excluded. This produces a sample of 373 firms receiving first-time direct-lending finance, which is then matched to the Orbis company population using the unique firm identifier. The main estimation sample contains 10,182,495 company-year observations. For each company receiving private debt funding, the sample contains only one observation: the year immediately preceding the funding year.

3.2 Descriptive statistics

Table 1 presents the annual distribution of firms in the sample between 2013 and 2023, distinguishing between those that obtained private debt financing ("Yes") and those that did not

("No"). The dataset comprises a total of 10,182,495 firm-year observations, of which only 373 correspond to firms receiving private debt funding. This represents a small share of the population, highlighting the rarity of private debt transactions among Italian firms during the period. The number of PD-funded firms shows modest fluctuations across years, ranging from a low of 16 in 2013 to a peak of 58 in 2020.[6] Figure 1 offers a graphical overview of the number of deals. In contrast, the number of non-funded firms remains stable and large throughout the period, reflecting the consistency of the underlying population of firms in the database.

[Insert Table 1 and 2 here]

Table 2 provides descriptive statistics comparing the companies funded by private debt with those that were not funded across a range of financial and industry characteristics. The table reports mean, standard deviation, and distributional moments (minimum, median, and maximum) for each variable for the whole sample, together with tests of differences in means (t-tests) and standardized differences (Cohen's d). Across the full sample, firms have an average log total asset value of 12.8, indicating a broad range of firm sizes. However, PD firms are substantially larger—mean (median) total assets of EUR 180 (30) million vs. EUR 8 (0.38) million. This result indicates that private debt is predominantly accessed by larger firms within the corporate population.

In terms of profitability and risk, PD-funded firms exhibit slightly higher ROA (mean ROA 2.4% vs. 0.7%) and are less likely to report losses (17% versus 34%), both statistically significant. They also display less volatile cash flows (mean of 1.00 compared to 1.59), consistent with the idea that private debt investors target financially stable firms. The PD-funded firms have fewer cases of no tangible assets (4% vs 21%), suggesting that asset tangibility may play a role in securing private debt financing. The small but significant differences in the probability of default show that PD-funded firms are slightly riskier.

Industry composition reveals that private debt is highly concentrated in manufacturing, which represents more than half of the PD funded firms (52%), compared with only 14% in the sample of non-funded firms. Conversely, PD funded firms are underrepresented in construction, retail, and real estate, sectors that tend to exhibit higher volatility and lower collateral quality. Significant differences also emerge in a few smaller sectors (e.g., mining, water supply, information, arts, and other services), though these are less economically important.

Overall, the descriptive statistics indicate that firms obtaining private debt financing are larger, with evidence of profitability, are riskier, and have medium levels of intangible assets than their peers. They are also concentrated in capital-intensive sectors such as manufacturing, aligning with the expectation that private debt providers prefer established firms with tangible assets and predictable cash flows. These patterns provide an important baseline for the empirical analysis that follows, suggesting that firm characteristics and industry affiliation play a major role in determining access to private debt markets and that the target market for PD funds is very nuanced.

3.3 Variables and methodology

The aim of this paper is to profile recipients of private debt funding and therefore the dependent variable is defined as an indicator of funding. Independent variables are specified in line with the proposed hypotheses. To capture the effect of firm size (H1), we use the natural logarithm of total assets. A quadratic term is included to address potential non-linear effects. Profitability (H2) is represented by return on assets (ROA), supplemented by its squared term to account for nonlinearities. An indicator for loss-making firms is added to assess PD funders' willingness to finance such entities. Cash flow volatility (H3) is measured by the absolute value of the coefficient of variation in cash flows over the preceding five-year period. Its quadratic term is also incorporated. The role of tangible assets (H4) is operationalized through the ratio of tangible assets to total assets,

[6] We have just one private debt deal for 2023 in our main estimation sample and this is because of incomplete coverage of year 2023, due to financial reporting lags, in our bulk dataset from Orbis that was extracted as of December 2024.

along with its squared term. An indicator for firms with no tangible assets is also included. Firm-level credit risk (H5) is represented by the predicted probability of default calculated based on the model described in Appendix A2, along with its quadratic term. Finally, we examine industry differences (H6), employing two-digit NACE codes to classify industry sections. All models control for industry, regional, and time fixed effects. Variable definitions and further construction details are provided in Appendix A1.

To test our hypotheses, we employ multivariate binary logistic regression models that determine PD funding. Logistic regression is a conditional probability function, where the probability of funding is determined by a set of several covariates and the respective vectors of coefficients β that measure the effects of the independent variables on probability of PD funding. We use the following equation:

$$P(\Omega_t) = 1/\{1 + exp\ exp\left[-\left(\alpha + X_{i,t}\beta + FE_{i,t}\right)\right]\} \quad (1)$$

where $Y_{i,t+1}$ is the indicator of PD funding, $X_{i,t}$ is the vector of independent variables and $FE_{i,t}$ are fixed effects. The temporal specification of the model, where the dependent variable is forwarded one year into the future, mitigates potential endogeneity concerns.

4. Empirical results

The results of the multivariate logit analysis reveal that PD investors in Italy systematically target larger, moderately profitable, and riskier firms with intermediate levels of asset tangibility, while avoiding loss-making, excessively risky, or highly collateralized borrowers.

Table 3 reports logistic panel regression estimates for the full sample of all firms, estimating the likelihood of receiving private debt (the dependent variable is an indicator of PD funding) using logit specifications that progressively add firm fundamentals, risk, asset structure, and industry composition, with region and year fixed effects throughout.

[Insert Table 3 here]

In Model 1 (Table 3), the coefficient on Total Assets (log) is positive and statistically significant at the 1 percent level, confirming H1 and indicating that private debt (PD) investors favour larger firms.

In Model 2, where a quadratic term is introduced to test for non-linear effects, the coefficient on Total Assets (log) remains positive, while the squared term is negative and significant. This pattern reveals an inverted U-shaped relationship between firm size and the likelihood of obtaining PD financing. The estimated inflection point—approximately €900 million in total assets (calculated as exp(5.732 / (−2 × −0.139))—lies well above the 99th percentile of Italian firms, implying that, for nearly the entire population, the relationship is effectively monotonically positive. This pattern indicates that the likelihood of receiving PD initially rises with firm size, but the marginal effect diminishes for very large firms. Finally, in the comprehensive specification (Model 15), which simultaneously includes all hypothesized firm characteristics, the coefficient on firm size remains positive and highly significant, confirming the robustness of the result across model specifications.

In economic terms, this pattern implies that PD funds target the mid- to upper mid-market segment: firms that are sufficiently large to justify the fixed costs of due diligence, monitoring, and customized structuring, yet not so large as to have access to cheaper or more standardized sources of financing such as syndicated bank loans or public bond markets. This interpretation is consistent with prior evidence showing that medium-sized enterprises are the most active non-bank borrowers, while small firms are constrained by informational opacity and high relative monitoring costs, and very large firms can access capital-market financing or syndicated bank credit (Berger and Udell, 1998; Ferrando and Mavrakis, 2017; Harrison et al., 2022; Owen et al., 2022; Block et al., 2024; Jang, 2024;

Erel and Inozemtsev, 2025; McGeown et al., 2025). Banks, under regulatory pressure, have indeed shifted lending to larger and safer borrowers (Cortés et al., 2020).

In Model 3 (Table 3), the coefficient for Return on Assets (ROA) is positive but statistically insignificant, suggesting no evident linear relationship between profitability and the likelihood of obtaining private debt (PD) financing. This finding suggests that, on average, higher profitability does not systematically enhance the probability of securing PD. In Model 4, we introduce a dummy variable indicating loss-making firms (ROA < 0), on the premise that such companies are less appealing to PD investors. The estimated coefficient is negative and statistically significant, confirming that firms with negative profitability are considerably less likely to obtain PD funding. Model 5 further investigates possible non-linear effects by including a quadratic term for ROA. The coefficient on ROA^2 is negative and highly significant, and the calculated inflection point (approximately -0.14) is near zero, suggesting that PD funds are most inclined to finance companies exhibiting small positive profitability. Conversely, the likelihood of securing funding decreases for both highly profitable and loss-making firms.

From an economic perspective, PD funds are expected to avoid non-profitable companies, as market practitioners have confirmed. When a company's profitability is negative, investors typically must incorporate insurance-type clauses or credit protection mechanisms, which elevate transaction costs and ultimately diminish net returns. However, highly profitable firms are seldom targeted by PD funds, likely because they face greater competition from other financing sources, such as banks or capital markets (Zawadowski and Albuquerque, 2025), and have less incentive to accept the higher interest costs of private debt. Additionally, PD funds often finance firms with projects expected to enhance profitability over time. Thus, PD firms do not only assess initial profitability but also consider the firm's business plan and future potential.

In the comprehensive specification (Model 15), the dummy variable for loss-making firms remains negative and statistically significant. In contrast, the linear and quadratic terms for profitability lose their significance once all firm characteristics are considered together. This finding reinforces the notion that the critical threshold for selecting profitability determinants is the avoidance of losses, rather than sensitivity to incremental differences in positive profitability. Overall, these results provide partial confirmation of Hypothesis 2: PD investors favor profitable firms, but not excessively so, and they systematically avoid financing firms with negative profitability.

In Model 6, the coefficient for cash flow volatility - defined as the absolute value of the coefficient of variation of cash flows - is negative and highly significant. This finding indicates that companies with more volatile cash flows are less likely to secure private debt (PD) funding. These results support Hypothesis 3, suggesting that PD investors prefer firms with stable cash flows. In Model 7, which includes a quadratic term to investigate potential non-linear effects, the coefficient for the squared term is positive and significant. This finding implies a decreasing yet non-linear relationship: while the probability of obtaining PD funding declines with increasing volatility, the impact diminishes at extreme levels. Notably, the inflection point (approximately 5.45) lies above the 90th percentile of cash flow volatility, indicating that, for the vast majority of companies, the relationship remains consistently negative, consistent with our hypothesis. These results confirm that PD investors prioritize the borrower's ability to generate reliable, recurring cash flows over collateral availability (Block et al., 2024; Cumming et al., 2019). By focusing on cash-flow-based lending, PD funds can better assess debt serviceability and reduce default risk. However, in the full specification (Model 15), the coefficient for cash flow volatility loses its statistical significance when all firm characteristics are considered simultaneously. This attenuation likely reflects the shared explanatory power between cash flow stability and profitability or size, which also capture aspects of firm performance and financial resilience.

In Model 8 (Table 3), where the proportion of tangible assets to total assets is used as the test variable, the coefficient is negative but statistically insignificant, suggesting no clear linear relationship between asset tangibility and the likelihood of receiving PD funding. When we include

in Model 9 a dummy identifying firms with no tangible assets, the coefficient becomes negative and statistically significant, indicating that companies entirely lacking tangible collateral are less likely to receive PD financing. However, in the same specification, the continuous measure of tangibility becomes statistically significant and negative, implying that, among firms with at least some tangible assets, the probability of PD funding decreases as tangibility rises, consistently with H4.

To explore potential non-linear effects, Model 10 introduces a squared term for asset tangibility. Both the linear and quadratic coefficients are statistically significant, revealing an inverted U-shaped relationship between asset tangibility and the likelihood of PD financing. This indicates that PD investors target firms with intermediate levels of tangibility: the probability of PD funding initially increases with tangibility, but it begins to decline beyond the inflection point of approximately 0.29, roughly corresponding to the third quartile of the distribution. For most firms, therefore, the relationship remains consistent with H4, confirming that PD investors are more likely to fund companies with relatively lower collateral intensity. In the comprehensive specification (Model 15), the 'no tangible assets' dummy remains significant; the nonlinearity persists via a significant negative square term, while the linear term is not significant.

Economically, these results indicate that PD investors target a specific range of asset tangibility, avoiding both highly intangible firms, which lack sufficient collateral protection in default scenarios, and highly tangible ones, which are more easily served by traditional bank credit. This investment strategy is consistent with Jang (2024), who documents that direct loans involve fewer borrowing-base restrictions than bank loans, and with Block et al. (2024), who show that PD investors often finance firms with insufficient collateral to access syndicated bank credit.

In Model 11 we test H5 using the predicted probability of default as a proxy for firm risk. The coefficient on this variable is positive and statistically significant, while its squared term is negative and significant, indicating an inverted U-shaped relationship between firm risk and the likelihood of obtaining PD funding. The probability of PD financing therefore increases with firm risk up to a moderate level, but declines beyond an inflection point of approximately 0.00071—between the median and the third quartile of the sample distribution. This suggests that PD funds operate in the riskier segment of the borrower spectrum while avoiding excessively risky firms. In the comprehensive specification (Model 15), both the linear and quadratic terms remain statistically significant, confirming the robustness of this non-linear relationship even after controlling for size, profitability, asset tangibility, and cash-flow stability. From an economic perspective, these results suggest that PD investors are willing to lend to firms with higher default probabilities, riskier than those financed by banks (Carey et al., 1998; Chernenko et al., 2022; Erel and Inozemtsev, 2025). However, this risk-taking is bounded: beyond a certain level of default probability, firms become too risky to fit within PD funds' investment mandates. In such cases, the expected cost of covenant breaches and restructurings may outweigh potential returns, especially since direct loan borrowers are more likely to violate covenants than bank borrowers (Jang, 2024).

Across Models 1–15, we find consistent evidence supporting H6. Compared with the reference group of retail and wholesale trade, firms in the manufacturing, information, and human health sectors are most likely to obtain PD funding, whereas firms in the real estate sector are significantly less likely to do so. This behavior reflects the risk-return logic of cash-flow-based lending, where funds avoid sectors with high exposure to cyclical shocks. The evidence aligns with prior findings that PD funds target sectors offering resilient margins and moderate growth potential (Böni and Manigart, 2022; Block et al., 2024; Buchner et al., 2024).

5. Conclusions

This paper provides the first large-scale firm-level analysis of private debt financing in Italy and addresses a clear gap in the literature. Prior research on PD has largely focused on fund-level returns,

contracting and aggregate market behaviour, with limited evidence on the borrower side, especially in European contexts. By merging proprietary direct-lending transactions with more than ten million firm-year observations, the analysis identifies the firm profile most likely to attract PD funding.

The Italian evidence should not be read as implying that private debt markets are identical across countries. It suggests instead that the core selection mechanism is portable. PD funds tend to finance firms whose risks are too complex or insufficiently collateralised for standard bank lending but sufficiently contractible, after due diligence, for private monitoring. Market size, legal institutions, bank competition and fund maturity will affect the scale and form of this activity, but the underlying borrower profile is consistent with the broader international evidence on direct lending and private credit.

The results contrast sharply with evidence from the US and UK. The US PD market is structurally a leveraged-buyout-finance market in which the great majority of direct-lending transactions are PE-sponsored. The Italian PD borrower identified here - mid-sized, moderately profitable, intermediate-tangibility, intermediate-risk and less sponsor-dominated than the US and UK profile - reflects a different equilibrium use of the PD instrument: not primarily LBO leverage, but growth finance for the upper mid-market. The implications of the US literature on the financial-stability properties of PD therefore do not transfer mechanically to the Italian context. The UK, which sits closer to the US in deal structure but has used public co-investment to address the small-firm access problem (British Business Bank, 2025), illustrates a policy stance that the Italian setting could adapt. The findings suggest that Italy already has the institutional foundations to formalise a public co-investment vehicle dedicated to direct-lending funds operating at smaller deal sizes.

If policymakers wish private debt to reach smaller and more informationally opaque firms, the binding constraint is the fixed cost of underwriting and monitoring, not the aggregate supply of capital. Three policy measures with established precedents follow. First, public co-investment vehicles can act as anchor investors in funds committed to smaller deal sizes, sharing the fixed cost of operating in this segment. Second, partial first-loss guarantees on diversified direct-lending vehicles can lower the effective cost of capital for smaller borrowers without displacing commercial funds active in the upper mid-market. Third, aligning the tax and regulatory treatment of direct lending with adjacent instruments - minibonds and private placements - can remove wedges that raise the underwriting cost of smaller deals. Standardised documentation for smaller transactions would complement these measures. The objective is to extend the contractible segment of the credit market by lowering underwriting and monitoring costs, not to subsidise risk indiscriminately.

The central finding is that private debt funds do not simply finance “risky firms” or “asset-light firms”; they finance firms whose risks are contractible. The typical Italian PD borrower is large enough to absorb monitoring costs, profitable enough to service debt, risky or non-standard enough to fall outside the lowest-cost bank segment, sufficiently but not excessively collateralised, and concentrated in sectors where cash flows are predictable. This is a bounded intermediate space in the corporate credit market - distinct from both the lowest-risk segment served by traditional bank credit and the highest-risk segment served by special-situations capital - and identifying it is the principal theoretical contribution of the paper.

Table 1 Breakdown of the main estimation sample

	Private debt		
Year	No	Yes	Total
2013	970,304	16	970,320
2014	977,284	31	977,315
2015	993,320	30	993,350
2016	1,008,622	38	1,008,660
2017	1,030,312	24	1,030,336
2018	1,054,970	55	1,055,025
2019	1,082,625	49	1,082,674
2020	1,085,264	58	1,085,322
2021	1,088,719	32	1,088,751
2022	886,788	39	886,827
2023	3,914	1	3,915
Total	10,182,122	373	10,182,495

Notes:
The table shows the breakdown of company-year observations in the main estimation sample by year and private debt funding. For each company receiving private debt funding, the sample contains only one observation: the year immediately preceding the funding year.

Figure 1 Number of private debt deals in the main estimation sample

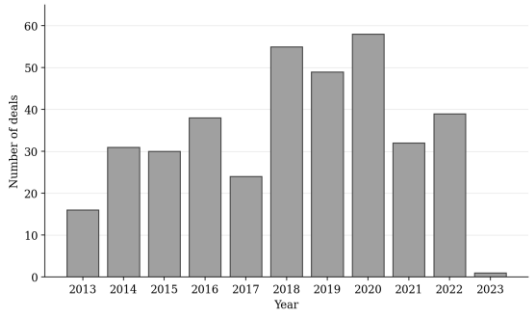


Table 2 Descriptive statistics

Notes:

The table reports descriptive statistics for the estimation sample used in the paper. The sample covers 2013-2023. The "Private debt funded" sample includes the pre-investment year for companies that obtained private debt financing. The "Not funded by private debt" sample includes all company-year observations for companies that did not receive private debt funding in 2013-2023. The table reports statistics for the whole sample and separately for the two subsamples. The penultimate column reports the p-value from the test of the difference in means between the two subsamples. Statistical significance is indicated by asterisks (* p < 10%, ** p < 5%, *** p < 1%). The final column reports the standardised difference between the two group means.

	Whole sample						Private debt funded			Not funded by private debt			PD-funded vs. non-funded	
	N	Mean	SD	Min	Median	Max	N	Mean	Median	N	Mean	Median	t-test	Cohen's d
Total assets (log)	10,180,490	12.802	2.054	0.000	12.854	27.606	373	17.403	17.226	10,180,117	12.802	12.854	0.000***	-2.241
Total assets (EUR thousands)	10,182,495	7,918	798,46 9	0	382	975,683,00 8	373	180,32 3	30,287	10,182,122	7,912	382	0.000***	-0.216
ROA	9,951,151	0.007	0.169	-1.000	0.007	1.000	371	0.024	0.018	9,950,780	0.007	0.007	0.050**	-0.102
Indicator of loss	10,182,495	0.342	0.474	0.000	0.000	1.000	373	0.172	0.000	10,182,122	0.342	0.000	0.000***	0.360
Volatility of cash flows	8,169,236	1.594	2.030	0.134	0.800	8.173	357	1.002	0.570	8,168,879	1.594	0.800	0.000***	0.291
Tangible assets to total assets	10,179,357	0.206	0.283	0.000	0.063	1.000	373	0.192	0.136	10,178,984	0.206	0.063	0.327	0.051
No tangible assets	10,182,495	0.206	0.405	0.000	0.000	1.000	373	0.038	0.000	10,182,122	0.206	0.000	0.000***	0.417
Probability of default	8,441,286	0.048	0.048	0.002	0.030	0.150	358	0.054	0.048	8,440,928	0.048	0.030	0.020**	-0.123
Section A - Agriculture	10,182,495	0.020	0.141	0	0	1	373	0.011	0	10,182,122	0.020	0	0.186	0.069
Section B - Mining	10,182,495	0.002	0.042	0	0	1	373	0.005	0	10,182,122	0.002	0	0.092*	-0.087
Section C - Manufacturing	10,182,495	0.136	0.343	0	0	1	373	0.517	1	10,182,122	0.136	0	0.000***	-1.113
Section D - Electricity/Gas	10,182,495	0.010	0.101	0	0	1	373	0.016	0	10,182,122	0.010	0	0.271	-0.057
Section E - Water Supply	10,182,495	0.006	0.078	0	0	1	373	0.013	0	10,182,122	0.006	0	0.067*	-0.095
Section F - Construction	10,182,495	0.148	0.355	0	0	1	373	0.051	0	10,182,122	0.148	0	0.000***	0.273
Section G - Wholesale/Retail	10,182,495	0.191	0.393	0	0	1	373	0.105	0	10,182,122	0.191	0	0.000***	0.220
Section H - Transportation	10,182,495	0.033	0.180	0	0	1	373	0.021	0	10,182,122	0.033	0	0.197	0.067
Section I - Accommodation	10,182,495	0.065	0.246	0	0	1	373	0.024	0	10,182,122	0.065	0	0.001***	0.165
Section J - Information	10,182,495	0.048	0.213	0	0	1	373	0.067	0	10,182,122	0.048	0	0.077*	-0.092
Section K - Financial	10,182,495	0.021	0.144	0	0	1	373	0.029	0	10,182,122	0.021	0	0.258	-0.059
Section L - Real Estate	10,182,495	0.129	0.335	0	0	1	373	0.011	0	10,182,122	0.129	0	0.000***	0.353
Section M - Professional	10,182,495	0.079	0.270	0	0	1	373	0.064	0	10,182,122	0.079	0	0.296	0.054
Section N - Administrative	10,182,495	0.047	0.212	0	0	1	373	0.038	0	10,182,122	0.047	0	0.387	0.045
Section O - Public Administration	10,182,495	0.000	0.008	0	0	1	373	0.000	0	10,182,122	0.000	0	0.884	0.008
Section P - Education	10,182,495	0.009	0.097	0	0	1	373	0.000	0	10,182,122	0.009	0	0.059*	0.098
Section Q - Human Health	10,182,495	0.022	0.148	0	0	1	373	0.021	0	10,182,122	0.022	0	0.900	0.007
Section R - Arts/Entertainment	10,182,495	0.020	0.138	0	0	1	373	0.003	0	10,182,122	0.020	0	0.019**	0.122
Section S - Other Service	10,182,495	0.012	0.111	0	0	1	373	0.003	0	10,182,122	0.012	0	0.089*	0.088
Section T - Households	10,182,495	0.000	0.002	0	0	1	373	0.000	0	10,182,122	0.000	0	0.965	0.002
Section U - Extraterritorial	10,182,495	0.000	0.005	0	0	1	373	0.000	0	10,182,122	0.000	0	0.916	0.005

Table 3 Main estimation results

The table reports estimation results for the models testing the hypotheses stated in the paper. The models are estimated using logistic regression, with the dependent variable equal to one for companies receiving private debt funding and zero otherwise. For funded companies, the estimation sample includes the observation from the year immediately preceding the funding event. For all other companies, the estimation sample comprises company-year observations from the population of Italian companies over 2013-2023. t-statistics are reported in parentheses, with p-values indicated by asterisks (* p < 10%, ** p < 5%, *** p < 1%).

	Hypothesis H1		Hypothesis H2			Hypothesis H3		Hypothesis H4			Hypothesis H5		All hypotheses		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Total assets (log)	0.838***	5.732***											0.853***	0.850***	6.750***
	(40.91)	(11.75)											(40.03)	(39.73)	(11.60)
Total assets (log) (sq)		-0.139***													-0.168***
		(-9.98)													(-10.10)
ROA			0.370	-1.001**	-1.808**								-0.101	-0.975	-0.420
			(1.10)	(-2.38)	(-2.54)								(-0.15)	(-1.32)	(-0.54)
ROA (sq)					-6.281***										1.769
					(-3.37)										(1.44)
Loss				-0.915***	-0.864***									-0.478***	-0.373**
				(-5.44)	(-5.06)									(-2.67)	(-2.11)
Volatility of cash flows						-0.168***	-0.471***						-0.0689*	-0.0416	0.142
						(-4.10)	(-4.05)						(-1.80)	(-1.09)	(1.20)
Volatility of cash flows (sq)							0.0432***								-0.0220
							(2.87)								(-1.39)
Tangible assets to total assets								-0.0298	-0.558**	2.785***			-0.936***	-1.003***	0.659
								(-0.13)	(-2.28)	(3.60)			(-3.52)	(-3.72)	(0.82)
Tangible assets to total assets (sq)										-4.866***					-3.076***
										(-4.33)					(-2.68)
No tangible assets									-1.774***	-1.559***				-1.551**	-1.419**
									(-6.31)	(-5.44)				(-2.17)	(-1.97)
Probability of default											3.033***	52.76***	4.054***	4.514***	46.90***
											(2.79)	(11.38)	(2.94)	(3.24)	(9.27)
Probability of default (sq)												-371.0***			-305.3***
												(-10.46)			(-8.31)
Section A - Agriculture	-0.302	-0.483	0.0724	0.143	0.103	-0.184	-0.184	0.0519	0.205	0.296	-0.177	-0.202	-0.252	-0.229	-0.305
	(-0.57)	(-0.91)	(0.14)	(0.27)	(0.20)	(-0.31)	(-0.31)	(0.10)	(0.39)	(0.56)	(-0.30)	(-0.34)	(-0.42)	(-0.38)	(-0.50)
Section B - Mining	0.0228	0.706	1.623**	1.666**	1.616**	1.621**	1.630**	1.606**	1.670**	1.571**	1.697**	1.636**	0.145	0.170	1.203*
	(0.03)	(0.97)	(2.23)	(2.29)	(2.22)	(2.23)	(2.25)	(2.21)	(2.30)	(2.16)	(2.34)	(2.25)	(0.19)	(0.22)	(1.65)
Section C - Manufacturing	1.031***	0.876***	1.910***	1.892***	1.872***	1.785***	1.771***	1.896***	1.875***	1.791***	1.884***	1.845***	1.063***	1.069***	0.998***
	(5.78)	(4.92)	(10.69)	(10.58)	(10.47)	(10.07)	(9.98)	(10.67)	(10.55)	(10.02)	(10.53)	(10.31)	(5.85)	(5.88)	(5.43)
Section D - Electricity/Gas	-0.887**	-0.783*	0.184	0.240	0.196	0.352	0.334	0.359	0.605	0.800*	0.294	0.176	-0.882*	-0.838*	-0.379
	(-1.99)	(-1.76)	(0.38)	(0.50)	(0.41)	(0.79)	(0.75)	(0.80)	(1.34)	(1.77)	(0.61)	(0.36)	(-1.82)	(-1.72)	(-0.78)
Section E - Water Supply	0.217	-0.0275	1.423***	1.403***	1.378***	1.332***	1.315***	1.415***	1.451***	1.355***	1.465***	1.445***	0.351	0.343	0.295
	(0.45)	(-0.06)	(2.99)	(2.95)	(2.90)	(2.80)	(2.77)	(2.97)	(3.05)	(2.84)	(3.08)	(3.04)	(0.73)	(0.71)	(0.61)
Section F - Construction	-0.421	-0.383	-0.432	-0.370	-0.381	-0.321	-0.310	-0.448	-0.286	-0.282	-0.310	-0.302	-0.192	-0.119	0.0974
	(-1.50)	(-1.36)	(-1.54)	(-1.32)	(-1.35)	(-1.15)	(-1.11)	(-1.60)	(-1.02)	(-1.01)	(-1.10)	(-1.08)	(-0.68)	(-0.42)	(0.34)
Section H - Transportation	-0.531	-0.418	0.198	0.197	0.184	0.155	0.153	0.179	0.201	0.140	0.178	0.153	-0.400	-0.385	-0.0604
	(-1.35)	(-1.07)	(0.51)	(0.51)	(0.47)	(0.40)	(0.39)	(0.46)	(0.52)	(0.36)	(0.46)	(0.39)	(-1.01)	(-0.97)	(-0.15)
Section I - Accommodation	0.00461	0.0350	-0.332	-0.253	-0.239	-0.286	-0.279	-0.371	-0.309	-0.335	-0.338	-0.301	0.475	0.557	1.173***
	(0.01)	(0.09)	(-0.90)	(-0.68)	(-0.64)	(-0.77)	(-0.75)	(-0.99)	(-0.83)	(-0.90)	(-0.91)	(-0.81)	(1.23)	(1.45)	(3.00)
Section J - Information	1.113***	1.340***	0.945***	0.973***	1.013***	0.942***	0.948***	0.919***	0.971***	1.000***	0.996***	1.104***	1.183***	1.237***	1.596***
	(4.26)	(5.16)	(3.66)	(3.77)	(3.93)	(3.67)	(3.69)	(3.58)	(3.78)	(3.90)	(3.86)	(4.28)	(4.49)	(4.69)	(6.09)

Section K - Financial	-2.170***	-1.218***	0.847**	0.945***	0.961***	0.359	0.382	0.820**	1.344***	1.387***	0.643	0.850*	-0.522	-0.386	0.0612
	(-5.96)	(-3.43)	(2.47)	(2.75)	(2.80)	(0.75)	(0.80)	(2.39)	(3.89)	(4.01)	(1.35)	(1.78)	(-1.07)	(-0.79)	(0.13)
Section L - Real Estate	-2.092***	-2.173***	-1.897***	-1.804***	-1.853***	-1.861***	-1.867***	-1.910***	-1.642***	-1.417***	-1.758***	-1.749***	-1.502***	-1.370**	-1.055**
	(-3.98)	(-4.13)	(-3.61)	(-3.43)	(-3.52)	(-3.54)	(-3.55)	(-3.60)	(-3.08)	(-2.67)	(-3.34)	(-3.32)	(-2.81)	(-2.56)	(-1.97)
Section M - Professional	0.182	0.146	0.350	0.397	0.445*	0.281	0.298	0.329	0.460*	0.481*	0.287	0.433	0.236	0.311	0.567*
	(0.69)	(0.56)	(1.34)	(1.52)	(1.70)	(1.04)	(1.10)	(1.27)	(1.77)	(1.85)	(1.04)	(1.56)	(0.82)	(1.07)	(1.95)
Section N - Administrative	0.523*	0.597*	0.439	0.464	0.485	0.396	0.408	0.410	0.497	0.492	0.480	0.555*	0.581*	0.616*	0.896***
	(1.66)	(1.90)	(1.40)	(1.48)	(1.55)	(1.24)	(1.27)	(1.31)	(1.59)	(1.58)	(1.53)	(1.77)	(1.78)	(1.89)	(2.76)
Section Q - Human Health	0.934**	0.842**	0.695*	0.730*	0.754*	0.672*	0.681*	0.671*	0.684*	0.632	0.710*	0.834**	1.073***	1.097***	1.115***
	(2.40)	(2.15)	(1.79)	(1.88)	(1.94)	(1.73)	(1.75)	(1.73)	(1.76)	(1.62)	(1.83)	(2.14)	(2.74)	(2.80)	(2.83)
Section R - Arts/Entertainment	-0.783	-0.695	-1.297	-1.208	-1.156	-1.252	-1.228	-1.340	-1.261	-1.293	-1.260	-1.104	-0.593	-0.519	-0.249
	(-0.77)	(-0.68)	(-1.28)	(-1.19)	(-1.14)	(-1.24)	(-1.21)	(-1.32)	(-1.24)	(-1.28)	(-1.24)	(-1.09)	(-0.59)	(-0.51)	(-0.25)
Section S - Other Service	0.170	0.369	-0.788	-0.742	-0.700	-0.749	-0.742	-0.838	-0.788	-0.859	-0.780	-0.689	0.445	0.489	1.034
	(0.17)	(0.36)	(-0.78)	(-0.73)	(-0.69)	(-0.74)	(-0.73)	(-0.83)	(-0.78)	(-0.85)	(-0.77)	(-0.68)	(0.44)	(0.48)	(1.02)
Constant	-23.95***	-66.41***	-11.68***	-11.42***	-11.34***	-11.26***	-11.07***	-11.67***	-11.45***	-11.66***	-11.71***	-12.63***	-24.17***	-24.04***	-76.50***
	(-51.77)	(-15.56)	(-37.80)	(-36.67)	(-36.35)	(-36.04)	(-34.69)	(-37.77)	(-37.03)	(-37.19)	(-36.73)	(-37.69)	(-49.07)	(-48.73)	(-15.02)
Regional fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Time fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	10180490	10180490	9951151	9951151	9951151	8169236	8169236	10179357	10179357	10179357	8441286	8441286	7246565	7246565	7246565
Companies with private debt	373	373	371	371	371	357	357	373	373	373	358	358	352	352	352
Log-likelihood	2049.9	2249.6	635.4	669.5	692.1	583.6	591.8	634.4	699.0	721.0	587.3	733.9	1869.5	1869.5	2179.1
Pseudo R^2	0.245	0.269	0.0765	0.0806	0.0833	0.0740	0.0751	0.0758	0.0836	0.0862	0.0741	0.0926	0.243	0.243	0.283
Area under ROC curve	.969	.973	.817	.822	.827	.811	.812	.817	.834	.837	.812	.841	.968	.968	.974

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Author contributions
All authors contributed equally to the paper.

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Appendix

Table A1 Definition of variables

	Definition	Source
Dependent variable		
PD funding	Equals unity if the company was funded by private debt funds, zero otherwise	AIFI
Main independent variables		
Total assets (log)	Total assets, natural logarithm	Orbis
ROA	Return on assets, computed as Net income / Total assets	Orbis
Indicator of loss	Equals unity if Return on assets is negative, zero otherwise	Orbis
Volatility of cash flows	Absolute value of coefficient of variation (mean / standard deviation) for cash flows computed for past five years, winsorised at 5% and 95%	Orbis
Tangible assets to total assets	Financial ratio, computed as Tangible assets / Total assets	Orbis
No tangible assets	Equals unity if Tangible assets equal zero, zero otherwise	Orbis
Probability of default	Insolvency risk score, winsorised at 10% and 90%. Details are presented in Appendix A2.	Own computation
Industry sector fixed effects		
Section A - Agriculture	Equals unity if the company operates in the industrial section Agriculture, forestry and fishing (divisions 01-03), zero otherwise	Orbis
Section B - Mining	Equals unity if the company operates in the industrial section Mining and quarrying (divisions 05-09), zero otherwise	Orbis
Section C - Manufacturing	Equals unity if the company operates in the industrial section Manufacturing (divisions 10-33), zero otherwise	Orbis
Section D - Electricity/Gas	Equals unity if the company operates in the industrial section Electricity, gas, steam and air conditioning supply (division 35), zero otherwise	Orbis
Section E - Water Supply	Equals unity if the company operates in the industrial section Water supply; sewerage, waste management and remediation activities (divisions 36-39), zero otherwise	Orbis
Section F - Construction	Equals unity if the company operates in the industrial section Construction (divisions 41-43), zero otherwise	Orbis
Section G - Wholesale/Retail	Equals unity if the company operates in the industrial section Wholesale and retail trade; repair of motor vehicles and motorcycles (divisions 45-47), zero otherwise	Orbis
Section H - Transportation	Equals unity if the company operates in the industrial section Transportation and storage (divisions 49-53), zero otherwise	Orbis
Section I - Accommodation	Equals unity if the company operates in the industrial section Accommodation and food service activities (divisions 55-56), zero otherwise	Orbis
Section J - Information	Equals unity if the company operates in the industrial section Information and communication (divisions 58-63), zero otherwise	Orbis
Section K - Financial	Equals unity if the company operates in the industrial section Financial and insurance activities (divisions 64-66), zero otherwise	Orbis
Section L - Real Estate	Equals unity if the company operates in the industrial section Real estate activities (division 68), zero otherwise	Orbis
Section M - Professional	Equals unity if the company operates in the industrial section Professional, scientific and technical activities (divisions 69-75), zero otherwise	Orbis
Section N - Administrative	Equals unity if the company operates in the industrial section Administrative and support service activities (divisions 77-82), zero otherwise	Orbis
Section O - Public Administration	Equals unity if the company operates in the industrial section Public administration and defence; compulsory social security (division 84), zero otherwise	Orbis
Section P - Education	Equals unity if the company operates in the industrial section Education (division 85), zero otherwise	Orbis
Section Q - Human Health	Equals unity if the company operates in the industrial section Human health and social work activities (divisions 86-88), zero otherwise	Orbis
Section R - Arts/Entertainment	Equals unity if the company operates in the industrial section Arts, entertainment and recreation (divisions 90-93), zero otherwise	Orbis

Section S - Other Service	Equals unity if the company operates in the industrial section Other service activities (divisions 94-96), zero otherwise	Orbis
Section T - Households	Equals unity if the company operates in the industrial section Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use (divisions 97-98), zero otherwise	Orbis
Section U - Extraterritorial	Equals unity if the company operates in the industrial section Activities of extraterritorial organisations and bodies (division 99), zero otherwise	Orbis
Regional fixed effects		
Region Abruzzo	Equals unity if the company is based in the Abruzzo region, zero otherwise	Orbis
Region Basilicata	Equals unity if the company is based in the Basilicata region, zero otherwise	Orbis
Region Calabria	Equals unity if the company is based in the Calabria region, zero otherwise	Orbis
Region Campania	Equals unity if the company is based in the Campania region, zero otherwise	Orbis
Region Emilia-Romagna	Equals unity if the company is based in the Emilia-Romagna region, zero otherwise	Orbis
Region Friuli-Venezia Giulia	Equals unity if the company is based in the Friuli-Venezia Giulia region, zero otherwise	Orbis
Region Lazio	Equals unity if the company is based in the Lazio region, zero otherwise	Orbis
Region Liguria	Equals unity if the company is based in the Liguria region, zero otherwise	Orbis
Region Lombardia	Equals unity if the company is based in the Lombardia region, zero otherwise	Orbis
Region Marche	Equals unity if the company is based in the Marche region, zero otherwise	Orbis
Region Molise	Equals unity if the company is based in the Molise region, zero otherwise	Orbis
Region Piemonte	Equals unity if the company is based in the Piemonte region, zero otherwise	Orbis
Region Puglia	Equals unity if the company is based in the Puglia region, zero otherwise	Orbis
Region Sardegna	Equals unity if the company is based in the Sardegna region, zero otherwise	Orbis
Region Sicilia	Equals unity if the company is based in the Sicilia region, zero otherwise	Orbis
Region Toscana	Equals unity if the company is based in the Toscana region, zero otherwise	Orbis
Region Trentino-Alto Adige	Equals unity if the company is based in the Trentino-Alto Adige region, zero otherwise	Orbis
Region Umbria	Equals unity if the company is based in the Umbria region, zero otherwise	Orbis
Region Valle D'Aosta	Equals unity if the company is based in the Valle D'Aosta region, zero otherwise	Orbis
Region Veneto	Equals unity if the company is based in the Veneto region, zero otherwise	Orbis
Time fixed effects		
Year 2013	Equals unity for financial year 2013, zero otherwise	Orbis
Year 2014	Equals unity for financial year 2014, zero otherwise	Orbis
Year 2015	Equals unity for financial year 2015, zero otherwise	Orbis
Year 2016	Equals unity for financial year 2016, zero otherwise	Orbis
Year 2017	Equals unity for financial year 2017, zero otherwise	Orbis
Year 2018	Equals unity for financial year 2018, zero otherwise	Orbis
Year 2019	Equals unity for financial year 2019, zero otherwise	Orbis
Year 2020	Equals unity for financial year 2020, zero otherwise	Orbis
Year 2021	Equals unity for financial year 2021, zero otherwise	Orbis
Year 2022	Equals unity for financial year 2022, zero otherwise	Orbis
Year 2023	Equals unity for financial year 2023, zero otherwise	Orbis

Notes:

The table defines each variable used in the study. The final column reports the source of the key data items used to construct each variable. AIFI denotes the Italian Association of Private Equity, Venture Capital and Private Debt. Orbis denotes the Moody's company-information database.

Table A2 Failure prediction model

	Default
ROA using Net income (%)	-0.0257***
	(-65.49)
Collection period DSO (days)	0.00115***
	(23.49)
Credit period DPO (days)	0.00187***
	(46.13)
Cash to total assets (%)	-0.0698***
	(-51.65)
Current ratio (x)	-0.0287***
	(-8.73)
Solvency ratio (Asset based) (%)	-0.0270***
	(-82.35)
Constant	-6.695***
	(-465.46)
Observations	15,776,539
McFadden pseudo-R^2	0.184
AUC	0.890

Notes:
The table reports coefficient estimates from the failure-prediction model for the population of Italian companies over 1984-2023. The dependent variable is default, defined as the last available accounts before a change in company status to payment default, insolvency or bankruptcy. The coefficients are estimated using logistic regression. t-statistics are reported in parentheses, with p-values indicated by asterisks (* $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$). The insolvency risk scores used to test H5 are the predicted default probabilities generated by this model.

Hybrid Entrepreneurial Agency: Reconfiguring Decision-Making in the era of AI-startups

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Abstract

Frame of the research. *The transition from digital transformation to AI transformation is reshaping entrepreneurship by embedding artificial intelligence within the cognitive and operational core of emerging ventures. While existing literature largely interprets AI as a performance-enhancing tool, its implications for the micro-foundations of entrepreneurial agency remain insufficiently conceptualized.*

Purpose of the paper. *The study aims to examine how the integration of AI as an operational component of the founding architecture reconfigures entrepreneurial agency, dynamic capabilities, and decision-making structures in AI-startups, advancing the concept of Hybrid Entrepreneurial Agency.*

Methodology. *A qualitative theory-building design based on multiple illustrative case studies is adopted. The empirical analysis draws on 14 AI-startups operating across heterogeneous sectors. Secondary data sources are analysed through a framework-guided pattern-matching approach to compare empirical configurations with theoretically derived dimensions.*

Results. *Findings identify four interrelated mechanisms: (i) redistribution of the cognitive function through AI-assisted hypothesis generation and validation; (ii) compression of executive cycles via reduced decision latency and intelligent automation; (iii) computational and asymmetric scalability enabled by cumulative learning effects; and (iv) strengthened governance requirements concerning accountability, architectural supervision, and risk management.*

Research limitations. *The reliance on secondary data and a context-specific sample constrains statistical generalisation and calls for longitudinal and quantitative extensions.*

Managerial implications. *AI integration emerges as an organisational design choice requiring early investment in data infrastructures, hybrid decision architectures, and governance protocols to ensure sustainable competitive advantage.*

Originality of the paper. *The study repositions the startup as a hybrid socio-technical system and contributes to extending dynamic capabilities theory by introducing algorithmic orchestration as an emerging constitutive dimension of entrepreneurial agency.*

Keywords: *AI Transformation; Entrepreneurial Agency; AI-startups; Dynamic Capabilities; Governance.*

1. Introduction

The classical literature on entrepreneurship has long interpreted the startup as an organisation aimed at reducing information asymmetries and market inefficiencies through technological innovation (Akerlof, 1978; Arrow, 1962; Kirzner, 2015).

In this perspective, the entrepreneur represents the main cognitive agent in the value creation process, who identifies opportunities, combines resources, and guides strategic choices under conditions of uncertainty (Knight, 1921; Schumpeter, 1934).

The most established approaches, such as Lean Startup (Blank & Dorf, 2020; Ries, 2011), while emphasising iterative cycles of experimentation and learning, maintain a decision-making structure centred on human intentionality.

However, the transition from Digital Transformation to AI Transformation introduces a structural discontinuity in this paradigm (Feroz & Kwak, 2024; Lee, 2025). If in previous technological waves technology assumed a predominantly instrumental role, in the era of artificial intelligence the distinction between creator and tool tends to progressively blur.

AI does not merely support entrepreneurial action, but participates in prediction, simulation, hypothesis generation, and validation of strategic choices (Agrawal et al., 2022; Jarrahi, 2018). In this context, it can be interpreted not only as a component of the tech stack but also as a constitutive

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element of the organisational architecture, capable of influencing the decision-making trajectories of the enterprise from the founding phase, leading to the establishment of so-called AI-startups (Pati et al., 2024).

If startups are traditionally described as temporary organisations engaged in discovering a scalable and repeatable business model in high-uncertainty contexts (Blank & Dorf, 2020; Freeman & Engel, 2007), in AI-startups, this definition is partial. Such companies do not limit themselves to seeking a business model, but architect systems capable of learning, adapting, and evolving over time through the integration of data, algorithmic models, and continuous feedback. The value does not reside exclusively in the product or service offered, but in the ability to orchestrate a distributed cognitive infrastructure, in line with the perspective of dynamic capabilities (Teece, 2017).

The true discontinuity introduced by AI, as highlighted by Agrawal et al. (2022), lies not only in automation but in the reduction of the cost of prediction. This has direct effects on decision-making processes, the speed of experimentation, and organisational configuration. In AI-startups, experimentation is not limited to the product but extends to algorithmic models, datasets, and operational processes. The organisation is configured as a socio-technical system (Pasmore et al., 2019) in which learning is continuous and the distinction between the development phase and the operational phase tends to dissolve (Davenport & Ronanki, 2018).

This change also profoundly affects the logic of growth. In traditional startups, scalability was predominantly associated with the expansion of organisational resources. In AI-startups, growth can be achieved through intelligent automation and system learning, generating forms of asymmetric scalability that allow small teams to produce disproportionate impacts relative to the resources employed (Tschang & Almirall, 2021). This dynamic suggests a transition from a resource-based logic to a cognitive-computational logic of scalability.

Despite the growing attention towards AI in management, the literature predominantly tends to treat these technologies as enablers of efficiency or performance. Their ontological implications on the very nature of entrepreneurship and the locus of organisational agency remain, however, still underexplored.

This shift calls into question the micro-foundations of entrepreneurial agency. If dynamic capabilities traditionally reside in managerial cognition and organisational routines (Teece, 2017), the integration of AI suggests a hybridisation of agency in which cognitive functions are partially externalised into algorithmic systems. This raises fundamental questions concerning intentionality, responsibility, and the distribution of decision authority within AI-spartups.

When AI is integrated into the validated learning cycle and contributes to the generation and evaluation of strategic hypotheses (Roundy, 2022), it no longer acts merely as a tool, but as a cognitive partner that intervenes in the construction of the startup's decision-making trajectories.

In light of these considerations, a significant theoretical gap emerges: The literature on entrepreneurship and managerial innovation has not yet provided an adequate conceptualisation of how the integration of AI as an operational component of the founding team redefines entrepreneurial agency, the foundations of dynamic capabilities, and the decision-making architecture of the startup.

Against this backdrop, the present study addresses the following research question: How does the integration of artificial intelligence as an operational component of the founding team redefine entrepreneurial agency, dynamic capabilities, and the decision-making architecture of AI-startups?

To address this question, the research adopts a qualitative design based on multiple cases, selected due to the central role played by artificial intelligence in decision-making and value creation processes. Through the comparative analysis of the examined companies, the aim is to explore how the cognitive, executive, scalable, and governance functions are reconfigured by the interaction between human judgement and algorithmic systems.

The objective is to develop a conceptualisation of Hybrid Entrepreneurial Agency, clarifying its implications for the micro-foundations of dynamic capabilities in AI-startups. In this way, the work contributes to the literature on entrepreneurship by overcoming a merely instrumental view of AI and

proposing a socio-technical perspective in which agency emerges from the structured interaction between human intentionality and algorithmic computational capability.

2. Theoretical background

2.1 Evolution of the Entrepreneurial Agency and the Lean Paradigm

The literature on entrepreneurship has traditionally attributed a central role to the entrepreneur in processes of innovation and economic transformation. In the Schumpeterian perspective, the entrepreneur is the agent of creative destruction, the one who introduces new productive combinations capable of reconfiguring markets and competitive structures (Schumpeter, 1934). In a different but complementary theoretical tradition, Knight (1921) distinguishes between measurable risk and incalculable uncertainty, attributing to the entrepreneur the function of making decisions under conditions of radical uncertainty, while Kirzner (1979) emphasises the dimension of alertness, that is, the ability to seize opportunities generated by informational asymmetries and market inefficiencies.

Over time, the debate has progressively shifted from the figure of the entrepreneur as an individual hero to the entrepreneurial process as a dynamic sequence of discovery, experimentation, and adaptation. The startup has thus been defined as a temporary organisation engaged in the search for a scalable and repeatable business model (Blank & Dorf, 2020; Ries, 2011). In this perspective, entrepreneurship is no longer just an individual creative act, but a structured process of exploration and continuous learning (Freeman & Engel, 2007).

At the same time, the field of entrepreneurial intention has highlighted the cognitive and intentional dimension of entrepreneurial action. Shapero and Sokol (1982) identify the combination of perceived desirability and perceived feasibility as the conditions preceding the entrepreneurial event, while Ajzen (1991) emphasises the predictive role of intention regarding behaviour. Bird (1988) links intentionality to the cognitive processes that guide the design of the enterprise, reinforcing the idea that entrepreneurial action is rooted in the mental representations of the founder.

Beyond the intentional dimension, entrepreneurial agency has progressively been interpreted through the lens of the micro-foundations of dynamic capabilities, according to which managerial cognition, organisational routines, and decision-making processes constitute the fundamental drivers of strategic renewal (Teece, 2017). In this perspective, the cognitive architecture of the entrepreneur not only represents the origin of opportunity recognition but also the place where the activities of sensing, seizing, and reconfiguring are concretely activated. Entrepreneurial agency thus emerges as a construct rooted in the mental processes and interpretative abilities of the founder, which guide the evolution of the organization over time. This perspective is further developed by McMullen et al. (2021), who propose a unified theory of entrepreneurial agency grounded in the intentional and cognitive dimensions of the entrepreneurial act, distinguishing it from broader organisational action and reinforcing the centrality of the founder's interpretative capacity as the locus of strategic initiative.

The Lean Startup paradigm has further formalised this cognitive centrality by proposing the Build–Measure–Learn cycle as a systematic mechanism for reducing uncertainty (Ries, 2011). The Minimum Viable Product (MVP) is conceived as an epistemic tool aimed at rapidly and iteratively testing value and business model hypotheses. Blank (2013) highlights the importance of Customer Discovery as a moment of empirical verification of entrepreneurial assumptions through direct market interaction. In this context, the emerging enterprise is interpreted as a dynamic system engaged in a constant process of exploration and exploitation, consistent with the broader tradition of organisational learning (Brix, 2019).

The Lean logic implicitly assumes that uncertainty can be reduced primarily through empirical interaction with the market. However, if artificial intelligence reduces the cost of forecasting (Agrawal et al., 2022), part of the uncertainty can be addressed ex ante through computational

inferences. This shift modifies the epistemic structure of experimentation: validation is no longer exclusively market-based, but takes on a hybrid, predictive-empirical configuration. The formulation and evaluation of strategic hypotheses can thus take place in part before the direct confrontation with the market, through simulations, algorithmic scenario generation, and predictive analysis.

Despite the methodological evolution introduced by Lean logic, a common assumption remains across different traditions: the generation of hypotheses, the interpretation of data, and the final decision remain predominantly human activities. Even where digital tools support the analysis, entrepreneurial agency remains centred on the founder. The learning cycle implicitly assumes a sequential and anthropocentric structure: first an hypothesis is formulated, then it is tested, and finally it is reformulated based on the results.

This approach becomes theoretically problematic when intelligent systems actively participate in the generation, simulation, and evaluation of strategic hypotheses. The integration of artificial intelligence into business processes introduces a potential discontinuity compared to this framework.

Intelligent systems are capable of generating product variants, simulating alternative scenarios, and analysing large volumes of data in real time, anticipating part of the validation process even before direct interaction with the market. The iterative cycle can thus evolve towards configurations of simultaneous and computational learning, where generation, simulation, and optimisation occur continuously and at non-anthropomorphic speeds. Learning no longer derives exclusively from empirical comparison with the market, but emerges from the interaction between data, predictive models, and managerial interpretation.

A significant conceptual tension thus arises between the anthropocentric foundations of entrepreneurial theory and the emergent role of algorithmic systems in strategic cognition. The issue is not only about efficiency or decision-making speed, but the reconfiguration of the locus of entrepreneurial agency itself.

When cognitive functions such as hypothesis generation, scenario simulation, and pattern recognition are partially externalised in algorithmic systems, entrepreneurial agency can no longer be conceptualised as exclusively human. It therefore becomes necessary to reconceptualise entrepreneurial agency within a socio-technical perspective, in which action is not located exclusively in the individual founder but emerges from the structured interaction between human intentionality and algorithmic computational capacity.

2.2 AI and the Reconfiguration of Entrepreneurial Agency

The transition from Digital Transformation to AI Transformation does not represent a mere technological evolution, but an ontological discontinuity in the way entrepreneurial action is conceived and practiced. If in previous technological waves software predominantly played an instrumental role, aimed at automating existing processes, in the era of artificial intelligence it directly intervenes in the cognitive sphere of the enterprise, impacting the formulation of hypotheses, the simulation of scenarios, and the configuration of strategic trajectories. This shift builds on a trajectory anticipated by Nambisan (2017), who argues that digital technologies fundamentally alter the nature of entrepreneurial action by introducing new modalities of opportunity creation, value co-creation, and boundary-spanning organising. The transition to AI transformation extends this logic further, moving from digital affordances to algorithmic agency. As highlighted by Agrawal et al. (2022), the true disruption introduced by AI does not lie so much in automation, but rather in the drastic reduction of the cost of prediction, with structural effects on the relationship between uncertainty, choice, and resource allocation.

In this context, the AI-startups cannot be interpreted as a traditional startups equipped with more sophisticated tools. It is rather configured as a socio-technical system in which artificial intelligence takes on the role of an operational partner, actively participating in value creation and the definition of strategic choices from the founding phase.

This configuration implies a redistribution of cognitive work: activities traditionally attributed to the founder — such as hypothesis generation, alternative evaluation, and trade-off analysis — are partially outsourced to algorithmic systems capable of learning, simulating, and optimising in real-time (Jarrahi, 2018).

This transformation primarily affects the cognitive function of the enterprise. Artificial intelligence amplifies the exploratory capacity of the entrepreneurial team, exponentially extending the space of analysable possibilities. Through predictive models, generative systems, and advanced simulation techniques, the startup can test alternative scenarios even before entering the market, anticipating part of the validation process.

The traditional Build–Measure–Learn cycle thus evolves towards configurations where generation, simulation, and optimisation occur continuously and non-sequentially, approaching a paradigm of augmented entrepreneurship. In this framework, validated learning does not disappear but hybridises: learning no longer derives exclusively from the ex-post comparison with the market, but rather from the constant interaction between data, models, and managerial interpretation (Roundy et al., 2022).

Cognitive reconfiguration also produces direct effects on the executive dimension. AI does not merely support analysis, but intervenes in compressing decision-making cycles and reducing information latency. The ability to generate code, content, financial analyses, and operational simulations drastically reduces time-to-market and transforms the MVP from a static prototype into an "evolutionary organism," capable of continuously adapting to user feedback.

In this sense, entrepreneurial action is no longer marked by discrete iterations, but takes the form of a continuous flow of micro-optimizations driven by the artificial partner. The founder, consequently, shifts from a role of direct executor to that of orchestrator of hybrid decision-making architectures.

Simultaneously, the configuration of scalability is changing. In AI-startups, growth does not solely depend on the expansion of human or financial resources, but on the ability of models to learn and improve through the accumulation of data. Thus, a form of asymmetrical scalability emerges, in which small teams can manage global volumes of users thanks to the integration of self-adaptive intelligent systems.

The competitive advantage is no longer solely anchored in the possession of static resources, but in the speed of learning of the system as a whole, consistent with an evolutionary reading of dynamic capabilities (Teece, 2017).

However, the increase in the operational autonomy of intelligent systems introduces new governance requirements. The opacity of models, the dependence on data quality, and the probabilistic nature of outputs make issues of accountability, supervision, and adaptive control central (Floridi, 2023; Liang et al., 2022; Schillaci et al., 2025; Talebi et al., 2025).

The Human-in-the-loop philosophy is progressively evolving towards Human-on-the-loop configurations, where human control is not exercised over every single decision, but over the overall behaviour of the system. Responsibility remains with the organization, but the founder's role extends to designing intervention thresholds, defining ethical constraints, and managing algorithmic risks.

Taken together, these transformations suggest that entrepreneurial agency can no longer be conceptualised as the exclusive property of the founding individual. Strategic action emerges from the structured interaction between human intentionality and computational power, configuring a form of Hybrid Entrepreneurial Agency in which the locus of action is distributed along an integrated socio-technical architecture. The AI startup thus appears as an adaptive system with continuous learning, in which cognition, execution, growth, and governance are deeply intertwined and co-evolve over time.

3. Methodology

This study adopts a qualitative research design orientated towards theoretical construction, based on a multiple case study strategy. The objective is to develop and refine an interpretative framework capable of explaining how artificial intelligence, when integrated as an operational component of the entrepreneurial architecture, reconfigures entrepreneurial agency.

The research therefore falls within the realm of theory-building studies based on qualitative evidence (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Gioia et al., 2013). Case studies are not treated as representative observations of a statistical universe, but rather as analytical devices for conceptual clarification. Empirical analysis takes on an explanatory and comparative function: each case allows us to observe how AI is structurally incorporated into business models, decision-making processes, and scalability dynamics. The design follows the logic of the multiple case study aimed at theoretical refinement through systematic comparison between organisational configurations (Eisenhardt, 1989; Yin, 2018).

The cases analysed were selected from AI-startup operating within the Le Village by CA Italia ecosystem, with particular reference to Le Village Sicilia. Le Village by CA represents a structured ecosystem of open innovation aimed at fostering interaction between startups, corporate partners, financial institutions, and academic actors. This context is particularly relevant for observing the structural integration of AI for at least three reasons.

Firstly, AI-startups frequently face constraints related to access to proprietary datasets, vertical use cases, and industrial validation environments. Inclusion in an ecosystem that connects startups with corporate partners allows AI to be seen not merely as a technological layer, but as an operational component integrated into real decision-making and production processes.

Secondly, the Village model enables a form of relational scalability. If AI enables technological scalability through automation and cumulative learning, the ecosystem promotes commercial validation and market access through structured partnerships. This allows for the analysis of the interaction between cognitive-computational scalability and network-based growth dynamics. This dynamic is consistent with Autio et al.'s (2018) perspective on entrepreneurial ecosystems and digital affordances, according to which the institutional and relational architecture of an ecosystem shapes the opportunity space available to ventures, influencing their growth trajectories and the modes through which they access and recombine resources.

Thirdly, the banking and institutional context introduces high standards of governance, compliance, and risk management. Startups integrated into the ecosystem are exposed from the early stages to regulatory constraints and accountability requirements that make the dimension of algorithmic governance particularly observable.

The selection of cases was carried out through purposive sampling. Startups that met the following criteria were included:

1. Artificial intelligence plays a central role in the value proposition.
2. AI is integrated into core decision-making or operational processes.
3. The sector of belonging allows for the observation of cognitive, executive, scalable, or governance implications of AI integration.
4. Sufficient documentation is available to reconstruct the architecture of the business model and the structural role of AI.

The sample includes startups operating in heterogeneous sectors in order to capture the variety of ways AI is integrated in different institutional and technological contexts. Such sectoral plurality allows for an analytical generalisation based on the identification of recurring patterns (Yin, 2018), rather than a statistical generalisation.

At the same time, the belonging of the cases to the same ecosystem represents a contextual condition that delineates the scope of validity of the results. The Village environment provides relational and institutional advantages that might not characterise completely independent startups.

The results must therefore be interpreted in terms of theoretical transferability and not empirical

universality.

The unit of analysis is constituted by the structural role of artificial intelligence within the organisational architecture and the business model of the startup. Consistent with the theoretical framework developed, the analysis focuses on four interconnected dimensions:

- the cognitive function of AI in the processes of generating, evaluating, and refining strategic hypotheses;
- the executive function of AI in compressing decision latency and restructuring operational processes;
- the computational configuration of scalability through cumulative learning mechanisms;
- the mechanisms of governance and accountability of algorithmic systems.

The focus is not on individual technological characteristics, but rather on the overall reconfiguration of entrepreneurial agency emerging from the interaction between human judgement and computational capabilities.

The data collection was primarily based on secondary sources, including corporate documentation (websites, pitch decks, one-pagers), institutional materials from the ecosystem, public interviews with founders, industry reports, and specialised articles. The predominant use of secondary data is consistent with the exploratory and theoretical-conceptual nature of the study and with the analysis of emerging organisational configurations in technologically dynamic contexts (Eisenhardt & Graebner, 2007).

In order to strengthen the methodological rigour of the study, specific validation procedures were adopted.

Construct validity was supported through the triangulation of multiple secondary sources, including corporate documentation (websites, pitch decks, one-pagers), institutional materials from the Le Village ecosystem, public interviews with founders, and industry reports.

Internal validity was strengthened through a systematic pattern matching process between the empirical configurations observed in the cases and the theoretical dimensions of the proposed framework (Yin, 2018).

Reliability was ensured through the explicit definition of case selection criteria and the transparent description of the analytical process, ensuring conceptual traceability of interpretative inferences. In line with the theory-building nature of the research, the results should be understood in terms of analytical generalisation rather than statistical generalisation (Eisenhardt, 1989; Yin, 2018).

Table 1 summarises the selected cases and constitutes the empirical basis for identifying cross-cutting patterns in the structural integration of artificial intelligence into entrepreneurial architectures.

Tab. 1: Selected startups

Startup	Sector	Description
Agrobit	AgriTech	Develops AI-based decision support systems for precision agriculture through image analysis and predictive agronomic modelling.
Vaimee	Industrial AI / Digital Twin	Provides interoperable digital twin solutions enabling simulation and optimisation of industrial systems.
Bandit	LegalTech	Uses AI and NLP to structure and optimise public tender documentation processes.
Audacia Innovations	MarketingTech	Applies predictive analytics to support strategic marketing planning and performance forecasting.
Longeviva	HealthTech	Integrates AI to personalise preventive health pathways using longitudinal biological and behavioural data.
Geen	HealthTech	Uses AI-powered tools to support informed health decision-making through structured medical information.
YourBes	EdTech	Develops adaptive AI-based learning systems that personalise educational content in real time.
ProfessionAI	EdTech	Offers AI-driven professional upskilling platforms with personalised learning trajectories.

Startup	Sector	Description
Liqex	FinTech	Provides AI-enabled orchestration of B2B payment flows to optimise liquidity and reduce friction.
EZ Lab	Agri-food Traceability	Develops digital traceability systems enhanced by AI to ensure compliance and transparency in supply chains.
Accudire	Pharma Supply Chain	Offers AI-supported tracking and compliance solutions for pharmaceutical logistics.
EV Field Service	EnergyTech	Uses predictive algorithms to optimise design and maintenance of EV charging infrastructures.
MUV	MobilityTech	Applies behavioural analytics to optimise sustainable mobility programs within organisations.
Snappel	TravelTech	AI-based tourism recommendation platform leveraging user preference data.

Source: our elaboration

4. Results

The comparative analysis of the case studies shows that the integration of artificial intelligence in the analysed startups does not simply represent a technological upgrade, but rather a systemic restructuring of the micro-foundations of entrepreneurial action. What emerges is not merely an increase in efficiency or a reduction in operational costs, but a redefinition of the distribution of organisational intelligence, decision-making timing, and nature of growth.

In all the analysed cases, a systematic redistribution of decision-making work between human actors and algorithmic systems emerges, consistent with the notion of Hybrid Entrepreneurial Agency proposed in the theoretical framework. AI intervenes structurally in the construction of the decision-making space, altering the way opportunities are identified, evaluated, and exploited. Entrepreneurial agency does not disappear, but is redistributed along a socio-technical architecture in which human judgement and computational capacity operate interdependently.

This redistribution takes on different configurations depending on the sector, data intensity, and the degree of regulation of the context, but it presents recurring patterns that allow for the articulation of four transformative dimensions: cognitive, executive, scalability, and governance.

4.1 Cognitive Function

In traditional startups, the entrepreneurial cognitive cycle follows a relatively linear sequence: market observation, interpretation, hypothesis formulation, experimentation, and learning. With the integration of AI, this sequence is partially reconfigured.

Predictive and generative models do not merely analyse data, but also contribute to the production of alternative scenarios, the selection of strategic options, and shaping the decision space. The reduction in the cost of forecasting allows for the exploration of a greater number of hypotheses in shorter times, transforming the inferential process into an iterative and data-intensive dynamic.

Analytical activity is progressively being delegated to models, while the human role is being repositioned in interpretation, validation, and the definition of decision thresholds. Entrepreneurial agency is not replaced, but redistributed along the cognitive architecture of the enterprise. In the cases of Agrobit and Vaimee, AI performs a "computational sensing" function. Agrobit translates multispectral images and agronomic data into operational metrics, making measurable phenomena traditionally entrusted to the tacit experience of the agronomist. The entrepreneurial act of "seeing" the field and formulating intervention hypotheses is no longer exclusively human: the model identifies patterns invisible to direct observation and pre-structures decision-making alternatives. In this setting, agency is distributed along the architecture of the system.

Vaimee, through the integration of interoperable digital twins, extends this logic from diagnosis to simulation. The entrepreneur does not merely react to observed conditions, but operates on

modelled scenarios that anticipate future states of the production system. Here, AI expands the space of explorative possibilities, transforming entrepreneurial activity from reactive to anticipatory.

In the case of Bandit, the cognitive transformation takes the form of regulatory abstraction. The regulatory complexity of public tenders is reorganised by AI models that extract constraints, suggest document structures, and transform a manual interpretative process into an assisted cognitive flow. The ability of entrepreneurial "alertness" intertwines with the system's capacity to identify recurring patterns in regulation.

At Audacia Innovations, AI reconfigures strategic marketing planning, transforming it into a continuous predictive process. The observation of data is no longer retrospective, but anticipatory: the model suggests probable performance trajectories, compressing the distance between analysis and decision.

In the healthtech domain, Geen and Longeviva introduce a particularly sensitive form of cognitive mediation. Linguistic models and clinical data organization systems do not merely retrieve information, but also modulate its priorities and comprehensibility. AI here operates as an epistemic infrastructure: it translates scientific complexity into individualised decision-making pathways, while maintaining final control within the organization.

In edutech (YourBes, ProfessionAI), the cognitive function becomes adaptive. The systems generate micro-hypotheses about the user's learning level and recalibrate content and difficulty in real-time. Validated learning is no longer just the result of market-product interaction, but of an endogenous cycle of algorithmic inference.

The recurring pattern is clear: the formulation of strategic and operational hypotheses is no longer exclusively human. AI participates in the generation, selection, and refinement of alternatives. Entrepreneurial agency becomes structurally distributed.

4.2 Executive Function

If the cognitive function concerns the construction of the decision-making space, the executive function pertains to the transformation of choices into concrete organisational action. In traditional startups, this transformation is characterised by a relatively linear sequence: analysis, deliberation, implementation. With the integration of artificial intelligence, this sequence is compressed, reorganised, and, in some cases, partially automated.

AI primarily intervenes on decision latency, that is, the time interval that separates the detection of a signal from the activation of a response. In the analysed cases, this latency is drastically reduced thanks to the systems' ability to process data in real-time, generate operational outputs, and activate procedures without intermediate manual interventions. However, the transformation is not limited to speed: it concerns the very structure of the execution process.

Intelligent automation does not simply overlay existing procedures, but re-encodes them. Routine activities – information gathering, verification of standard conditions, document generation, flow coordination – are progressively incorporated into the algorithmic architecture. Human work is not eliminated, but reallocated towards systemic supervision functions, exception management, and decision threshold design.

In the case of Liqex, the integration of AI in the synchronisation of B2B payment flows transforms financial execution from a sequential process to an algorithmically orchestrated networked process. In traditional models, payment management requires manual coordination, subsequent reconciliations, and ex post corrective interventions. Here, instead, the algorithm anticipates imbalances, optimises collection and payment priorities, and dynamically coordinates transactions. The action is no longer reactive to a deviation that has already occurred, but proactive in response to a flow forecast. Execution becomes predictive.

In Bandit, the document production for public tenders is no longer a fragmented activity involving regulatory interpretation, manual drafting, and final verification. Natural language processing models automatically structure the documentation based on the constraints extracted from the tender, generating coherent and formally compliant versions. This entails a profound reconfiguration of

executive work: the team no longer focuses on the material construction of the document, but on strategic validation and the management of non-standard cases. AI absorbs the repetitive, high-cognitive-intensity component, leaving human actors to manage ambiguities and critical choices.

In the cases of EZ Lab and Accudire, operating in agri-food and pharmaceutical traceability, artificial intelligence and digital infrastructures transform compliance from episodic fulfilment to a continuous process. The collection, harmonisation, and verification of data along the supply chain no longer occur at discrete moments, but are integrated into a continuous flow of control. The executive function takes on a systemic dimension: the action is not about intervening retrospectively on a non-conformity, but about designing a system that makes deviation less likely and immediately detectable. AI here enhances the capacity for seizing and reconfiguring, translating regulatory constraints into integrated operational logics.

In EV Field Service, the proprietary algorithm optimises the design, installation, and maintenance of electric vehicle charging infrastructures. Technical intervention is no longer scheduled exclusively based on reports or predefined calendars, but on predictive inferences related to usage, load, and failure probability. The executive function shifts from a corrective logic to a preventive logic. Uptime is not the result of an effective reaction, but of accurate forecasting. In this sense, AI modifies the temporal nature of organisational action, anticipating the event rather than responding to it.

In Muv, the behavioural analysis of employees regarding mobility choices allows for the dynamic adaptation of sustainable commuting programs. Organisational policies are no longer static, but adaptable based on emerging patterns. Execution does not consist of the rigid implementation of a plan, but in the continuous recalibration of measures based on the data collected. AI introduces a form of adaptive execution.

A common element across all cases concerns the transformation of the entrepreneurial role in the execution phase. If in traditional startups the founder is often directly involved in operational implementation, in AI-startup models their role tends to evolve towards that of orchestrator of decision-making architectures. Attention shifts from the direct management of activities to the design of parameters, the definition of intervention thresholds, and the supervision of the outputs generated by the system.

4.3 The Computational Nature of Scalability

In traditional startups, scalability is generally conceived as the ability to expand the volume of activities while maintaining a relatively stable cost structure. Such expansion typically involves a proportional increase in organisational resources: more customers require more personnel, more coordination, more infrastructure. Growth is therefore predominantly linear and resource-intensive.

In the models of AI-startups observed in the analysed cases, this logic is partially reconfigured. Growth does not depend solely on commercial expansion, but on the system's ability to learn and improve over time through the accumulation and processing of data. Scalability is not only economic, but cognitive.

The central element is the cumulative nature of algorithmic learning. The increase in the user base or interactions generates new data; the new data allows for the retraining or fine-tuning of models; more accurate models produce higher quality output; better output reinforces adoption and engagement, generating further data. A self-reinforcing cycle is thus established, in which growth and learning mutually feed each other.

On platforms like YourBes, the increase in students and training sessions not only leads to an expansion of the served market but also to a continuous improvement of the adaptive algorithm that personalises the content. Every interaction contributes to refining the system's ability to estimate the user's competence level and calibrate the difficulty of the educational materials. The quality of the service does not remain constant as the scale increases: it tends to improve. Growth thus becomes a cognitive multiplier.

A similar dynamic is observed in Snappel, where the increase in users and recorded preferences allows for the refinement of tourism recommendation systems. The proposed experience

progressively becomes more consistent with emerging behaviour patterns, reinforcing the perceived value and generating lock-in effects based not only on the network but also on the predictive quality of the system.

In Liqex, scalability takes on a systemic dimension. The increase in businesses connected to the platform generates a greater informational density on financial flows, improving the algorithm's ability to optimise synchronisations and payment priorities. The platform does not only grow in the number of transactions, but also in orchestration capacity. Complexity does not automatically translate into inefficiency, but into a potential improvement in the system's intelligence. In the cases of Agrobit and Longeviva, the computational nature of scalability is particularly evident. In Agrobit, the accumulation of environmental, agronomic, and seasonal data progressively increases the accuracy of the recommendations. The system becomes more capable of identifying correlations between climatic conditions, soil status, and crop yield. Similarly, in Longeviva, the integration of longitudinal biological and behavioural data enhances the model's ability to generate personalised preventive suggestions. In both cases, growth is not limited to expanding the customer base: it broadens the cognitive space of the system.

At Audacia Innovations, the analysis of multiple campaigns allows for continuous refinement of performance predictive models. Each new campaign becomes an additional dataset that enriches the ability to anticipate future results. The marketing strategy is no longer just the result of the team's experience, but of the cumulative learning of the system. The competitive advantage lies in the depth of the model.

These dynamics suggest that scalability in AI-startups takes on a cognitive-computational nature. It does not depend exclusively on the expansion of the workforce or the increase in tangible assets, but on the ability of the socio-technical architecture to learn over time. Performance is increasingly linked to the speed and quality of algorithmic updates.

This thus shapes a form of asymmetric scalability: relatively small teams manage to handle increasing volumes of decisions, interactions, and transactions without a proportional increase in the organisational structure. The increase in external complexity is absorbed by the algorithmic infrastructure. Growth is not linear with respect to human resources, but non-linear with respect to computational capacity.

However, this dynamic is neither automatic nor guaranteed. Computational scalability is heavily conditioned by the quality of the data infrastructure, the ability to ensure interoperability, the robustness of the models, and the management of biases. A fragile information infrastructure can turn expansion into vulnerability rather than cumulative advantage. Moreover, the increase in scale can introduce model generalisation issues or algorithmic drift that require continuous monitoring and retraining capabilities.

From the perspective of the micro-foundations of dynamic capabilities, computational scalability implies an extension of the reconfiguring capacity. It's not just about reallocating organisational resources, but constantly updating the system's learning logics. Sustainable growth depends on the ability to design architectures that integrate data accumulation, feedback loops, and model updates in a manner consistent with the strategy.

4.4 Governance and Algorithmic Accountability

If the integration of artificial intelligence reduces some forms of informational uncertainty—enhancing predictive capacity and compressing cognitive asymmetry among actors—it simultaneously introduces new complexities related to model opacity, data quality and provenance, dependence on historical training, and the inherently probabilistic nature of outputs.

The transformation concerns not only decision-making efficiency but also the structure of responsibility. In traditional startups, governance primarily coincides with direct control of decisions and supervision of operational processes. In AI-startup models, however, control shifts upstream: from individual decisions to the design of the decision-making architecture. The founder does not lose responsibility, but exercises it in a mediated and structural form.

Responsibility no longer consists exclusively in choosing between alternatives, but rather in defining the rules through which the system generates such alternatives. This implies the design of decision thresholds, human override mechanisms, validation protocols, audit systems, and continuous monitoring of algorithmic performance. Governance becomes a design function.

This reconfiguration is particularly evident in the regulated sectors analysed. In the healthcare domain, cases like Geen and Longeviva show how AI operates as an epistemic infrastructure that organises and prioritises clinical or behavioural information. However, precisely because the system intervenes in areas of high social sensitivity, the traceability of sources, the transparency of recommendations, and the possibility of human review become central elements. The algorithmic output is never self-sufficient: it must be placed within a clearly defined organisational responsibility framework. Reliability is not just technical, but institutional.

In the Bandit case, the automated reorganisation of regulatory requirements and the assisted generation of documentation raise accountability issues regarding interpretative accuracy. The system can abstract and structure regulatory complexity, but the ultimate responsibility for compliance remains with the organization using the platform. Governance, in this case, manifests itself in defining the boundaries between algorithmic suggestion and legal validation.

Similarly, in EZ Lab and Accudire, which operate in agri-food and pharmaceutical traceability, AI enhances continuous compliance infrastructures. However, the automation of data collection and verification along the supply chain does not eliminate the risk of error or manipulation. Governance translates into certification mechanisms, transaction auditability, and dataset quality control. Compliance is no longer an episodic event, but a process structurally embedded in the technological architecture.

What emerges transversally is a redistribution of risk. The informational uncertainty is reduced thanks to the predictive capacity of the models, but the design uncertainty increases: bias

es in datasets, algorithmic drift, dependence on external model or cloud infrastructure providers, explainability issues. The risk does not disappear; it shifts from the decision-making moment to the architectural moment.

In terms of micro-foundations, governance in AI-startups implies a redefinition of entrepreneurial agency as the capacity for algorithmic orchestration. The entrepreneur is no longer just the subject who takes risks under conditions of uncertainty (Knight, 1921), but the one who designs the conditions under which the system makes probabilistic decisions. The decision-making authority becomes distributed, but the responsibility remains concentrated.

The probabilistic nature of the outputs also requires the definition of intervention thresholds. The observed startups adopt, in various forms, human-in-the-loop or human-on-the-loop logics, in which the system operates autonomously within certain parameters, while human intervention is activated in the presence of anomalies, deviations, or high-stakes cases. Governance thus becomes a combination of controlled automation and strategic supervision.

This dimension is particularly relevant in models that operate on sensitive data or high-impact social decisions. The integration of AI forces startups to incorporate ethical, regulatory, and reputational considerations into their business model from the design phase. Governance is not an external constraint imposed by regulations, but a constitutive element of the value proposition and the legitimisation of the enterprise.

Taken together, the four mechanisms suggest that hybrid agency is not the sum of human and machine contributions, but the outcome of an orchestrated socio-technical architecture in which AI expands the option space (cognitive), compresses action cycles (executive), enables non-linear growth through cumulative learning (scalability), and simultaneously increases the need for design-based accountability (governance).

5. Theoretical Implications

The results emerging from the comparative analysis of the cases allow for a theoretical repositioning of entrepreneurial agency in the context of AI startups. Empirical evidence suggests that artificial intelligence should not be interpreted as a mere efficiency tool, but rather as a structural component of the entrepreneurial architecture. Such a configuration produces theoretical implications along four main directions: the ontological redefinition of the startup, the extension of the micro-foundations of dynamic capabilities, the evolution of the Lean paradigm, and the reconfiguration of entrepreneurial risk and governance.

First, the results suggest an ontological redefinition of the concept of startup in the era of AI transformation. The classical literature describes the startup as a temporary organization engaged in the search for a scalable and repeatable business model (Blank & Dorf, 2020; Ries, 2011). However, in the analysed cases, AI does not represent an ancillary technological resource integrated into the tech stack, but systematically participates in hypothesis generation, scenario simulation, operational translation of decisions, and learning processes (cognitive and executive dimensions). This results in a conception of the startup as a hybrid socio-technical system, in which the algorithmic dimension is not external to the entrepreneurial process, but co-constitutive of strategic action. Agency is no longer exclusively centred on the individual intentionality of the founder, but distributed along an integrated cognitive architecture.

Second, the study extends the debate on dynamic capabilities (Teece, 2017). Empirical evidence shows that AI strengthens sensing and seizing capabilities, reducing information latency and expanding the space of analyzable alternatives (cognitive dimension), as well as compressing execution cycles (executive dimension). However, the contribution goes beyond mere efficiency improvement. Configurations emerge where dynamic capabilities no longer consist solely of reallocating resources, but in designing, supervising, and retraining intelligent systems that learn over time (computational scalability dimension). A new micro-foundation thus emerges: algorithmic orchestration. The entrepreneur does not only coordinate human and material resources, but also adaptive computational architectures, extending the very nature of dynamic capability from a socio-technical key.

Third, the results allow for the proposal of an evolution of the Lean paradigm. The Build–Measure–Learn model (Ries, 2011) assumes iterative cycles driven by empirical validation through the market. In the analysed cases, the integration of AI allows for partial anticipation of validation through predictive simulations, automatic generation of variants, and real-time analysis. The learning cycle becomes hybrid: part predictive, part empirical. Learning is no longer exclusively ex post relative to the market, but incorporated into the inferential capacity of the models. This does not eliminate uncertainty, but it modifies its management, shifting the focus from sequential experimentation to the combination of algorithmic simulation and real feedback. The Lean paradigm thus evolves toward a model of augmented experimentation

Fourth, the study contributes to the reflection on the nature of entrepreneurial risk. In the Schumpeterian and Kirznerian tradition, the entrepreneur acts under conditions of uncertainty and information asymmetry. The analysed cases show that AI reduces some forms of informational uncertainty (through prediction and pattern identification), but introduces new forms of design uncertainty (related to bias, model opacity, algorithmic drift, and data infrastructure dependence), as evidenced in the governance dimension. The risk does not disappear, but it is redistributed: it decreases in the analytical phase and increases in the design and supervision phase of the algorithmic architecture. Entrepreneurial agency thus shifts from decision-making under uncertainty to systemic responsibility for the design of probabilistic decision-making architectures.

Finally, the results enrich the debate on algorithmic governance in business contexts. The operational autonomy of intelligent systems coexists with a concentrated organisational responsibility. The human-in-the-loop and human-on-the-loop configurations highlighted in the cases show that AI does not replace human agency, but rather reconfigures it in terms of architectural

control and systemic supervision. Governance is not an external constraint, but a constitutive dimension of hybrid entrepreneurial architecture.

Taken together, these implications support the conceptualisation of Hybrid Entrepreneurial Agency as a distinctive configuration of AI startups. The difference compared to a traditional digital startup lies not only in the technological intensity but also in the distributed nature of cognition, the algorithmic mediation of execution, the computational logic of scalability, and the architectural centrality of governance. Artificial intelligence must therefore be interpreted not as an enabling technology, but as a constitutive element of entrepreneurial action in the era of AI transformation.

6. Managerial Implications

The comparative analysis of the cases highlights that the integration of artificial intelligence is not merely a technological choice, but an architectural decision that profoundly impacts the four dimensions revealed in the results: cognitive function, executive function, computational scalability, and algorithmic governance.

Firstly, on a cognitive level, the cases show that AI actively participates in the generation and evaluation of strategic hypotheses (*e.g.*, Agrobit, Vaimee, Bandit, Audacia). For founders, this implies the need to decide from the early stages whether AI represents the core of the competitive advantage or a mere support tool. When AI is core (as in data-intensive models), the entire decision-making architecture must be designed around data quality, predictive capability, and continuous model validation. When AI instead performs an optimisation function, organisational and investment choices can be less radical. The distinction influences cost structure, dependence on proprietary datasets, exposure to technological risk, and the composition of internal skills.

Secondly, on the executive level, the evidence shows a drastic compression of decision latency and an increasing automation of operational processes (*e.g.*, Liqex, EV Field Service, EZ Lab). However, the reduction in decision-making times does not eliminate the need for critical interpretation. Startups must design a decision-making architecture consistent with the presence of intelligent systems, defining intervention thresholds, levels of algorithmic autonomy, and human override mechanisms. Founding teams must develop data literacy skills and the ability to interpret models, avoiding both algorithmic overconfidence and the a priori rejection of recommendations generated by the systems.

Thirdly, regarding scalability, the cases show that growth in AI startups is not linear with respect to human resources, but depends on the system's ability to learn cumulatively through the accumulation of data (e.g., YourBes, Snappel, Longeviva, Audacia). This implies that managers must invest early in robust data infrastructures, consistent tracking systems, and structured information collection processes. Without a solid data architecture, the potential for algorithmic learning diminishes and the promise of asymmetric scalability weakens. The system's learning speed becomes a central strategic variable, analogous to product-market fit.

Fourthly, in terms of governance, it clearly emerges that the operational autonomy of intelligent systems does not eliminate organisational responsibility. In regulated or socially sensitive sectors (healthtech, legaltech, pharma supply chain), the design of auditability, traceability, and continuous supervision mechanisms becomes an integral part of the business model. Managers must integrate validation protocols, monitoring procedures, and explicit definition of responsibilities from the outset. AI does not reduce risk; rather, it redistributes itfrom the decision-making phase to the design phase: governance becomes a strategic competence and not just a legal one.

An additional implication concerns the redefinition of the founder's role. In the analysed cases, the entrepreneur tends to evolve from a central decision-maker to an orchestrator of hybrid intelligences. The value no longer resides exclusively in the ability to make decisions under uncertainty, but in the ability to design the architecture within which probabilistic decisions are generated and supervised. The composition of the team, therefore, cannot be limited to the traditional distinction between

technical and commercial skills, but must integrate the ability to translate strategic parameters into computational terms and to systematically control models.

Finally, for investors and policymakers, the results suggest that the evaluation of an AI startup should not focus exclusively on the idea or the product, but on the robustness of the data infrastructure, the quality of the decision-making architecture, and the maturity of the governance mechanisms. The sustainability of the competitive advantage appears closely linked to the system's ability to learn over time and to responsibly manage its algorithmic autonomy.

Taken together, these implications show that the integration of artificial intelligence transforms the very nature of entrepreneurial design. Startups that manage to coherently integrate the human dimension and the algorithmic dimension—along the four directions that emerged in the results—are more capable of converting AI from a tool of efficiency to a lever of sustainable growth and structural competitive advantage.

7. Conclusions

This study has analysed how the integration of artificial intelligence as an operational component of entrepreneurial architecture modifies the nature of entrepreneurial action in contemporary startups.

Empirical evidence suggests that AI does not merely represent a factor of efficiency or a tool for automating pre-existing processes. Rather, it intervenes in the internal distribution of cognition, execution, scalability, and governance, redefining the very configuration of entrepreneurial agency. This is illustrated, for instance, by the predictive execution logic observed in Liqex, where algorithmic orchestration transforms financial flows from reactive to anticipatory processes, or by the epistemic governance infrastructure emerging in Longeviva and Geen, where AI mediates clinically sensitive decision pathways while maintaining concentrated organisational responsibility.

In this perspective, the startup can no longer be interpreted merely as a temporary organization in search of a scalable business model, but as an adaptive system in which the competitive advantage increasingly depends on the quality of the cognitive-computational infrastructure and the ability to orchestrate algorithmic learning processes over time. This results in a reinterpretation of dynamic capabilities: no longer just the ability to integrate and reconfigure resources, but also the ability to design, supervise, and evolve intelligent systems embedded in decision-making processes.

Artificial intelligence, therefore, does not replace human agency, but redefines its locus and modes of operation. The founder progressively assumes the role of architect and orchestrator of hybrid decision-making systems, in which responsibility remains human, while action is partially mediated by computational infrastructures.

Within the limits arising from the qualitative nature of the study and the ecosystem-specific nature of the cases analysed, the concept of Hybrid Entrepreneurial Agency offers a theoretical basis for further empirical and longitudinal insights into AI-intensive startups. The reliance on secondary data represents the primary methodological boundary of this work: future research should incorporate primary data through in-depth interviews with founders and key decision-makers, enabling a more granular reconstruction of the cognitive and governance mechanisms identified here. Longitudinal designs would further allow for the observation of how hybrid agency evolves as AI systems mature and accumulate data over time. Quantitative extensions, including survey-based studies on larger samples of AI-startups across different ecosystems, would contribute to assessing the generalisability of the theoretical framework proposed.

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Il marketing imprenditoriale come percorso di apprendimento multilivello per imprenditori emergenti

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Abstract

Frame of the research. *Il marketing imprenditoriale (EM) si è evoluto in un ambito di ricerca distinto, caratterizzato da proattività, innovazione, attenzione al cliente, assunzione di rischi calcolata, attenzione alle opportunità, sfruttamento delle risorse e creazione di valore (Morris et al., 2002; Hisrich & Ramadani, 2017). A differenza del marketing tradizionale, l'EM si sviluppa in condizioni di incertezza e vincoli di risorse, emergendo attraverso l'azione e l'interazione piuttosto che attraverso una pianificazione formale (Stokes, 2000; Sarasvathy, 2001).*

Purpose of the paper. *Questo studio mira a esplorare come le difficoltà iniziali nel marketing imprenditoriale inneschino processi di apprendimento e influenzino l'evoluzione dei comportamenti strategici, con particolare attenzione ai professionisti che passano da un impiego tradizionale a ruoli imprenditoriali.*

Methodology. *La ricerca adotta un approccio interpretativo qualitativo basato sull'analisi di dati secondari di natura narrativa, costituiti da 60 storie di vita professionale raccolte da piattaforme web dedicate alla transizione lavorativa. L'analisi è stata condotta tramite codifica tematica garantendo il rigore nel passaggio dai concetti di primo livello alle dimensioni teoriche aggregate. L'analisi raccoglie e analizza le esperienze vissute dai professionisti in transizione di carriera per catturare le dimensioni cognitive, relazionali, strategiche ed emotive delle loro prime attività di marketing imprenditoriale.*

Results. *I risultati delineano un modello di apprendimento in cui l'EM emerge come processo di ri-negoziazione identitaria. I principali temi emersi includono il superamento del 'comfort della pianificazione' (tipico del lavoro dipendente) a favore di una proattività relazionale. Vengono identificati tre livelli di adattamento: cognitivo (nuovi schemi mentali), relazionale (legittimazione sociale) e comportamentale (sperimentazione tattica). I risultati mostrano inoltre che l'ambiguità cognitiva, le sfide legate alla costruzione di legittimità, l'incertezza strategica e le tensioni emotive agiscono da catalizzatori per l'apprendimento esperienziale e sociale (Kolb, 1984; Lave & Wenger, 1991).*

Research limitations. *Il design qualitativo e l'attenzione rivolta ai professionisti in transizione potrebbero limitare la generalizzabilità. Ricerche future potrebbero adottare approcci longitudinali o quantitativi per convalidare ed estendere il quadro proposto.*

Managerial implications. *Lo studio evidenzia l'importanza di abbracciare la sperimentazione, la riflessione e la creazione di reti nell'EM in fase iniziale. Considerare le difficoltà come fattori scatenanti dell'apprendimento può supportare pratiche di marketing più adattive e resilienti.*

Originality of the paper. *L'articolo integra difficoltà, apprendimento e strategia all'interno di un quadro unificato e introduce la transizione di carriera professionale come una nuova prospettiva nella ricerca di marketing imprenditoriale.*

Keywords: *entrepreneurial marketing; ricerca qualitativa; apprendimento;*

1. Introduzione

Il marketing imprenditoriale è generalmente definito come il marketing svolto da imprenditori o solopreneur all'interno del proprio business. A partire dalla sua introduzione nei primi anni '80, i contributi accademici hanno progressivamente perfezionato e ampliato il costrutto, culminando nell'identificazione di sette dimensioni fondamentali del marketing imprenditoriale: (1) proattività, (2) innovazione, (3) intensità del cliente, (4) assunzione di rischi calcolati, (5) focalizzazione sulle opportunità, (6) sfruttamento delle risorse e (7) creazione di valore (Morris et al., 2002; Hisrich & Ramadani, 2017).

La letteratura sul tema ha focalizzato l'attenzione su come le attività di marketing in contesti imprenditoriali differiscano dal marketing tradizionale per la loro natura informale, adattiva e orientata all'azione, spesso sviluppata in condizioni di elevata incertezza e scarsità di risorse (Stokes, 2000; Fillis, 2002). In tali contesti, le strategie di marketing non sono infatti completamente definite ex ante, ma emergono progressivamente attraverso l'interazione con il mercato e l'esperienza diretta, assumendo la forma di processi dinamici piuttosto che di piani formali (Mintzberg, 1987; Sarasvathy,

2001). Le fasi iniziali del percorso di marketing imprenditoriale sono quindi particolarmente critiche, poiché i nuovi imprenditori devono contemporaneamente sviluppare una comprensione del mercato e le relazioni con gli stakeholder e devono definire una direzione strategica ancora instabile.

Le sfide incontrate in queste fasi iniziali sono multidimensionali. Dal punto di vista cognitivo, i marketer imprenditoriali alle prime armi operano in condizioni di razionalità limitata e ambiguità informativa, incontrando difficoltà nell'interpretare i segnali di mercato, valutare le opportunità e comprendere le reazioni dei clienti (Simon, 1955; Mitchell et al., 2002). I processi decisionali sono frammentati e fortemente influenzati da schemi interpretativi in continua evoluzione, rendendo il marketing un'attività esplorativa piuttosto che pianificata.

Queste sfide sono accompagnate da dimensioni relazionali, poiché il marketing imprenditoriale è profondamente radicato nelle interazioni sociali e nelle reti informali. Costruire relazioni con i primi clienti e partner richiede la continua negoziazione di fiducia, credibilità e legittimità, spesso in assenza di una reputazione consolidata (Granovetter, 1985; Stokes, 2000). Queste dinamiche influenzano la capacità di ottenere risorse, feedback e supporto esterno, con un impatto diretto sulle pratiche di marketing emergenti (Fillis, 2002; Cope & Watts, 2000). Le difficoltà assumono anche una dimensione strategica, poiché l'assenza di obiettivi chiari e di mercati definiti complica la formulazione di strategie coerenti nel tempo. L'approccio efficace sottolinea come gli imprenditori tendano ad agire entro i limiti delle risorse disponibili, adattando le proprie azioni alle contingenze emergenti piuttosto che seguire piani strategici formalizzati (Sarasvathy, 2001). Ciò si traduce in una strategia emergente, sviluppata attraverso l'azione e l'apprendimento progressivo, che può generare incertezza riguardo alle priorità e all'allocazione delle risorse (Mintzberg, 1987).

Oltre alle dimensioni cognitive, relazionali e strategiche, la letteratura riconosce il ruolo delle componenti emotive nei percorsi imprenditoriali. Emozioni come ansia, frustrazione o entusiasmo accompagnano le fasi iniziali del marketing imprenditoriale e influenzano il giudizio, la perseveranza e la capacità di apprendimento degli individui (Shepherd, 2003; Cope, 2011). Quando l'identità personale e quella imprenditoriale si intrecciano, le sfide emotive possono amplificare la percezione di incertezza e influenzare le successive scelte strategiche. Piuttosto che rappresentare semplici ostacoli, queste sfide sono importanti fattori scatenanti per i processi di apprendimento imprenditoriale. L'apprendimento è concepito come un processo dinamico attraverso il quale l'esperienza si trasforma in conoscenza, soprattutto in contesti caratterizzati da incertezza e cambiamento (Kolb, 1984; Politis, 2005). Nel marketing imprenditoriale, questo apprendimento assume prevalentemente una forma esperienziale, emergendo dall'interazione diretta con il mercato e dalla sperimentazione di pratiche di marketing.

L'apprendimento si sviluppa anche attraverso processi sociali e riflessivi. Le interazioni con clienti, partner e altri stakeholder consentono la condivisione di significati e l'elaborazione collettiva delle difficoltà incontrate (Lave & Wenger, 1991; Cope & Watts, 2000), mentre la riflessione sulle esperienze vissute consente di attribuire significato a errori e fallimenti, favorendo forme di apprendimento più profonde (Schön, 2017; Mezirow, 1991). Attraverso questi processi, le difficoltà contribuiscono allo sviluppo di comportamenti strategici adattivi, caratterizzati da sperimentazione, flessibilità e capacità di rispondere a stimoli contestuali (Fillis, 2002; Sarasvathy, 2001).

Nel loro insieme, questi contributi suggeriscono che le difficoltà incontrate nelle prime fasi del marketing imprenditoriale modellano i processi di apprendimento e influenzano anche l'evoluzione dei comportamenti strategici nel tempo. Tuttavia, la letteratura esistente ha spesso trattato separatamente difficoltà, apprendimento e strategia, offrendo una visione frammentata del fenomeno. Pertanto, la comprensione di come queste dimensioni interagiscono rimane limitata.

In questo contesto, la ricerca ha individuato un gap di letteratura relativo allo scollamento tra la teoria del marketing imprenditoriale come 'pratica' e la comprensione di come tali pratiche vengano interiorizzate da soggetti con imprinting cognitivo manageriale/esecutivo. Sebbene la letteratura abbia ampiamente descritto le dimensioni dell'EM, sappiamo ancora poco su come avvenga la transizione mentale e operativa per chi proviene da percorsi di lavoro dipendente, dove le logiche di marketing sono spesso governate da pianificazione formale e risorse pre-allocate. Questo studio

colma tale lacuna distinguendo tre piani analitici: (1) l'apprendimento come meccanismo di acquisizione; (2) l'identità come driver di cambiamento del ruolo; (3) il comportamento di marketing come esito strategico osservabile.

Basandosi sulla concettualizzazione del marketing imprenditoriale come processo non lineare, basato sulla pratica e fondato sull'esperienza (Stokes, 2000; Fillis, 2010) e su prospettive efficaci che enfatizzano l'apprendimento attraverso l'azione in condizioni di incertezza (Sarasvathy, 2001), questo studio affronta il marketing imprenditoriale come un percorso di apprendimento situato in cui conoscenza e strategia emergono dall'esperienza piuttosto che da una pianificazione preventiva. In termini di originalità: qualifica l'EM come un processo di 'unlearning' (disapprendimento) dei modelli di marketing tradizionale. Il contributo specifico consiste nel mappare come la 'resistenza' ai modelli appresi nel lavoro dipendente inneschi una transizione verso l'EM non solo per necessità economica, ma come evoluzione del sé professionale.

2. Letteratura

L'analisi della letteratura sul marketing imprenditoriale (EM) evidenzia un campo di studio ampio e frammentato, caratterizzato da una pluralità di approcci teorici e da una forte eterogeneità metodologica. I contributi analizzati si basano su framework consolidati come l'orientamento imprenditoriale e l'orientamento al mercato (Covin & Slevin, 1988; Morris et al., 2002), la teoria dell'effettuazione (Sarasvathy, 2001; Read et al., 2009), la Resource-Based View (Barney, 1991), la teoria delle reti (Hoang & Antoncic, 2003) e, più recentemente, prospettive relative alla sostenibilità, alla digitalizzazione e alla creazione di valore sociale. In questo scenario, la revisione sistematica di Breit e Widlok (2023) offre una mappatura tematica fondamentale del campo post-2010, confermando come l'EM si sia evoluto verso una dimensione più dinamica e multidimensionale.

La letteratura si concentra principalmente sul marketing imprenditoriale come insieme di pratiche strategiche orientate alla performance aziendale. Numerosi studi empirici dimostrano l'impatto positivo dell'EM su crescita, performance finanziaria, brand equity, innovazione e internazionalizzazione, soprattutto nel contesto di PMI e start-up (Hills et al., 2008; Becherer et al., 2012; Whalen et al., 2016; Manigandan, 2025). In questo filone, l'attenzione è principalmente focalizzata sui risultati organizzativi, mentre il ruolo dell'individuo è spesso ridotto a quello di un attore funzionale nell'implementazione di strategie efficaci. Tuttavia, come suggerito dagli studi longitudinali di Belchior e Castro-Silva (2023), l'identità imprenditoriale emerge proprio attraverso queste transizioni di carriera, rendendo l'esperienza individuale un elemento centrale e non meramente accessorio della strategia.

Un secondo filone riguarda il ruolo delle risorse relazionali, cognitive e simboliche nella pratica dell'EM. La letteratura sottolinea l'importanza delle capacità di networking, della legittimità, della conoscenza del mercato e dell'uso dei social media come leve chiave per superare la scarsità di risorse e la vulnerabilità della novità (Hoang & Antoncic, 2003; Amjad, 2025; Fillis & Telford, 2020). Studi recenti mostrano come il coinvolgimento degli stakeholder e la gestione del network siano centrali nei processi di costruzione di credibilità e accesso alle risorse (Amjad, 2025). Tuttavia, questi contributi tendono a dare per scontata la capacità degli attori di mobilitare efficacemente queste risorse, trascurando le difficoltà iniziali legate all'apprendimento, all'incertezza e alla mancanza di esperienza.

Una terza serie di studi concettualizza il marketing imprenditoriale come un processo creativo, non convenzionale e adattivo, in contrasto con il marketing tradizionale. In quest'ottica, il marketing imprenditoriale è descritto come basato sull'intuizione, la sperimentazione, il bricolage, la narrazione e le pratiche informali (Fillis, 2002; Gilmore et al., 2001; Fillis & Rentschler, 2010). Alcuni contributi recenti ampliano questa prospettiva per includere dimensioni identitarie, culturali e simboliche, ad esempio in contesti femminili, artistici o postcoloniali (Fillis, 2015; Saxena, 2025). In questo quadro, il concetto di 'Possible Selves' (Markus & Nurius, 1986) fornisce una chiave di lettura cruciale,

suggerendo che le difficoltà incontrate non siano solo ostacoli operativi, ma parte di un processo di negoziazione tra ciò che l'imprenditore è e ciò che teme di diventare o aspira a essere. Tuttavia, questi studi tendono anche a descrivere il marketing imprenditoriale come una pratica consolidata, piuttosto che come un processo progressivamente costruito.

Nel complesso, l'analisi di letteratura mostra una lacuna relativa alla scarsità di studi che analizzano esplicitamente le difficoltà incontrate da coloro che intraprendono una carriera come marketer imprenditoriali. In particolare, i processi di apprendimento iniziale, la gestione dell'incertezza decisionale, la tensione tra sperimentazione e legittimazione, il carico cognitivo ed emotivo, il rapporto con l'errore e il fallimento, nonché la costruzione dell'identità professionale nei contesti imprenditoriali in fase iniziale sono scarsamente esplorati (Weick, 1995; Shepherd et al., 2011). Per affrontare questa lacuna, è necessario un approccio metodologico rigoroso che, seguendo le recenti indicazioni di Leick e Tuitjer (2025), valorizzi la ricerca qualitativa come strumento elettivo per decodificare la complessità dei processi imprenditoriali emergenti.

Questa lacuna ha portato i ricercatori a considerare il marketing imprenditoriale come un processo esperienziale in cui gli imprenditori emergenti incontrano una serie di difficoltà che, se condivise, possono aiutare le iniziative future a ridurre l'incertezza e a prepararsi meglio agli ambienti che dovranno affrontare.

In questa prospettiva, la ricerca condotta punta a rispondere alla RQ: quali difficoltà incontrano gli imprenditori durante le prime fasi del loro percorso di marketing imprenditoriale e in che modo queste sfide influenzano i loro processi di apprendimento e i loro comportamenti strategici nel tempo?

3. Metodo

La ricerca ha utilizzato un approccio qualitativo per analizzare la storia di 60 persone che hanno cambiato il loro percorso di carriera per diventare imprenditori (Van Burg et al., 2022). Le storie sono state raccolte da una piattaforma web[1] che pubblica resoconti di transizione di carriera di persone provenienti da tutto il mondo. Le narrazioni, originariamente raccolte attraverso interviste semi-strutturate condotte da job coach professionisti, forniscono approfondimenti sulle motivazioni dei partecipanti, sulle sfide e sugli ostacoli incontrati e sulle strategie adottate per affrontare e sostenere la transizione. Chiunque, indipendentemente dal fatto che abbia acquistato servizi dalla piattaforma, può contattare la redazione e raccontare la propria esperienza di transizione di carriera. In particolare, su oltre 400 storie pubblicate, i ricercatori si sono focalizzati sul tipo di transizione di carriera coerente con gli obiettivi di ricerca e avvenuto nel più recente lasso temporale corrispondente agli ultimi 5 anni. Le storie personali sono state analizzate dai ricercatori per identificare qualsiasi riferimento al loro approccio al marketing nella loro nuova impresa. In particolare, i ricercatori hanno raccolto tali informazioni concentrando l'attenzione su tre serie di domande: (1) "Cosa hai imparato durante il processo?", (2) "Cosa non è andato bene? Quali svolte sbagliate hai preso? Qual è stata la cosa più difficile del cambiamento?" e (3) "Cosa consiglieresti ad altri di fare nella stessa situazione?". I dati sono stati analizzati utilizzando un approccio di analisi qualitativa del contenuto diretto basato su un framework di codifica definito esternamente (Hsieh e Shannon, 2005). Data la molteplicità dei casi, abbiamo seguito la logica di Eisenhardt (1989) del confronto tra casi per identificare pattern ricorrenti. Le macrocategorie sono state derivate dalla struttura editoriale incorporata nei protocolli di intervista semi-strutturata (Schreier, 2012).

La solidità del campione analizzato è supportata dall'autorevolezza dell'organizzazione di riferimento, attiva nel settore da oltre vent'anni con un network di oltre 180.000 utenti. L'impresa, inoltre cura e pubblica narrazioni di carriere individuali con continuità ventennale, garantendo così una prospettiva diacronica e una base empirica consolidata nel tempo. Nonostante le interviste non esplicitino direttamente la provenienza dei soggetti, secondo i bilanci di impatto dell'impresa, il

[1] https://www.careershifters.org/

dataset integra testimonianze raccolte su scala globale ed in particolare provenienti da 21 paesi distribuiti in Nord America, Europa, Medio Oriente, Africa, Asia-Pacifico. Il processo di codifica è stato implementato, perfezionato manualmente da un ricercatore e poi convalidato da un secondo (Miles et al., 2014). A ciascuna intervista sono stati assegnati un codice identificativo e un numero sequenziale per garantirne la tracciabilità. Infine, un totale di 169 porzioni di testo sono stati codificati e classificati come apprendimento esperienziale, riflessivo o sociale. I ricercatori hanno discusso i pattern emersi e li hanno rivisti in temi, insieme in un approccio iterativo. In particolare, il processo di codifica ha portato all'identificazione di sei macro-temi che riflettono le dimensioni della transizione; questi sono stati ulteriormente declinati in 16 sottocategorie e 42 codici analitici (tab. 1).

Macro-Tema (Livello 1)	**Sottocategoria (Livello 2)**		**Codici Analitici (Livello 3)**
		Frequenza assoluta e %	
1. Identity work & ricostruzione del sé	Crisi dell'identità precedente	14 12%	Perdita dello status sociale; Sensazione di "scissione" interna; Nostalgia della stabilità professionale passata; Paura del giudizio altrui.
	Sperimentazione Identitaria	*12* *10%*	*Identity Play* (testare nuovi ruoli); Età come valore aggiunto (maturità vs giovinezza); Ricerca di coerenza tra valori personali e lavoro.
	Validazione e Legittimazione	18 15%	Superamento della sindrome dell'impostore; Necessità di certificazioni formali; Feedback positivi come ancora identitaria.
2. Marketing strategico individuale	Posizionamento e Pricing	*16* *13%*	*Underpricing* iniziale (svendita); Passaggio a tariffe basate sul valore (*Value-based*); Identificazione della nicchia di mercato.
	Networking e Capitale Relazionale	15 12%	Uso strategico di LinkedIn; *Pay-it-forward* (chiedere aiuto e ricambiare); Networking proattivo vs passivo; Mentorship.
	Comunicazione del Brand Personale	9 7%	Storytelling della trasformazione; Pitching dei servizi; Gestione della reputazione online e offline; Visibilità vs Introversione.
3. Gestione del rischio e risorse	Sostenibilità Finanziaria	11 9%	Gestione del "cuscinetto" economico (6+ mesi); *Bootstrapping* (fai-da-te burocratico); Gestione dei periodi a reddito zero.
	Sistemi di Supporto	7 6%	Supporto emotivo della famiglia/amici; Community di settore (gruppi FB/associazioni); Uso della tecnologia per scalare l'attività.
	Pianificazione d'Emergenza	5 4%	Definizione del *Worst-case scenario*; Valutazione della reversibilità (possibilità di tornare al vecchio settore).
4. Psicologia della transizione	Dinamiche Emotive Negative	13 11%	Paura della paralisi decisionale; Stress da incertezza (*Liminality*); Senso di solitudine del freelance; Ansia da feedback.
	Risorse Cognitive ed Emotive	19 8%	Resilienza e *Resourcefulness*; Mindset proattivo (Roosevelt); Fiducia nell'intuito e nella "pancia"; Accettazione del fallimento.
5. Esecuzione tattica e metodologia	Benessere e Self-Care	6 *5%*	Rifiuto della *Hustle Culture*; Camminare/Attività fisica come problem solving; Gestione dei confini casa-lavoro.
	Apprendimento e Sviluppo	14 12%	Acquisizione rapida di nuove *Hard Skills*; *Trial & Error* (imparare dagli errori); Ricerca metodologica sull'industria target.
	Gestione Operativa	8 7%	Pro-bono strategico (lavorare gratis per portfolio); Gestione del tempo e dei carichi di lavoro; Selezione qualitativa dei clienti.
	Adattamento al Contesto	10 8%	Transizione da ufficio a *Remote/Solo work*; Gestione delle nuove gerarchie (essere "junior" da adulti); Risposta a shock esterni (es. Pandemia).
6. Etica e valore sociale	Impatto e Scopo	*6* *5%*	*Purpose-driven work* (lavoro con significato); Contributo alla comunità; Trasformazione del dolore personale in servizio agli altri.

4. Risultati

Il disegno di ricerca implementato ha portato all'identificazione delle pratiche marketing adottate nelle prime fasi del processo imprenditoriale. Gli imprenditori emergenti imparano a creare, comunicare e generare valore credibile sul mercato, costruendo contemporaneamente identità professionali, offerte, relazioni e routine operative. In termini di marketing imprenditoriale (EM), le esperienze raccolte mostrano il passaggio dal marketing "organizzativo", tipico di contesti strutturati e ruoli definiti, al marketing "imprenditoriale", caratterizzato da incertezza, risorse limitate, sperimentazione continua e ricerca di legittimità. Un tema chiave emerso è la centralità della dimensione relazionale nella costruzione di una strategia di marketing così destrutturata che caratterizza gli imprenditori emergenti: "*Mi sono reso conto che non si tratta necessariamente solo del settore in sé, ma anche del team più ampio, dell'ambiente*" (CS_1).
L'apprendimento esperienziale è il motore principale del comportamento di marketing imprenditoriale per gli imprenditori emergenti. L'ingresso nel mercato avviene spesso prima che l'offerta sia completamente definita o che l'identità professionale sia consolidata. Errori come la sottovalutazione dei prezzi, l'accettazione di incarichi al di fuori della propria area di competenza o la sottovalutazione della complessità dei progetti non sono visti come semplici errori, ma come momenti di apprendimento generativo: "*All'inizio mi sottovalutavo... col tempo, ho imparato il valore di ciò che so fare e ho più che raddoppiato i miei compensi*" (CS_26). In termini di processo di apprendimento, molti intervistati hanno appreso il significato del pricing solo dopo aver sottovalutato il proprio lavoro e aver sperimentato stress, sovraccarico o insoddisfazione finanziaria. Una successiva riflessione consente loro di reinterpretare il pricing come un segnale strategico di valore e professionalità: "*Non bisogna vergognarsi di chiedere ciò che si vale*" (CS_34).
Da una prospettiva di marketing imprenditoriale, questo passaggio evidenzia come il pricing funzioni come variabile economica e come segnale di valore e leva di posizionamento, appreso attraverso l'interazione diretta con il mercato. L'apprendimento sul campo produce anche una progressiva capacità di valutare clienti, progetti e i confini dell'offerta. Esperienze stressanti o infruttuose diventano criteri operativi per il futuro: "*È stata una lezione preziosa su come concentrarsi su ciò che si sa di poter offrire. Ho ignorato i segnali d'allarme e mi sono scottato*" (CS_25). Da questa prospettiva, l'esperienza diventa il principale strumento di indagine del mercato.
Accanto alla dimensione esperienziale, l'apprendimento riflessivo gioca un ruolo centrale nel trasformare l'esperienza in direzione strategica. Le interviste mostrano come la paura, la sindrome dell'impostore e il disorientamento iniziale vengano progressivamente rielaborati in modelli decisionali che guidano il posizionamento e la selezione delle opportunità di marketing: "*Ho imparato a lasciar andare il perfezionismo, a convivere con il disagio e ad accettare che la mia attività si evolverà*" (CS_2). Tale riflessività consente agli imprenditori di passare da una fase esplorativa a una maggiore coerenza strategica, elemento chiave del marketing imprenditoriale in contesti di incertezza.
L'apprendimento riflessivo si traduce anche in un lavoro sull'identità. In termini di posizionamento, gli imprenditori descrivono la difficoltà di "dare un nome" a ciò che fanno, di restringere il loro focus o di rendere tangibile la loro proposta. Attraverso la riflessione, gli imprenditori sviluppano una narrazione credibile e comunicabile che converte l'identità personale in una proposta di valore percepita come legittima dal mercato: "*Mi sono posizionato in modo troppo generico... mi ci è voluto un po' per scegliere una nicchia*" (CS_15).
L'apprendimento sociale emerge come il terzo pilastro del processo di marketing imprenditoriale. Networking, mentoring e community sono descritti non solo come supporto emotivo, ma come veri e propri meccanismi di accesso al mercato e legittimazione: "*Solo per essere stato invitato, ti apprezzano già"* (CS_7). Da una prospettiva di marketing imprenditoriale, le relazioni funzionano come infrastrutture di marketing poiché generano lead, creano fiducia e riducono l'incertezza informativa tipica delle fasi iniziali. Il networking favorisce anche l'apprendimento implicito delle regole di mercato, delle aspettative dei clienti e delle norme del settore. Le interazioni sociali diventano così luoghi di apprendimento strategico, dove il feedback non è formalizzato ma continuo:

"*Se non chiedi, non ottieni*" (CS_29). Questi risultati evidenziano la centralità del comportamento di coinvolgimento del mercato tipico del marketing imprenditoriale, basato sull'iniziativa e sull'attivazione di relazioni. Gli imprenditori emergenti apprendono attraverso l'interazione con altri attori (es. clienti, colleghi, reti, comunità professionali), scoprendo che il mercato è un'entità tangibile fatta di reti di relazioni. I comportamenti strategici associati implicano la capacità di attivare, mantenere e interpretare le relazioni come fonti di opportunità. Per questo tipo di imprenditore, il marketing non è pianificato ex ante, ma emerge dall'azione relazionale e dalla visibilità sociale. Queste affermazioni dimostrano come l'acquisizione di clienti venga appresa come pratica relazionale, piuttosto che come tecnica formale.

Le evidenze raccolte mostrano inoltre come il posizionamento e il personal branding rappresentino il punto di convergenza più evidente tra processi di apprendimento e comportamenti strategici. Costruire una nuova identità professionale richiede sperimentazione, riflessione e validazione sociale: "*Sto ancora lavorando alla creazione di una nuova narrazione che rappresenti ciò che mi interessa e dove sono diretto*" (CS_45). In questo senso, il posizionamento non è un atto comunicativo isolato, ma un comportamento strategico che si affina nel tempo attraverso il feedback del mercato.

In linea con l'evidenza che il marketing imprenditoriale è plasmato da un processo relazionale e dialogico piuttosto che da una strategia pianificata, l'acquisizione di clienti e l'interazione con il mercato emergono come pratiche di apprendimento continuo. Inviare pitch, discutere le proprie ambizioni, accettare incarichi iniziali o fare volontariato sono descritti come modi per impegnarsi con il mercato.

La dimensione della sperimentazione e dell'adattamento riflette pienamente la logica efficace del marketing imprenditoriale. I partecipanti descrivono percorsi fatti di piccoli passi, tentativi reversibili e continui aggiustamenti. La sperimentazione diventa una vera e propria epistemologia del marketing imprenditoriale, in cui l'apprendimento precede la previsione e l'azione genera conoscenza: "*Tutto ciò che facciamo è un esperimento*" (CS_45). Da una prospettiva strategica, questo si traduce in comportamenti adattivi: testare le offerte, cambiare direzione, riformulare servizi e obiettivi: "*Il fallimento è ciò che ti avvicina al successo*" (CS_23).

La fase di consolidamento emerge quando identità, offerte e routine iniziano ad allinearsi. Nelle fasi più avanzate, il processo di apprendimento diventa prevalentemente riflessivo. Gli intervistati dimostrano una maggiore capacità di guardare retrospettivamente al proprio percorso, riconoscendo modelli, priorità e direzioni strategiche: "*Sto imparando a dire di no alle opportunità che non sono allineate*" (CS_45). Questo dimostra come il processo di apprendimento porti gli imprenditori a passare da un marketing reattivo a uno strategicamente consapevole. La stabilizzazione avviene attraverso una maggiore selettività, una gestione più consapevole delle risorse e la costruzione di una continuità relazionale. Tuttavia, i dati mostrano anche che il consolidamento include una riflessione sulla sostenibilità personale: "*Abbiamo bisogno di tempo solo per distrarci... il cervello si libera per pensare alle soluzioni*" (CS_1). In termini di marketing imprenditoriale, il rifiuto della cultura del trambusto è esplicito e la sostenibilità individuale diventa una condizione per la continuità strategica dell'azienda.

Nel complesso, le prove suggeriscono che il marketing imprenditoriale nelle transizioni di carriera è un processo di apprendimento multilivello che produce comportamenti di mercato strategici. Le sfide cognitive, emotive e relazionali non sono esterne al marketing, ma ne costituiscono piuttosto la forza trainante: innescano riflessione, sperimentazione e relazioni, plasmando progressivamente posizionamento, prezzi e marketing. interazione. Il marketing emerge quindi come lo spazio in cui identità e mercato vengono co-costruiti, evidenziando il contributo specifico del marketing imprenditoriale alla comprensione delle carriere imprenditoriali nascenti.

5. Discussione e conclusioni

La ricerca presentata ha portato a identificare il marketing imprenditoriale come un processo di apprendimento multilivello in cui gli imprenditori emergenti muovono i primi passi fino al consolidamento del loro comportamento imprenditoriale. I risultati mostrano che le difficoltà svolgono un ruolo fondamentale nell'attivazione dei processi di apprendimento imprenditoriale. Piuttosto che rappresentare semplici ostacoli, le sfide fungono da fattori scatenanti critici che stimolano la riflessione e, successivamente, l'evoluzione.
Questi processi di apprendimento, a loro volta, plasmano i comportamenti strategici degli imprenditori. Man mano che gli individui si confrontano con l'incertezza e i vincoli di risorse, affinano progressivamente le proprie logiche decisionali, riposizionano la propria offerta e adattano i propri approcci al mercato. La strategia emerge quindi non come un piano predefinito, ma come il risultato di dinamiche di apprendimento iterative. Infine, lo studio dimostra che il marketing si apprende come una pratica situata, incarnata e progressiva. Si sviluppa attraverso l'azione e l'interazione in contesti specifici, si fonda sull'esperienza e sull'identità personale e si evolve gradualmente nel tempo. La competenza di marketing si acquisisce quindi attraverso la pratica imprenditoriale vissuta. In teoria, le voci dei professionisti che hanno compiuto la transizione dal lavoro tradizionale all'imprenditorialità assumono un valore particolare, colmando il gap individuato da Fillis (2015). Le testimonianze analizzate, focalizzate sulla fase iniziale dell'esperienza imprenditoriale, forniscono un "kit informativo" in grado di orientare i futuri imprenditori verso pratiche di marketing più consapevoli. In particolare, il marketing imprenditoriale emerge come il risultato di un processo di apprendimento in cui azione, riflessione e relazioni si intrecciano per plasmare comportamenti strategici adattivi e progressivamente più coerenti.
In linea con la letteratura che descrive il marketing imprenditoriale come informale, adattivo e orientato all'azione (Stokes, 2000; Fillis, 2002), le narrazioni raccolte dimostrano come le pratiche di marketing non siano definite ex ante, ma emergano attraverso l'esperienza, l'interazione e la riflessione, configurandosi come strategie emergenti nel senso di Mintzberg (1987) e come processi efficaci nel senso di Sarasvathy (2001). Le difficoltà incontrate dagli imprenditori nella fase nascente (incertezza sul posizionamento, ambiguità nella valutazione delle opportunità, incertezza nel prezzo, mancanza di risorse finanziarie e reputazionali) non si limitano a ostacoli contingenti. Esse attivano processi di apprendimento che trasformano progressivamente l'esperienza in conoscenza operativa, confermando la prospettiva di Kolb (1984) e Politis (2005), secondo cui l'apprendimento imprenditoriale è un processo dinamico di trasformazione dell'esperienza.
A livello cognitivo, le testimonianze riflettono le condizioni di razionalità limitata e ambiguità informativa descritte da Simon (1955) e Mitchell et al. (2002). I partecipanti descrivono momenti di disorientamento interpretativo, in cui comprendere il mercato e attribuire significato al feedback ricevuto risulta complesso. È proprio in questi momenti che si attivano forme di apprendimento riflessivo (Schön, 2017; Mezirow, 1991): rallentare, prendersi del tempo per "pensare" e rifiutare la logica della produttività incessante diventano pratiche strategiche. La riflessione consente di riformulare il problema, ridefinire le priorità e costruire una visione più coerente. In questo senso, comportamenti come la pianificazione strategica, il ritmo strategico, la determinazione dei prezzi o il rafforzamento dell'impegno a lungo termine emergono non come il risultato di un piano formale, ma come la sedimentazione di processi riflessivi attivati dall'incertezza.
Allo stesso tempo, le difficoltà stimolano l'apprendimento esperienziale. In condizioni di risorse scarse e in assenza di una reputazione consolidata, gli imprenditori agiscono entro i limiti di ciò che è disponibile, adattando le proprie scelte alle contingenze emergenti, in linea con la logica effettuale (Sarasvathy, 2001). La sperimentazione precoce, l'accettazione di opportunità imperfette e la costituzione di riserve finanziarie prima di assumersi rischi maggiori rivelano una strategia che si sviluppa attraverso l'azione, confermando il concetto di strategia emergente (Mintzberg, 1987). L'apprendimento avviene attraverso l'azione, la correzione e la ricalibrazione. Il marketing diventa quindi un'attività esplorativa, piuttosto che pianificata, in cui l'interazione diretta con il mercato

produce progressivi aggiustamenti nelle scelte di posizionamento, allocazione delle risorse e gestione del rischio.
La dimensione relazionale, ampiamente riconosciuta nella letteratura sul marketing imprenditoriale (Granovetter, 1985; Hoang & Antoncic, 2003; Fillis, 2002), emerge con forza anche nei nostri risultati. Le reti non sono semplici canali di acquisizione clienti, ma spazi di apprendimento sociale (Lave & Wenger, 1991; Cope & Watts, 2000). Attraverso il coinvolgimento di clienti, partner e colleghi, gli imprenditori negoziano significati, ridefiniscono le proprie competenze e costruiscono credibilità in assenza di una legittimazione pregressa. Il pitching proattivo, la valorizzazione delle raccomandazioni e la riformulazione delle proprie competenze diventano pratiche attraverso le quali la reputazione si consolida progressivamente. In questo processo, l'identità professionale si intreccia con gli sforzi di marketing, confermando come le dimensioni simboliche e relazionali siano centrali nella fase nascente. Dal punto di vista teorico, lo studio contribuisce alla letteratura sull'Entrepreneurial Marketing (EM) spostando l'attenzione dall'efficacia delle tattiche organizzative al processo di costruzione identitaria e cognitiva dell'individuo (Breit & Widlok, 2023). La ricerca estende la comprensione delle transizioni di carriera (Belchior & Castro-Silva, 2023) dimostrando che il marketing, in contesti nascenti, non è una funzione predefinita ma una competenza adattiva che emerge dalla rinegoziazione dei propri 'sé possibili' (Markus & Nurius, 1986). Il passaggio da un'identità professionale tradizionale a una imprenditoriale richiede un profondo processo di 'unlearning' dei modelli di marketing convenzionale a favore di logiche effettuali e dell'adozione di identità provvisorie (Ibarra, 1999) utili a testare il nuovo ruolo sul mercato. In questo senso, il lavoro rafforza il legame tra apprendimento e strategia emergente (Mintzberg, 1987), teorizzando che le difficoltà iniziali agiscano come meccanismi di apprendimento riflessivo indispensabili per la sedimentazione della conoscenza operativa (Politis, 2005).
In termini di implicazioni manageriali, chiarendo come le difficoltà attivino processi di apprendimento che plasmano i comportamenti di marketing strategico, i risultati hanno portato alla definizione di linee guida per supportare gli imprenditori emergenti nell'impegno in azioni di marketing imprenditoriale più consapevoli e ponderate.
In termini di implicazioni manageriali, l'apprendimento esperienziale emerge come una leva essenziale per la gestione del rischio e la sperimentazione di mercato. Creare riserve finanziarie prima di assumersi rischi più significativi è considerata una pratica cruciale: come sottolinea un intervistato, "*Avere un piano e una certa stabilità finanziaria per almeno i primi sei mesi*" (CS_19). Questi dati, supportati dall'alta frequenza del codice 'Sostenibilità Finanziaria'. suggeriscono che per l'imprenditore emergente la prudenza fiscale non è un freno, ma un abilitatore del marketing: solo con una base economica solida è possibile evitare l'"Underpricing' permettendo una negoziazione del prezzo basata sul valore reale e non sulla necessità immediata di liquidità.
Allo stesso tempo, dire "sì" alle opportunità e sperimentare in anticipo consente di imparare facendo: "*Non aspettare di essere perfetto... Il modo migliore per imparare è semplicemente dire 'sì'*" (CS_26). Per manager o mentor, ciò significa che i programmi di formazione o supporto dovrebbero incoraggiare la sperimentazione guidata e l'apprendimento attivo, creando ambienti in cui gli errori non vengono stigmatizzati ma diventano opportunità di crescita e adattamento.
L'apprendimento sociale gioca un ruolo altrettanto centrale, soprattutto nella costruzione di relazioni e legittimità di mercato. La capacità di mobilitare la rete per ottenere credibilità e accesso alle opportunità emerge chiaramente dalle testimonianze. Un partecipante ha osservato che "*Le persone che si raccomandano a vicenda sono un fattore assolutamente positivo*" (CS_128), mentre un altro ha sottolineato l'importanza del networking e del pitching: "*Invia il pitch, contatta le persone e crea una connessione"* (CS_17). Il successo del 'Networking Relazionale' dimostra che il ruolo del mentor deve evolvere da consulente tecnico a 'connettore sociale'. I coach dovrebbero incoraggiare la costruzione di micro-community per mitigare il senso di 'Isolamento', trasformando il networking da attività ansiogena a pratica di apprendimento collettivo e legittimazione reciproca. Questi esempi inoltre dimostrano come la costruzione di relazioni e la negoziazione della fiducia siano pratiche strategiche, non solo tattiche, e suggeriscono che gli interventi manageriali dovrebbero aiutare gli

imprenditori emergenti a sviluppare competenze narrative e relazionali, nonché capacità di riformulazione del valore, come evidenziato da un partecipante che ha osservato: "*Se osservate con occhi nuovi, le vostre competenze attuali potrebbero essere il trampolino di lancio verso qualcosa di nuovo*" (CS_20). Alla luce della pervasività della 'Sindrome dell'Impostore', l'implicazione per mentor e coach è la necessità di spostare il focus dalla mera acquisizione di hard skills alla validazione dell'identità. I programmi di mentoring devono integrare strumenti di 'riflessività guidata' per aiutare i soggetti a ricodificare il proprio passato professionale, trasformando il senso di inadeguatezza in una proposta di valore distintiva e autentica.

Infine, la gestione del valore e della direzione strategica richiede una combinazione di apprendimento riflessivo e pianificazione consapevole. Sentirsi sicuri nella determinazione dei prezzi "*Trova la fiducia in te stesso per far pagare ciò che vali*" (CS_13), pianificare strategie coerenti e garantire segnali di qualità "*Avere una strategia e una visione... assicurarsi che la qualità sia davvero buona*" (CS_127), nonché impegnarsi pienamente e definire obiettivi a lungo termine: "*Lavoraci ogni giorno... poi aumenta la posta in gioco nei tuoi obiettivi"* (CS_SOLO_161) sono comportamenti che emergono dall'integrazione di riflessione, esperienza e relazioni sociali. Da una prospettiva manageriale, ciò implica che il supporto agli imprenditori emergenti non può limitarsi a fornire strumenti operativi: è essenziale supportare la costruzione di fiducia, visione strategica e capacità di pianificazione, affinché le decisioni operative siano coerenti con la loro identità professionale e il loro posizionamento di mercato.

Limiti della ricerca sono legati all'utilizzo esclusivo di dati secondari, alla consultazione di una sola piattaforma e quindi di un solo dataset e all'autoselezione delle persone che hanno deciso di raccontare la loro storia. In questo senso un ampliamento della ricerca su nuovi database o l'integrazione dell'analisi con dati primari potrebbe rafforzare una futura ricerca. Sulla base di tali evidenze, si delineano diverse traiettorie per la ricerca futura. In primo luogo, appare prioritario approfondire il fenomeno attraverso l'integrazione di dati primari e studi longitudinali che, seguendo i più recenti orientamenti metodologici (Leick & Tuitjer, 2025), permettano di monitorare l'evoluzione delle pratiche di marketing in tempo reale. In secondo luogo, sarebbe opportuno indagare come variabili culturali o motivazionali (imprenditorialità per necessità vs. opportunità) influenzino la velocità del processo di 'unlearning' e la capacità di gestire l'incertezza del pricing. Infine, futuri approfondimenti potrebbero esplorare il ruolo delle tecnologie digitali nel facilitare la costruzione di legittimità relazionale, fornendo una visione ancora più granulare dei percorsi di consolidamento del comportamento imprenditoriale.

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The King's Speech: How Entrepreneurs' Family Social Capital and Risk Aversion Shape New Venture Financing

LUCIA LUDOVICI, PIETRO TARAGONI

Abstract

Frame of the research. *Traditionally, the entrepreneurial function has been conceptualized as closely related to the entrepreneur's personal wealth. Despite the expanding supply of equity-based funding and the fact that venture capitalists (VCs) usually provide managerial and value-added contributions critical to new ventures success, VCs continue to account for only a modest share of overall entrepreneurial finance, especially when quantitatively compared to commercial banks. This phenomenon raises a fundamental question: what are the factors that systematically shape the propensity of entrepreneurs to choose between venture capital and bank financing?*

Purpose of the paper. *The primary objective of the paper is to advance our understanding of when a rational entrepreneur would seek venture capital rather than bank financing by developing a more comprehensive framework that incorporates two practically salient factors: family social capital and risk aversion of the entrepreneur.*

Methodology. *We propose a theoretical model of entrepreneurial financing in which preferences are characterized alternatively by a mean-variance framework and CARA utility, linking family social capital and risk aversion to show how their interaction shapes the financing choice.*

Results. *Family social capital affects utility under bank financing through two channels: it improves borrowing conditions by lowering the cost of debt, but it also increases effective risk aversion. The net impact of social capital on utility therefore depends on the relative strength of these two forces.*

Under venture capital, equity-based financing exposes the entrepreneur to full payoff variability, so that risk aversion directly reduces the attractiveness of venture capital.

As a result, there exists a threshold level of effective risk aversion such that venture capital is preferred to bank financing.

Research limitations. *The impact of family social capital on borrowing conditions and risk aversion is modeled in a linear form, but potentially nonlinear relationships may generate richer dynamics and alternative threshold effects.*

Managerial implications. *Venture capital financing is likely to be most beneficial when the new venture lies squarely within the venture capitalists' domain of expertise, enabling meaningful managerial value-added, when entrepreneurs pursue ambitious growth objectives, and exhibit lower risk aversion. Venture capitalists are more likely to achieve favorable outcomes when the entrepreneur's family social capital is limited.*

Originality of the paper. *While past research has focused almost exclusively on the central trade-off in venture capital financing – the profit motive versus the control motive – characterizing this trade-off as a "double moral hazard" problem, we advance the idea that entrepreneurial risk aversion and family social capital jointly shape the choice between bank debt and venture capital. Abstracting from these factors sharpens analytical tractability, yet it limits the understanding of a phenomenon that remains widely underexplored despite its practical relevance for new venture success.*

Keywords: *family social capital; risk aversion; venture capital; entrepreneurship; double moral hazard; entrepreneurial finance*

1. Introduction

Traditionally, the entrepreneurial function has been conceptualized as closely related to the entrepreneur's personal wealth (Evans and Jovanovic, 1989). With the transition to a system increasingly grounded in equity rather than debt (Lerner and Leamon, 2023; Cumming et al., 2023), the creation of new ventures is no longer necessarily limited by the endowment of the entrepreneur's resources. Despite this paradigmatic shift and the fact that venture capitalists (VCs) usually provide managerial and value-added contributions critical to new ventures success, VCs continue to account for only a modest share of overall entrepreneurial finance, especially when quantitatively compared to commercial banks (Honjo and Yoshida, 2025; Miglo, 2022). The coexistence of equity and debt financing sources, coupled with the persistent dominance of the latter, raises a fundamental question: what are the factors that systematically shape the propensity of entrepreneurs to choose between

venture capital and bank financing?

Prior research on resource assembly has explained entrepreneurial finance decisions primarily in terms of entrepreneurs' preferences among alternative financing sources (Shepherd et al., 2018). For example, this stream of work has examined entrepreneurs' propensity to rely on lower levels of debt (e.g., Huyghebaert, Gucht, and Hulle, 2007), their choice between debt and venture capital (e.g., de Bettignies and Brander, 2007), between venture capitalists and business angels (e.g., Fairchild, 2011), among different venture capital investors (e.g., Drover, Wood, and Payne, 2014), as well as preferences for other financing mechanisms such as crowdfunding (e.g., Miglo, 2022) and additional emerging forms of entrepreneurial finance. This literature has often conceptualized the fundamental financing decision around the central trade-off in venture capital financing: the profit motive – linked to the benefits of VCs' value-adding managerial contributions (e.g., Kirzner 1999; Schumpeter 1934) – versus the control motive – linked to the costs associated with effort dilution and loss of control when entrepreneurs cede substantial equity to a VC (e.g., Sapienza, Korsgaard, and Forbes 2003).

The current theory of venture financing is grounded in agency-based considerations that characterize this trade-off. Models of entrepreneurial finance highlight adverse selection outcomes, whereby high-quality entrepreneurs – who possess superior information about their startups relative to potential investors (Venkataraman, 1997) – are less inclined to rely on equity financing due to ownership dilution and the higher opportunity costs associated with relinquishing control rights (Meza and Webb, 1987; Stiglitz and Weiss, 1981). This trade-off also highlights a "double moral hazard" problem inherent in venture capital finance. Specifically, de Bettignies and Brander 2007 argue that under equity financing, both the entrepreneur and the VC supply non-observable (or at least non-verifiable) effort that is critical to venture performance. Allocating a larger equity stake to the VC strengthens the VC's incentives to exert effort but weakens effort incentives for the entrepreneur. By contrast, bank financing preserves the entrepreneur's full ownership, thereby avoiding effort dilution and loss of control, but it deprives the venture of the VC's managerial value-added.

While prior studies have advanced our understanding of entrepreneurs' preferences among alternative financing sources, academic understanding remains limited regarding a range of additional factors that shape these preferences. These factors – that include entrepreneurs' behavioral traits and social processes – are both theoretically and practically relevant for systematically explaining how the core trade-off varies when considering the choice between different forms of financing, beginning with the fundamental one between debt and equity (de Bettignies and Brander, 2007). First, scholars have paid limited attention to entrepreneurs' risk aversion. Much of the research on entrepreneurial firms has focused on access to credit, whereas comparatively little is known about the role of risk preferences (Hvide and Panos, 2014). Willingness to take risks has long been recognized as a salient attribute of successful entrepreneurs (Arteaga-Fonseca et al., 2025; Herranz, Krasa, and Villamil, 2015; Forlani and Mullins, 2000). Risk aversion can shift the preferences of entrepreneurs between debt and equity by altering the relative importance of the benefits of the managerial contributions of VCs versus the costs of effort dilution. Second, research in strategy and entrepreneurship has underscored the role of entrepreneurs' family social capital in shaping new-venture financing choices (Stasa and Machek, 2022; Shepherd et al., 2018; Chua et al., 2011)[1]. However, this line of research has indicated that the relationship between social capital and the capital structure of new ventures still remains poorly understood (Dudley, 2021). Conceptualized as the goodwill and resources available through reciprocal, trust-based relationships (Adler and Kwon, 2002; Hitt, Lee, and Yucel, 2002; Lin, 2001), social capital is often argued to be valuable, rare, difficult to imitate, and non-substitutable (Barney, 1991) and thus to contribute positively to firm outcomes (Nahapiet and Ghoshal, 1998).

To advance our understanding of when a rational entrepreneur would seek venture capital rather than bank financing, we build on previous agency considerations and retain the core feature of the double–moral hazard problem of the model presented by de Bettignies and Brander (2007) but

[1] Social capital was originally defined as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (Bourdieu 1986).

develop a more comprehensive framework that incorporates two practically salient factors: the risk aversion and family social capital of the entrepreneur. First, focusing on the entrepreneur's risk aversion, we theorize that an entrepreneur's willingness to take risks shifts the equilibrium of the core venture-capital financing trade-off by altering both the benefits of venture capital value-added and the costs of entrepreneurial effort dilution when equity is ceded to the venture capitalist. A dominant view holds that entrepreneurs are less risk-averse than the general population (Knight 1921; Kihlstrom and Laffont, 1979). However, this view largely assumes time-invariant risk aversion and, consequently, that less risk averse individuals are more likely to found new ventures. Subsequent research relaxes this assumption, showing that risk aversion is not time invariant and documenting heterogeneous pathways into self-employment (e.g., Brändle et al., 2025; Carroll and Mosakowski, 1987) and new venture creation (e.g., Urbano et al., 2022; Kacperczyk, 2012). Consistent with this evidence, we assume that entrepreneurs' risk aversion can vary, especially contingent upon different levels of family social capital, and dynamically reweighs the relative importance of venture capital benefits and the costs of incentive dilution, thereby shifting the balance toward (or away from) VCs participation. More risk-averse entrepreneurs tend to operate with higher leverage and face a greater likelihood of negative-equity positions than their less risk-averse counterparts, leading them to value more the retention of the full ownership of the business. By contrast, less risk-averse entrepreneurs are more willing to forgo current consumption and bear the costs of effort dilution, placing greater value on the upside exposure associated with venture capital financing (Herranz, Krasa, and Villamil, 2015).

Second, focusing on family social capital, we theorize that it is a crucial determinant of entrepreneurs' propensity to resort to debt rather than venture capital. Previous work shows that social capital is central to increasing access to outside financing reducing reliance on owner equity to finance the new venture (e.g., Dudley, 2021), and mitigating agency conflicts with lenders (e.g., Bosse, 2009; Petersen and Rajan, 1994; Uzzi, 1999). Whereas managers and employees in large firms benefit from established organizational reputations and broad recognition, entrepreneurs are often "unknown quantities" to customers, suppliers, investors, and other potential partners because they have yet to accumulate organizational social capital (Stinchcombe, 1965; Kwon, Heflin, and Ruef, 2013). Financial institutions therefore face particular difficulty in assessing the creditworthiness of nascent ventures (Wiklund, Baker, and Shepherd, 2010). As a result, entrepreneurs must rely on their own personal social capital or, if it is insufficient, attempt to "borrow" the social capital of others (Arregle et al., 2007). Yet, entrepreneurs cannot credibly leverage the social capital of others absent trust-based relationships or mutual obligations with their owners; moreover, the social capital of third parties may be exposed to opportunistic use or reputational erosion if the venture fails, further complicating access. Family involvement helps overcome this constraint. Only when family involvement enables the entrepreneur to draw on the family's social capital does the new venture's access to bank debt improve (Chua et al., 2011). When the entrepreneur successfully leverages this capital, access to debt is facilitated through three key benefits of family involvement: i) by reducing borrower–lender agency costs due to a lower likelihood of managerial opportunism (Fama and Jensen, 1983; Jensen and Meckling, 1976); ii) by making entrepreneurs more risk averse (McConaughy, 1999; Ward, 1997), and iii) more long-term oriented (Arregle et al., 2007; Chua, Chrisman, and Sharma, 1999; Smith and Warner, 1979). Specifically, family ties mitigate agency problems in external financing through information transfer (Uzzi, 1999) and social obligation (Saparito, Chen, and Sapienza, 2004). The former arises when the lender has observed the borrower's behavior over an extended period and, as a result, develops trust in the borrower's character and judgment. The latter occurs when the lender's decision is influenced by loyalty or by a perceived need to reciprocate favorable treatment received in other transactions or contexts. Additionally, family ties, reduce firms' propensity to pursue risky growth objectives. Higher risk aversion reduces lenders' exposure and should increase their willingness to extend credit to firms with family involvement. Post-loan, family ties associated with heightened entrepreneurial risk aversion, mitigate a key moral-hazard concern for lenders. Finally, in family firms the desire for control and "dynastic

stability" shifts their priorities toward long-term survival rather than growth (Arregle et al., 2007). Accordingly, the core mechanism is that when the family has social capital with lenders, more risk averse entrepreneurs can draw on that capital, agency frictions with lenders are alleviated and access to debt financing is facilitated.

In sum, we advance the idea that entrepreneurial risk aversion and family social capital jointly shape the choice between bank debt and venture capital. While related contributions have separately emphasized either entrepreneur's risk preferences or the family social processes underpinning legitimacy with lenders, these elements are rarely integrated into the canonical debt-equity trade-off. Abstracting from them sharpens analytical tractability, yet it limits the understanding of a phenomenon that remains widely underexplored despite its practical relevance for new venture success (Honjo and Yoshida, 2025, de Bettignies and Brander, 2007). In our framework, entrepreneurial risk aversion affects the financing trade-off through the relative valuation of upside exposure and incentive costs. More risk-averse entrepreneurs assign greater weight to the downside risk and effort-related costs associated with venture capital, whereas less risk-averse entrepreneurs value more strongly the upside potential generated by VCs value-added and growth opportunities. At the same time, family social capital operates as a relational asset that relaxes credit frictions, improves borrowing conditions, and mitigates the perceived downside risk associated with bank financing. The interaction between these two dimensions generates a threshold structure in the entrepreneur's financing decision. The model predicts the existence of a switching level of risk aversion that separates regions in which venture capital or bank debt is optimal. Moreover, this threshold is endogenous to social capital: higher family social capital shifts the switching point toward higher levels of risk aversion, delaying the transition from venture capital to bank financing and highlighting the interaction between relational advantages and prudential behavior.

Overall, our study makes several contributions. By integrating insights from agency theory on entrepreneurial financing choices with research on entrepreneurial risk aversion and social capital, we advance all three literatures. First, we contribute to entrepreneurial finance, and specifically to the canonical debt–equity choice (Honjo and Yoshida, 2025; Lerner and Leamon, 2023; Cumming et al., 2023; Miglo, 2022; de Bettignies and Brander, 2007; Winton and Yerramilli, 2006). Building on the suggestions of de Bettignies and Brander (2007), we develop a comprehensive theoretical model that incorporates adverse selection and moral hazard. We further include additional mechanisms shaping financing choices, rooted in practically salient factors such as entrepreneurs' risk aversion and social processes, that have thus far been largely overlooked in the literature. Second, we contribute to the social capital literature by theorizing how family social capital reshapes the central debt–equity trade-off rather than mechanically tilting it toward bank financing. While prior work has largely noted that social capital facilitates access to credit (Stasa and Machek, 2022; Dudley, 2021; Chua et al., 2011; Arregle et al., 2007), we explain how such facilitation alters a rational entrepreneur's financing choice between bank debt and venture capital. Finally, we contribute to research on entrepreneurial risk aversion (Arteaga-Fonseca et al., 2025). While prior studies have examined risk aversion in relation to foundational entrepreneurial choices – such as venture creation (e.g., Urbano et al., 2022; Kacperczyk, 2012) or entry into self-employment (e.g., Brändle et al., 2025; Carroll and Mosakowski, 1987) – our analysis demonstrates its relative importance in determining the equilibrium between the benefits of VC value-added and the costs associated with effort dilution.

The paper proceeds as follows. Section 2 introduces the model and develops testable propositions. Section 3 shows numerical simulations that illustrate the main mechanisms and comparative statics of the model. Section 4 assesses the robustness of the results by including adverse selection, considering an alternative specification of the entrepreneur's utility function, and non-linear effects of family social capital. Section 5 concludes, reports directions for future research, and discusses managerial and policy implications.

2. The model

Consider an entrepreneur seeking external financing to develop a new venture. The entrepreneur can obtain financing from either a competitive bank or a competitive venture capitalist (VC).

The project has a positive return R with probability $p \in (0,1)$. Conditional on success, gross revenue R depends on both entrepreneurial effort e and VC managerial input i (de Bettignies and Brander, 2007):

$$R(e,i) = \alpha e + \beta i \text{ [1]}$$

where $\alpha > 0$ and $\beta > 0$ capture the marginal productivity of entrepreneurial and VC effort, respectively.

Efforts are not verifiable and entail costs $c(e) = \frac{e^2}{2}$ and $c(i) = \frac{i^2}{2}$.

This setting generates the standard trade-off in entrepreneurial finance: venture capital provides managerial value-added but dilutes entrepreneurial incentives, whereas bank financing preserves incentives but offers no managerial contribution.

We assume the entrepreneur evaluates financing regimes using mean-variance preferences, so that for any payoff X, utility is given by:

$$U = \mathbb{E}[X] - \frac{\rho_0}{2}\mathrm{Var}(X) \text{ [2]}$$

where ρ_0 captures the entrepreneur's risk.

We introduce family social capital (SC) as a relational and reputational asset capturing the entrepreneur's embeddedness in the local financing environment. Family social capital improves access to bank financing by facilitating more favorable borrowing terms. At the same time, stronger family social capital raises the reputational and socioemotional stakes associated with entrepreneurial failure. Because failure may jeopardize family reputation, relational networks, and the preservation of family wealth, entrepreneurs embedded in dense family-based networks perceive risky outcomes as more costly. Accordingly, family social capital operates through two complementary channels: a price channel, improving borrowing conditions, and a preference channel, increasing the entrepreneur's effective aversion to payoff variability.

2.1 Bank financing

Under bank financing, the entrepreneur retains full ownership and provides effort e, while the bank acts purely as a financier. If the project succeeds, the entrepreneur produces αe and repays $\theta_0 = 1 + r$, where r is the bank risk-free rate.

The entrepreneur's payoff under bank financing, X_{Bank}, is therefore:

$$X_{Bank} = \begin{cases} \alpha e - \theta_0 & \text{with probability } p \\ 0 & \text{with probability } 1-p \end{cases} \text{ [3]}$$

The expected payoff net of effort cost:

$$\mathbb{E}[X_{Bank}] - c(e) = p(\alpha e - \theta_0) - \frac{e^2}{2} \text{ [4]}$$

And the variance:

$$\mathrm{Var}(X_B) = p(1-p)(\alpha e - \theta_0)^2 \text{ [5]}$$

Access to debt is shaped by the entrepreneur's family involvement and thus social capital: SC improves lending conditions by reducing agency frictions but increases risk aversion. We capture the price channel by allowing the effective cost of bank finance to depend on family social capital (SC):

$$\theta(SC) = \theta_0 - \gamma\, SC \qquad \gamma > 0 \text{ [6]}$$

so that higher social legitimacy relaxes credit frictions and increases the attractiveness of bank financing (Chua et al., 2011; Anderson et al., 2003). This means that the family social capital acts as an incentive to bank debt.

In addition, family social capital affects the entrepreneur's perception of risk by increasing the costs associated with failure. Entrepreneurs embedded in strong family-based networks may face greater losses in terms of reputation and perseveration of family wealth, leading them to adopt more conservative attitudes toward risky outcomes. We capture this mechanism through an effective risk-aversion parameter that increases with social capital:

$$\rho(SC) = \rho_0 + \kappa SC, \qquad \kappa > 0 \text{ [7]}$$

The entrepreneur's utility under bank financing is therefore:

$$U_{Bank}(\rho, SC) = p(\alpha e - \theta(SC)) - \frac{\rho(SC)}{2} p(1-p)(\alpha e - \theta(SC))^2 \text{ [8]}$$

This specification highlights the interaction between family social capital and risk aversion. Higher family social capital improves borrowing conditions by lowering the cost of debt $\theta(SC)$, thereby increasing expected returns from bank financing. At the same time, stronger family ties and reputational concerns increase the entrepreneur's effective exposure to potential losses, and thus his risk aversion. When financial outcomes affect not only individual wealth but also family reputation and socioemotional endowment, the entrepreneur behaves more prudently and assigns a greater weight to payoff variability.

The entrepreneur chooses effort e to maximize [8], yielding the first-order condition:

$$\frac{\partial U_{Bank}}{\partial e} = p\alpha - e - \rho(SC)\, p(1-p)\alpha\big(\alpha e - \theta(SC)\big) = 0 \text{ [9]}$$

which defines the optimal effort under bank financing e^*_{Bank}:

$$e^*_{Bank} = \frac{p\alpha - \rho(SC)\, p(1-p)\alpha\, \theta(SC)}{1 - \rho(SC)\, p(1-p)\alpha^2}, \text{ [10]}$$

provided $1 - \rho(SC)\, p(1-p)\alpha^2 > 0$.

Proposition 1. *Utility is affected by family social capital through two channels: it improves borrowing conditions by lowering the cost of debt, but it also increases effective risk aversion. The net impact of social capital on utility therefore depends on the relative strength of these two forces.*

2.2 Venture capital financing

Under venture capital financing, the VC provides funding and managerial input i in exchange for an equity share $s \in (0,1)$. The entrepreneur retains the residual share $(1-s)$ and chooses effort e. Both the entrepreneur and the VC exert unverifiable effort.

If the project succeeds, the entrepreneur obtains $(1-s)(\alpha e+\beta i)$, while payoff is zero if the project fails.

The entrepreneur's payoff under venture capital financing, X_{VC}, is:

$$X_{VC}=\begin{cases}(1-s)(\alpha e+\beta i) & \text{with probability } p\\ 0 & \text{with probability } 1-p\end{cases} \quad [11]$$

The expected payoff net of effort cost:

$$\mathbb{E}[X_{VC}]-c(e)=p(1-s)(\alpha e+\beta i)-\frac{e^2}{2} \quad [12]$$

Variance:

$$\mathrm{Var}(X_{VC})=p(1-p)(1-s)^2(\alpha e+\beta i)^2 \quad [13]$$

Let $\rho \geq 0$ capture the entrepreneur's risk aversion under VC financing. The entrepreneur evaluates the VC regime according to mean-variance preferences with effective risk aversion as in equation [7]:

$$U_{VC}(\rho,SC)=p(1-s)(\alpha e+\beta i)-\frac{e^2}{2}-\frac{\rho(SC)}{2}\,p(1-p)(1-s)^2(\alpha e+\beta i)^2 \quad [14]$$

The VC's payoff is:

$$\Pi_{VC}=sp(\alpha e+\beta i)-\frac{i^2}{2}-\theta \quad [15]$$

so that the VC chooses i to maximize Π_{VC}, yielding:

$$\frac{\partial \Pi_{VC}}{\partial i}=sp\beta-i=0 \quad \Rightarrow \quad i^*=sp\beta \quad [16]$$

Given i^*, the entrepreneur chooses effort e to maximize [14], which implies the first-order condition:

$$\frac{\partial U_{VC}}{\partial e}=p(1-s)\alpha-e-\rho(SC)\,p(1-p)(1-s)^2\alpha(\alpha e+\beta i^*)=0 \quad [17]$$

and thus the optimal entrepreneurial effort under venture capital:

$$e_{VC}^*=\frac{p(1-s)\alpha-\rho(SC)\,p(1-p)(1-s)^2\alpha\beta i^*}{1+\rho(SC)\,p(1-p)(1-s)^2\alpha^2} \quad [18]$$

Proposition 2. *Since family social capital enters the VC regime only through $\rho(SC)$, higher SC reduces the entrepreneur's utility under venture capital. Equity-based financing exposes the entrepreneur to full payoff variability, so that risk aversion directly reduces the attractiveness of venture capital.*

2.3 Financing choice

The entrepreneur compares utilities across financing regimes. The choice of venture capital over bank financing occurs whenever:

$$\Delta U(\rho, SC) = U_{VC}(\rho, SC) - U_{Bank}(\rho, SC) > 0 \text{ [19]}$$

The utility gap depends on the relative exposure to payoff variability across financing regimes and on the effective level of risk aversion $\rho(SC)$. Since venture capital exposes the entrepreneur to full payoff variability while bank financing provides lower exposure to payoff variability, higher effective risk aversion reduces the relative attractiveness of venture capital.

This monotonic relationship implies the existence of a threshold level of effective risk aversion separating the regions in which venture capital and bank financing are preferred.

Proposition 3. *There exists a threshold level of effective risk aversion $\rho^*(SC)$ such that venture capital is preferred for $\rho(SC) < \rho^*(SC)$, while bank financing is preferred for $\rho(SC) > \rho^*(SC)$. Family social capital affects this threshold through both borrowing conditions and prudential behavior, implying that $\rho^*(SC)$ is endogenous to social capital. In particular, higher social capital reshapes the switching point between financing regimes by modifying the trade-off between expected returns and exposure to downside risk.*

A proof of Proposition 3 is provided in Appendix A.

Proposition 3 highlights that family social capital does not mechanically tilt entrepreneurs toward bank financing; rather, it reshapes the risk tolerance frontier separating the two financing regimes. The financing decision therefore depends not only on entrepreneurial and VC productivity but also on underlying social processes and behavioral traits. In particular, family social capital increases the attractiveness of bank financing by reducing borrowing costs, while weaker risk aversion enhances the relative appeal of venture capital by increasing the value of upside exposure.

3. Numerical simulations

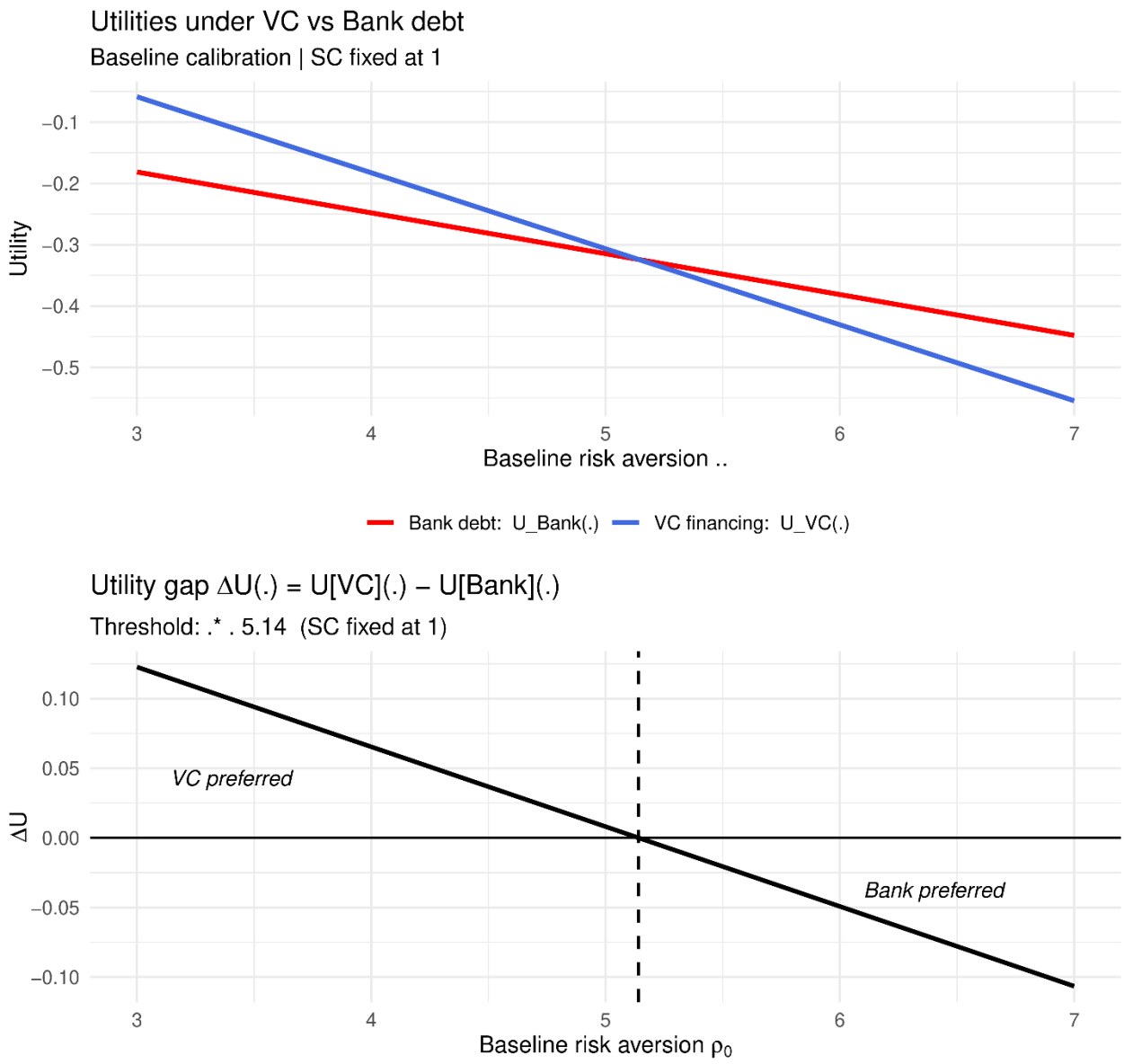
3.1 Utilities under bank and VC financing

To illustrate the mechanisms highlighted by the model, we perform a set of numerical simulations under a baseline calibration. The objective is to visualize how the entrepreneur's financing choice varies with risk aversion and family social capital. Unless otherwise stated, parameters are set as follows:

$$p = 0.5, \qquad \alpha = 1.6, \qquad \beta = 2.0, \qquad s = 0.35, \qquad \theta = 0.8, \qquad \gamma = 0.25 \text{ [20]}$$

Family social capital SC is initially held fixed at $SC = 1$ in order to isolate the effect of risk aversion on financing preferences. Effort levels are fixed at their interior benchmark values to keep the graphical analysis transparent and to focus on the interaction between payoff variability and financing regimes.

Fig. 1: Utilities under VC vs Bank financing



Source: Authors' own elaboration.
Note. Entrepreneurial utilities and financing threshold for fixed family social capital ($SC = 1$). The upper panel reports utilities under venture capital and bank financing as a function of family social capital and risk aversion. The lower panel plots the utility differential $\Delta U(\rho, SC)$ and highlights the threshold ρ^* separating the regions in which venture capital and bank financing are preferred.

Figure 1 plots entrepreneurial utility under venture capital and bank financing as a function of family social capital and risk aversion. Consistent with the theoretical predictions, utility under venture capital declines more steeply as risk aversion increases, reflecting the entrepreneur's full exposure to payoff variability under equity financing. In contrast, utility under bank financing decreases more gradually because the entrepreneur is partially insulated from downside risk and benefits from improved borrowing conditions associated with family social capital. As a result, the utility differential $\Delta U(\rho, SC) = U_{VC}(\rho, SC) - U_{Bank}(\rho, SC)$ crosses zero at a threshold level $\rho^*(SC)$ separating the regions in which venture capital and bank financing are preferred. For low levels of risk aversion, the entrepreneur values managerial value-added and prefers venture capital, whereas for sufficiently high risk aversion the relative stability and lower cost of bank financing dominate.

3.2 The Social Capital–Risk Interaction and the Financing Threshold

To characterize how family social capital shapes financing choices, we compute the risk tolerance threshold $\rho^*(SC)$ implicitly defined by

$$\Delta U(\rho, SC) = U_{VC}(\rho, SC) - U_{Bank}(\rho, SC) = 0 \text{ [21]}$$

The threshold $\rho^*(SC)$ identifies the level of baseline risk aversion at which the entrepreneur is indifferent between venture capital and bank debt. For $\rho < \rho^*(SC)$, venture capital is preferred, whereas for $\rho > \rho^*(SC)$ bank financing becomes optimal.

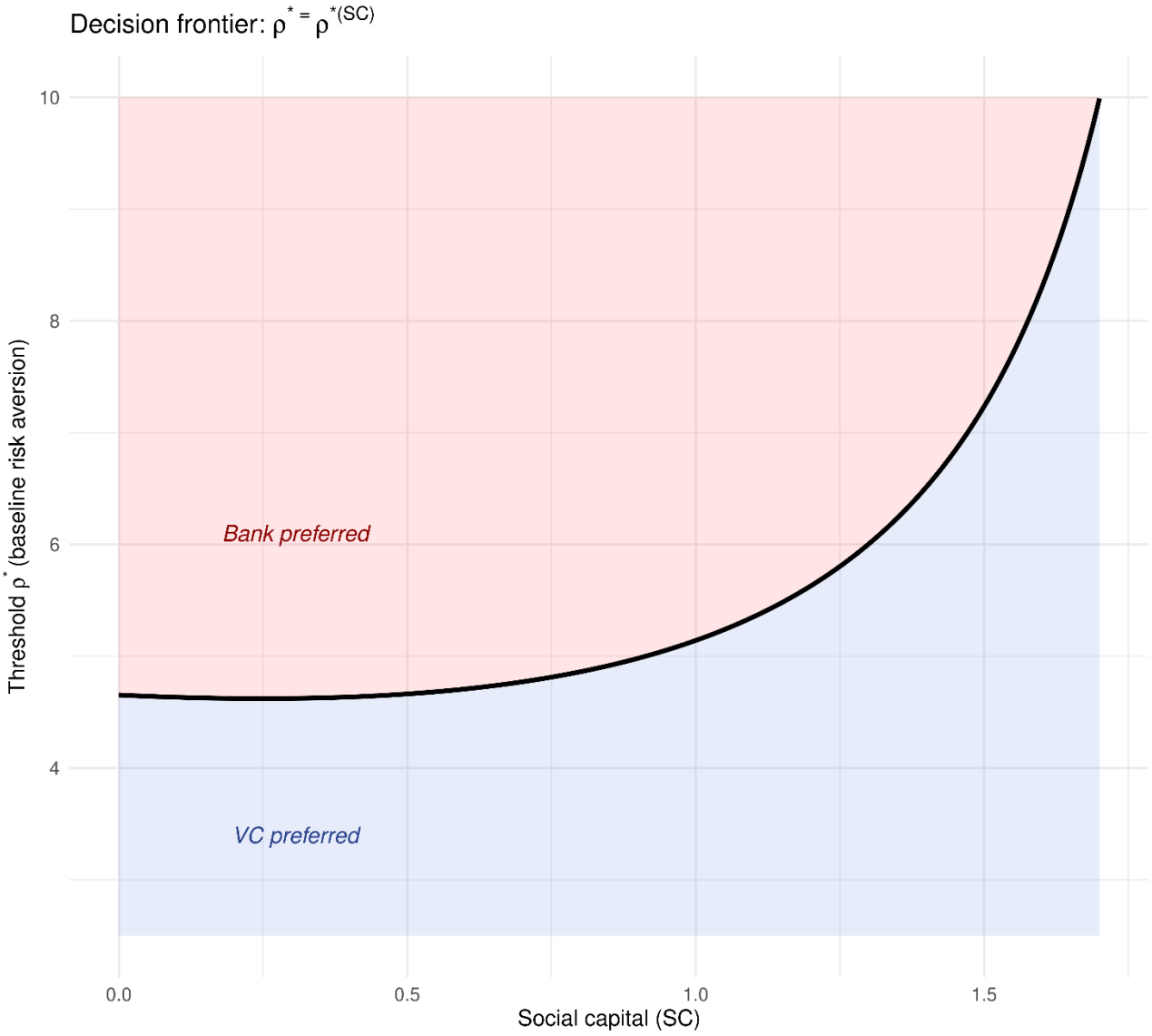
Family social capital affects the threshold through two distinct channels: it enhances borrowing terms, captured by the decreasing function $\theta(SC) = \theta_0 + \gamma SC$ and it increases entrepreneurs' risk aversion, $\rho = \rho_0 + \kappa SC$. These two channels operate simultaneously; thus family social capital does not mechanically shift financing preferences toward bank debt. Instead, it modifies the mapping between risk preferences and financing choices. In particular, numerical simulations show that the threshold $\rho^*(SC)$ varies systematically with family social capital, highlighting an interaction effect between relational advantages and risk aversion: family social capital reshapes, rather than simply shifts, the boundary separating venture-capital oriented and bank-oriented entrepreneurs.

Figure 2 shows that while family social capital improves access to bank debt, it also alters the entrepreneur's risk aversion. As a result, bank financing becomes the preferred option only when risk aversion is sufficiently high. Family social capital therefore delays the point at which entrepreneurs switch from venture capital to bank debt, highlighting an interaction effect between relational advantages and risk perception.

This mechanism reflects the coexistence of the price and preference channels introduced in Equation [6]. On the one hand, lower borrowing costs increase the expected payoff from bank financing, strengthening its relative attractiveness. On the other hand, stronger family embeddedness raises the socioemotional stakes associated with entrepreneurial failure. When family reputation, relational networks, and intergenerational wealth are at risk, the downside state becomes particularly salient. In this sense, family social capital amplifies the perceived dispersion between success and failure outcomes. Even if the statistical payoff structure remains unchanged, entrepreneurs internalize the failure state as involving larger non-pecuniary losses, such as reputational damage or socioemotional wealth erosion. This perceived increase in downside exposure generates a stronger precautionary motive and translates into higher effective risk aversion.

The plot illustrates this interaction effect: as family social capital rises, risk considerations become more prominent, so that bank financing becomes optimal only at higher levels of risk aversion. In other words, greater social capital requires stronger prudential attitudes for the entrepreneur to prefer bank debt, emphasizing that social capital modifies, rather than mechanically shifts, the financing decision.

Fig. 2: Decision frontier



Source: Authors' own elaboration.
Note. Financing threshold $\rho^*(SC)$ separating venture capital and bank debt. The shaded regions identify the combinations of baseline risk aversion and social capital for which each financing regime is preferred. The figure illustrates how social capital reshapes the risk tolerance frontier through the interaction of relational advantages and risk attitudes.

4. Robustness checks

4.1. Adverse selection

The baseline model captures the effect of family social capital on borrowing conditions through a reduced-form function $\theta(SC)$. While this approach is analytically convenient, it abstracts from the informational frictions that characterize entrepreneurial finance. In this section we provide a micro-foundation for the borrowing channel by introducing adverse selection.

Suppose that project quality is not directly observable to outside financiers. The entrepreneur can be of type $q \in \{q_H, q_L\}$, $q_H > q_L$, where q_H denotes a high-quality project and q_L a low-quality one. Let $\mu \in (0,1)$ be the prior probability that the entrepreneur is of high quality. Before extending credit, the bank observes a signal $z \in \{G, B\}$\$, where G stands for a good signal and B for a bad signal. The precision of this signal depends on family social capital. In particular, let

$$P(G|q_H) = \phi_H(SC) \text{ [22]}$$

$$P(G|q_L) = \phi_L(SC) \text{ [23]}$$

with

$$\phi'_H(SC) > 0, \;\; \phi'_L(SC) < 0 \text{ [24]}.$$

These assumptions imply that higher family social capital improves the informativeness of the signal received by lenders. Defining

$$\Delta\phi(SC) = \phi_H(SC) - \phi_L(SC) \text{ [25]}$$

we assume $\Delta\phi'(SC) > 0$, so that family social capital mitigates adverse selection by increasing the separation between high and low-quality entrepreneurs.
Upon observing signal z, the bank updates its beliefs according to Bayes' rule.
After a good signal G, the posterior probability that the entrepreneur is high quality is

$$\mu_G(SC) = \frac{\mu\phi_H(SC)}{\mu\phi_H(SC) + (1-\mu)\phi_L(SC)} \text{ [26]}$$

while after a bad signal B it is

$$\mu_B(SC) = \frac{\mu[1-\phi_H(SC)]}{\mu[1-\phi_H(SC)] + (1-\mu)[1-\phi_L(SC)]} \text{ [27]}$$

Expected project quality conditional on the signal is therefore

$$\bar{q}(z, SC) = \mu_z(SC)q_H + [1-\mu_z(SC)]q_L \text{ [28]}$$

We assume that borrowing conditions depend on the bank's posterior assessment of project quality:

$$\theta = \theta\big(\bar{q}(z, SC)\big), \quad \frac{\partial\theta}{\partial\bar{q}} < 0 \text{ [29]}$$

Higher family social capital improves borrowing conditions indirectly, by increasing the precision of the signal and thereby raising expected project quality. This provides a structural interpretation of the reduced-form relationship between θ and SC used in the baseline specification.
Under this extension, the entrepreneur's payoff under bank financing is

$$X_{Bank} = \begin{cases} \alpha e - \theta\big(\bar{q}(z, SC)\big) & with\ probability\ p \\ 0 & with\ probability\ 1-p \end{cases} \text{ [30]}$$

And expected utility becomes

$$U_{Bank} = p(\alpha e - \theta\big(\bar{q}(z, SC)\big) - \frac{\rho(SC)}{2}p(1-p)(\alpha e - \theta\big(\bar{q}(z, SC)\big)^2 \text{ [31]}$$

4.1.1. Financing choice
The entrepreneur's financing decision is given by:

$$\Delta U(SC, z) = U_{VC} - U_{Bank} \text{ [32]}$$

The introduction of adverse selection does not alter the structure of the model. Family social capital continues to affect the financing choice through two channels: it improves borrowing conditions and increases effective risk aversion. The difference is that the borrowing advantage is no longer imposed exogenously, but arises endogenously from the reduction of informational asymmetries. This extension therefore provides a micro-foundation for the baseline specification and shows that the main qualitative results are robust to the presence of adverse selection.

4.2. Alternative specifications of the utility function

As a robustness check, we reformulate the entrepreneur's problem under constant absolute risk aversion (CARA) preferences. While the baseline mean-variance specification offers a reduced-form representation of prudential behavior, CARA preferences provide a fully micro-founded expected utility framework.

Preferences are defined as:

$$u(x) = -\exp(-\eta x), \qquad \eta > 0 \text{ [33]}$$

where η is the Arrow-Pratt (Pratt, 1976) coefficient of absolute risk aversion. Consistent with the baseline model, family social capital affects risk attitudes through a preference channel:

$$\eta(SC) = \eta_0 + \kappa SC, \qquad \kappa > 0 \text{ [34]}$$

4.2.1. Bank financing

Under bank financing, the entrepreneur's payoff is:

$$X_{Bank} = \begin{cases} \alpha e - \theta(SC) & \text{with probability } p \\ 0 & \text{with probability } 1-p \end{cases} \text{ [35]}$$

where borrowing conditions improve with social capital:

$$\theta(SC) = \theta_0 - \gamma SC, \qquad \gamma > 0 \text{ [36]}$$

Expected utility is:

$$\mathbb{E}[U_{Bank}(\eta, SC)] = -\,p \exp\Big(-\eta(SC)\big(\alpha e - \theta(SC)\big)\Big) - (1-p) \text{ [37]}$$

Since the constant term $-(1-p)$ does not affect optimization, we consider the normalized expected utility:

$$\widetilde{U}_{Bank}(\eta, SC) = -\,p \exp\Big(-\eta(SC)\big(\alpha e - \theta(SC)\big)\Big) - \frac{e^2}{2} \text{ [38]}$$

The entrepreneur chooses effort e solving:

$$\max_e \widetilde{U}_{Bank}(\eta, SC) \text{ [39]}$$

yielding the first-order condition:

$$p\,\eta(SC)\alpha \exp\Big(-\eta(SC)\big(\alpha e - \theta(SC)\big)\Big) - e = 0 \text{ [40]}$$

which implicitly defines the optimal effort $e^*_{Bank}(\eta, SC)$.

4.2.2. Venture capital financing

Under venture capital financing, the entrepreneur's payoff is:

$$X_{VC} = \begin{cases} (1-s)(\alpha e + \beta i) & \text{with probability } p \\ 0 & \text{with probability } 1-p \end{cases} \quad [41]$$

Expected utility is:

$$\mathbb{E}[U_{VC}(\eta, SC)] = -p\, exp\big(-\eta(SC)(1-s)(\alpha e + \beta i)\big) - (1-p) \quad [42]$$

Dropping the constant term and subtracting effort cost, normalized utility is:

$$\widetilde{U}_{VC}(\eta, SC) = -p \exp\big(-\eta(SC)(1-s)(\alpha e + \beta i)\big) - \frac{e^2}{2} \quad [43]$$

As in the baseline model, the VC chooses managerial effort i to maximize profits, yielding $i^* = sp\beta$. Given i^*, the entrepreneur solves:

$$\max_e \widetilde{U}_{VC}(\eta, SC) \quad [44]$$

which implies the first-order condition:

$$p\,\eta(SC)(1-s)\alpha \exp\big(-\eta(SC)(1-s)(\alpha e + \beta i^*)\big) - e = 0 \quad [45]$$

defining optimal entrepreneurial effort $e^*_{VC}(\eta, SC)$.

4.2.3. Financing choice

The entrepreneur compares utilities across regimes. Venture capital is preferred whenever:

$$\Delta\widetilde{U}(\eta, SC) = \widetilde{U}_{VC}(\eta, SC) - \widetilde{U}_{Bank}(\eta, SC) > 0 \quad [46]$$

Because CARA preferences penalize downside risk more strongly as $\eta(SC)$ increases, higher family social capital strengthens prudential behavior while simultaneously improving borrowing conditions. This interaction mirrors the price and preference channels of the baseline specification and implies the existence of a threshold level of effective risk aversion $\eta^*(SC)$ such that venture capital is preferred for $\eta(SC) < \eta^*$, while bank financing becomes optimal for $\eta(SC) > \eta^*$.

4.3. Nonlinear Effects of Family Social Capital

The baseline specification assumes that family social capital affects borrowing conditions and risk aversion in a linear way. While this reduced-form representation is useful for tractability and for highlighting the core trade-off of the model, it abstracts from potentially important nonlinearities in the way family social capital affects the two channels.

In this section, we relax the linearity assumption and allow family social capital to affect $\theta(SC)$ and $\rho(SC)$ in a nonlinear way. We assume that family social capital SC exhibits diminishing returns in reducing borrowing costs, and increasing marginal effects in shaping risk aversion.

4.3.1. Nonlinear Borrowing Conditions

Let $\theta(SC)$ be the parameter that captures the borrowing conditions, as in the baseline model. We posit now that $\theta(SC)$ is a decreasing and concave function of family social capital:

$$\theta'(SC) < 0, \quad \theta''(SC) > 0 \text{ [47]}$$

A convenient functional form consistent with these properties is:

$$\theta(SC) = \theta_0 - \gamma\left(1 - e^{-\phi SC}\right), \quad \gamma, \phi \text{ [48]}$$

where ϕ represents the sensitivity of borrowing conditions to family social capital: higher values of ϕ imply that even small increases in family social capital significantly reduce borrowing costs.
This specification captures diminishing marginal improvements in borrowing conditions as social capital increases. The economic intuition is that family social capital can facilitate access to bank credit enhancing the trust of the lender. However, once lenders have acquired sufficiently precise information about the borrower, additional increments in family social capital generate progressively smaller informational gains. As a result, the increase in family social capital generates decreasing marginal borrowing costs.

4.3.2. Nonlinear risk aversion
Let $\rho(SC)$ denote the risk aversion. We posit that:

$$\rho'(SC) > 0, \quad \rho''(SC) > 0 \text{ [49]}$$

A simple functional form satisfying these properties is:

$$\rho(SC) = \rho_0 + kSC^v, \quad k > 0, v > 1 \text{ [50]}$$

where v controls the curvature of effective risk aversion with respect to family social capital. This convex specification reflects the idea that the socio-emotional and reputational costs associated with failure increase more than proportionally with family embeddedness. When family social capital is low, incremental increases have a limited effect on perceived downside risk, by contrast, for highly embedded entrepreneurs, additional increases in family social capital amplify reputational exposure and concerns, leading to a more pronounced increase in risk aversion.

4.3.3. Implications for the Financing Choice
The main qualitative predictions of the model remain unchanged. Family social capital continues to affect the financing choice through two distinct channels: a borrowing conditions channel and a preference channel. However, allowing for nonlinear effects highlights that the interaction between these two channels may generate richer comparative statics, including non-monotonic responses of the financing decision to social capital. In particular, the existence and uniqueness of a switching threshold between bank financing and venture capital are preserved under standard regularity conditions. However, the position of this threshold and its sensitivity to model parameters depend on the relative curvature of $\theta(SC)$ and $\rho(SC)$. Overall, this extension shows that the baseline linear specification can be interpreted as a first-order approximation of a more general nonlinear relationship, and that the core insights of the model are robust to more flexible and economically grounded functional forms.

5. Discussion and conclusion

This paper examines the choice of the entrepreneur between venture capital and bank financing. This decision remains theoretically and practically consequential: although equity financing offers entrepreneurs greater scope to pursue high-growth objectives (Lerner and Leamon, 2023; Cumming et al., 2023; Evans and Jovanovic, 1989), a substantial body of research shows that venture capital continues to account for only a modest share of overall entrepreneurial finance relative to commercial bank lending (Honjo and Yoshida, 2025; Miglo, 2022). Prior work has largely framed the debt–equity choice as a core trade-off between the profit motive (e.g., Kirzner, 1999; Schumpeter, 1934) and the

control motive (e.g., Sapienza, Korsgaard, and Forbes, 2003). However, relatively little research has considered additional factors with both theoretical and practical relevance to explain the variation in this trade-off. We focus on two such factors – entrepreneurial family social capital and risk aversion – and theorize how they impact the choice between debt and equity within well-known agency settings.

We advance the idea that distinct mechanisms influence the balance between the benefits of VC value-added (managerial contributions) and the costs of entrepreneurial effort dilution when equity is ceded to the VC. Absent these mechanisms, higher levels of VC productivity direct the choice toward venture capital; accordingly, VC financing is more likely where VCs can provide substantial managerial value-added (de Bettignies and Brander, 2007). These mechanisms involve family social capital and risk aversion. Family social capital reduces borrower–lender agency frictions, thereby improving access to credit. We refer to this mechanism as the price channel. At the same time, family involvement is associated with higher entrepreneurial risk aversion. Because failure can jeopardize family reputation, relational networks, and family wealth, entrepreneurs who draw on family social capital perceive un-certain outcomes as more costly. Family social capital therefore signals to banks not only lower tolerance for risk but also greater prudence in corporate governance and managerial decision-making. We refer to this mechanism as the preference channel. As a result, the positive effect of family social capital on debt operates through both channels: reduced agency conflicts and higher risk aversion, therefore, facilitating access to bank credit. Ultimately, there exists a threshold level of effective risk aversion such that venture capital is preferred over bank financing. Family social capital affects this threshold through both borrowing conditions and prudential behavior, implying that effective risk aversion is endogenous to social capital.

5.1. Directions for future research

Our model also yields a set of empirically testable propositions concerning the role of entrepreneurial family social capital and risk aversion in shaping financing choices. The model predicts a negative relationship between risk aversion and the preference for venture capital financing, as well as an interaction effect between family social capital and risk attitudes. In particular, family social capital simultaneously improves access to bank debt through more favorable borrowing conditions and strengthens prudential behavior by increasing effective risk aversion. As a consequence, social capital reshapes the risk-aversion threshold separating the two financing regions rather than mechanically shifting financing preferences toward bank debt. These predictions can be tested using proxies for entrepreneurs' risk preferences, relational lending intensity, and observed financing structures. For example, prior studies have operationalized risk aversion using survey-based measures (Kan and Tsai, 2006) or proxies grounded in individual asset allocation theory. The latter approach approximates risk aversion based on individuals' investment histories, such as stock market participation, among other indicators (e.g., Hvide and Panos, 2014). With respect to family social capital, because it is not directly observable and its benefits depend on the degree of family involvement, the literature has relied on measures that capture this involvement. Family involvement, which enables entrepreneurs to draw on family social capital, is commonly operationalized through indicators of family ownership, family governance, and family management (e.g., Chua et al., 2011). Family ownership is measured as the percentage of equity held by family members. Family governance is measured by the number of family members serving on the venture's board of directors or advisors. Family management captures the number of family members involved in managerial roles.

5.2. Managerial implications

Our analysis also yields several managerial implications. First, from the entrepreneur's standpoint, venture capital is most valuable when the new venture lies squarely within the VC's domain of expertise, enabling meaningful managerial value-added. Crucially, however, the effectiveness of VC contributions depends on the entrepreneur's growth orientation. It is not sufficient for the VC to have strong incentives to contribute; the entrepreneur must also be willing to accept equity dilution in

exchange for more variable future payoffs. In other words, VC financing is likely to be most beneficial when entrepreneurs pursue ambitious growth objectives and exhibit lower risk aversion. Second, VCs are more likely to achieve favorable outcomes when the entrepreneur's family social capital is limited. Where family social capital is high, the entrepreneur's role is decisive not only for the venture's performance but also for the financing choice. For VC investments to succeed, VCs typically require a sufficiently large equity stake to sustain their effort incentives. Yet such stakes necessarily dilute the entrepreneur's incentives and may trigger conflicts associated with reduced control. When entrepreneurs possess substantial family social capital, these costs loom larger than in cases where entrepreneurs are pivotal to the venture but lack family social capital.

5.3. Policy implications

Finally, our study also has implications for policy makers. The start-up ecosystem is widely regarded as a major engine of economic growth and job creation. At the same time, a well-developed venture capital industry is critical for fostering the emergence and scaling of successful start-ups (Gallo et al., 2025). Our findings can inform policymakers seeking to unlock the growth potential of start-ups by acting through distinct levers that encourage entrepreneurs to solve the traditional control–profit dilemma in favor of the latter, thus generating broad societal benefits.

In entrepreneurial ecosystems in which family capital is highly prevalent, the model predicts a systematic underutilization of venture capital due to both easier access to debt financing and greater risk aversion among entrepreneurs. Policymakers should therefore pursue targeted interventions aimed at unlocking the growth potential of startups that remains constrained by the traditional control–profit trade-off, often resolved in favor of control. Such interventions should focus on improving the institutional conditions for entrepreneurship, on programs directly targeting entrepreneurs, and on policies oriented towards the creation of entrepreneurial ecosystems (OECD, 2020).

With respect to the interventions aimed at improving the institutional conditions for entrepreneurship, policies should primarily emphasize the promotion of favorable attitudes and motivations among prospective entrepreneurs, as well as the removal of administrative and regulatory barriers to entrepreneurial activity (e.g., taxation, competitive practices, regulation). In this context, policies aimed at increasing awareness of the societal importance of new entrepreneurial ventures, the resources available to entrepreneurs, and the growth potential of startups are particularly critical. These efforts can foster an entrepreneurial culture oriented toward growth and innovation rather than toward dynastic stability.

Regarding the development of programs directly targeting entrepreneurs, contexts char-acterized by the systematic underutilization of venture capital require initiatives designed to address this "equity gap". Because entrepreneurs endowed with family social capital tend to be more risk averse and enjoy easier access to debt financing, the rationale for equity-oriented interventions is to stimulate the growth potential of startups that is often constrained by entrepreneurs' desire to retain control. In this respect, possible policy measures include the establishment of public sector venture capital funds; "hybrid" funds (Murray 2007), in which public resources are used to leverage private investment into funds managed by private-sector investment professionals—thereby reducing risk for private investors while increasing their expected returns; co-investment funds that invest alongside both venture capital funds and business angels; and the development of the fintech sector to facilitate alternative sources of finance.

Finally, the context in which entrepreneurship unfolds shapes entrepreneurial intentions, the entrepreneurial process, and firm growth (Stam, 2018; Spigel, 2017; Mason and Brown, 2014; Audretsch and Fritsch, 1994). Policies aimed at supporting the development of entrepreneurial ecosystems thus seek to promote a favorable, comprehensive, and well-integrated environment for venture creation and growth.

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Appendix A – Proof of Proposition 3

Under mean-variance preferences, utility in each regime takes the form

$$U = \mathbb{E}[X] - \frac{\rho(SC)}{2}\mathrm{Var}(X), \quad [51]$$

where $\rho(SC)$ denotes effective risk aversion. Hence, higher effective risk aversion reduces utility whenever the entrepreneur is exposed to payoff variability.

Since venture capital financing leaves the entrepreneur with an equity claim on project returns, it involves greater payoff variability than bank debt. Therefore, an increase in $\rho(SC)$ reduces U_{VC} more than U_{Bank}, implying that the utility difference $\Delta U(\rho(SC))$ is decreasing in effective risk aversion:

$$\frac{\partial \Delta U}{\partial \rho(SC)} = -\frac{1}{2}\left(\mathrm{Var}(X_{VC}) - \mathrm{Var}(X_{Bank})\right) < 0 \ [52].$$

For low levels of effective risk aversion, the entrepreneur values upside exposure and venture capital may be preferred, implying $\Delta U(\rho(SC)) > 0$. For sufficiently high effective risk aversion, the disutility from payoff variability dominates and bank financing becomes more attractive, implying $\Delta U(\rho(SC)) < 0$.

Since $\Delta U(\rho(SC))$ varies with $\rho(SC)$ and decreases monotonically, there exists a threshold level ρ^* such that

$$\Delta U(\rho(SC)) \begin{cases} > 0 & \text{if } \rho(SC) < \rho^*, \\ < 0 & \text{if } \rho(SC) > \rho^*. \end{cases} \quad [53]$$

This establishes the existence of a cutoff level of effective risk aversion separating the regions in which venture capital and bank financing are preferred. Because $\rho(SC)$ increases with social capital, higher social capital anticipates the switch toward bank financing.

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From Compliance to Purpose: Governance Models for Sustainability Innovation

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Abstract

Frame of the research. *Sustainable Corporate Governance research has mainly focused on ESG performance and board characteristics. Limited attention has been given to how governance supports sustainable innovation in SMEs, particularly in purpose-driven firms.*

Purpose of the paper. *This study aims to understand which Sustainable Corporate Governance models enable purpose-driven SMEs to develop sustainable innovation.*

Methodology. *The study adopts a multiple case study methodology involving three Italian purpose-driven SMEs. Data were collected through semi-structured interviews and triangulated with secondary sources. Cross-case analysis was conducted to compare governance structure and functioning and related innovation patterns.*

Results. *The findings show that sustainable innovation in purpose-driven SMEs is supported by the combination of founder leadership and governance formalization. Purpose-driven leadership provides strategic direction, while higher levels of formalization contribute to greater stability and a more long-term orientation.*

Research limitations. *The qualitative nature of the study limits the generalizability of the findings. Moreover, the governance configurations identified reflect conditions at a specific moment in time.*

Managerial implications. *This research provides insights for SMEs seeking to strengthen their governance systems to better support sustainable innovation. The study helps managers assess whether their current governance system enables or hinder innovation efforts and identify areas where formalization or purpose alignment may be required.*

Originality of the paper. *This study advances sustainable innovation and Sustainable Corporate Governance research by shifting attention from ESG outcomes to how governance supports innovation in founder-driven SMEs. It introduces a purpose-centred perspective and highlights the role of decision coherence as a central outcome of governance formalization for sustainable innovation.*

Keywords*: Sustainable corporate governance, sustainable innovation, governance structure, governance functioning, SME, purpose-driven organizations.*

1. Introduction

In recent years, corporate governance research has shown a growing interest in sustainability. Environmental and social challenges increasingly require firms to move beyond short-term financial logics and peripheral corporate social responsibility initiatives, calling instead for governance mechanisms capable of long-term orientation. Within this perspective, Sustainable Corporate Governance (SCG) has emerged as a central lens through which scholars examine how sustainability considerations are integrated into firms' core decision-making processes. This shift is reinforced by the recognition that sustainable innovation is a systemic and long-term organizational process, characterized by high uncertainty and short-term economic trade-offs (Seebode et al., 2012; Silvestre & Țîrcă, 2018; Ferlito & Faraci, 2025). Far from being manageable through peripheral CSR activities, sustainable innovation requires strategic coherence, continuity of resources, and firm-wide commitment, conditions that corporate governance is uniquely positioned to support (Boons et al.,

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2023; Sarpong et al., 2022). Governance thus serves as the infrastructure that enables firms to respond effectively to environmental shifts while maintaining a consistent sustainability trajectory.

The SCG literature has increasingly examined how governance mechanisms incorporate sustainability objectives into firms' decision-making systems (Mazaj et al., 2022). Prior studies emphasize the role of board composition (e.g. independence, diversity, size, workload), ownership structures (e.g. CEO/Chair separation), and formalization (e.g. committees, procedures, metrics) in shaping long-term orientation (Ludwig & Sassen, 2022). Some contributions further highlight that formalization is particularly critical in SMEs (Brunninge et al., 2007; Daily, & Dalton, 1992; De Massis et al., 2015), where ownership and control often overlap and rapid decision-making may become a vulnerability without appropriate counterbalances and codified rules (Chrisman et al., 2025).

Despite this growing attention, a significant gap persists regarding how SCG concretely supports sustainable innovation development, especially in SMEs. Much of the existing literature has focused on sustainability performance, reporting, and ESG practices (Michelon et al., 2015), whereas less attention is devoted to how governance models, rather than isolated governance practices, enable or hinder sustainable innovation (Scherer & Voegtlin, 2020). Yet sustainable innovation requires firms to re-design products, processes, and organizational solutions in ways that align economics, environmental and social objectives (Longo & Cardillo, 2024). Understanding how governance configurations facilitate this process remains an open question.

This gap becomes even more salient when firms adopt a purpose-driven orientation. A growing research stream conceptualizes corporate purpose as a firm's explicit aim to address societal challenges; positioning sustainability as a guiding principle embedded in corporate governance (George et al., 2023; Hollensbe et al., 2014). When authentically embedded, purpose guides investment priorities and helps manage stakeholder tensions, ensuring strategic coherence, resource continuity, and legitimacy; when merely symbolic, it risks inconsistency and loss of credibility.

Starting from these considerations, our research aimed to understand which SCG models enable SMEs to develop long-term sustainable innovations.

To address this question, we conducted an exploratory multiple case study, involving three SMEs characterized by strong sustainability orientation, but different levels of governance system and rules formalization.

This study provides several insights into how SMEs govern sustainable innovation. First, it reveals that governance supports sustainable innovation through the interaction between founder's leadership and governance structures. Second, sustainable innovation is shown to rely on structured processes that ensure consistency in decision-making. Third, legitimacy is found to be pivotal for maintaining continuity and credibility.

This paper consists of six sections. After the introduction in Section 1, we present the theoretical background in Section 2. Section 3 describes the research design, while Section 4 presents the findings. Section 5 is dedicated to discussion and Section 6 concludes by highlighting contributions, limitations and future research directions.

2. Theoretical Background

2.1 Sustainable Innovation

Sustainable innovation is conceptualized as a socially grounded process in which innovators engage with multiple stakeholders to ensure the ethical acceptability and societal relevance of innovation processes and outcomes (Mazaj et al., 2022; Ferlito, 2024). Within this broad perspective, corporate governance plays a foundational role (Xu & Bai, 2019). It operates as a form of meta-responsibility that creates the conditions under which social, environmental and technological initiatives can emerge, develop and persist over time (Voegtlin & Scherer, 2017).

Strategically, sustainable innovation entails reorienting corporate strategy so that environmental and social objectives influence resource allocation decisions and long-term competitive aims (Hart,

1995; Longo & Cardillo, 2025; Porter & Kramer, 2011). For example, this strategic shift includes adopting sustainable business models that decouple value creation from resource use and developing low-carbon strategies supported by investments in clean technologies (Bocken et al., 2014; Ferlito & Faraci, 2022; Geissdoerfer et al., 2017).

At organizational level, sustainable innovation manifests through changes in internal structures, routines, and learning processes (Damanpour, 1991). It involves revising managerial processes, coordination mechanisms, and internal arrangements so that environmental and social considerations become embedded in everyday organizational activities (Du Plessis, 2007).

At product level, it entails modifying product architectures, production technologies, and material choices to reduce environmental and social impacts across the life cycle (Hallstedt et al., 2013).

Taken together, these dimensions indicate that sustainable innovation cannot be developed through isolated managerial initiatives, but requires governance arrangements capable of aligning strategic intent, organisational processes and technological choices.

2.2 Board of Directors' structure and functioning in Sustainable Corporate Governance

SCG refers to the governance structures and processes through which sustainability objectives are embedded in firms' strategic decision-making and control systems (Berrone et al., 2023).

Within this perspective, a first stream of SCG research examines how board structure influence ESG performance and practices. Among structural attributes, board independence is the most widely investigated as the presence of non-executive directors presumed to exercise objective monitoring functions (Kang et al., 2007). Studies show that board independence is positively associated with higher ESG performance and more extensive sustainability disclosure (Ludwig & Sassen, 2022; Yang et al., 2024; Brogi & Lagasio, 2025).

Board size, represented by the number of directors serving on the board, is another frequently examined attribute (Correa-García et al., 2020). Larger boards provide broader expertise, more diverse professional backgrounds and stronger external connections, which enhance firms' capacity to address sustainability issue (Chatjuthamard et al., 2022). Consistently, board size correlates positively with higher-quality sustainability disclosure and more consolidated CSR reporting practices (Ludwig & Sassen, 2022). However, research also finds that such benefits hold only up to an optimal threshold, beyond which coordination and communication problems reduce board effectiveness (Treepongkaruna et al., 2024).

Board diversity has also as a critical determinant of sustainability orientation. Boards with higher gender diversity tend to exhibit greater stakeholder sensitivity, ethical orientation, and engagement with sustainability issues (Chen et al., 2016; Konadu et al., 2022). A larger proportion of women directors is associated with higher ESG performance (Terjesen et al., 2009; Mensi-Klarbach, & Seierstad, 2020). Similarly, nationality diversity, represented by the presence of foreign directors, enhances ESG reporting quality and rigorous by broadening the board's cultural and institutional perspective (Ellili, 2023).

A second stream of SCG research focuses on board functioning in pursuing sustainability. Ownership concentration is a key structural mechanism influencing managerial discretion over sustainability strategies. Concentrated control tends to limit stakeholder-oriented decisions, reinforcing short-term pressures (Correa-García et al., 2020; Ludwig & Sassen, 2022; Yang et al., 2024). Block holder ownership is negatively associated with both environmental performance and CSR orientation (Shaukat et al., 2016). Conversely, dispersed ownership supports more stakeholder-oriented behaviours. Leadership structure also matters: CEO duality, when the same individual occupies both the CEO and chair positions, reduce board monitoring capacity and is negatively associated with environmental performance; while leadership separation, when the roles of CEO and board chair are attributed to different individuals, promotes a more balanced long-term stakeholder orientation (Shaukat et al., 2016; Naciti, 2019).

Founder leadership, in this context, reflects the entrepreneur's values, vision, and discretion in shaping strategic priorities, including sustainability-oriented choices (He, 2008). However, when

governance structures remain informal, strategic direction tends to be enacted through personalized decision-making processes, limiting the development of stable organizational routines (Brunninge et al., 2007). Conversely, when founder leadership and governance are treated as overlapping, sustainability-oriented decisions risk being interpreted as outcomes of governance, even if they primarily reflect individual discretion. This makes it difficult to establish whether strategic orientation is anchored in organizational arrangements or remains contingent on the founder's influence, raising the question of how such orientation can be sustained beyond the founder level.

Finally, SCG effectiveness depends on the degree of formalisation of governance mechanisms. Formalisation refers to the codification of roles, procedures and accountability structures that reduce discretion (Pugh et al., 1968). Applied to sustainability, it captures the extent to which ESG responsibilities are institutionalised through formal policies, charters and documented processes, rather than delegated to informal practices or left to managerial discretion (Hamad et al., 2024; Brogi & Lagasio, 2025).

Overall, existing SCG literature highlights how board structure and board functioning contribute to firms' sustainability orientation. However, a key research gap remains. Current studies rarely investigate how the governance mechanisms affect firms' capacity to pursue sustainable innovation through a purpose purpose-driven approach. This gap opens the way for examining how boards can enable sustainability not only through oversight and disclosure but through the strategic alignment of purpose, innovation, and sustainability objectives.

2.3 Purpose-driven Sustainable Corporate Governance

Corporate purpose has progressively shifted from a symbolic expression of organizational identity to a governance principle that shapes how firms interpret their role in society (George et al., 2023). Across the managerial literature, purpose is conceptualized as the reason why a firm exists: a guiding logic that goes beyond profit maximization and seeks to align economic goal with social and environmental needs (Jimenez et al., 2021). Unlike mission and vision, which describe what a firm does or aspires to do, purpose clarifies why it acts, thereby influencing stakeholder relationships and governance arrangements (Hollensbe et al., 2014).

Recent studies (Cucino et al., 2025) highlight the difference between firms that merely declare a purpose and those that are genuinely purpose-driven. Purpose-driven firms integrate pro-social objectives into their core business logic, ensuring that purpose is not confined to rhetorical statements but permeates strategic decision-making and organizational processes (George et al., 2023). This orientation is often grounded on internal factors such as managerial values, ethics and pro-social attitudes. In SMEs, particularly the founder's personal values, ethical beliefs, and cultural background play a pivotal role in shaping the firm's purpose, which tends to be deeply rooted in the entrepreneurial identity and strongly aligned with community-oriented and relational logics (Mariani et al., 2023; De Massis et al., 2018; Aguinis & Glavas, 2019).

The rise of corporate purpose is also interpreted as a response to external pressures and institutional tensions that challenge traditional business models. Purpose is framed as a reaction to systemic grand challenges, rising inequality, declining trust, technological disruption, and environmental degradation, that render conventional shareholder-oriented strategies insufficient (Jimenez et al., 2021; Longo & Cardillo, 2025). These pressures are reinforced by global institutional frameworks such as the Sustainable Development Goals (SDGs), which increasingly shape expectations regarding firms' societal contributions (Mahajan et al., 2024).

Overall, the SCG literature suggests that both governance structures and purpose orientation shape how firms interpret their economic, social and environmental role. Yet, while purpose clarifies why firms act, corporate governance determines how such intentions are translated into strategic and operational choices. Existing research has not yet clarified how purpose interacts with sustainable corporate governance mechanisms and, specifically, how purpose-driven governance supports sustainable innovation. To better understand the relationship between purpose and sustainable innovation, it is therefore relevant to examine how governance mechanisms influence

firms' ability to develop and prioritize sustainability-oriented innovation. This provides the basis for the final research stream: the link between corporate governance, purpose determination and sustainable innovation.

2.4 Corporate Governance and Sustainable innovation

SCG can be understood as a set of governance dimensions that create the conditions under which sustainable innovation is prioritised and supported over time. These dimensions concern how boards define innovation priorities, allocate resources, and legitimize sustainability-oriented projects within the organization.

A first SCG dimension concerns how boards set priorities for sustainability-oriented innovation. Boards that are independent, inclusive and heterogeneous are more likely to promote sustainable innovation, as they can challenge short-term managerial biases and integrate stakeholder perspectives into strategic decision-making (Xu & Bai, 2022; Cek & Ercantan, 2024). This priority-setting ability is closely connected to the decision quality, understood as the extent to which boards base their evaluations and judgments on systematic information processing rather than intuitive or short-term oriented assessments (Martínez-Ferrero & García-Meca, 2020).

A second dimension concerns resources allocation. SCG influences how financial, human and organisational resources are deployed to support sustainability-oriented innovation. As governance mechanisms become more structured, firms are better able to channel resources toward innovation initiatives that ehnance organisational resilience and environmental stewardship (Helfaya & Aboud, 2023; Martínez-Ferrero & García-Meca, 2020). By formalising sustainability criteria through tools such as impact assessments and ESG risk indicators, governance ensure that sustainability systematically informs budget decisions and innovation portfolio choices (Aras & Crowther, 2008; Kayikci et al., 2022).

A third dimension concerns the institutional legitimisation of sustainability-oriented innovation. Governance contributes by strengthening transparency and accountability, reducing the risk of stakeholder contestation (Cek & Ercantan, 2024; Mocciaro Li Destri et al., 2024). Governance practices that promote more reliable disclosure of environmental and social performance enable stakeholders to assess firm's conduct more effectively, reinforcing trust and organisational legitimacy (Xu & Bai, 2022; Saeed et al., 2024).

Taken together, these dimensions show that sustainable innovation also depends on the governance mechanisms that prioritise, resource, and legitimise sustainability-oriented initiatives. However, existing literature has not yet integrated these mechanisms into a coherent governance perspective, particularly in purpose-driven firms.

Three main research gaps emerge: (1) the lack of a governance perspective on how specific mechanisms shape sustainable innovation; (2) Limited understanding of how purpose orientation modifies or strengthens the governance mechanisms over time, particularly in purpose-driven firms; and (3) limited understanding of how sustainable corporate governance and purpose orientation interact to steer long-term sustainable innovation.

Addressing these gaps is particularly relevant to assess whether and how purpose drives the alignment of governance systems and sustainability-oriented innovation, thereby motivating the following research question: *How do sustainable corporate governance mechanisms interact with founder-driven purpose to support long-term sustainable innovation in SMEs?*

3. Research Design

3.1 Methodology

Case selection. The study adopts a multiple case study approach (Yin, 2009), focusing on Italian SMEs within the biomaterials, biotechnology, and wine sectors. In line with a purposive sampling strategy (Suri, 2011), the sample was selected to reflect the specific aims of the study, which focus

on sustainable innovation. Only firms recognized as top-tier performers in sustainability innovation were considered eligible for inclusion. Accordingly, firms were intentionally selected based on their demonstrated excellence and strong commitment to sustainable innovation, as documented in sustainability reports, investor-oriented disclosures, and sustainability-related awards received.

Firm 1 develops a sustainable, high-end leather alternative by transforming recycled orange and cactus waste into durable textiles. Firm 2 is a biotech Benefit Corporation and a spin-off of a family-owned plastics firm. It specializes in the extraction and production of microalgae compounds. Firm 3, a family-owned winery, has launched sustainable Sicilian wine by reinterpreting tradition practices through high-quality viticulture.

In all cases, these are founder-led SMES, where leadership is vested in the entrepreneur, who also serves as CEO.

Data collection and Triangulation. The analysis focuses on the following dimensions: Founder/CEO leadership; Board structure and functioning; Corporate purpose; Degree of governance formalization; Patterns of sustainable innovation.

The data collection followed a multi-step process involving primary and secondary sources, data analysis and findings.

Primary data were collected through semi-structured interviews with founders (or one of them)/CEOs. They were complemented by secondary sources, including official corporate websites, sustainability and impact reports, certifications, press releases and institutional documents, economic databases (AIDA Bureau Van Djik, 2026). The interview protocol was aligned with the study's objectives and the aforementioned literature-derived dimensions.

Interviewees were contacted by email and mobile to introduce the research goals and clarify in advance the content of the questions. Each engagement began with a two-hour recorded presentation. Following the transcription of these presentations, semi-structured interviews featuring open-ended questions were conducted in a subsequent phase. Interviewees were also asked to provide supporting documentation and sources for their answers.

Table 1 reports the interview structure adopted and the main topics.

Table 1. Interview Framework

Leadership & Purpose ● Number of co-founders ● Company overview ● Sustainability purpose & strategy alignment
Board Structure ● Board mechanisms: ➢ Size ➢ Gender diversity ➢ International diversity ➢ Independence ➢ Board workload ● Ownership: ➢ Ownership concentration ➢ Leadership separation ➢ ESG-linked Incentives ● Degree of board formalization: ➢ Charters, regulatory obligations, ESG reporting, ESG or sustainability Committees ➢ Climate and sustainability risk management ➢ Motivation to codification (normative or voluntary)
Board Functioning ● Board orientation and coordination on sustainability: ➢ Inclusiveness ➢ Sustainability expertise in the board ● Assessment of the Sustainability-related decision making

➢ Sustainability performance monitoring ● Resources allocation to sustainability ● Strength of external validation mechanisms: ➢ Interaction with Chief Sustainability Officer ➢ Stakeholders' relationship ➢ Institutional legitimacy ➢ Certifications
Purpose-driven Sustainable Corporate Governance ● Corporate Governance's purpose and values ● Motivation of key actors: ➢ Mission-driven, Opportunistic, Reactive, or Rule-based motivation ➢ Hybrid motivations (strategic + ethical) ● Internal factors and managerial tensions: ➢ Balancing economic vs. sustainability tensions ● External factors and institutional tensions: ➢ Stakeholder-driven ➢ Market-based ➢ Sustainability regulatory based ● External innovation enablers (technology hubs, innovation ecosystem)
Sustainable Innovation/ Solution ● Circular innovation process and circular economy practices ➢ Eco-design approach ➢ Sustainable materials selection ➢ Environmental impact ➢ Energy efficiency ➢ Waste reduction ● Digitalization ➢ Digital technologies enabling sustainability (AI, IoT, LCA tools) ● KPIs and measures of sustainable innovation performance

Source: our elaboration

To ensure empirical consistency, primary data were triangulated with secondary data, covering the period 2022-2025. The analysis was conducted by each sustainability dimension and cross-checked with secondary data, before final case results were elaborated. The table 2 reports the triangulation activity.

Table. 2. Integration between primary and secondary data

Company overview ● Official firms' websites ● Italian Business Register official website ● Italian Chamber of Commerce (CCIAA) ● Italian Trade Agency Official Website (ICE) ● Annual Financial Statements ● Press releases (2022-2025)
Board structure and functioning ● Corporate governance disclosure on official websites ● Sustainability/ESG Committee charters ● ESG-linked compensation ● Third-party ESG ratings ● National Corporate Governance Code references
Purpose-driven Sustainable Corporate Governance ● Interviews with corporate leadership (CEO/Founders) ● Mission, purpose and values statements on corporate websites ● Codes of Ethics and Codes of Conduct ● Stakeholder engagement documents ● Impact Valuation Report 2024 (*Firm 2*) ● Sustainability Report (*Firm 3*)
Sustainable Innovation ● Innovation & Technology Hubs (Intesa Sanpaolo Innovation Center)

- Awards & Institutional recognition (Eni Award 2023 - *Firm 2*)
- Start-cup ecosystem (*Startup Italia 2025 - Firm 1*)
- Accredia/DNV GL Certification Reports (2025 Firm 3)
- University–industry collaborations and Partnership (MUSA Scarl – *Firm 2*)

Source: our elaboration

Data Analysis. The data analysis followed a structured and iterative process. First, detailed case overviews were developed for each firm by integrating primary interview data with secondary sources, including corporate documents, sustainability reports, and institutional materials. This step enabled the construction of contextualized accounts of each case, capturing governance configurations, purpose orientation, and sustainable innovation practices (Eisenhardt, 1989).

The analysis was conducted in two sequential stages. In the first stage, a within-case analysis was performed for each firm. Each case was examined along the three core analytical dimensions identified in the research design: board structure and functioning, corporate purpose, and sustainable innovation. Pattern matching methods were used to compare empirical observations with the theoretical dimensions derived from the literature (Yin, 2009).

In the second stage, a cross-case analysis was conducted to identify similarities and differences across cases. This comparative analysis enabled the identification of recurring patterns and the development of more generalizable insights regarding the role of Sustainable Corporate Governance in supporting sustainable innovation in purpose-driven SMEs. Following an iterative approach, cases were systematically compared (Eisenhardt & Graebner, 2007). Specifically, the results are presented in comparative tables (Table 3-6), placing firms in relation to the specific dimensions of their governance system and sustainable innovation.

To enhance the robustness of the analysis, interpretation process was conducted independently by the authors and subsequently compared. The convergence of interpretations across researchers strengthened the reliability of the findings (Miles & Huberman, 1994).

3.2 Company Overview

Firm 1 - Innovative Sustainable Leather from Agro-Industrial Waste

Firm 1 produces a bio-based alternative to animal leather, which is also sustainable and cruelty-free. It uses by-products of Sicilian oranges and cactus as raw materials. Through a patented circular-economy process, it converts agro-industrial waste, such us orange peels and cactus leftovers, into a high-performance treated material using recycled polymers. The resulting product is soft, durable, and visually comparable to luxury leather. The material serves several industries, primarily luxury fashion (apparel, footwear and accessories), interior design, automotive, and occasionally nautical furniture. The founder is a textile designer woman and pioneer in sustainable materials. The Co-founders are respectively an engineer specializing in development and operations with experience in the automotive sector and a chemist, who contributed to the development of the material.

The innovation lies in patenting a material derived from citrus pulp and prickly pear cladodes. Unlike other bio-based materials, it is designed for industrial scale production and aims to transform the landscape of vegan material. In 2023, the company reported revenues of €48.150,00. In 2024, revenues increased to €77.291,00. Through a partnership with the Italian Trade Agency (ITA), firm 1 has gained international visibility as representative of "Made in Italy" innovation.

It also collaborates with the Municipality of Milan to position its material as a sustainable market alternative. These achievements are recognized by certifications and awards such as the VVV+ label (to guarantee that products are 100% animal-free), and the Eni Award, granted by the President of Italy for contributions to environmental research and decarbonization.

Firm 2 - Innovative Sustainable Microalgae-based Biotechnology

Firm 2, registered as a Benefit Corporation, is an innovative startup operating in experimental research and development in the biotechnology sector. It specializes in producing and extracting compounds from microalgae, integrating CO_2 into its processes as part of a circular-economy model.

Production employs eco-friendly solvents for the industrial-scale cultivation of microalgae such

as Chlorella and Spirulina. Its innovation lies in the use of advanced technologies for indoor cultivation under controlled environmental conditions, enabling the production of high-value compounds with a level of purity unattainable through outdoor systems The extracted and formulated microalgae-based compounds target various sectors, including agriculture and nutraceuticals. In 2024, the firm reported revenues of €281,762, reflecting a 3.67% increase from the 2023 figure of €271,786.

This improvement demonstrates an enhanced ability to generate margins from its core business. The firm received Scientific Approval from an Italian university, whose researchers provided chemical and physical validation confirming the sustainability of the production process. It was also recognized with the Start Cup competition award, a prestigious regional competition for high-tech entrepreneurship.

Firm 3 - Innovative Sustainable Viticulture and Wine Production

Firm 3 is a family-owned business founded in 1983 in Italy and has played a key role in revitalizing local wine production. It shifted from standardized methods to a model of high-quality, sustainable viticulture, characterized by low yields (approximately 50 hectoliters per hectare). Its commitment to environmental stewardship is exemplified by the practice of "heroic viticulture" in a small island, where grape cultivation occurs under extreme geographical conditions, performed entirely by hand, without chemical fertilizers, and with systematic monitoring of carbon and water footprints. Firm 3 aligns its operations with the EU Green Deal and published its first Sustainability Report in 2025. It has expanded its presence to 65 countries, transitioning from local sales to a wide digital e-commerce, which grew by 400% in 2020.

A multi-year partnership with a leading fashion brand has further elevated its market positioning, particularly through the launch of the 2024 limited-edition wine, which strengthened the brand's identity as a model of local innovative and sustainable craftsmanship. The firm has been recognized by UNESCO for its commitment to the environmental protection and landscape conservation. Additionally, it holds the Bio Suisse organic certification, valid in both the EU and Swiss markets, and the ISO 50001 certification, which attests to the presence of an energy management system.

4. Findings

The multiple-case analysis reveals a relationship between founder-driven purpose and governance system in developing sustainable innovation. Following we report the results for each firm and then a comparative analysis.

Firm 1, operating in the bio-materials sector, is characterized by a founder-controlled and low-formalized board. The three founders compose a small, non-independent board and retain full ownership. Although governance is concentrated, external financial support comes from accelerators and Italian institutional investors: the former strengthens sustainability-oriented innovation capabilities, while the latter focus on early-stage financing.

The firm is led by a female CEO, and all board members share the same nationality. The company is not legally required to adopt sustainability governance mechanisms and lacks a dedicated sustainability committee, confirming low formalization.

Nevertheless, governance remains limited in formal mechanisms, while sustainability orientation is primarily driven by the founder's leadership style formally acknowledged through the "Women's Enterprise Recognition," listing the firm among the top 100 Italian women-led excellence cases.

Decision-making quality is supported by a Life Cycle Assessment (LCA) conducted with an independent partner, which monitors the carbon footprint while ensuring material durability. The LCA sets thresholds for carbon footprint and durability that determine whether a material can be adopted. The screening process excludes conventional materials that fail to meet sustainability targets

and directs experimentation toward bio-based alternatives derived from agricultural waste. As a result, material selection becomes a structured decision process that channels innovation toward circular solutions.

Resource allocation follows the same logic. Governance directs investments toward bio-based materials, stabilization processes, and performance testing. Concentrated ownership places evaluation and funding decisions in the same decision locus, allowing founders to commit resources directly to selected projects without additional approval layers. The coupling between funding decisions and technical development shortens experimentation cycles and supports the advancement of sustainable material solutions. A similar approach governs production and value-chain decisions. Value-chain traceability is ensured through digital tools such as QR codes and dedicated platforms. Each production output is verified against predefined compliance requirements before moving forward. The verification step filters out suppliers and processes that do not meet sustainability standards and directs sourcing and production toward certified inputs. As a result, traceability operates as a selection mechanism that stabilizes decisions.

External validation emerges through the firm's ability to build high-quality partnerships, participate in sustainability-oriented networks, and obtain public funding. Access to these relationships depends on meeting predefined requirements, so decisions on materials, suppliers, and production processes must be validated externally before being confirmed.

Its purpose is anchored in circular-economy principles, value-chain transparency, and cruelty-free production. This orientation stems from the CEO's educational and professional background—combining fashion studies, chemistry-lab experience, and deep knowledge of the local context—and is reinforced by industry-level pressures such as the environmental impact of leather production and opportunities for collaboration with fashion, furniture, and automotive companies.

Despite operating under limited mandatory sustainability requirements (e.g., REACH, PROP65, VVV+), the firm voluntarily adopts practices that exceed regulatory obligations. Motivation is primarily driven by self-realization and the strategic use of the CEO's prior experience, reflecting an opportunity-oriented purpose logic.

A combination of mechanisms explains these outcomes: LCA-based evaluation defines viable options, concentrated governance enables rapid resource allocation, purpose establishes stable decision criteria, and external validation reinforces their consistent application, leading to circular material innovation. It follows a bio-circular model that uses agricultural waste (orange peels and prickly pear residues) combined with recycled polymers. Solar panels installed in partnership with an energy provider improve energy efficiency. QR-code-based traceability, a zero-waste approach, and carbon and water footprint monitoring further strengthen the firm's bio-circular and traceability-driven innovation model.

Firm 2, active in biotechnology and centered on microalgae-based solutions, has a one-member board, with the founder serving as both sole director and owner. Governance is therefore non-independent, and ownership is fully concentrated in the Italian CEO. The firm reports no external financial investors. As a Benefit Corporation, it is legally required to disclose sustainability practices and publishes an Impact Valuation. It also has a Scientific Advisory Board composed of external academic researchers, contributing to a high level of governance formalization.

Governance functioning is influenced by inclusive female leadership and supported by an interdisciplinary team of engineers, agronomists, and business specialists, which also promotes local talent retention. Technical competences are brought into the same decision process, allowing the firm to assess whether each innovation choice is scientifically feasible, operationally manageable, and economically viable.

Decision-making follows a value-creation logic that directly links environmental resources to economic outcomes. CO_2 and biological inputs are treated as productive resources, and investment decisions are evaluated based on their ability to generate both environmental and economic value. Resource allocation prioritizes patenting sustainable extraction processes and developing carbon-

neutral logistics with local farmers.

External validation comes from university-based scientific approval and recognition through the regional competition. Scientific validation operates as a selection mechanism: only processes that meet academic standards of reliability and replicability are pursued. This reduces experimentation based on unverified assumptions and directs development toward solutions with proven scientific grounding.

The firm's purpose centers on creating sustainable economic and social value, particularly through CO_2 valorization in production. This orientation stems from the CEO's multidisciplinary background, architecture studies, entrepreneurial family experience, and business expertise, and is reinforced by external drivers such as a research center partnership and application of the 231 Organizational Model. Regulatory and institutional requirements introduce formal constraints that structure decision-making, requiring documentation, and accountability in project development. Each project must satisfy these conditions before proceeding, which limits the range of feasible options and directs investment toward processes that are compliant. Innovation therefore concentrates on solutions that can be validated and scaled within a regulated environment. The firm's recent financial turnaround further shapes its purpose logic, resulting in a family-driven, reactive orientation.

Therefore, three mechanisms explain the findings: scientific validation selects technically viable solutions, formal governance requirements restrict the range of feasible options, and resource allocation concentrates efforts on scalable applications of biological inputs, leading to circular and zero-landfill innovation. The sustainability innovation derived follows a circular model with end-of-life disassembly principles, using biological raw materials from recycled plastics and industrial residues. Energy efficiency is supported by a temperature-monitoring system that minimizes thermal impact. Real-time material-flow monitoring ensures process traceability. Given its emphasis on waste reduction, disassembly, and recovery, the firm's sustainability innovation can be characterized as zero-landfill and circular-design oriented.

Firm 3, active in viticulture and wine production, has a four-member board, two of whom are founders and co-CEOs. The board shows medium independence, and ownership is concentrated in the two founder-directors, who share the same nationality. The firm reports no external financial investors. Although not legally required to provide sustainability reporting, it published its first Sustainability Report in 2024. It also has an agronomic committee composed of internal specialists and external consultants, including an entomology expert, indicating a medium level of governance formalization.

Governance functioning reflects inclusive, gender-balanced leadership: one out of four board member is a woman, and the organizational culture emphasizes valuing individual contributions. Decision-making is supported by a formal management and control model based on the firm's ethical code, supplemented by a whistleblowing system for internal oversight. The presence of both formal control systems and specialized committees introduces multiple decision checkpoints, requiring production choices to be justified against ethical, environmental, and technical criteria before implementation. Choices that do not meet these criteria are not pursued, which directs innovation toward practices that preserve environmental quality and meet certification standards.

Resource allocation focuses on "heroic viticulture," a chemical-free cultivation method carried out in challenging environmental conditions. Investment decisions prioritize practices that preserve soil integrity and adapt to local environmental constraints, even when these choices increase operational complexity. The directs resources toward cultivation techniques, monitoring systems, and inputs that maintain long-term land productivity.

External validation comes from several certifications and recognitions, including a partnership with a leading fashion brand, UNESCO acknowledgment for sustainable practices, Bio Suisse certification, and ISO 50001 for energy management. Access to and maintenance of these certifications require compliance with strict environmental and production standards.

The firm's purpose is expressed through the idea of acting as "Guardians of the Earth,"

emphasizing local production, territorial value, and minimizing anthropogenic impact to preserve soil fertility for future generations. A key driver of this purpose orientation is the view of sustainability as a value-generating investment. The purpose logic is shaped by external forces such as pressure from Northern European markets requiring quality certifications and alignment with EU Green Deal guidelines. The purpose introduces long-term decision criteria: production and investment choices must preserve soil fertility, maintain ecosystem balance, and sustain territorial value.

Sustainability innovation reflects the combined effect of the governance mechanisms described above. It includes lightweight, chemical-free material design, monitoring of carbon and water footprints, and soil-preservation practices. Energy efficiency is supported by solar panel systems enabling both self-production and energy selling, complemented by precision-viticulture techniques. The firm also employs satellite monitoring and field sensors for process traceability.

These solutions are selected and developed because they satisfy multiple decision conditions: they preserve soil fertility, comply with certification requirements, and meet technical and environmental evaluation criteria. Its waste-reduction policy is based on circular viticulture, transforming organic waste into soil-restorative fertilizers, characterizing its sustainability innovation as preservation-based.

In order to highlight similarities and differences we compare the three case studies according to governance model (board structure and functioning and corporate purpose) and sustainable innovation dimensions. The following four tables (Table 3-6) report the comparative results.

Table 3. Corporate Governance Structure

Board Structure	**Firm 1**	**Firm 2**	**Firm 3**
Board Size	3 members	1 member	4 members
Gender Diversity ***(% women/ total members)***	1 woman out of three	1 woman	1 woman out of four
International Diversity	Absent (100% Italians)	Absent (100% Italians)	Absent (100% Italians)
Independence ***(#independent directors/total directors)***	Zero outsider directors	Zero outsider directors	Two outsider directors
Ownership Concentration	High, split among three owners	Maximum (the unique Director is the owner)	High, split among two owners
Leadership separation	Low separation – founder-controlled board; CEO is also founder; no independent chair.	No separation – single-member board; founder is sole director, CEO, and owner.	Low separation – dual leadership concentrated in two founder-CEOs; no independent chairperson.
Degree of board formalization	Absence of sustainability report, regulatory obligation, or sustainability committee	High: Benefit Corporation status; mandatory "Impact Valuation" (annual report) and Preventive Plans	"2024 Sustainability Report" Absence of regulatory obligation; Whistleblowing system.
Sustainability Committees	Absent	Scientific Advisory Board including external academic researchers	Agronomic committee with external consultants and one agronomist specialized in entomology
Key Highlights of Corporate Governance Structure	**Small-sized board, high-concentrated ownership, low degree of formalization**	**Maximum ownership and board concentration, high degree of formalization**	**High ownership and board concentration, medium degree of formalization**

Source: our elaboration

Table 4. Corporate Governance Functioning

Board Functioning	Firm 1	Firm 2	Firm 3
Board orientation and coordination on sustainability (inclusiveness and expertise)	Female leadership; "Made in Italy: Women's Enterprise" recognition.	Female leadership; Mixed background board (engineering, agronomy, business) focused on local talent retention.	Gender-balanced leadership; "work ecosystem" environment
Sustainability decision-making quality	Guided by Life Cycle Assessment; Trade-off between durability and carbon footprint reduction.	Value creation approach based on environmental-to-economic value ratio.	Formalized management and control model based on firm's ethical code
Resource allocation to sustainability	Directed toward research for material and processes refining; Traceable blockchain	Patenting sustainable extraction processes and carbon-neutral logistics developed with local farmers.	Sustainable and chemical-free agronomical research; "Heroic viticulture".
External validation mechanisms	Alliances with large corporations and public entities; VVV+ label and Eni Awards.	Scientific Approval from University	Partnership with leading fashion firm; UNESCO recognition for sustainable product; BioSuisse Certificate; ISO 50001.
Key Highlights of Corporate Governance Functioning	**Inclusive Female Leadership & Life-Cycle–Driven Decision Quality, Resource traceability allocation, Stakeholder validation**	**Inclusive Female Leadership & Value-Based Sustainability Decisions, Resource footprint assessment, Institutional validation**	**Gender-Balanced Leadership & Ethics-Driven Sustainability Governance, Chemical-free resource allocation, Stakeholder and institutions validation**

Source: our elaboration

Table 5. Purpose-driven sources

Corporate Purpose	Firm 1	Firm 2	Firm 3
Purpose and values	Circular economy, transparency, and cruelty-free/animal-free production.	Sustainable economic and social value creation; CO_2 valorisation.	Being "Guardians of the earth"; Promoting local production and territory value while minimizing the anthropogenic footprint; Leaving fertile soil for future generations
Motivation of key actors	Self-realization; Strategic leverage of past experiences	Family-business financial turnaround	Commitment to future generations; Research on strategic differentiation factors
Internal factors and tensions	Sustainability-focused background (fashion studies, chemical lab experience); Strong local knowledge	Sustainability-focused background (architecture studies); Second-generation entrepreneur with family business background; Business knowledge	Sustainability as value - creating investment
External factors and institutional tensions	Alternative to leather industry pollution; Partnership with fashion, furniture, and automotive industries; Low compliance (REACH, PROP65, and VVV+ Animal-Free labels)	Research Center partnership; 231 Model	Pressures from northern European markets demanding quality certifications; Alignment with the EU Green Deal.
External innovation enablers	Accelerators and institutional investors	University partnership. Local recognition.	Industry partnership
Key Highlights of Purpose-driven Sources	**Self-oriented, opportunistic purpose with low compliance commitment**	**Family-driven, reactive purpose aligned with high compliance commitment**	**Future-oriented purpose with high compliance commitment**

Source: our elaboration

Table 6. Circular Sustainable Innovation

Sustainable Innovation/Solution	Firm 1	Firm 2	Firm 3
Circular innovation process and practices: *Eco-design*	Circularity-oriented design Durable and flexible packaging	Disassembly based end-of-life design	Lightweight material design
Circular innovation process and practices: *Sustainable materials selection*	Bio-based and recycled raw materials from agricultural sources; Recycled polymers	Bio-based raw materials from recycled plastics and industrial residues	Chemical-free raw materials
Circular innovation process and practices: *Environmental impact*	Carbon-footprint reduction; Water pollution reduction	Carbon circularity model	Carbon-footprint reduction Water-footprint reduction Soil fertility preservation
Circular innovation process and practices: *Energy efficiency*	Solar cells implementing partnership	Thermal minimization impact: temperature monitoring	Solar panels; Energy self-production and sell; Precision viticulture technicals
Circular innovation process and practices: *Waste reduction*	Zero Waste: circular processes	Zero-waste-to-landfill: circular processes	Circular viticulture: Organic waste valorization through composting to soil-restorative fertilizer
Digitalization	Product-level QR-code traceability	Digital platforms for real-time material-flow monitoring	Satellite monitoring and field sensors
Key Highlights of Circular Sustainable Innovation	**Bio-circular and traceability based**	**Disassembly and zero-landfill based**	**Preserving-based**

Source: our elaboration

5. Discussion

This study advances the SCG literature by explaining how governance supports sustainable innovation in purpose-driven SMEs, a context largely overlooked compared to large corporations. While prior research has examined governance structures, sustainability reporting, and board characteristics in established firms, little is known about how governance systems interact with entrepreneurial leadership to support long-term sustainable innovation in SMEs. In detail, the findings clarify the mechanisms through which governance influences sustainable innovation, showing how decision processes, resource allocation, and validation practices connect governance configurations to innovation outcomes.

Findings reveal that sustainable innovation is supported by the interaction between founder-driven purpose and corporate governance. This interaction effect operates at different levels: founder leadership defines the initial sustainability orientation, while governance outlines whether such orientation is translated into consistent and organization-wide decision-making. Without a clear separation, sustainability outcomes may be attributed to governance, while they are still driven by the founder's decisions.

Consistent with prior research, in resource-constrained SMEs, effective progress depends less on technology adoption and more on early design choices that embed sustainability principles into core processes (Maxwell & Van der Vorst, 2003; Ferlito & Faraci, 2022).

Evidence indicates that sustainability orientation originates from founder-driven purpose. It legitimizes sustained investment despite short-term financial pressures (Bhattacharya et al., 2023), making sustainability a constitutive element of corporate identity (Jones-Khosla & Gomes, 2023; Longo & Cardillo, 2025). While purpose-driven orientation allows rapid action and experimentation, it does not ensure consistent decision-making when initiatives scale or financial constraints intensify. This refines existing research on purpose-driven organizations (George et al., 2023). Although internalized purpose strengthens intrinsic motivation and cooperation (Bhattacharya et al., 2023), our evidence shows that, without appropriate governance formalization, purpose can inadvertently increase dependence on individual leaders. As a result, sustainable innovation remains tied to individual decisions rather than being sustained through organizational processes. Thus, this study extends SCG research by identifying a non-traditional role for governance formalization. Previous

studies typically associate formalization with compliance, monitoring, and reporting (Pugh et al., 1968).

Our evidence suggests instead that appropriate level of formalization supports stabilizes sustainable innovation paths, by translating the founder's purpose into consistent organizational practices. Even "light-touch" mechanisms, such as independent advisors, help limit selective participation (Michelon & Parbonetti, 2012) by establishing procedural discipline and standardized routines (Peters & Romi, 2014). Furthermore, external pressures (investor scrutiny in Firm 1; customer expectations in Firm 3; environmental-industry requirements in Firm 2) also reinforce governance formalization, consistent with Cui and Wang (2022), and Nazari et al. (2015). Collectively, these findings reveal that purpose orientation and governance formalization are mutually reinforcing, enabling sustainable innovation without constraining entrepreneurial initiative.

A second theoretical insight concerns decision-making processes. Prior SCG research stresses how boards improve decision quality on sustainability through deliberation, information processing, and structured evaluation (Berrone et al., 2023).

Our findings extend this perspective by showing that, in the context of sustainable innovation, the primary challenge is not only to make good decisions at discrete points in time, but to preserve coherence across successive decisions.

In particular, sustainability-oriented innovation requires organizations to remain consistently aligned with shared sustainability criteria and long-term objectives across strategic, technological, and resource allocation choices. We conceptualize this capability as decision coherence, defined as the ability to maintain consistency among interdependent decisions when sustainability goals are characterized by uncertainty, trade-offs, and delayed returns.

Formalized governance structure, as observed in our case studies, play a critical role in sustaining decision coherence by providing stable reference criteria and shared standards against which decisions are evaluated (Galbreath, 2018).

Formal reporting practices, advisory bodies, ethical codes, certifications, and control systems emerge as institutionalized decision anchors that guide sustainability-oriented innovation and help ensure its continued alignment with long-term goals. By contrast, when governance structures are weakly formalized, decision-making tends to rely more heavily on situational and ad hoc assessments. This may preserve the quality of individual decisions while simultaneously generating fragmentation and drift across the innovation trajectory.

These findings invite a shift in the SCG literature from the focus on decision quality toward greater attention to decision coherence as a distinct and largely overlooked governance dimension. Whereas decision quality refers to the soundness and robustness of a specific choice, decision coherence captures the continuity and alignment among multiple decisions over time that collectively sustain sustainable innovation pathways. As such, decision coherence represents a promising theoretical contribution for understanding how governance mechanisms shape long-term sustainability outcomes beyond isolated decision episodes.

A third theoretical insight concerns legitimacy for ensuring continuity and credibility to sustainable innovation pathways. Existing SCG literature examines legitimacy as an outcome of transparency, accountability, and stakeholder alignment with their expectations. Authors (Cek & Ercantan, 2024; Saeed et al., 2024) mainly emphasize legitimacy in reducing contestation and enhancing organizational credibility. Legitimacy is primarily associated with disclosure quality, compliance, and formal accountability mechanisms.

Our findings show that, in purpose-driven SMEs engaged in sustainable innovation, legitimacy is not merely a reputational asset; it is an enabling condition for innovation continuity. Certifications, scientific partnerships, awards, and institutional recognitions reduce perceived risk and facilitate access to strategic resources, such as external finance, knowledge sharing, and market access, which are essential for sustaining capital-intensive sustainable innovation. This insight complements studies emphasizing the board's role in mediating between external pressures and long-term strategic objectives (Kavadis & Thomsen, 2022; Mocciaro Li Destri et al., 2024). It extends SCG research by

showing that governance-generated legitimacy not only enhances accountability but also enables access to critical resources, allowing SMEs to pursue long-term innovation pathways.

6. Conclusion, Contributions and Future Research

This study fills a key gap in the sustainable corporate governance (SCG) literature by showing how governance supports sustainable innovation in purpose-driven SMEs.

The study advances SCG research in several ways. First, it links board orientation and governance formalization to sustainable innovation pathways. Second, it shifts attention from ESG outcomes to the processes through which governance supports innovation. Third, it introduces a purpose-centered view of governance, where purpose acts as a strategic compass and formalization provides the operational map. Finally, it proposes SCG models specific to founder-driven SMEs, showing how purpose-driven leadership, ownership concentration, and governance formalization interact.

Empirically, the three cases illustrate distinct governance models. Firm 1, a biomaterials start-up, combines low formalization with strong purpose-driven leadership, enabling experimentation and ecosystem partnerships. Tools such as Life Cycle Assessment and digital traceability enhance innovation coherence.

Firm 2, active in biotechnology, pairs concentrated ownership with a more formalized governance system, including a scientific advisory board, mandatory impact reporting, and codified procedures. This configuration reduces mission drift and stabilizes decision-making. Firm 3, a family-owned wine producer, exhibits a hybrid model integrating a partially independent board, formal governance instruments, third-party certifications, an ethical organizational model, and a strong purpose orientation centered on environmental stewardship. Its innovation pathway is preservation-based, focused on reducing environmental footprints, protecting soil, and adopting digital monitoring systems. These elements position the firm between purpose-driven and compliance-driven governance archetypes.

Across all three cases, however, a common pattern emerges: governance mechanisms, regardless of their level of formalization, serve to translate the founder's purpose into coherent, long-term sustainability-oriented decisions.

The study offers several practical implications. For entrepreneurs and SME leaders, introducing light touch formalization (e.g., sustainability committees, ESG linked incentives, clear board selection criteria) can strengthen resilience in informal, purpose driven firms. In compliance driven contexts, promoting inclusive leadership and reinforcing purpose internalization help avoid box ticking behaviors.

For policy makers and investors, establishing minimum formalization standards can enhance accountability while preserving entrepreneurial agility. Overall, the study highlights the importance of aligning corporate purpose with governance formalization to sustain sustainable innovation.

This research has several limitations. It examines three purpose-driven SMEs, while broader cross-industry or cross-country comparisons could reveal different governance–purpose interactions. The qualitative data capture governance models at a single point in time; longitudinal studies could examine how such models evolve as firms grow. Moreover, stakeholders beyond founders and boards also warrants deeper investigation.

Future research could investigate how purpose–governance interactions vary across institutional contexts, whether specific combinations of ownership concentration, board composition, and formalization lead to distinct SCG archetypes, and how founders' identities, values, and socioemotional wealth shape long-term sustainable innovation pathways.

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Heuristic shortcuts in Technology Acceptance Model: The cognitive architecture of perceived usefulness in the zero-emission vehicle market

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Abstract

Frame of the research. *Consumers' evaluations of emerging sustainable technologies are shaped by uncertainty, complexity, and limited familiarity. Although TAM research has extensively examined predictors of Perceived Usefulness (PU), little is known about how consumers cognitively assemble PU when faced with multiple interdependent attributes typical of sustainability-oriented innovations.*

Purpose of the paper. *The study investigates the structure of the utility function underpinning PU in zero-emission mobility, comparing Battery Electric Vehicles (BEVs) and Fuel Cell Electric Vehicles (FCEVs), and assessing how attribute hierarchies evolve across technologies and information frames.*

Methodology. *We conduct a rank-ordered logit (Rologit) experiment using vignette scenarios that vary five attributes capturing product-level, ecosystem-level, and policy-driven features. The design is implemented across four groups (BEV vs. FCEV; explicit vs. blind) to test whether attribute weights shift with technological labels or information structures.*

Results. *Findings reveal a highly stable and recurrent utility structure across all groups. Four of the five attributes remain consistently significant, with robust coefficient signs across conditions. This stability suggests reliance on satisficing heuristics rather than analytical evaluation. The hierarchy, dominated by use-phase savings, charging/refueling time, and infrastructure-related range anxiety, persists even when misaligned with the actual technology.*

Research limitations. *The vignette-based design may simplify real-world decision complexity, and results are limited to zero-emission mobility in a single national context.*

Managerial implications. *Consumers appear to "delegate" technical trade-offs to firms and policymakers, focusing instead on pragmatic, experiential attributes. Competitive advantage will depend on infrastructure robustness, pricing models, and support services rather than technology-centric narratives.*

Originality of the paper. *The study extends TAM's cognitive foundations by revealing how bounded rationality shapes PU formation and demonstrates the value of cross-sample Rologit designs to uncover stable consumer heuristics.*

Keywords: *Technology acceptance model; Perceived usefulness; Green mobility; Sustainable technology; Heuristics and Bounded Rationality; Rank-Ordered Logit Model (Rologit)*

1. Introduction

The imperative to transition global production and consumption paradigms toward sustainable, low-carbon models has catalysed a fundamental reconfiguration of carbon-intensive industries. While firms have to assume the role of eco-innovators, developing radical alternatives that must reconcile emission reductions with evolving market expectations (McMeekin and Southerton, 2012; Rizzi et al., 2014), consumers now confront a landscape populated by pioneering and often immature innovations, marked by heightened technological complexity and "fluctuating market conditions" (Ziegler and Abdelkafi, 2023).

The automotive sector epitomizes these dynamics. As a primary contributor to global GHGs (IEA, 2016; Larson et al., 2014; Wang et al., 2017), transportation has become a central target for policymakers (Lane and Potter, 2007; Ajanovic, 2015; Liao et al., 2017). A prominent example is the European Union's mandate to phase out internal combustion engine (ICE) production by 2035, a regulatory shock that has fundamentally altered the industry's strategic trajectory. Manufacturers, accordingly, have spent the past years developing and commercializing alternative vehicle technologies aimed at reducing carbon emissions (De Santiago et al., 2011), exploring a portfolio of technological pathways that must jointly ensure environmental compliance, maintain competitiveness, and meet consumer preferences. However, the systemic success of this transition is ultimately contingent upon consumer adoption (Chorus et al., 2013; Junquera et al., 2016), who face significantly higher uncertainty and cognitive load when evaluating innovative sustainable mobility technologies than when making conventional purchases (Calabrese and Tang, 2023; Du et al., 2024; Garibbo et al., 2025).

This evaluative ***uncertainty*** stems from the fact that sustainable mobility solutions - whether Battery Electric Vehicles (BEVs), hydrogen fuel cells (FCEVs), or synthetic fuels - cannot be appraised as "stand-alone" products. Rather, they are ecosystem-dependent innovations. Their market diffusion is inextricably linked to exogenous factors, including an evolving regulatory framework, the maturity of refuelling and charging infrastructures, and national investment strategies that dictate dominant technological trajectories. This systemic uncertainty is compounded by the ***technology's inherent complexity***, which requires users to engage in sophisticated trade-off analyses involving product performance metrics, long-term cost-benefit ratios, access to public subsidies, and prospective usage constraints. Consequently, although understanding the cognitive processes that foster consumer engagement is vital to accelerating the diffusion of sustainable mobility models, unpacking how consumers navigate a volatile, uncertain, and highly complex evaluative context remains profoundly challenging.

Within the broader landscape of behavioral theories, the Technology Acceptance Model (TAM) (Davis, 1989) offers a particularly suitable framework for examining the adoption of emerging technologies, especially in contexts where multiple technology-specific features and exogenous factors jointly shape consumers' decision processes (FakhrHosseini et al., 2024). At the core of the Technology Acceptance Model (TAM) lies the **Perceived Usefulness** (PU), which represents a key predictor of behavioral intention (Venkatesh, 2000) and describes the degree to which a person believes that "*using a particular technology will enhance his or her performance"* (Davis, 1989). However, in a context characterised by substantial technological complexity and high environmental uncertainty, the capacity of consumers to effectively assess the extent to which such technology will "*enhance his or her performance*" becomes severely constrained. Given that consumers must assess alternatives that are deeply technical, unevenly mature, and embedded in fluid regulatory and infrastructural ecosystems, the construction of Perceived Usefulness cannot be assumed to follow a linear or fully rational process.

Although numerous studies have applied TAM to green technologies and, more specifically, to the automotive domain (Yuen, 2021; Jaiswal et al.,2021; Shanmugavel, 2022; Lakshmanan et al., 2024), existing research predominantly employs the model in a straightforward, structural fashion, estimating relationships among established constructs through structural equation models (SEM).

While these contributions offer valuable insights into the antecedents of adoption, they leave a critical gap regarding the underlying cognitive synthesis through which consumers construct PU. Specifically, current literature fails to explicate the internal evaluative logic by which disparate, often conflicting inputs are weighted and integrated to shape PU when consumers are confronted with emerging, uncertain, and unfamiliar sustainable technologies. This study seeks to "open the black box" of PU by shifting the focus from static predictors to the dynamic hierarchical construction of utility, leading to the following research question:

RQ1. *How do consumers construct perceived usefulness when evaluating emerging green technologies under conditions of complexity and uncertainty?*

To address this research question, we employ a **discrete-choice experimental** design, utilizing a **Rank-Ordered Logit (ROLOGIT)** model. While traditional survey-based instruments often capture static, stated preferences, choice experiments simulate the trade-off environments inherent in real-world decision-making (Hyman and Steiner, 1996). By requiring respondents to rank attribute-based scenarios, the ROLOGIT model does not merely elicit latent preferences; it maps the hierarchical structure of the consumer's utility function, providing an empirical proxy for the internal logic used to construct Perceived Usefulness.

The experimental architecture adopts a **cross-sample comparative approach** across four treatment groups: Battery Electric Vehicles (BEV) and Fuel Cell Electric Vehicles (FCEV), each presented in both **explicit** and **"blind" (unlabelled)** formats. This multi-cohort design is specifically engineered to test the stability of the evaluative logic. By comparing the emerging utility functions across these four samples, we can determine whether consumers adapt their cognitive construction to the specificities of each technology (contextual rationality) or whether, faced with high uncertainty, they retreat to **standardized decision heuristics** that prioritize a consistent set of attributes regardless of the technological features. In doing so, the methodology directly addresses the identified gap by shifting from a measurement of *what* is preferred to an analysis of *how* usefulness is cognitively synthesized.

Our findings "open the black box" of Perceived Usefulness (PU) by demonstrating that, under conditions of profound uncertainty and evaluative complexity, consumers rely on **stable cognitive heuristics** to navigate the decision-making process. The identification of consistent PU construction patterns across all four experimental cohorts suggests that when consumers are unable to ascertain an objective optimum, they adopt systematic simplifications to mitigate cognitive load.

This study extends the TAM literature by demonstrating that beyond the identification of incremental predictors, it is essential to explicate the generative processes through which core constructs are formed. By revealing how individuals resolve decision trade-offs through simplification strategies, the study identifies the specific product attributes and informational cues that consumers prioritize when navigating unfamiliar technological landscapes advancing our understanding of decision-making under technological and contextual volatility. Managerially, these insights offer actionable guidance for firms and policymakers, pinpointing the critical levers required to alleviate cognitive barriers and foster the widespread diffusion of sustainable mobility innovations.

2. Theoretical Background

2.1. Evolution and Architecture of the Technology Acceptance Model

Among the various behavioral theories, a distinction is commonly drawn between theories that explain technology acceptance and adoption at the individual user level and those that conceptualize these phenomena at societal or cultural levels (FakhrHosseini et al., 2024). TAM is positioned as a holistic paradigm that transcends this dichotomy by synthesizing multifaceted dimensions of the adoption process. By integrating the heterogeneous characteristics of users, technical systems, and broader environmental and task-specific contexts, TAM provides a comprehensive analytical lens (FakhrHosseini et al., 2024). This integrative capacity is essential for capturing the nuanced interplay between consumer perceptions and the structural complexities inherent in modern socio-technical transitions.

Originally proposed by Davis (1989), TAM is rooted in cognitive-behavioral traditions, specifically the Theory of Reasoned Action (Fishbein and Ajzen, 1975) and the Theory of Planned Behavior (Ajzen, 1991). It conceptualizes adoption as a sequential process where cognitive beliefs shape intentions, which subsequently determine usage behaviour. Initially developed to examine IT adoption in organisational settings, TAM's foundational architecture relies on two primary belief constructs: **Perceived Ease of Use (PEOU)** and **Perceived Usefulness (PU)**. While early formulations included "attitude" as a mediator between these beliefs and intentions, subsequent

research demonstrated that attitude offered limited explanatory power (Legris et al., 2003). Consequently, refined versions of the model positioned PEOU and PU as direct predictors of behavioural intention.
Over time, the model has been extensively applied, tested, refined, and, crucially, expanded, particularly shifting attention toward unpacking the antecedents of TAM's two central belief constructs. **TAM2** (Venkatesh and Davis, 2000) incorporates social influence processes (subjective norms, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, and result demonstrability) as determinants of PU, alongside PEOU, which also functions as an antecedent of PU. A further elaboration came with **TAM3** (Venkatesh and Bala, 2008), designed to deepen understanding of the drivers of PEOU. In this extended model, PEOU is shaped by anchor variables, including computer self-efficacy, perceptions of external control, computer anxiety, and computer playfulness, and adjustment variables, such as perceived enjoyment and objective usability. Experience and voluntariness operate as moderating conditions influencing behavioural intention.
Despite these extensive refinements, PU remains the central driver within the framework. As noted by Venkatesh and Davis (2000), because PU is the fundamental determinant of usage intentions, it is critical to understand its underlying components, especially since PEOU often exhibits less consistent effects across different contexts. However, a significant distinction must be made between identifying the predictors of PU and understanding the cognitive process through which PU is constructed. While the existing literature has successfully isolated a wide range of predictors, the mechanism by which consumers weigh and integrate these diverse and often conflicting information inputs remains a distinct area of inquiry. This study shifts the focus from the identification of external drivers to the internal evaluative logic used by individuals to synthesize these inputs into a final judgment of utility. Understanding this integrative process is essential for explaining how perceived usefulness is formed in complex and uncertain technological environments.

2.2. The Cognitive Construction of Perceived Usefulness

Building on the extensive refinements of TAM and its emphasis on belief formation, an important next step is to unpack how individuals actually form judgments of PU. Perceived usefulness is defined as "*the degree to which a person believes that using a particular system would enhance his or her job performance. This follows from the definition of the word useful: capable of being used advantageously*" (Davis, 1989, p. 320). This definition underscores a performance-oriented cognitive evaluation: individuals assess whether a system/technology is *advantageous* relative to their work goals, implicitly engaging in a forward-looking judgment of expected utility. While originally applied to workplace productivity, in the context of broader technological innovation, this translates to the consumer's belief that adopting a new technology will effectively meet their needs while offering relative advantages over incumbent alternatives.
Understanding how this evaluation is constructed requires acknowledging the cognitive constraints under which individuals operate. Davis (1989) and Venkatesh & Bala (2008) explicitly note that usefulness assessments involve a cognitive trade-off between the effort required to employ the strategy and the quality (accuracy) of the resulting decision. This insight resonates with foundational work on bounded rationality (Simon, 1955) and dual-process models of judgment (Tversky and Kahneman; 1976; Kahneman, and Frederick 2002), which show that decision makers seldom engage in fully exhaustive analytical processing. Instead, when task complexity increases or information becomes difficult to integrate, individuals gravitate toward satisficing strategies, seeking an intermediate point between a computationally costly optimal analysis and a sub-optimal heuristic assessment. PU judgments therefore emerge from a cognitively efficient compromise: people evaluate potential performance gains while minimizing unnecessary mental effort.
From this starting point Venkatesh and Davis (2000) clarify the deeper cognitive mechanism by which individuals build a sense of usefulness. People form PU judgments partly by comparing what a system *can* do with what they *need* to accomplish. This comparison is grounded in a broader cognitive architecture that links actions to goals. Across work motivation theory, action theory, and

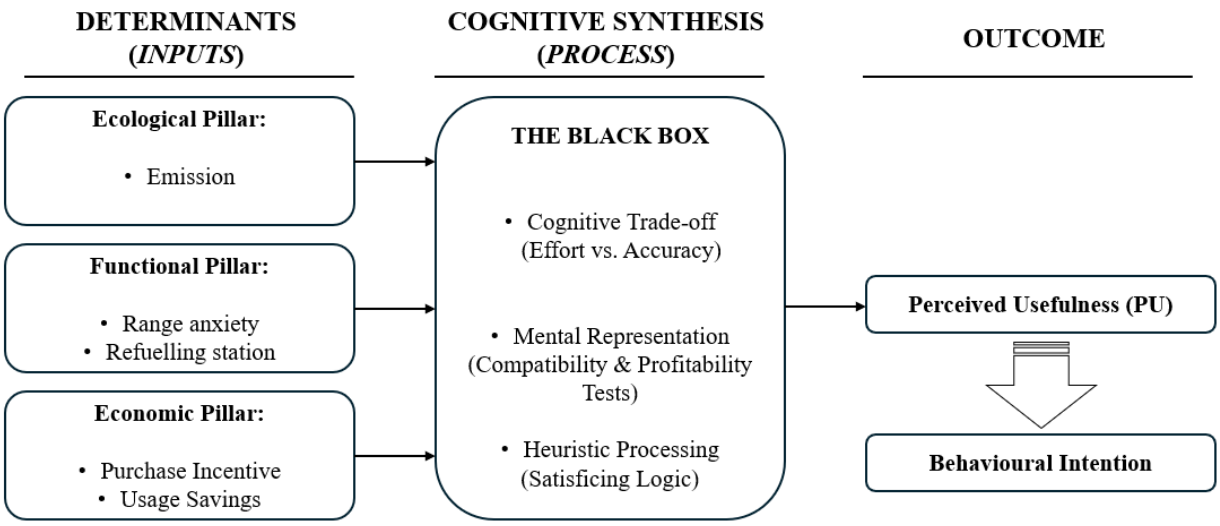
behavioral decision theory, research converges on the idea that behavior is guided by mental representations connecting higher-level goals to the instrumental actions believed to achieve them. For example, **work motivation theory** (Vroom 1964) highlights task-specific plans (Locke & Latham, 1990), which cognitively map sequences of acts to desired goals. Similarly, **action identification theory** (Vallacher & Wegner, 1987) posits identity structures that connect lower-level action descriptions to higher-level purposes, enabling individuals to regulate behavior toward meaningful ends. **Image theory** (Beach & Mitchell, 1996, 1998) provides an even clearer account of this process: individuals first screen alternative actions for "*compatibility*" with their standards and goals, and then, if multiple viable options remain, evaluate them in terms of their expected "*profitability*," that is, the extent to which they maximize desired outcomes. Both stages rest on assessing the match between one's goals and the perceived consequences of available action paths.
These converging theoretical streams support the core of TAM: individuals form PU judgments by evaluating how well using a system aligns with and advances important work goals. In other words, PU emerges from a cognitive assessment of the *use–performance contingency*: whether the action of using a technology is instrumentally suited to achieving valued outcomes. This perspective not only clarifies the internal process of usefulness evaluations but also provides the conceptual mechanism for modelling their formation as a systematic process of decision-oriented cognition, setting the stage for the analytical choices developed in the next section.

2.3. Zero emission vehicles and perceived usefulness formation

Building on the general cognitive mechanisms underlying the formation of PU in TAM, the next step is about contextualizing this process in the domain of zero-emission mobility by identifying which evaluations consumers actually mobilize when constructing the utility of adopting a zero-emission vehicle (ZEV). While the original TAM predictors, such as job relevance, output quality, or result demonstrability, were formulated within organizational and task-oriented contexts, consumer decisions involving technologically complex durable goods, such as electric and hydrogen-powered vehicles, hinge on a different set of considerations. Here, usefulness pertains not to work performance but to mobility performance, energy system integration, and the broader environmental implications of transport choices.
A substantial body of literature has examined the determinants and barriers shaping consumer adoption of electric and zero-emission vehicles across different geographical contexts. Although country-specific variations exist, studies consistently point to a common constellation of factors. For instance, Prakash et al. (2018) identified regulatory incentives and consumer traits as critical determinants of EV adoption in India, while Noel and Sovacool (2016) highlighted the interplay among social, technical, political, and environmental constraints in Denmark and Israel. Similarly, large cross-country reviews (Biresselioglu et al., 2018; Sierzchula et al., 2014; Berkeley et al., 2017) converge on a set of recurring barriers such as infrastructural limitations, economic costs, technological concerns, and attitudinal predispositions. Other studies further refine these dimensions by emphasizing financial factors, charging infrastructure, and vehicle performance issues (She et al., 2017), while stressing the importance of adopting an ecosystem perspective given the interdependencies among these barriers (Tarei et al., 2021).
Taken together, these studies reveal marked redundancy among the factors shaping consumer evaluations of ZEVs, suggesting an emerging consensus on the main determinants of PU in this domain. Recent TAM-based studies on electric mobility identify three overarching dimensions that structure consumers' assessments of usefulness: ecological performance, functional performance, and economic performance. These dimensions capture how consumers weigh environmental implications, operational capabilities, and cost-related considerations when evaluating ZEVs.
Ecological performance is salient because electric and hydrogen vehicles are positioned as eco-innovative solutions to mitigate transport-related emissions (Wu et al., 2020). Empirical work shows that environmental performance can rival or even outweigh price considerations in shaping purchase intentions (Degirmenci & Breitner, 2017), and that environmental knowledge influences perceptions

of the usefulness of green technologies (Masukujjaman et al., 2021). Consistent with this evidence, we incorporate the variable **Emissions**, which reflects the perceived environmental impact of ZEVs, a factor linked to the energy source used for charging or refuelling the vehicles.
The second major dimension, *functional performanc*e, captures the operational attributes consumers expect from a mobility product. The literature consistently identifies recharging/refuelling time (Carley et al., 2013; Chen et al., 2021; Degirmenci & Breitner, 2017), driving range and (Eccarius et al., 2023; Chen et al., 2021), and the availability of charging infrastructure (Wiedmann et al., 2011) as critical determinants of adoption. These concerns reflect users' attempts to minimize the risk and inconvenience associated with mobility disruptions. Drawing on this stream of research, we include two variables: **Range Anxiety**, capturing the discomfort associated with limited range and sparse charging options; and **Recharging Time**, representing the time required to replenish the battery or hydrogen tank, which is often perceived as inferior relative to traditional refuelling processes.
Finally, the *economic performance* represents a third foundational aspect, reflecting the monetary trade-offs consumers consider when comparing ZEVs to internal combustion engine vehicles (Harvey, 2020). Economic value is shaped by both upfront costs, often still higher than conventional vehicles, and operational savings derived from lower energy costs. National subsidies, tax exemptions, and infrastructure investments have played a decisive role in accelerating adoption in countries such as China, Norway, the Netherlands, and the United States (Bunsen et al., 2018). Accordingly, our model includes **Incentives**, capturing the role of public financial support in reducing the cost gap, and **Savings**, reflecting expected economic benefits during vehicle use due to lower charging or refuelling costs compared to fossil fuels.
Together, these five variables (Emissions, Range Anxiety, Recharging Time, Incentives, and Savings) represent the core determinants through which consumers in the ZEV domain construct the perceived usefulness providing a robust theoretical foundation for modelling how consumer build PU in the context of zero-emission mobility.
As illustrated in **Figure 1**, the construction of Perceived Usefulness in the ZEV context is conceptualised as a dynamic integration process rather than a linear summation of attributes. The model suggests that consumers do not evaluate the five identified determinants in isolation. Instead, these inputs enter a 'cognitive black box' where individuals perform a mental trade-off between the effort required to process technical complexities and the desired accuracy of their utility judgment. This evaluative logic, shaped by prevailing uncertainty in the transition environment, determines how these ecological, functional, and economic dimensions are weighted to form a final assessment of usefulness, which ultimately drives the intention to adopt.

Figure 1: Conceptual Framework of PU Construction in ZEV Adoption



3. Research methodology

3.1 Vignette-based method

Given this study's objective of uncovering how consumers construct PU of zero-emission vehicles, we adopted a vignette-based experimental methodology, specifically the constant-variable-value vignette (CVVV) approach (Cavanagh & Fritzsche, 1985). This method represents an advanced and widely applied refinement of the general vignette framework introduced by Alexander and Becker (1978).

In this experimental design, all respondents are presented with identical sets of vignettes, short descriptive scenarios of mobility, and are required to rank them according to their preference. Each vignette is defined by a unique configuration of the five attributes identified in the theoretical background (emissions, range anxiety, charging times, incentives, and savings). By ranking these scenarios, respondents generate consistent intra-respondent data that reveal their relative desirability, and, by extension, the latent salience assigned to each underlying attribute (Wason et al., 2002).

Vignette methodologies are particularly well suited to studying complex evaluative processes because they approximate real-world decision-making conditions and preserve contextual richness. As Hyman and Steiner (1996, p. 1) observe, vignettes "*offer a range of situational or contextual factors that approximate real-life decision-making situations*", enabling respondents to engage with multifaceted trade-offs more naturally than in abstract survey items.

This methodological choice is especially appropriate for our research aims for several reasons. First, the mitigation of **evaluative bias**. As a choice-based model, this methodology does not ask respondents to rate individual attributes in isolation. Instead, preferences are revealed through the ranking of scenarios. This is critical in the context of sustainable products, where traditional survey methods often suffer from social desirability and self-image biases. By focusing on relative ranking rather than absolute ratings, we effectively bypass these distortions to uncover more authentic latent preferences.

Second, the activation of **cognitive trade-offs**. The vignettes are carefully constructed so that no single scenario is objectively superior to the others across all attributes. This design forces respondents to engage in the cognitive trade-off described previously, balancing the effort required to evaluate complex information against the accuracy of their decision. This compels the consumer to navigate the space between an analytically exhaustive optimal analysis and a heuristic-driven sub-optimal assessment, thereby revealing their true decision-making "shortcuts."

Third, the alignment with **PU construction mechanisms**. Unlike binary choice models that merely identify a single "winner," the ranking process closely mirrors the dual-stage construction of Perceived Usefulness. As respondents order scenarios from most to least preferred, they implicitly replicate the compatibility test (screening out scenarios that violate their standards) and the profitability test (ordering viable options based on their perceived benefits). This procedural isomorphism ensures that the methodology is a direct empirical reflection of the theoretical process it seeks to measure.

Finally, we analysed the ranking data using a **Rank-Ordered Logit (ROLOGIT)** model, which estimates a utility function defined over the attributes embedded in the vignettes. Because these attributes were selected to represent the core determinants of perceived usefulness (i.e. the 5 variables), the resulting utility function serves as a **proxy for PU**. The ROLOGIT estimation enables us to derive the **hierarchy of attribute importance** and to uncover the underlying cognitive structure through which individuals organize information and resolve decision trade-offs. This hierarchy reflects the pattern by which respondents exclude undesirable options (compatibility) and prioritize promising ones (profitability), thereby illuminating the mental representation of usefulness that guides their evaluations of zero-emission mobility options.

In summary, by simulating the informational density and multi-dimensional trade-offs inherent in the transition to sustainable mobility, this methodology provides a controlled yet realistic lens through which to observe how consumers navigate **complexity and uncertainty**. It enables the identification

of the stable cognitive patterns and hierarchical simplifications that individuals employ to maintain evaluative agency in a volatile, technologically opaque landscape.

3.2 Survey design and sample

To investigate the formation process of PU, we chose not to restrict the analysis to a single technological product. Instead, we examined two distinct low-emission vehicle technologies: battery electric vehicles (BEVs) and hydrogen fuel-cell electric vehicles (FCEVs). Furthermore, to assess whether respondents' evaluations were influenced by prior predispositions, for example, those shaped by national policies, media narratives, or public discourse, we implemented a blind experimental condition for each technology. In these blind conditions, respondents evaluated the same set of scenarios as their non-blind counterparts, but without being informed of the specific technology under assessment. As a result, **the empirical analysis is based on four samples**: BEV, BEV-Blind, FCEV, and FCEV-Blind.

Two core elements of the research design deserve emphasis. The BEV and BEV Blind groups were subjected to an identical set of vignettes. The only experimental manipulation was the presence or absence of a technological identifier at the start of the survey (a stimulus stating that the survey was about BEVs vehicles). This ensures that any variance in the resulting utility functions between these two groups can be attributed solely to the influence of the "BEV" label and its associated pre-conditioned beliefs. The same logic was applied to the FCEV and FCEV Blind groups. Second, when comparing vignettes across the broader BEV and FCEV conditions, the content of the scenarios were qualitatively differentiated to reflect the intrinsic technological differences between BEVs and FCEVs. For instance, current BEV models typically require charging times that may reach up to eight hours, whereas commercially available FCEVs can refuel significantly faster. To ensure realistic and meaningful scenario evaluations, these differences were incorporated into the vignette designs. Nonetheless, the structural logic of the vignettes, i.e. the ways in which scenarios differ from one another, was held constant across all four samples. This means that if the variation between Scenario 1 and Scenario 2 involved, for example, an improvement in charging/refueling time and a deterioration in emissions performance, the magnitude and direction of these attribute changes were kept identical in all four experimental groups[1].

This architecture offers a distinct methodological advantage: it allows us to examine whether the cognitive mechanisms underlying PU are technology-specific or technology-general, and whether individuals rely on similar or different evaluative criteria when assessing emerging sustainable technologies. By observing patterns of reasoning across two technologies that differ in maturity, visibility, and public familiarity, we gain analytical leverage to disentangle whether PU arises from stable cognitive structures or from technology-related priors, expectations, and mental models.

Therefore, a pivotal stage of the experimental design is the rigorous construction of the scenarios. Following the established methodological framework proposed by Contini et al. (2020), the vignette development process was operationalized through four distinct phases: (i) attribute identification, (ii) specification of variation levels, (iii) the synthesis of attributes into coherent scenarios, and (iv) the elicitation of respondent preferences.

The identification of attributes (**Step 1**) aligns with the five variables discussed in the theoretical background: *emissions, range anxiety, charging times, purchase incentives, and operational savings*. For the definition of variation levels (**Step 2**), each attribute was operationalized across three distinct tiers (Levels 1, 2, and 3), representing a trajectory from current technological constraints to an idealized future state: Level 1 (Baseline Performance), which reflects the current technological and infrastructural landscape as of 2024. For instance, charging durations and driving ranges were calibrated to match the performance of existing mid-range electric vehicles. Level 2 (Projected Advancements) incorporates anticipated short-to-medium-term improvements. These values are derived from official industry roadmaps and policy frameworks, such as the European Hydrogen

[1] This is evident in table 3, where the column levels are exactly the same in the 2 group sets of scenarios, while the contents (i.e. the descriptions) change according to the respective technology.

Strategy, which outlines specific targets for refuelling infrastructure density. Level 3 (Technological Frontier) represents an optimal or "ideal" state for each technology. This level includes frontier solutions such as battery-swapping systems capable of replenishing energy in under 10 minutes that reflect the ultimate objectives of manufacturers and policymakers.

While the values at Level 3 may represent an aspirational rather than a current reality, their inclusion is theoretically motivated. The primary objective of this design is not to mirror the present market accurately, but to observe how systematic improvements across the variable levels impact the consumer's ranking of alternatives. By forcing respondents to evaluate these increments, the model can isolate the relative salience of each attribute, revealing which factors are most influential in the internal construction of Perceived Usefulness. The specific values for both BEV and FCEV samples are detailed in **Tables 1 and 2**, respectively.

Step 3, concerning the combination of attributes into coherent scenarios, represented both a delicate and essential phase of the research design. The guiding principle was to construct scenarios that simultaneously exhibited strengths and weaknesses, ensuring that none of them dominated the others across all variables. Each scenario was developed by assuming a different strategic emphasis among manufacturers and policymakers, thereby simulating how alternative national interventions and automaker investment priorities might plausibly shape future mobility landscapes. To avoid overwhelming respondents with excessive cognitive load during the ranking task, we limited the final design to seven scenarios. Six of these reflected distinct strategic trajectories, whereas the seventh acted as a deliberately inferior "dummy" configuration, set at the lowest possible level across all variables. This benchmark scenario functioned as a reliability check to confirm respondent attentiveness. The resulting design prevented the emergence of a clear optimal choice and required respondents to evaluate genuine trade-offs among competing mobility scenarios, thereby mirroring the complex decision environments characteristic of emerging sustainable technologies. **Table 3** presents the full set of scenarios.

Step 4 involved asking respondents to rank the seven scenarios from most to least desirable. These ordered evaluations generated quantitative evidence on the relative salience of each attribute and enabled us to infer the underlying hierarchical logic governing how individuals resolve complex trade-offs. This approach reveals the pattern of informational prioritisation that consumers employ when forming their judgments of Perceived Usefulness during the transition toward sustainable mobility solutions.

Table 1: BEV (labelled and blind) attributes, modalities of variation and associated weights

Attribute	Modalities of variation	Level
Range anxiety	450 km range; charging stations primarily located in urban centres.	1
	650 km range; charging stations available in urban centres and expanding along motorways.	2
	850 km range; infrastructure density equivalent to conventional fuel stations.	3
Charging times	~7 hours (Standard overnight/workplace charging).	1
	~5 hours (Accelerated charging).	2
	8-minute battery swapping or ultra-fast tank replacement.	3
Savings	2% reduction in running costs compared to petrol/diesel vehicles.	1
	30% reduction in running costs compared to petrol/diesel vehicles.	2
	60% reduction in running costs compared to petrol/diesel vehicles.	3
Emissions	40% of the energy consumed is derived from renewable sources.	1
	60% of the energy consumed is derived from renewable sources.	2
	80% of the energy consumed is derived from renewable sources.	3
Incentives	Government eco-incentives up to €7,000.	1
	Government eco-incentives up to €11,000.	2
	Government eco-incentives up to €15,000.	3

Table 2: FCEV (labelled and blind) attributes, modalities of variation and associated weights

Attribute	Modalities of variation	Level
Range anxiety	600 km range; refuelling stations limited to a few urban hubs.	1
	800 km range; refuelling stations available in urban hubs and developing along motorways.	2
	1,000 km range; infrastructure density equivalent to conventional fuel stations.	3
Charging times	~5 minutes; exclusively available at dedicated refuelling stations.	1
	~5 minutes; includes domestic refuelling/recharging services in urban areas.	2
	~5 minutes; includes domestic refuelling/recharging in both urban and rural areas.	3
Savings	+20% cost premium compared to petrol/diesel counterparts.	1
	20% reduction in running costs compared to petrol/diesel counterparts.	2
	60% reduction in running costs compared to petrol/diesel counterparts.	3
Emissions	50% of the fuel utilised is classified as zero-emission (Green Hydrogen).	1
	75% of the fuel utilised is classified as zero-emission (Green Hydrogen).	2
	100% of the fuel utilised is classified as zero-emission (Green Hydrogen).	3
Incentives	Government eco-incentives up to €7,000.	1
	Government eco-incentives up to €11,000.	2
	Government eco-incentives up to €15,000.	3

Table 3: Scenarios, Levers and Attributes

Bev and Bev Blind	Scenario 1: Joint Strategic Focus: Automakers' Range Extension and Policy-Led Operational Savings		Scenario 2: Inter-Sectoral Coordination: Automakers' Charging Efficiency and Policy-Led Grid		Scenario 3: Automakers' Disruptive Innovation: Implementation of Ultra-Fast Recharging Models		Scenario 4: Policy Makers' Aggressive Fiscal Strategy: Purchase and Usage Cost Reduction		Scenario 5: Policy Makers' Sustainability Leadership: Green Energy Transition and Operational		Scenario 6: Automakers' Technological Prioritisation: Maximising Long-Range Autonomy		Scenario 7: Baseline Configuration: Absence of Targeted Strategic Interventions (Dummy)	
	Level	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***
Range anxiety	**2**	650 km range; charging stations available in urban centres and expanding along motorways.	**2**	650 km range; charging stations available in urban centres and expanding along motorways.	**1**	450 km range; charging stations primarily located in urban centres.	**1**	450 km range; charging stations primarily located in urban centres.	**1**	450 km range; charging stations primarily located in urban centres.	**3**	850 km range; infrastructure density equivalent to conventional fuel stations.	**1**	450 km range; charging stations primarily located in urban centres.
Charging times	**1**	~7 hours (Standard overnight/workplace charging).	**2**	~5 hours (Accelerated charging).	**3**	8-minute battery swapping or ultra-fast tank replacement.	**1**	~7 hours (Standard overnight/workplace charging).	**1**	~7 hours (Standard overnight/workplace charging).	**1**	~7 hours (Standard overnight/workplace charging).	**1**	~7 hours (Standard overnight/workplace charging).
Savings	**2**	30% reduction in running costs compared to petrol/diesel vehicles.	**1**	2% reduction in running costs compared to petrol/diesel vehicles.	**1**	2% reduction in running costs compared to petrol/diesel vehicles.	**3**	60% reduction in running costs compared to petrol/diesel vehicles.	**3**	60% reduction in running costs compared to petrol/diesel vehicles.	**1**	2% reduction in running costs compared to petrol/diesel vehicles.	**1**	2% reduction in running costs compared to petrol/diesel vehicles.
Incentives	**1**	Government eco-incentives up to €7,000.	**1**	Government eco-incentives up to €7,000.	**2**	Government eco-incentives up to €11,000.	**3**	Government eco-incentives up to €15,000.	**2**	Government eco-incentives up to €11,000.	**1**	Government eco-incentives up to €7,000.	**1**	Government eco-incentives up to €7,000.
Emissions	**1**	40% of the energy consumed is derived from renewable sources.	**2**	60% of the energy consumed is derived from renewable sources.	**1**	40% of the energy consumed is derived from renewable sources.	**1**	40% of the energy consumed is derived from renewable sources.	**3**	80% of the energy consumed is derived from renewable sources.	**1**	40% of the energy consumed is derived from renewable sources.	**1**	40% of the energy consumed is derived from renewable sources.

Fcev and FCEV Blind	Scenario 1: Joint Strategic Focus: Automakers' Range Extension and Policy-Led Operational Savings		Scenario 2: Inter-Sectoral Coordination: Automakers' Charging Efficiency and Policy-Led Grid		Scenario 3: Automakers' Disruptive Innovation: Implementation of Ultra-Fast Recharging Models		Scenario 4: Policy Makers' Aggressive Fiscal Strategy: Purchase and Usage Cost Reduction		Scenario 5: Policy Makers' Sustainability Leadership: Green Energy Transition and Operational		Scenario 6: Automakers' Technological Prioritisation: Maximising Long-Range Autonomy		Scenario 7: Baseline Configuration: Absence of Targeted Strategic Interventions (Dummy)	
	Level	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***	***Level***	***Description***
Range anxiety	**2**	800 km range; refuelling stations available in urban hubs and developing along motorways.	**2**	800 km range; refuelling stations available in urban hubs and developing along motorways.	**1**	600 km range; refuelling stations limited to a few urban hubs.	**1**	600 km range; refuelling stations limited to a few urban hubs.	**1**	600 km range; refuelling stations limited to a few urban hubs.	**3**	1,000 km range; infrastructure density equivalent to conventional fuel stations.	**1**	600 km range; refuelling stations limited to a few urban hubs.
Charging times	**1**	~5 minutes; exclusively available at dedicated refuelling stations.	**2**	~5 minutes; includes domestic refuelling/recharging services in urban areas.	**3**	~5 minutes; includes domestic refuelling/recharging in both urban and rural areas.	**1**	~5 minutes; exclusively available at dedicated refuelling stations.	**1**	~5 minutes; exclusively available at dedicated refuelling stations.	**1**	~5 minutes; exclusively available at dedicated refuelling stations.	**1**	~5 minutes; exclusively available at dedicated refuelling stations.
Savings	**2**	20% reduction in running costs compared to petrol/diesel counterparts.	**1**	+20% cost premium compared to petrol/diesel counterparts.	**1**	+20% cost premium compared to petrol/diesel counterparts.	**3**	60% reduction in running costs compared to petrol/diesel counterparts.	**3**	60% reduction in running costs compared to petrol/diesel counterparts.	**1**	+20% cost premium compared to petrol/diesel counterparts.	**1**	+20% cost premium compared to petrol/diesel counterparts.
Incentives	**1**	Government eco-incentives up to €7,000.	**1**	Government eco-incentives up to €7,000.	**2**	Government eco-incentives up to €11,000.	**3**	Government eco-incentives up to €15,000.	**2**	Government eco-incentives up to €11,000.	**1**	Government eco-incentives up to €7,000.	**1**	Government eco-incentives up to €7,000.
Emissions	**1**	50% of the fuel utilised is classified as zero-emission (Green Hydrogen).	**2**	75% of the fuel utilised is classified as zero-emission (Green Hydrogen).	**1**	50% of the fuel utilised is classified as zero-emission (Green Hydrogen).	**1**	50% of the fuel utilised is classified as zero-emission (Green Hydrogen).	**3**	100% of the fuel utilised is classified as zero-emission (Green Hydrogen).	**1**	50% of the fuel utilised is classified as zero-emission (Green Hydrogen).	**1**	50% of the fuel utilised is classified as zero-emission (Green Hydrogen).

3.3. Data collection

We conducted our study using an online survey developed in Qualtrics and administered in May 2024 via a professional survey provider. To ensure the relevance of responses, we targeted only potential vehicle buyers within the Italian market, restricting participation to individuals who held a valid driving license and either owned a car or intended to purchase one within the following year.

The survey followed a streamlined structure. At the outset, respondents were exposed to a stimulus informing them of the type of vehicle they would be evaluating: BEVs, FCEVs, or a generic reference to "zero-emission vehicles" in the case of blind conditions. This was followed by a set of demographic questions designed to ensure balanced distributions across age, gender, and educational background. In the final section, respondents were presented with the vignette scenarios. Before beginning the ranking task, they were clearly instructed to read each scenario carefully and to order the seven configurations from the most to the least desirable. To ensure data reliability, several attention and quality checks were incorporated. First, because the distinction among BEV, FCEV, and blind labelling was central to the study design, we included a closing verification question assessing whether respondents correctly recalled the type of vehicle they had evaluated; only those who answered correctly were retained. As an additional safeguard, we applied an opt-out criterion to respondents who did not place the dummy scenario last. Failure to do so was interpreted as evidence of inattentive or random ranking. Finally, we excluded respondents who completed the entire questionnaire in less than five minutes, considered the minimum reasonable threshold given the number of items and the need for reflective scenario evaluation.

After applying these exclusion criteria, the final dataset consisted of 399 valid respondents: 102 in the BEV group, 112 in the BEV Blind group, 95 in the FCEV group, and 90 in the FCEV Blind group. The average of c.a. 100 respondents per sample is fully adequate for the purposes of our analysis. The rank-ordered logit (ROLOGIT) model operates on individual rankings rather than aggregate responses, meaning that each ranked scenario represents an observation. Given seven scenarios per respondent, the dataset includes 2793 observations (399 valid respondent × 7 ranked scenario), which provides a sufficient basis for robust estimation and inference. **Table 4** reports the demographic composition of the sample. Gender distribution was balanced across all groups, with each comprising approximately 50% male and 50% female participants. The majority of respondents were over 35 years of age and in higher education, consistent with the demographic profile of car owners in Italy (ISTAT, 2023). Random sampling procedures ensured comparability across groups with respect to age, gender, and education, thereby supporting robust cross-sample analyses.

Table 4: respondent profiles

Respondent profile		**BEV**		**Bev blind**	
Variable	Sub -variable	Abs	%	Abs	%
Gender	Female	49	48%	60	54%
	Male	53	52%	52	46%
Age (in years)	18-35	13	13%	12	11%
	35-54	42	41%	40	36%
	over 54	47	46%	60	54%
Education level	Middle school	9	9%	4	4%
	Professional college	49	48%	59	53%
	Postgraduate degree	44	43%	49	44%
Total Respondent		**102**	**100%**	**112**	**100%**

Respondent profile		**Fcev**		**Fcev Blind**	
Variable	Sub -variable	Abs	%	Abs	%
Gender	Female	51	54%	48	53%
	Male	44	46%	42	47%
Age (in years)	18-35	9	9%	5	6%
	35-54	44	46%	37	41%
	over 54	42	44%	48	53%
Education level	Middle school	4	4%	6	7%
	Professional college	49	52%	49	54%
	Postgraduate degree	42	44%	35	39%
Total Respondent		**95**	**100%**	**90**	**100%**

3.4 Data analysis

To analyze the data elicited from the ranking tasks, we employed a Rank-Ordered Logit (ROLOGIT) model, executed via Stata 15. This approach is specifically designed to handle data in which respondents provide a complete preference ordering of alternatives, as it estimates the relative contribution of each attribute to the perceived desirability of a given scenario (StataCorp, 2005).

The model is grounded in the Random Utility framework, which posits that an individual's preference for an alternative is a function of its perceived utility (Guimarães et al., 2016). In this study, the ROLOGIT estimation utilizes the respondents' full rankings as the dependent variable. This allows us to express consumer preferences not just as a single choice, but as a systematic evaluation of various technological and economic configurations. Crucially, by leveraging the complete ranking information rather than focusing solely on the most preferred option, the model captures the exhaustive pattern of trade-offs that consumers perform among competing attributes (Contini et al., 2020). Each ranked vignette constitutes an observation that contributes to reconstructing the underlying utility structure.

Formally, it is assumed that each respondent r assigns a latent utility U_{jr} to scenario j (where $j = 1, \dots, 7$) in order for the model to calculate the overall utility $\boldsymbol{U_j}$ as:

$$\boldsymbol{U_j = \beta_0 + \beta_1 X_{1j} + \beta_2 X_{2j} + \cdots + \beta_k X_{kj} + \varepsilon_j}$$

where:

- $\boldsymbol{X_{1j}, \dots, X_{kj}}$ are the **explanatory variables**, namely the specific levels of the five attributes (emissions, range anxiety, charging times, incentives, and savings) defining scenario j,
- $\boldsymbol{\beta_0, \dots, \beta_k}$ are the **estimated coefficients**, which indicate the relative influence and "weight" of each attribute on the overall perceived utility,
- and $\boldsymbol{\varepsilon_j}$ is an idiosyncratic error term.

The ROLOGIT estimation provides more than a simple preference list; it reveals the latent hierarchy of attributes through which consumers organize information to construct Perceived Usefulness. Rather than focusing on individual coefficients in isolation, our analysis reveals the relative rankings and statistical weights of these parameters to map respondents' underlying cognitive architecture. This approach treats the resulting utility function as a direct empirical window into the consumer's evaluative logic. Crucially, the multi-sample design allows for a comparative analysis of these hierarchies across the four experimental groups. By comparing the utility functions of BEV and FCEV groups and their respective "blind" controls, we can identify whether the construction of PU is driven by a stable, technology-agnostic cognitive model or is significantly reshaped by technology-specific features, providing a rigorous assessment of how consumers navigate complexity and uncertainty in the ZEV transition.

4. Results

4.1. Rologit results

The results of the Rank-Ordered Logit (ROLOGIT) estimation, detailed in **Table 5**, provide the statistical significance and beta coefficients for each of the five attributes across the four samples.
A primary finding is that four out of the five variables, Range anxiety, Charging Time, Purchase Incentives, and Savings, are **statistically significant** at the $p < 0.05$ level in all samples. This consistent significance underscores the robustness of the model, confirming that these attributes effectively explain the variance in the utility function, which is defined in this study as a proxy for Perceived Usefulness (PU).

Table 5: Rologit Results

Variable	BETA	Std.Err.	z	P>|z|	95% Conf. Interval (low)	95% Conf. Interval (high)
BEV						
Range anxiety	0,779	0,092	8,500	0,000	0,599	0,959
Charging times	2,012	0,241	8,350	0,000	1,539	2,484
Emissions	0,066	0,083	0,800	0,425	-0,096	0,228
Incentives	-0,892	0,162	-5,510	0,000	-1,209	-0,575
Savings	2,440	0,290	8,410	0,000	1,871	3,009
FCEV						
Range anxiety	0,836	0,112	7,440	0,000	0,616	1,056
Charging times	2,179	0,292	7,470	0,000	1,607	2,751
Emissions	-0,151	0,088	-1,710	0,087	-0,324	0,022
Incentives	-1,101	0,179	-6,140	0,000	-1,452	-0,750
Savings	3,273	0,352	9,310	0,000	2,584	3,962
FCEV Blind						
Range anxiety	0,934	0,135	6,940	0,000	0,671	1,198
Charging times	2,329	0,346	6,730	0,000	1,651	3,008
Emissions	0,009	0,089	0,100	0,924	-0,166	0,183
Incentives	-1,095	0,197	-5,570	0,000	-1,481	-0,709
Savings	3,089	0,410	7,530	0,000	2,286	3,893
Bev Blind						
Range anxiety	0,779	0,096	8,110	0,000	0,591	0,967
Charging times	2,178	0,252	8,660	0,000	1,685	2,671
Emissions	0,104	0,079	1,310	0,189	-0,051	0,259
Incentives	-1,037	0,161	-6,430	0,000	-1,353	-0,721
Savings	2,793	0,301	9,270	0,000	2,202	3,384

Regarding the **directionality of the coefficients**, which indicate the marginal utility and relative weight of each variable, the data reveals a *uniform pattern across the groups*. Range anxiety, Charging Time, and Savings exhibit positive beta coefficients. In contrast, Incentives yields a negative coefficient across all samples. Although environmental performance did not reach statistical significance, it showed a positive trend in three of the four groups. Crucially, the stability of these signs across the experimental groups suggests that the impact of these variables on marginal utility is independent of the specific technology (BEV vs. FCEV) and remains consistent across both explicit and "blind" conditions.
The **negative sign** associated with *Incentives* warrants further clarification, helpful to better clarify the interpretation of the rologit results. A negative beta should not be interpreted as in traditional regression models (e.g., SEM), because the Rologit model operates on a ranked set of closed scenarios rather than on independently rated items. As such, *coefficients capture the trade-offs* that respondents make when ranking scenarios. In general, a positive coefficient implies that higher levels of attribute *xj* increase the likelihood that a scenario is placed higher in the ranking, while a negative coefficient indicates that increases in *xj* tend to push the scenario lower. However, because each scenario

comprises a bundle of attributes, a negative sign may reflect compensatory effects. From this perspective, the negative coefficient for *Incentives* becomes interpretable. Respondents appear willing to sacrifice higher incentive levels to avoid decreases in attributes with stronger positive utility contributions, such as *Savings*, *Charging Time*, or *Range Anxiety*. Conversely, scenarios that offered substantial gains in these positively valued attributes were prioritized, even when accompanied by lower incentive levels.

This logic underscores the key value of the Rologit framework, which forces respondents to navigate competing priorities in a manner analogous to real-world decision-making. It does not estimate the absolute importance of each attribute in isolation, but rather its importance **relative to the others**, within a constrained choice environment

4.2 Cross-sample analysis

Table 6 consolidates the beta coefficients and associated p-values across all groups, allowing for a direct comparison of the underlying preference structures. A central finding of this research is that the **hierarchy of attributes** remains remarkably constant across all four groups. This structural consistency indicates a universal evaluative logic among consumers when assessing zero-emission mobility solutions. Specifically, the results identify Savings as the most critical attribute with the highest beta coefficient, followed in descending order of importance by Charging/Refuelling Time, Range Anxiety, and Incentives (the latter maintaining its negative coefficient). Environmental Performance consistently failed to reach statistical significance across all groups. This suggests that consumer preferences are not only resilient to "technological bias" as the "Blind" and "Explicit" groups exhibit nearly identical utility structures, but are also independent of the specific technological platform. Both BEV and FCEV respondents appear to employ the same decision-making approach. The interpretation of this outcome suggests that regardless of the ZEV technology, consumers prioritize a pragmatic value proposition: they seek significant operational cost reductions, rapid energy replenishment, and the elimination of range anxiety through high autonomy and a mature refueling ecosystem. Notably, the "greenness" of the energy source (percentage of renewable energy used) does not yield a statistically significant improvement in utility. Furthermore, the findings confirm that purchase incentives are viewed as a "tradable" asset; they are willingly sacrificed by respondents to prioritize improvements in more impactful functional or economic dimensions.

Table 6: Cross-sample analysis

	BEV		**Bev Blind**		**FCEV**		**FCEV Blind**	
Variables	**BETA**	**P>|z|**	**BETA**	**P>|z|**	**BETA**	**P>|z|**	**BETA**	**P>|z|**
Range anxiety	0,779	0,000	0,779	0,000	0,836	0,000	0,934	0,000
Charging times	2,012	0,000	2,178	0,000	2,179	0,000	2,329	0,000
Emissions	0,066	0,425	0,104	0,189	-0,151	0,087	0,009	0,924
Incentives	-0,892	0,000	-1,037	0,000	-1,101	0,000	-1,095	0,000
Savings	2,440	0,000	2,793	0,000	3,273	0,000	3,089	0,000
Observation	**714**		**784**		**665**		**630**	

To further validate the robustness of these findings, we analysed the probability that each scenario would be ranked first, following ROLOGIT guidelines (Stata, 2005). These results, presented in **Table 7**, show the scenarios ordered by their probability of being most preferred within each sample. As expected, Scenario 7 (the dummy control) consistently ranks last, reflecting the effectiveness of our respondent screening and the sample's logical consistency. In contrast, the top three positions, those with the highest probability of being ranked first, are consistently occupied by Scenarios 5, 1, and 4. While this probability analysis does not offer the same depth as the ROLOGIT beta derivation (as it focuses only on the top rank and omits information regarding the lower-tier preferences), it provides strong secondary evidence for our utility model. Specifically, Scenarios 5 and 4, which

dominate the first-choice rankings, both feature Savings at Level 3 (the attribute with the highest beta). Scenario 1, also a frequent top choice, represents a balanced configuration where both Savings and Range Anxiety are at Level 2. The fundamental takeaway from this secondary analysis is the high degree of coherence in preference levels across the entire sample. The fact that the same scenarios emerge as leaders across BEV and FCEV group, as well as their blind counterparts, confirms that the preference for specific strategic "packages" is robust and cross-sample stable.

Table 7: Scenarios probabilities to be selected as first choice

BEV		Bev blind		FCEV		FCEV blind	
Scenario	Mean	Scenario	Mean	Scenario	Mean	Scenario	Mean
5	0,204	5	0,275	4	0,271	5	0,232
1	0,180	1	0,183	5	0,261	1	0,201
3	0,165	4	0,172	1	0,214	4	0,194
6	0,163	3	0,142	6	0,100	6	0,151
4	0,159	6	0,116	3	0,091	3	0,127
2	0,126	2	0,110	2	0,062	2	0,095
7	0,003	7	0,002	7	0,002	7	0,001
Tot	**100%**	**Tot**	**100%**	**Tot**	**100%**	**Tot**	**100%**

5. Discussion

5.1 Theoretical Contribution

This study sets out to understand how consumers construct perceived usefulness (PU) when evaluating technologies characterized by high uncertainty and substantial cognitive complexity. Rather than identifying which predictors of PU matter most, the objective was to illuminate how consumers process multiple attributes when forming their utility judgments. Two main contributions emerge from this investigation.

The central contribution of this study is to show that, when confronted with complex technological choices, consumers do not follow the fully analytical, sequential evaluation process commonly assumed in PU formation. Instead, across all four experimental samples, respondents relied on a highly stable, recurring structure of the utility function, which strongly suggests the adoption of a robust heuristic rather than a detailed, attribute-by-attribute assessment.

This finding extends the theoretical foundations of the Technology Acceptance Model (TAM). The classical PU formation process, as articulated by Venkatesh and Davis (2000) and rooted in work motivation theory (Vroom 1964), action identification theory (Vallacher & Wegner 1987), and image theory (Beach & Mitchell 1996, 1998), assumes that individuals first screen relevant inputs (compatibility test) and then prioritize alternatives through a profitability evaluation. Such a framework assumes a largely rational, functional decision-making process.

However, our results challenge this assumption in contexts where technologies are unfamiliar, multi-dimensional, and cognitively demanding. For example, charging time emerged as a highly influential attribute not only for BEVs, where long recharging times are a known barrier, but also for FCEVs, despite hydrogen vehicles offering refueling times comparable to conventional combustion engines (one of the main strength of this technology). Similarly, although the lack of refueling infrastructure is the primary constraint on hydrogen mobility uptake, range anxiety did not emerge as the dominant attribute in the FCEV samples, ranking below savings and, unexpectedly, below charging time.

These patterns indicate that respondents did not analytically differentiate between technology-specific constraints. Instead, they anchored their judgments around a limited subset of attributes

directly associated with expected user experience (e.g., savings, time requirements, and infrastructure support). The stability of attribute hierarchies across all group samples, therefore, does not imply that "consumers know exactly what they want"; rather, it reveals that they do not discriminate among nuanced technological differences. They simplify the decision problem by resorting to a satisficing strategy consistent with Simon's (1955) notion of bounded rationality.

This insight answers our research question: in contexts characterized by uncertainty and technological complexity, consumers shift from an analytical decision process to a heuristic one. Consequently, studies employing TAM or similar behavioral models in sustainability transitions should pay greater attention to the cognitive shortcuts that structure decision-making. These heuristics provide crucial insights into what consumers consider salient and what they systematically overlook when evaluating emerging technologies.

The second contribution of this study pertains specifically to the automotive domain and concerns the attribute hierarchies that shape perceived usefulness (PU) in the context of zero-emission mobility. Prior research consistently emphasizes that these products cannot be evaluated in isolation. Instead, they require an ecosystemic lens, as adoption depends on the simultaneous alignment of multiple interdependent conditions. Tarei et al. (2021) and Berkeley et al. (2018) argue that the barriers hindering the diffusion of sustainable mobility solutions are intertwined, and that understanding consumer evaluations requires moving beyond single-attribute or individual-level analyses.

Our study explicitly adopts this ecosystemic perspective. The experimental design integrates product-specific attributes (e.g., charging time, driving range), system-level conditions (e.g., availability of charging infrastructure), policy-driven factors (e.g., purchase incentives and energy mix), and hybrid attributes that arise from the interaction of product and system characteristics (e.g., use-phase savings, which depend both on vehicle features and electricity prices). By jointly modelling these dimensions, the study directly addresses the gap identified by Tarei et al. (2021) regarding the limited empirical evidence on how consumers rank, prioritize, and trade off interconnected barriers and strengths in sustainable mobility.

The results reveal patterns that are empirically distinctive and detectable only through a methodology grounded in trade-offs, such as the rank-ordered logistic framework employed here. A notable first finding is that the *emissions* attribute is not statistically significant in any of the four samples. This result should not be interpreted as contradicting the extensive evidence showing that pro-environmental values and sustainability orientations are strong predictors of interest in green mobility (Garibbo et al., 2025; Lakshmanan et al., 2024). Rather, it reflects the deliberate choice made in this study to focus on the *actual environmental determinant of vehicle sustainability,* namely, the energy source used for charging, an aspect expected to influence PU through environmental knowledge (Masukujjaman et al., 2021).

The non-significance of this variable indicates that highly abstract and system-external factors, which are distant from direct usage experience, exert limited influence on PU, particularly once consumers already know they are evaluating zero-emission vehicles. In other words, respondents were operating within a pre-established "green product frame (i.e., the stimuli we provided)" and marginal improvements or deteriorations in upstream emissions were not sufficiently salient to affect their utility judgments. This finding advances prior evidence on the role of environmental knowledge (Degirmenci & Breitner, 2017) by showing that, in zero-emission mobility, environmental performance becomes secondary to more experiential attributes when consumers form PU.

A second and integrative relevant finding concerns the role of incentives. Previous research consistently highlights financial incentives as key levers to offset the green premium and accelerate adoption (Berkeley et al., 2017; Bunsen et al., 2018; Biresselioglu et al., 2018; Harvey, 2020). In contrast, the negative sign of the *incentives* coefficient in our model must be interpreted within the logic of forced trade-offs. It does not imply that incentives are undesirable, but that, when ranking complete scenarios, respondents consistently prioritize other attributes, such as use-phase savings, driving range, and charging infrastructure. The finding resonates with recent work (Liu et al., 2021;

Setiawan, 2022) calling for a recalibration of the weight attributed to state subsidies and highlights that PU in complex technological transitions is primarily guided by pragmatic, usage-oriented considerations rather than by financial optimization alone.

Taken together, with the emergent utility functions, these findings reveal that *use-phase savings*, *charging time*, and *range anxiety* constitute the core drivers of PU. Beyond indicating bounded rationality (given that some prioritizations, especially in the FCEV samples, are not fully aligned with technological realities), this pattern reinforces the idea that consumers anchor their evaluations to tangible, easily assessable, experience-proximal attributes. This is consistent with the foundational definition of PU as "*the degree to which a person believes that using a particular system would enhance his or her job performance*." In complex, and interdependent ecosystems such as zero-emission mobility, consumers simplify the evaluation by focusing on what most directly signals a smooth, predictable, and convenient usage experience: fuel costs, charging time, and the perceived ease of refuelling.

These results deepen our understanding of how consumers process ecosystem-level information when forming PU judgments. They demonstrate that, even in contexts requiring advanced systemic reasoning, consumers gravitate towards concrete, experience-linked dimensions and struggle to incorporate abstract, upstream, or policy-driven features into their evaluations. This contributes to the literature by showing that PU in sustainable mobility emerges from a boundedly rational, ecosystem-filtered trade-off process in which only a subset of attributes meaningfully enters the cognitive calculus.

A final contribution concerns the methodological approach used to interpret the Rank-Ordered Logit (ROLOGIT) results. While this study does not aim to propose a formal extension of the ROLOGIT technique, it demonstrates a more nuanced way of leveraging choice-based vignette designs to explore consumer cognition. Traditionally, choice models are employed to estimate the relative importance of attributes within a specific product configuration (Contini et al., 2020). In such analyses, the beta coefficients indicate which factors contribute most to utility in a given moment. However, our research design employs a cross-sample experimental design (BEV vs. FCEV; explicit vs. blind conditions) to assess the **stability** of these utility functions across different technological and informational contexts.

By comparing these four distinct cohorts within the same product category (zero-emission vehicles), we move beyond a simple "list of preferences." The finding that attribute hierarchies remain invariant across all groups (regardless of the technology or the presence of a label) suggests that the ROLOGIT model can be used to detect **latent decision heuristics**. From this perspective, the value of the model lies in its ability to reveal not only *what* is important but also whether the consumer's *evaluative logic* is stable or context-dependent. This approach enriches the interpretation of choice models by shifting the focus from individual attribute weights to the **consistency of the cognitive architecture** used by consumers to navigate complex transitions. This level of analysis provides a more robust foundation for predicting consumer behavior in emerging markets than traditional, single-sample attribute analyses.

5.2 Managerial Implication

The empirical evidence from this study provides a clear strategic roadmap for automakers and policymakers, shifting the focus from technological advocacy to a user-centric ecosystemic strategy. The implications revolve around three fundamental pillars:

The finding that consumers apply a standardized decision heuristic regardless of technology suggests a "**Delegation Effect".** Consumers appear to ignore the underlying technological trade-offs (e.g., differences between batteries and fuel cells) and implicitly delegate the responsibility for addressing adoption issues of technical solutions to firms and policymakers. By adopting a satisficing approach, they seek a "package" that meets their minimum requirements for cost saving, absence of range

anxiety, and quick charging time. For managers, this means that marketing efforts should move away from explaining technical complexities and instead emphasize the reliability of the deriving service (sustainable mobility), positioning the ZEV as a worry-free utility rather than a technological breakthrough.

Secondly, the stability of the attribute hierarchy suggests a **dual strategic path for firms**: in communication, brands must emphasize the most salient attributes identified by the model: operational savings and refueling infrastructure and charging time. These are the primary drivers of Perceived Usefulness that trigger the purchase intention. In development (mirroring the operational reality) given that consumers may de-prioritize certain technical constraints - factors that ultimately dictate the real-world performance - firms should continue to innovate in these "under-the-radar" areas to ensure that the user experience matches the initial promise, thereby preventing long-term dissatisfaction and negative word-of-mouth.

Finally**,** because technological labels (BEV vs. FCEV) do not significantly alter consumers' cognitive hierarchies, basing a competitive position solely on "**technological superiority**" is likely to be ineffective. Competitive advantage in the ZEV market will no longer be determined by vehicle specs alone but by **ecosystemic attributes**: the maturity of the charging/refueling network, innovative pricing models (e.g., energy-as-a-service), and seamless support services. This implies that the path to ZEV adoption lies not in promoting the technology, but in demonstrating its seamless integration into the user's functional and economic life.

6. Limitations and further research

This study presents limitations that offer avenues for future research. First, the empirical setting is restricted to a single country. While this limits the generalizability of our findings, a cross-country design would have introduced substantial noise due to structural differences in energy prices, charging-infrastructure availability, and hydrogen mobility diffusion. We therefore recommend replicating the study in other national contexts rather than combining them ex ante, enabling meaningful cross-country comparisons without compromising internal validity.

Second, although the study investigates the construction of the utility function, data were collected through a survey completed in a relatively short time frame (approximately ten minutes). Vehicle purchase decisions, however, are typically extended, deliberative processes. Our findings should thus not be interpreted as a direct reflection of all the factors consumers consciously evaluate. For instance, we cannot infer that respondents were completely unaware of the lack of hydrogen refueling infrastructure. Rather, the results should be viewed as capturing the initial cognitive heuristics that shape early-stage evaluations of zero-emission vehicles. Such heuristics are highly informative for understanding instinctive reasoning patterns and for designing effective communication strategies.

Finally, the set of attributes included in the study reflects only a subset of the broader determinants of perceived usefulness. We did not incorporate value-based drivers (e.g., environmental identity), symbolic or self-image considerations, or brand-related variables. The selection was intentionally constrained to attributes tightly aligned with the functional core of perceived usefulness and to maintain a viable experimental design. Expanding the attribute space or the number of scenarios would have increased informational richness at the cost of excessive cognitive burden, potentially undermining task completion. Future research should therefore explore alternative scenario designs and include additional attributes, while preserving a feasible balance between experimental complexity and respondent capability.

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Long papers

Track:
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Entrepreneurial agency and hybrid finance in post-globalization. Evidence from SMEs facing the twin transition

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Abstract

Objective. The paper analyzes how hybrid regional financial instruments reshape entrepreneurial agency and strategic decision-making processes in small and medium-sized enterprises (SMEs) engaged in the twin transition of digital transformation and environmental sustainability. Moving beyond a purely financial perspective, the study interprets finance as an active governance mechanism capable of influencing entrepreneurial decisions in contexts of post-globalization and structural uncertainty.

Methodological design The study adopts a qualitative, theory-driven case study approach. The empirical evidence derives from the analysis of the *Garanzia Campania Bond* program, a hybrid regional financial instrument that combines market-based minibonds and public portfolio guarantees. The analysis relies on a triangulation of sources, including institutional documentation, aggregated financial data, reports from financial intermediaries and independent evaluations, as well as a semi-structured interview with a key institutional actor involved in the instrument's design and governance.

Findings. The results show that GCB operates not only as a mechanism for alleviating financial constraints, but also as an agentic governance device capable of recalibrating entrepreneurs' risk perception, extending the time horizon of investment decisions, and steering entrepreneurial choices toward digital and sustainable transformation pathways. The instrument supports investments with a high intangible intensity, such as digitalization, organizational innovation, and energy efficiency.

Theoretical implications. The paper contributes to the literature on entrepreneurship and SME finance by conceptualizing hybrid financial instruments as drivers of entrepreneurial agency rather than neutral financing tools. It also enriches the debate on the twin transition by highlighting the role of financial architectures in shaping the directionality of digital transformation and sustainability-oriented entrepreneurship in post-globalization contexts.

Practical implications. For entrepreneurs, the findings emphasize the importance of using structured financial instruments to support transformative, long-term investment strategies. For policymakers and financial intermediaries, the study highlights the need to design hybrid instruments that do not merely reduce financial risk but actively accompany entrepreneurial decision-making processes, including through complementary capacity-building policies aimed at strengthening inclusiveness.

Originality. The originality of the work lies in integrating the research streams on entrepreneurship, SME finance, and the twin transition, showing how hybrid regional financial instruments can operate as governance mechanisms capable of shaping entrepreneurial agency, thereby offering an innovative place-based perspective on entrepreneurial transformation in uncertain and fragmented economic contexts.

Keywords: *Entrepreneurial agency, Hybrid financial instruments, SMEs, Twin transition, Digital and sustainable transformation, Post-globalization*

1. Introduction

Access to adequate financial resources represents a strategic element for entrepreneurial action, innovation, and the transformation of small and medium-sized enterprises (SMEs). This relevance is intensified in contexts marked by high uncertainty, institutional fragmentation, and the reconfiguration of global value chains — conditions typical of the post-globalization phase — in which entrepreneurs are required to make complex strategic decisions in the presence of recurring shocks, geopolitical discontinuities, and increasing regulatory pressures. Under such circumstances, the entrepreneurial capacity to recognize opportunities, manage risk, and steer transformation depends not only on individual capabilities, but also on the financial and institutional architectures that frame entrepreneurial action (Berger & Udell, 2006; Hanedar et al., 2014; Udell, 2020).

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In the Italian bank-centered system, SMEs' dependence on traditional credit tends to limit entrepreneurs' strategic discretion, with particularly pronounced effects in less developed regions, where financial constraints, information asymmetries, and a lack of collateral hinder innovative and intangible investments (Banca d'Italia, 2022; ISTAT, 2022; SVIMEZ, 2023).
The literature on SME finance has extensively documented these constraints, focusing on the effects of access to credit in terms of investment, growth, and financial stability (Berger & Udell, 2006; Hanedar et al., 2014; Udell, 2020). However, this stream tends to consider finance as a predominantly exogenous factor, devoting less attention to how financial configurations influence entrepreneurial decision-making processes and entrepreneurs' capacity to pursue long-term transformation trajectories.
At the same time, the literature on entrepreneurship and SMEs highlights that firms adopt proactive and flexible strategies in response to crises and uncertain environments, leveraging resilience, adaptation, and entrepreneurial competences to preserve competitive advantage (Pusceddu, 2022). Studies on the role of local innovation systems and collaborative networks further emphasize how innovation processes in SMEs are often the product of inter-organizational relationships, partnerships with knowledge actors, and territorial dynamics that integrate resources and capabilities (De Martino et al., 2012). These contributions show that entrepreneurial agency is expressed not only through individual choice but also through networks and local contexts that facilitate access to resources and knowledge.
The twin transition — understood as the joint transition toward digitalization and environmental sustainability — represents a central challenge for SMEs. The literature shows that digitalization and sustainability can reinforce each other, but such complementarities are not automatic: they depend on organizational capabilities, strategic choices, and the quality of contextual institutions (Faucheux & Nicolaï, 2011; Montresor & Vezzani, 2023; Aiello et al., 2025).
Recent research in the Italian context highlights how digital transformation, when strategically oriented, can enhance sustainability outcomes and generate resilient business models (Lanfranchi et al., 2025). However, the effectiveness of these trajectories depends on entrepreneurs' ability to make intentional decisions under conditions of uncertainty and to mobilize adequate resources for investments that are often intangible and characterized by delayed returns.
In light of this evidence, hybrid financial instruments — namely devices that combine market mechanisms with public guarantees or interventions — have emerged, designed to reduce perceived risk, extend the investment time horizon, and support projects with high intangible intensity (Zedda, 2019; Pampurini et al., 2024). These instruments have mainly been interpreted as mechanisms for capital access; less attention has been devoted to their potential role as governance devices capable of shaping entrepreneurial agency by influencing risk perception, strategic discretion, and entrepreneurs' capacity for experimentation along twin transition pathways

1.2 Literature gap

Overall, the reviewed streams provide important but partial contributions. Studies on SME finance analyze credit access constraints without fully considering how such constraints and financial solutions may reshape entrepreneurs' decision-making practices; the literature on entrepreneurship and local systems emphasizes capabilities and networks but tends to treat financial architectures as a given context; research on the twin transition often focuses on technological or environmental outcomes without systematically analyzing the financial mechanisms that enable (or constrain) sustainability-oriented entrepreneurial choices. Consequently, a gap emerges: there is a lack of an integrated analysis showing how hybrid financial instruments may act as agentic devices, recalibrating entrepreneurial action and the strategic decision-making process of SMEs in the twin transition, especially in regional contexts characterized by structural fragilities and post-globalization.

In light of the identified gap, this study interprets hybrid regional financial instruments not merely as mechanisms of capital access, but as governance devices capable of affecting entrepreneurial action.

Specifically, the paper analyzes how particular financial architectures can recalibrate the decision-making processes of SMEs engaged in the twin transition in contexts marked by post-globalization and structural uncertainty. To this end, the research is guided by the following questions:

*RQ1***.** How do hybrid regional financial instruments recalibrate SMEs' entrepreneurial agency by influencing risk perception, strategic discretion, and the time horizon of investment decisions?

*RQ2***.** How do such instruments shape the directionality of entrepreneurial choices toward trajectories consistent with the twin transition, fostering the integration of digital transformation and environmental sustainability?

*RQ3***.** To what extent do territorial and institutional contexts condition the effectiveness and inclusiveness of hybrid financial instruments and, consequently, the limits of SMEs' entrepreneurial agency?

From this perspective, the case of the *Garanzia Campania Bond* program allows observation of how specific financial architectures may operate as agentic devices, influencing not only access to resources but also the quality and direction of entrepreneurial action.

The remainder of the article is organized as follows. Section 2 describes the methodological design and the case study analyzed; Section 3 develops the theoretical framework by integrating the literature on entrepreneurship, SME finance, and the twin transition; Section 4 presents the empirical findings; Section 5 discusses the evidence in light of the research questions and theoretical contributions; finally, Section 6 concludes by highlighting theoretical, managerial, and policy implications, as well as limitations and directions for future research.

2. Methodology

2.1 Research design

This study adopts a qualitative, theory-driven case study approach, consistent with the methodological literature on theory building through case studies (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; George & Bennett, 2005; Yin, 2018). Such an approach is particularly appropriate for analyzing complex and underexplored phenomena in which the boundaries among context, actors, and causal mechanisms are blurred, as in the interaction between hybrid financial instruments and entrepreneurial agency in SMEs.

Consistent with the gap identified in the literature, the case study is not used to test predefined hypotheses but to investigate in depth the mechanisms through which specific financial architectures influence entrepreneurial decision-making processes, risk perception, and the time horizon of strategic choices in the twin transition. The theory-driven approach makes it possible to connect empirical evidence to a conceptual framework that integrates entrepreneurship, SME finance, and the governance of digital and sustainable transformation.

2.2 Case selection

The *Garanzia Campania Bond* (GCB) program was selected following a logic of theoretical relevance and an information-rich case (Siggelkow, 2007). The case is particularly suitable for observing how hybrid regional financial instruments — combining minibonds, market mechanisms, and public portfolio guarantees — can reorganize SMEs' financial constraints and affect entrepreneurs' decision-making processes.

GCB represents an emblematic case for at least three reasons. First, it operates in a regional context characterized by structural fragilities, where financial and institutional constraints amplify

entrepreneurial difficulties. Second, the instrument is explicitly oriented toward supporting medium- to long-term investments, often intangible, typical of digitalization and sustainability processes. Third, GCB involves a plurality of actors — entrepreneurs, financial intermediaries, institutional investors, and public institutions — allowing observation of entrepreneurial agency within a complex financial and institutional ecosystem.

2.3 Data sources and data collection

The analysis relies on a triangulation of primary and secondary sources (Denzin, 1978) in order to strengthen the internal validity of the study and enable a comprehensive understanding of the instrument's operating mechanisms.

First, institutional and administrative documents from the Campania Region and Sviluppo Campania were analyzed, including public calls, monitoring reports, technical materials, documentation related to ERDF programming for 2014–2020 and 2021–2027, and independent evaluation reports. These sources made it possible to reconstruct the instrument's design, stated objectives, selection criteria, and governance mechanisms.

To complement these sources, a semi-structured interview was conducted with a key actor involved in the design and management of the program (the President of Sviluppo Campania). The interview aimed to explore qualitative aspects that are difficult to observe through documentary sources alone, such as the decision-making processes underlying the instrument's design, the risk-sharing logic, the modes of interaction with SME entrepreneurs, and the strategic choices related to the orientation of investments. In line with the literature on elite interviews, the interview played an interpretative and contextualizing function (Patton, 2002; Harvey, 2011).

2.4 Data analysis strategy

The data analysis was conducted following a theory-guided logic, consistent with the conceptual framework developed. The empirical material was organized along three analytical dimensions, corresponding to the research questions:

1. Financial and governance mechanisms through which GCB mitigates SMEs' financial constraints;
2. Effects on entrepreneurs and decision-making processes, in terms of risk perception, time horizon, and types of investments undertaken;
3. Territorial and institutional conditions influencing the effectiveness and inclusiveness of the instrument.

3. Literature Review

3.1 Entrepreneurial agency

The concept of entrepreneurial agency has assumed a central role in entrepreneurship studies, as it allows the firm to be interpreted not as a purely adaptive response to market constraints, but as the outcome of intentional action capable of influencing the economic context. Research defines entrepreneurship as the study of the processes through which opportunities are identified, evaluated, and exploited by specific economic actors (Shane & Venkataraman, 2000). From this perspective, the entrepreneur is not simply a rational decision-maker reacting to given incentives, but an actor who actively contributes to the configuration of opportunities and the transformation of markets.

The theoretical debate has progressively distinguished two main interpretations. The opportunity discovery perspective assumes that opportunities exist independently of economic actors and can be identified in the presence of informational imperfections. The opportunity creation approach, by contrast, maintains that opportunities emerge from entrepreneurial action and from interactions among actors, resources, and interpretations, framing entrepreneurship as a constructive process developed under conditions of non-probabilistic uncertainty (Alvarez & Barney, 2007). Subsequent

studies have reinforced this view by highlighting how economic opportunities are the product of interpretive and social processes rather than pre-existing objective entities (Wood & McKinley, 2010).

Within this debate, the opportunity-based entrepreneurship perspective proposes an integrative position, emphasizing that opportunities are neither entirely given nor entirely constructed, but emerge from the interaction between external conditions and entrepreneurial action. Entrepreneurship can therefore be interpreted as a process in which actors attribute economic meaning to potentially profitable situations through judgments, decisions, and experimentation (Davidsson, 2015). This approach reconciles the structural and agentic dimensions, showing how entrepreneurial action depends simultaneously on contextual conditions and on entrepreneurs' capacity to interpret and modify them.

Entrepreneurial agency manifests itself particularly in the ability to act under conditions of radical uncertainty. Entrepreneurial action occurs when an individual commits resources without being able to probabilistically calculate future outcomes, accepting the risk of failure while simultaneously contributing to market formation (McMullen & Shepherd, 2006). In this perspective, entrepreneurship is explained not only by the availability of opportunities or resources, but also by the willingness to act amid ambiguity and by the capacity to construct shared expectations.

A complementary contribution derives from effectuation theory, according to which entrepreneurs do not plan action on the basis of predetermined objectives and market forecasts; rather, they progressively build the competitive context through sequential decisions based on available means and interaction with other actors (Sarasvathy, 2001). The market, therefore, is not merely anticipated but co-evolves with stakeholders.

Organizational literature has also highlighted that entrepreneurial agency is embedded, meaning incorporated within social and institutional structures that simultaneously constrain and enable action. Entrepreneurs may modify practices, rules, and organizational arrangements, thereby contributing to the transformation of the economic fields in which they operate (Garud, Hardy & Maguire, 2007). Entrepreneurial agency should therefore be interpreted as a multilevel phenomenon emerging from the interaction among individual characteristics, organizational capabilities, and institutional conditions.

This dimension is particularly relevant in small and medium-sized enterprises. In SMEs, the concentration of strategic decisions in the entrepreneur or owner-manager makes entrepreneurial action directly sensitive to contextual conditions. In the presence of financial constraints, informational asymmetries, and limited access to resources, the possibility of undertaking innovative investments depends not only on individual competences but also on the institutional architecture within which the firm operates. Financing conditions influence investment propensity and the time horizon of decisions, indirectly affecting entrepreneurial action (Brown, Martinsson & Petersen, 2012; Kerr & Nanda, 2015).

Consequently, entrepreneurial agency cannot be interpreted as an exclusively individual property. Rather, it represents a situated capability shaped by the interaction among entrepreneurs, organizations, and institutional contexts. From this perspective, financial architectures do not merely constitute an enabling factor or an external constraint; they can directly influence risk perception, strategic discretion, and the time horizon of decisions. Financial instruments may therefore be interpreted as governance devices capable of recalibrating entrepreneurial action, affecting not only access to capital but also the very quality of SMEs' strategic decision-making processes.

3.2 Entrepreneurial processes and decision-making under uncertainty

Entrepreneurship literature has progressively moved away from a static view of the entrepreneur as a set of individual traits, adopting instead a processual perspective on entrepreneurial action. From this standpoint, entrepreneurship does not coincide with a single decision-making act, but with a dynamic sequence of interpretations, evaluations, and reallocations of resources that unfolds over time and under conditions of uncertainty (Shane & Venkataraman, 2000). Entrepreneurial action emerges

through continuous cognitive and strategic adjustments, in which the entrepreneur combines incomplete information, expectations, and operational constraints in order to guide firm choices.
This interpretation is consistent with studies emphasizing the role of radical uncertainty in entrepreneurial decision-making processes. Entrepreneurial action takes shape when an individual commits resources despite the absence of calculable probabilities regarding future outcomes, assigning economic meaning to still-indeterminate situations (McMullen & Shepherd, 2006). In this context, entrepreneurs frequently rely on heuristics and cognitive schemas different from those of managers in large organizations, adopting faster and more experimental decision modes typical of highly ambiguous environments (Busenitz & Barney, 1997). The entrepreneur therefore does not merely react to given opportunities, but contributes to constructing them through judgment, experimentation, and progressive learning (Davidsson, 2015).
A complementary contribution derives from effectuation theory, according to which entrepreneurs do not plan action on the basis of market forecasts and rigidly defined objectives; rather, they develop strategies through sequential decisions grounded in available resources and interaction with other actors (Sarasvathy, 2001). Entrepreneurial action thus assumes an iterative nature: decisions are continually revised in light of environmental feedback and operational possibilities, configuring the entrepreneurial process as an evolutionary path rather than a predetermined plan. In this perspective, entrepreneurship can also be interpreted as a dynamic mindset that develops through experience, interaction, and continuous learning rather than as a simple individual endowment (Ali et al., 2023).
The processual perspective also highlights the relevance of the temporal dimension of entrepreneurship. Recent studies describe the entrepreneurial path as an entrepreneurial journey characterized by sequences of decisions, strategic revisions, and progressive reorientations (McMullen & Dimov, 2013). Beliefs about opportunities arise through learning-by-doing, in which the entrepreneur reduces initial uncertainty and progressively constructs shared expectations (Shepherd et al., 2007). Technological and environmental changes may further reshape entrepreneurial trajectories, affecting attainable opportunities, business models, and firm performance (Foisal et al., 2023).
Within this framework, institutional context and access to resources play a decisive role. The entrepreneur does not operate in isolation but interprets opportunities and risks in light of mobilizable resources, social relationships, and available organizational configurations. Relational networks facilitate access to information, capabilities, and opportunities, helping compensate for the size limitations of smaller firms (Urbano et al., 2011). In particular, access to entrepreneurial resources is often mediated by personal and relational networks, increasingly integrated through digital tools (Bidart & Ibrahim, 2023).
An important implication is that conditions of access to resources directly affect entrepreneurial decision-making processes. The availability or scarcity of financial resources does not only determine the volume of feasible investments; it also modifies how entrepreneurs evaluate risk, time, and the scope of opportunities they pursue. From this perspective, institutional and financial architectures are not external elements to the firm but components of the entrepreneurial process itself, as they contribute to defining perceived opportunities and feasible strategies.
Financial instruments therefore do not operate exclusively as funding mechanisms but as factors that influence the formation of entrepreneurial decisions and the configuration of SMEs' development trajectories. By reducing perceived uncertainty and expanding the range of mobilizable resources, hybrid financial instruments can be interpreted as devices intervening in the micro-foundations of entrepreneurial action, recalibrating the process through which entrepreneurs evaluate opportunities, risks, and time horizons.

3.3 Financial constraints, hybrid instruments and entrepreneurial decision-making

A substantial body of research analyzes SMEs' financial constraints, highlighting how information asymmetries, lack of collateral, and dependence on bank credit limit access to capital and shape investment decisions (Berger & Udell, 2006; Hanedar et al., 2014; Udell, 2020). In particular, in

bank-centered systems these constraints are especially severe for intangible and long-term investments, typically associated with innovation and transformation processes.
More recent literature has begun to explore alternative and hybrid financial instruments, such as minibonds, basket bonds, and public guarantee schemes, emphasizing their potential to mitigate SMEs' financial constraints and mobilize private capital (Zedda, 2019; Pampurini et al., 2024). These studies show that "second-generation" instruments, based on risk-sharing mechanisms and multilevel governance, can improve access to credit without substituting for the market.
However, much of this literature adopts a predominantly financial or policy perspective, assessing the effectiveness of such instruments in terms of volumes disbursed, financial leverage, or system stability. By contrast, analysis of how these instruments affect entrepreneurial decision-making processes — influencing risk perception, investment propensity, and the time horizon of strategic choices — remains marginal. In other words, finance is often treated as an exogenous input rather than as an active element capable of shaping entrepreneurial agency (Ceglia et al., 2025).
This gap is particularly relevant in the case of SMEs, where investment decisions are strongly concentrated in the hands of the entrepreneur or owner-manager and are therefore highly sensitive to financial conditions and to the incentive structures embedded in financing instruments.

3.4 Twin transition, digital transformation and entrepreneurial directionality
Another relevant stream of literature concerns the **twin transition**, understood as the integration between digital transformation and environmental sustainability. Theoretical studies distinguish between forms of digitalization aimed at reducing the environmental impact of technologies (*Green IT*) and the use of digital technologies as enablers of broader sustainable innovations (*IT for Green*), emphasizing that environmental benefits depend on the directionality of digital transformation (Faucheux & Nicolaï, 2011).
Empirical contributions show that digitalization and eco-innovation can mutually reinforce each other, but only in the presence of adequate organizational capabilities, investments in intangible capital, and supportive institutional contexts (Montresor & Vezzani, 2023; Aiello et al., 2025; Checchinato et al., 2025). Management research further highlights that sustainability-oriented digital transformation requires intentional strategic choices and advanced managerial capabilities, especially in SMEs (Lanfranchi et al., 2025).
However, much of this literature focuses on the technological and environmental outcomes of the twin transition, devoting less attention to the financial mechanisms through which such entrepreneurial choices become feasible. In particular, the ways in which specific financial instruments may shape the directionality of digital transformation — influencing entrepreneurs' decisions and fostering (or hindering) the integration of digitalization and sustainability — remain underexplored.

3.5 Synthesis and research gap
Taken together, the reviewed streams provide complementary but fragmented contributions. The entrepreneurship literature highlights the central role of entrepreneurial agency and strategic capabilities in SMEs; studies on SME finance analyze constraints in access to capital and the effectiveness of alternative instruments; research on the twin transition emphasizes the non-automatic nature of the integration between digitalization and sustainability.
What is missing is a systematic integration of these perspectives. In particular, the literature has not yet clarified how hybrid financial instruments may act as governance devices capable of shaping entrepreneurial agency, influencing SMEs' strategic decision-making processes and directing digital transformation toward trajectories compatible with environmental sustainability, especially in regional contexts characterized by structural fragilities and post-globalization.
This study addresses this gap by analyzing a hybrid regional financial instrument as an empirical case, interpreting it not only as a mechanism for capital access but as an institutional architecture capable

of recalibrating SMEs entrepreneurs' risk perception, time horizon, and strategic discretion within the twin transition.

4. Results

The *Garanzia Campania Bond* (GCB) is a regional financial instrument designed to facilitate small and medium-sized enterprises' access to market financing through the issuance of medium- to long-term debt securities (minibonds) backed by a public guarantee. Unlike traditional subsidy schemes, the program does not provide direct grants or public loans to firms; rather, it relies on a public–private collaboration mechanism aimed at activating private capital and reducing SMEs' dependence on bank credit. The initiative is promoted by the Campania Region and operationally managed by Sviluppo Campania S.p.A., the in-house regional company responsible for coordinating selection, eligibility, and guarantee administration procedures.

The operation of the instrument unfolds through several stages. First, interested firms submit an application including an investment project and financial documentation. After a preliminary verification of formal and size requirements, firms undergo a creditworthiness assessment conducted by institutional investors and financial intermediaries involved in the transaction. Firms deemed eligible then issue a minibond, a corporate debt security that commits the firm to periodic interest payments and principal repayment at maturity.

The minibonds issued by different firms are not individually placed on the market but aggregated into a portfolio. Each security is transferred to a Special Purpose Vehicle (SPV), established to acquire the firms' bonds and transform them into a single financial instrument. The SPV subsequently issues an overall security, known as a *basket bond*, subscribed by institutional investors (investment funds, investment banks, or other financial operators). Through this structure, risk is no longer linked to a single firm but distributed across the entire portfolio, allowing greater diversification.

The public actor provides a direct first-demand guarantee covering a predetermined share of potential losses of the overall portfolio. The guarantee therefore operates at the basket-bond level rather than at the level of individual firms: in the event of default by some firms, the Region intervenes to cover the guaranteed portion, reducing investors' exposure. This mechanism does not eliminate the economic risk of the operation but redistributes it between public and private actors according to a risk-sharing logic. Investors retain a significant share of risk and therefore continue to perform screening and monitoring activities, while the presence of the public guarantee makes the investment viable even for relatively small firms or those with limited credit history.

The resources raised through the subscription of the basket bond are transferred by the SPV to the issuing firms, which use them for development programs, technological innovation, digitalization, productive investment, and organizational strengthening. Repayment of the minibonds occurs over time through cash flows generated by business activity. In this way, GCB introduces a financing channel alternative to traditional bank lending and allows SMEs to obtain resources with longer time horizons and greater flexibility than standard loans.

Overall, the instrument does not merely expand liquidity availability but modifies the structure of the financial conditions under which firms operate, enabling capital market access even for actors normally excluded. The program thus functions as a regional financial market activation intervention in which public action does not replace private capital but reduces its perceived risk, making investment projects financeable that would otherwise struggle to obtain coverage through traditional credit channels.

By reducing exposure to loss risk and making medium- to long-term resources available, the instrument alters the conditions under which entrepreneurs evaluate investment opportunities. It therefore not only increases accessible capital but also affects decision-making processes, extending the time horizon and the propensity to undertake innovative and transformative initiatives, thereby concretely influencing the exercise of entrepreneurial agency.

From a quantitative perspective, GCB mobilized approximately €200 million in financing for 90 SMEs, against a regional public endowment of €37 million provided in the form of a portfolio guarantee (Sviluppo Campania, 2024; Regione Campania, 2023). This results in financial leverage close to 4:1, indicating a substantial capacity to attract private capital.
A further relevant aspect concerns the instrument's temporal and adaptive dimension. The articulation of the program into multiple successive phases (first edition in 2019, second in 2023) has transformed the intervention into an evolutionary process capable of incorporating institutional learning and adapting to macroeconomic changes following the pandemic shock.

Examination of the portfolio composition shows a sectoral distribution consistent with regional development trajectories. Beneficiary firms mainly belong to manufacturing, agri-food, ICT, and advanced services sectors, characterized by a high incidence of investments in digitalization, organizational innovation, and energy efficiency. From a geographical perspective, however, a significant territorial concentration emerges: most firms are located in the province of Naples, followed by Salerno, while inland areas are only marginally represented.

Another finding concerns the type of investments financed. Available information indicates that the mobilized resources were allocated primarily to capital-intensive tangible investments but also to intangible investments — such as software, research and development activities, patents, and ICT platforms — as well as technological upgrades and energy-efficiency interventions (Sviluppo Campania, 2024). Overall, initiatives aimed at modernizing production processes and strengthening firms' digital capabilities prevail.

These elements suggest that GCB does not operate solely as a tool for closing a financing gap but also contributes to orienting firms toward projects consistent with the twin transition. In particular, the financed digital investments support optimization of production processes, reduction of energy consumption, and improvements in environmental monitoring and reporting, configuring applications of *IT for Green* rather than mere technological adoption. Moreover, the nature of the supported interventions appears aligned with the European regulatory framework, including the objectives of the EU Taxonomy and the Green Deal, strengthening the program's coherence with supranational policy priorities (European Commission, 2019; 2020).

5. Discussion

*RQ1 – Hybrid financial instruments and the recalibration of entrepreneurial agency***.** With reference to the first research question, the findings show that GCB helps mitigate SMEs' financial constraints not only by expanding access to capital, but by qualitatively transforming the conditions under which entrepreneurs make investment decisions. The combination of the basket-bond structure and the public portfolio guarantee reduced the perceived risk associated with medium- to long-term and high-intangible-intensity investments, thereby expanding entrepreneurs' strategic discretion.
This result enriches the SME finance literature, which traditionally interprets financial constraints in terms of the quantity of available resources. The evidence instead suggests that financial architectures also affect the quality of entrepreneurial agency, influencing entrepreneurs' ability to plan over the long term, to experiment, and to undertake more ambitious transformation paths. In this sense, GCB confirms that "second-generation" financial instruments can perform a crowding-in function not only of capital but also of entrepreneurial agency.

RQ2 – Directionality of entrepreneurial choices in the twin transition. The second research question concerns GCB's contribution to aligning digital transformation with environmental sustainability.

The findings show that the instrument does not merely finance generic adoption of digital technologies but indirectly steers entrepreneurial choices toward transformation trajectories consistent with the twin transition. The prevalence of investments in process digitalization, software, R&D, and energy efficiency suggests that entrepreneurs used the resources to strengthen productive and organizational capabilities oriented toward long-term objectives.
This result is consistent with the literature on the directionality of digital transformation, which emphasizes that complementarities between digitalization and sustainability are not automatic but depend on intentional strategic choices. In this sense, GCB operates as an orienting mechanism, creating financial and temporal incentives that make sustainability-aligned entrepreneurial decisions more likely, even in the absence of stringent ex ante environmental constraints.
However, the evidence also suggests that such orientation strongly depends on the organizational capabilities of beneficiary firms. This implies that financial instruments, while capable of favoring the directionality of transformation, cannot substitute for entrepreneurial agency and the competences required to systematically integrate digitalization and sustainability.

RQ3 – Territorial context, selectivity, and limits of entrepreneurial agency. The third research question situates the findings within a broader territorial perspective. Analysis of the portfolio composition reveals a sectoral concentration consistent with regional development trajectories, but also a significant geographic concentration in the economically stronger areas of the region. This result confirms that entrepreneurial agency is deeply conditioned by context, in line with the literature on local innovation systems and territorial inequalities.
On the one hand, territorial selectivity may be interpreted as an outcome of the market discipline embedded in the instrument, which favors firms with more manageable risk profiles and stronger organizational capabilities. On the other hand, it highlights the limits of sophisticated financial instruments in reaching firms located in more fragile contexts, where financial and institutional gaps reduce entrepreneurs' ability to access and benefit from such tools.
This evidence suggests that GCB's impact on entrepreneurial agency is heterogeneous and depends on the interaction between financial architectures and territorial contexts.

6. Conclusions and implications

This study analyzed the *Garanzia Campania Bond* program as a case study to understand how hybrid regional financial instruments may affect SMEs' entrepreneurial action, contributing to the governance of the twin transition in contexts characterized by post-globalization and structural uncertainty. Adopting a theory-driven case study approach, the paper shows that the twin transition is not the automatic result of technological adoption or the availability of financial resources, but a deeply entrepreneurial process in which financial architectures play an active role in shaping entrepreneurs' strategic decisions.

Theoretical contributions
From a theoretical perspective, the paper's main contribution lies in repositioning finance at the center of the entrepreneurship debate, interpreting it not as a simple enabling factor but as a device of entrepreneurial agency. The GCB case shows that hybrid financial instruments can recalibrate risk perception, expand strategic discretion, and extend the time horizon of entrepreneurial decisions, making possible the intangible and transformative investments typical of the twin transition.
Second, the paper contributes to the twin transition literature by highlighting the directional and governed nature of digital transformation. The findings suggest that alignment between digitalization and environmental sustainability does not emerge spontaneously, but depends on the interaction between entrepreneurial agency and financial architectures that orient investment choices. In this sense, the study enriches existing research — which mainly focuses on technological or

environmental outcomes — by showing that the direction of transformation results from specific financial and decision-making mechanisms.
Finally, the study contributes to the literature on entrepreneurship and territorial contexts by showing that the impact of financial instruments on entrepreneurial agency is heterogeneous and strongly conditioned by institutional and regional environments. This result reinforces the interpretation of entrepreneurship as a situated phenomenon emerging from the interaction among entrepreneurs, instruments, and local systems rather than as an exclusively individual expression.

Implications for entrepreneurship research
The paper opens several avenues for future research. First, it suggests the need to integrate more systematically the literature on entrepreneurship and SME finance, shifting attention from capital-access outcomes alone to entrepreneurial decision-making processes and the mechanisms through which financial architectures shape agency.
Second, future studies could further investigate the role of financial instruments as agentic devices through comparative approaches across regions, sectors, or types of instruments, as well as through longitudinal research designs capable of capturing the evolution of entrepreneurial agency over time. In particular, integrating micro-level qualitative data — for example, interviews with entrepreneurs — would allow more direct observation of the underlying cognitive and decision-making processes.
Finally, the study suggests further exploration of the interactions among entrepreneurship, sustainability, and digital transformation in post-globalization contexts, with attention to the role of institutions and place-based policies in creating favorable conditions for inclusive and long-term-oriented entrepreneurial transformation.

Managerial and policy implications
From a managerial standpoint, the findings indicate that SME entrepreneurs can benefit significantly from structured financial instruments that reduce perceived risk and enable planning over longer investment horizons. However, such benefits are not automatic: they require adequate organizational capabilities and entrepreneurial competences to integrate digitalization and sustainability into coherent long-term strategies. Entrepreneurs are therefore called to develop a strategic vision that goes beyond mere technological adoption, using financial instruments as levers for transformation.
For financial intermediaries and policymakers, the GCB case highlights the importance of designing instruments that do not merely fill financial gaps but actively accompany entrepreneurial action throughout the transformation process. This implies particular attention to instrument governance, risk-sharing arrangements, and adaptive capacity over time. Moreover, the findings suggest that sophisticated financial instruments, if not accompanied by complementary capacity-building and entrepreneurial support policies, risk favoring already structured firms and limiting their inclusive impact.

Limitations and future directions
This study presents several limitations. The analysis is based on a single case study and therefore does not allow statistical generalization. In addition, the availability of data on the long-term outcomes of the financed investments — particularly regarding environmental and digital performance — is still limited. As noted, the absence of direct data on entrepreneurs' decision-making processes represents an additional limitation.
Despite these constraints, the paper offers a meaningful analytical generalization, showing how hybrid regional financial instruments may operate as governance architectures capable of shaping entrepreneurial agency in contexts of uncertainty and post-globalization. Future research may extend and test these insights through comparative and quantitative approaches, contributing to a deeper understanding of the role of finance in entrepreneurial transformation.

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Humanistic Enterprise and Reputational Vulnerability: Evidence from the Brunello Cucinelli Case

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Abstract

This paper examines how public accusations become intelligible as brand transgression episodes when a brand has built its legitimacy around an explicitly humanistic and morally charged identity. Focusing on Brunello Cucinelli, the study analyzes two recent episodes that challenged the symbolic coherence of the brand: the September 2025 accusations concerning the company's operations in Russia and the February 2026 testimony-based allegations regarding employees' experiences and organizational practices. Adopting an embedded single-case study design, the paper relies on a diversified set of documentary sources, including official corporate materials, investor-facing documents, public statements, journalistic coverage, observable market-facing signals, and academic papers. The findings show that, although both episodes challenged the same symbolic core of the brand, they generated markedly different public trajectories. The Russia-related accusations produced stronger media visibility, market reaction, and explicit organizational engagement, whereas the employee-related allegations, while symbolically more corrosive to the brand's humanistic promise, remained less institutionally amplified and less visibly addressed. The paper interprets this asymmetry by suggesting that the public salience of brand transgression depends not only on the symbolic seriousness of an accusation, but also on its public legitimacy, amplifiability, and the degree of organizational engagement it elicits. The study contributes to brand transgression research by showing how heterogeneous accusations may converge on the same moral brand promise while diverging in their post-event trajectory.

Keywords: *humanistic enterprise; brand transgression; brand promise; reputational vulnerability; public legitimacy*

1. Introduction

The relationship between consumers and brands is often compared to interpersonal relationships because similar relational dynamics may develop over time (Alvarez & Fournier, 2016; Fournier, 1998). Within this perspective, brand transgressions, understood as violations of implicit or explicit norms within the relationship with consumers, can significantly affect the bond established with consumers. Such dynamics are especially relevant for brands that present themselves as sincere, human-like, and responsible, since these brands build their legitimacy not only on product or service quality, but also on a strong identity, enduring values, and perceived coherence across consumer interactions and institutional communication (Aaker et al., 2004). When public accusations circulate, these brands may become particularly exposed to reputational erosion and face negative behavioral responses, with repercussions for their symbolically and emotionally rich brand promise (Aaker, 1996, 2014).

Although brand transgression research has advanced our understanding of norm violations, stakeholder reactions, and recovery processes, more insights are needed to understand how acts of transgression unfold for those brands whose public legitimacy rests on explicit moral and humanistic promises. This limitation is especially relevant when such legitimacy is strongly personified in the founder, so that public accusations potentially challenge not only the organization itself, but also the symbolic authenticity given to the brand by the founder's values (Hamby et al., 2019). As a result, we still know relatively little about how heterogeneous public accusations may converge in destabilizing the symbolic core of a stakeholder-oriented brand.

This paper addresses this issue through a single embedded case study of Brunello Cucinelli, an Italian luxury brand in the fashion industry. The company is internationally known for its so-called

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humanistic management philosophy and socially responsible identity, both strongly embodied in the figure of its founder. Recently, the company has faced two public accusation episodes that are analytically relevant to brand transgression theory: first, the accusations concerning its market operations in Russia in September 2025; second, the public allegations published in February 2026, based on reported testimonies by current and former employees, which challenged the coherence of the brand's corporate social responsibility narrative. While different in nature, the two episodes are analytically comparable because both called into question the alignment between brand promise and publicly attributed conduct. The empirical reconstruction relies on multiple sources, namely corporate identity documents, official company statements, investor-relations materials, and reputable journalistic coverage and academic literature. The paper's contribution is primarily analytical: it shows how different public accusations may converge in destabilizing the symbolic core of a humanistic brand, thereby extending the empirical readability of brand transgression theory in a contemporary setting.

The paper proceeds as follows. First, we introduce brand transgression through a theoretical lens and its implications for brands characterized by moral and humanistic claims. Second, we present the methodology and the case background. Third, we analyze the two episodes and discuss the findings in light of the literature. Finally, we conclude by outlining limitations and directions for future research.

2. Theoretical Background

A brand transgression is defined as an "act of violation of the implicit or explicit rules guiding consumer-brand relationship performance and evaluation" (Aaker et al., 2004, p. 2). This conceptualization is rooted in a view of brands not merely as transactional entities, but as relationship partners with whom consumers may develop meaningful bonds over time (Fournier, 1998). Interpersonal processes in consumer-brand relationships are often activated through brand anthropomorphism, whereby consumers attribute mindfulness, morality, and human-like qualities to brands (Alvarez & Fournier, 2016; Puzakova et al., 2013). Within this perspective, brands are not evaluated only in terms of product and service quality. Consumers may also rely on relationship norms when evaluating whether a brand has acted appropriately, coherently, or disappointingly (Aggarwal, 2004; Aggarwal & Law, 2005). Brand transgressions therefore concern specific relational ruptures, insofar as they call into question the trust, coherence, and accountability expected from the brand as a relationship partner (Aaker et al., 2004).

Subsequent literature has positioned brand transgressions within the broader discipline of negative events in marketing, namely significant negative incidents capable of triggering a reappraisal of the relationship between consumers and firms, brands, or offerings. This broader perspective is especially useful when the focal issue is not simply substandard performance, but the perceived violation of norms or standards. Brand transgressions should therefore not be understood as isolated episodes, but as temporally extended relational processes that unfold along the customer journey (Khamitov et al., 2020). Since transgressions occur within an already established relationship, their meaning and consequences are shaped by prior promises and relational configurations, which can be framed as the pre-event phase of the transgression process. In these terms, the transgressive incident represents the core event and subsequent brand and stakeholder responses belong to the post-event phase. This view implies that the same negative episode may be interpreted differently depending on the relationship that preceded it, including its strength, trust, commitment, and relational expectations (Grégoire et al., 2009; Su et al., 2022). This explains why prior research has frequently relied on experimental, survey-based, and in some cases longitudinal designs to examine how negative brand episodes unfold in the presence of different relational types and across different phases of the customer journey.

Prior research has also shown that the outcomes of brand transgressions are not homogeneous. Post-transgression forgiveness, for example, depends on the interaction between relationship strength

and controllability attributions, while also being shaped by consumers' self-construal and their orientation toward justice or relationship maintenance (Sinha & Lu, 2016). Severity also matters, since more serious transgressions tend to reduce forgiveness and weaken downstream behavioral intentions, including repurchase intentions (Tsarenko & Tojib, 2015). More recent work has further shown that consumer responses differ depending on the type of transgression involved. In particular, a relational perspective distinguishing between performance-related and performance-unrelated transgressions suggests that the impact of brand transgression on consumer choice is also moderated by moral identity, thereby highlighting the relevance of morality-based individual differences in shaping responses to negative brand episodes (Rosendo-Ríos et al., 2025).

A particularly important implication of this literature is that strong consumer–brand bonds do not automatically protect brands from adverse reactions. As a matter of fact, previous studies showed that when failure occurs, customers who had a strong prior relationship with the firm react more negatively in the long run, especially in terms of disaffect and avoidance (Grégoire et al., 2009). In some cases, firms even face direct and indirect avengers (Grégoire et al., 2018). Thus, when the transgression is ethically charged or personally relevant, close brand relationships may lose their buffering effect and, under some conditions, intensify the significance of the violation (Trump, 2014). In a similar vein, betrayal should not be treated as a mere extension of dissatisfaction. It represents a qualitatively deeper response, associated with psychological loss, rumination, indignation-focused anger, and self-castigation, all of which indicate that the transgression has affected not only evaluations of the brand, but the meaning of the relationship itself (Reimann et al., 2018).

Brand characteristics further shape how transgressions are interpreted and amplified. Sincere brands appear especially vulnerable because they elicit stronger partner-quality expectations, while anthropomorphized brands tend to be judged more harshly when wrongdoing occurs, as consumers are more likely to attribute intentionality, responsibility, and stable traits to them (Aaker et al., 2004; Puzakova et al., 2013). Related work suggests that brands perceived as more agentic and cognitively capable are also more likely to elicit blame, anger, and punishment in the face of transgressive conduct (Huang et al., 2020). At the same time, post-event outcomes depend not only on stakeholder interpretations, but also on how firms respond. Apologies, denials, and remedial actions may influence forgiveness and repurchase intentions, although their effectiveness varies depending on transgression severity and prior awareness of the brand's socially responsible behavior (Tsarenko & Tojib, 2015). Corporate social (ir)responsibility itself represents an expanding platform on which acts of transgression can take place, threatening a specific dimension of brand credibility (Lock & Seele, 2017; Riera & Iborra, 2017). These transgressions acquire broader significance through public circulation, newsworthiness, and media amplification. Negative events linked to corporate irresponsibility are more likely to become economically consequential when they attract wider media coverage, and stronger brands may be particularly exposed because their salience increases the probability of public attention (Stäbler & Fischer, 2020). These insights are especially important for qualitative case-based research, because they suggest that brand transgression may be examined not only through direct measures of consumer response, but also through observable traces such as public accusations, organizational responses, media attention, and market-facing consequences.

The overall theoretical lens supported by this body of literature is particularly useful when the brand's legitimacy rests on explicit moral and humanistic promises, since accusations of inconsistency may challenge not only organizational conduct but also the coherence of the brand's symbolic core. It becomes even more salient when such legitimacy is strongly personified in the founder, so that public accusations potentially affect the overlapping authenticity between founders and brands (Hamby et al., 2019). In this sense, brand transgression provides an appropriate interpretive lens for examining the Brunello Cucinelli case as a contemporary and publicly unfolding challenge to brand coherence.

3. Methodology

3.1. Research design

We adopted a single embedded case study design to investigate how recent public accusation episodes involving a stakeholder-oriented Italian luxury brand can be interpreted through the lens of brand transgression. Case study research is particularly appropriate when the research objective is to develop a detailed understanding of "how" and "why" (Yin, 2018). According to previous literature, brand transgression is a phenomenon that depends on specific contextual elements related to brand attributes and behavior, along with stakeholders' responses. This makes the case study approach methodologically suitable, since the phenomenon is not independent and detachable from its setting. Given the nature of the phenomenon, with the present study we do not aim at generalization, but rather advance a theory-informed interpretation of a contemporary brand case in its specific real-life circumstances (Stake, 1995). The overall case is Brunello Cucinelli, while the two accusation episodes examined in the paper are treated as embedded units of analysis. Although the two episodes are different in content, consequences and sources for data collection, the adopted design allowed us to preserve the integrity of the brand case while analytically comparing distinct transgressions that challenged the brand's symbolic core dimension in different ways (Yin, 2018).

3.2. Case selection

We selected Brunello Cucinelli as an information-rich and theoretically relevant case because of the strong moral, humanistic, and founder-centered identity that characterizes the brand. Its stakeholder orientation, humanistic business ethics, and corporate social responsibility efforts have already been the subject of multiple studies (Donato et al., 2019; Napolitano & Fusco, 2019), which collectively portray the company as a value-laden and symbolically distinctive business case. The heritage-infused identity and territorial embeddedness of the brand further reinforce theoretical relevance, as these characteristics contribute to a public image strongly grounded in continuity, authenticity, and moral coherence, enriching also the well-discussed stakeholder orientation (Napolitano et al., 2018; Rindell & Santos, 2021; Riviezzo et al., 2021; Urde et al., 2007). Our choice was therefore motivated by analytical potential: two recent accusation episodes, different in nature yet directed at the same symbolic core of the brand, make Brunello Cucinelli especially suitable for examining how brand transgression may unfold in a humanistic and founder-personified brand.

3.3. Data collection

We based data collection on the construction of a documentary case study database aimed at reconstructing both the pre-event brand identity context and the two accusation episodes analyzed in the study. For the sake of credibility and reliability, we selected multiple types of materials to reconstruct the case. These sources comprised academic papers, corporate identity documents, official company statements, official visual communication materials, investor-relations materials, high-reputation journalistic coverage, and, where available, publicly observable market-facing signals. Official visual communication materials included selected campaigns published on the company's corporate website and used to reconstruct the visual and narrative articulation of the brand promise. Since the company released an official documentary film in December 2025, we also considered it as an official source for reconstructing the brand promise in the pre-event phase. Although this occurred between the two transgression episodes, we decided to include it in the collected materials since the brand narrative antecedent to the first episode (September 2025) was reinforced and not changed.

Our approach was not intended to establish judicial certainty regarding the facts under dispute, but to compare different narrative positions to get a complete understanding of the case. The database ensured traceability, comparability, and analytical consistency across the two embedded episodes. For each source, the database recorded the link or document reference, source type, publication date, relevance to the two episodes and to the three brand transgression phases, and notes concerning its

content and potential analytical contribution. For journalistic sources we assessed credibility based on national and international relevance and resonance, maintaining an objective approach. Our final corpus included 14 web pages from the official main and investor relations websites, 4 official corporate documents, 1 corporate documentary film, 19 corporate campaigns, 18 non-scientific national and international publications and 5 academic sources.

3.4. Data analysis

We conducted data analysis through a comparative interpretive reconstruction of the two embedded accusation episodes. In line with the three-phase perspective adopted in the study, we classified all materials according to pre-event, core event, and post-event. This phase-based organization made it possible to reconstruct not only the focal episodes, but also the relational and symbolic conditions that preceded them and the observable developments that followed them.

More specifically, in the pre-event phase we included materials used to reconstruct the brand promise and public identity of Brunello Cucinelli before the emergence of the accusations (e.g., official website communications, past visual campaigns). In the core event phase we included materials directly related to the accusations themselves (e.g., the Morpheus Research report and related journalistic articles, Lucarelli's article). Finally, in the post-event phase we included materials documenting the organizational response, the public development of the episode, and any observable reputational or market-facing signals (e.g., press release). We first reconstructed each episode individually and then compared them to identify similarities and differences in the way they challenged the symbolic core of the brand.

4. Case background

Brunello Cucinelli is an Italian luxury fashion company whose origins date back to 1978, when its founder launched the business around what the company itself presents as a then-innovative idea: colored cashmere knitwear for women. Over time, this entrepreneurial initiative developed into a globally recognized luxury brand, while maintaining a strong symbolic and productive anchorage in Italy. A crucial stage in this trajectory was the move to Solomeo, the small medieval hamlet near Perugia that progressively became one of the most distinctive elements of the company's public identity. In the company's own narrative, Solomeo is not simply a location but part of a broader moral and aesthetic project linking craftsmanship, beauty, place, and work («The company continued to grow in step with my love for this village, to the point that I began to imagine a sort of rebirth», from the company website). Today the company's economic relevance is reflected in its recent financial performance: Brunello Cucinelli closed 2025 with a net profit of €142 million and proposed a dividend of €1.04 per share, confirming its solid market position.

Official corporate materials consistently frame the company through the language of "humanistic capitalism" and "human sustainability", presenting economic activity as inseparable from human dignity, fair work, respect for privacy, and responsibility toward communities and places. In this view, profit is not denied, but morally framed, as Brunello Cucinelli stated in his speech at the G20 in Rome in 2021: «I wanted a company that made healthy profits, but did so with ethics, dignity and morals». This orientation is also rooted in the founder's autobiographical narrative, where he explicitly recalls learning «the great theme of life: the balance between profit and giving» from his childhood experience in the countryside. This means that the brand promise extends well beyond product quality or luxury performance and incorporates explicit ethical and relational expectations, consistent with a shared value model (Porter & Kramer, 2011) and a corporate humanistic responsibility view (Arnaud & Wasieleski, 2014). Official visual campaigns also reinforce this promise over time, repeatedly mobilizing themes such as humanism, beauty, harmony, privacy, truth, and respect for nature. In institutional communication the company always presents craftsmanship, manual skills, and Made in Italy know-how as central dimensions of its ethos. The territorial

embeddedness of the brand therefore does not function merely as a heritage cue or as a backdrop for storytelling, but as part of a wider claim to authenticity and coherence. Here again, the founder's self-narrative is meaningful: recalling his early life, he writes that «we lived in harmony with Creation», linking work, order, beauty, and respect for the natural world within a single moral horizon. In this sense, the company's self-presentation suggests that commercial success, organizational conduct, and moral legitimacy should appear aligned.

A further reason why the case is analytically significant lies in the centrality of the founder himself. The public image of Brunello Cucinelli is deeply intertwined with the identity of the firm. The official corporate narrative explicitly associates his entrepreneurial path with the moral and economic dignity of human beings, as well as with a broader philosophy of work and life. As a result, the legitimacy of the brand appears to rest not only on organizational claims, but also on a strong symbolic overlap between founder identity and brand identity.

Against this background, the relevance of the case lies in the fact that the two recent accusation episodes examined in this paper concerned a brand whose legitimacy had long been built around moral coherence, human dignity, organizational responsibility, and founder personification. This makes Brunello Cucinelli a particularly suitable case for examining how public accusations may challenge the symbolic core of a humanistic brand.

5. Findings

5.1. Episode 1: The accusations on operations in Russia

On 25 September 2025 Morpheus Research, a short-selling and investigative platform founded by financial analysts, published a report (morpheus-research.com/cucinelli) accusing Brunello Cucinelli of continuing to operate in Russia inconsistently with EU sanctions and of misleading investors about the scope of its Russian business. The report was presented as the result of more than three months of investigation, involving interviews with former Cucinelli employees and partners, an extensive analysis of trade data, and visits to Cucinelli's Russian stores.

The allegations rapidly moved beyond the originating report and acquired immediate public visibility through both financial and general news coverage. On the same day, trading in Brunello Cucinelli shares was suspended pending a company statement, and the stock recorded a double-digit decline, with reports indicating a fall of 17.28% on 25 September 2025. Italian and international media framed the case not only as a financial controversy, but also as a reputational shock affecting one of the most symbolically distinctive Italian luxury brands.

Brunello Cucinelli responded immediately through an official statement released on 25 September 2025. In that statement, the company firmly rejected the accusations and reaffirmed full compliance with EU rules. More specifically, it stated that its continued presence in Russia was limited to activities considered lawful, including the maintenance of local structures, the payment of salaries and rents, and the management of shipments within the applicable regulatory framework. The statement also rejected the claim that the Russian market had been used to dispose of excess inventory, emphasized the sharply reduced economic relevance of Russia for the group, and announced that the company was evaluating possible legal action to protect its reputation and stakeholders. In the days that followed, this line was reiterated in public reporting and investor-facing communication. The episode quickly evolved from an accusation originating in a report produced by a financially interested actor into a public challenge to the consistency between the brand's declared values and its attributed conduct in Russia.

5.2. Episode 2: The employee-related allegations

Against a pre-event promise centered on the dignity of work, respect for the person, and a humanistic vision of enterprise, the employee-related episode publicly challenged the internal credibility of the brand's organizational self-presentation. The episode emerged on 10 February 2026,

when the Italian journalist Selvaggia Lucarelli published on Substack an extended version of an inquiry released the same day in *Il Fatto Quotidiano*. The article was explicitly framed as a challenge to the widely circulated image of Brunello Cucinelli as an exemplary employer and was based on reported testimonies from current and former employees.

The allegations did not concern a single isolated incident, but a broader pattern of perceived inconsistency between the company's humanistic narrative and everyday organizational experience. Some reported testimonies described a work environment marked by pronounced asymmetries of status and by interactional rules experienced as degrading rather than respectful. Others referred to episodes of verbal aggression, public reproach, and managerial conduct perceived as inconsistent with the image of a human-centered enterprise. Additional claims concerned organizational control and pressure, including the perception that the public narrative of balance, beauty, and civilized working conditions did not correspond to the everyday reality experienced by at least some workers.

The allegations acquired secondary public visibility through other online outlets and social media posts, but in a rather limited way. The available materials do not indicate a broad institutional amplification of the episode through major financial or general news outlets, nor do they show clearly identifiable market-facing consequences.

Regarding the organizational response, Lucarelli stated that she attempted to contact Cucinelli before publication, but that the press office reportedly indicated there was no interest in further addressing the matter. Beyond this, no visible formal public response of comparable prominence was identified in the materials collected for this study. This shows how the episode did not unfold through an explicit and structured organizational rebuttal. Nevertheless, it remains relevant because it strikes directly at the organizational and relational core of the brand promise.

5.3. Cross-episode comparison

Although different in sources, content, and public trajectory, the two episodes can be analytically compared because both activated a perceived incongruence between Brunello Cucinelli's pre-event brand promise and publicly attributed conduct. Table 1 summarizes the main empirical dimensions through which the two episodes were reconstructed and compared.

Tab. 1: Cross-episode comparison

	Episode 1	**Episode 2**
Content of the promise	Fair profit, responsible economic conduct	Dignity of work, respect for the person
Trigger	Investigative report (short seller)	Journalistic investigation
Type of accusation	Inconsistency between declared values and market operations	Inconsistency between humanistic philosophy and organizational reality
Threatened credibility	External	Internal
Media coverage	Extensive	Limited
Organizational response	Immediate formal response	No formal response
Immediate repercussions	Temporary suspension of the stock and decline in share price	None clearly identifiable in market terms

Source: authors' own elaboration

The comparison highlights both convergence and asymmetry. In both cases, the accusations became relevant because they challenged a brand publicly grounded in moral coherence, dignity, and founder-personified legitimacy. At the same time, the two episodes differed significantly in accusation domain, public visibility, organizational response, and evidentiary robustness. The Russia-related case developed into a highly visible market-facing controversy accompanied by an immediate formal denial, whereas the employee-related allegations remained less amplified and were not followed by a comparably visible public rebuttal.

6. Discussion

In this study we examine two accusation episodes related to the Italian luxury brand Brunello Cucinelli through the lens of brand transgression. The brand is internationally known for its humanistic responsibility view and its stakeholder-oriented organizational conduct, which enhances the theoretical relevance of the case (Napolitano & Fusco, 2019).

Both episodes challenged the brand promise and the relational norms established over years with stakeholders, but in different ways and with different trajectories in the public space. The Russia-related accusations concerned Cucinelli's market conduct, which pertains to the economic pillar of sustainability (Elkington, 1997), more than the most intimate organizational dimension of the brand promise. Yet these accusations generated the strongest public transgression trajectory, with direct financial consequences and amplification from general news outlets. By contrast, the employee-related allegations appear symbolically more corrosive to the company's humanistic promise, because they targeted the internal credibility of its organizational narrative and the integrity of the founder himself. Nevertheless, they remained less institutionally amplified and unanswered by the organization.

This asymmetry suggests a useful distinction between symbolic severity and public claim legitimacy. Symbolic severity refers here to the extent to which an accusation appears to strike the core meaning of the brand promise. Public claim legitimacy, by contrast, refers to the extent to which an accusation appears publicly plausible, documentable, amplifiable, and therefore difficult for the organization to ignore. Thus, the Russia-related accusations seem to have possessed greater public claim legitimacy, not in the sense of being established as truer, but in the sense of being more easily translated into a publicly actionable controversy. This interpretation is coherent with conceptualizations of claims' perceived legitimacy advanced in the growing historical brand transgression literature (Pecot et al., 2025; Schrempf-Stirling et al., 2016).

Seen from this angle, the organizational response becomes theoretically meaningful and reflects contextual elements. Denial does not function merely as a defensive move. It can also be read as an indicator that the accusation had already reached a level of public legitimacy and visibility that made non-engagement too costly. The company's immediate rebuttal, reaffirmation of compliance, and consideration of legal action all suggest that the accusation had become a public challenge requiring explicit organizational engagement. In the employee-related episode, by contrast, the absence of a visible formal public response of comparable prominence may indicate either that the accusation did not achieve the same degree of institutional legitimacy or that a strategy of non-amplification was preferred. In both cases, no compensatory actions emerged in the materials analyzed. However, in this paper we provide a short-term reading of the case. The literature reviewed above underlines that brand transgressions are temporal phenomena whose consequences may unfold over time (Khamitov et al., 2020). Not only can consumers "hold a grudge" (Grégoire et al., 2009) with a desire for revenge or avoidance, but companies that rely on collective forgetting in the long run may also create additional layers of historical irresponsibility and generate a compounded liability (Coraiola & Derry, 2020). This means that the case could become more significant in terms of its future consequences and the company may be held accountable for past alleged or perceived wrongdoings.

Overall, the findings suggest that brand transgression trajectories should not be inferred from accusation content alone, but from the entire process. From this perspective, the main contribution of the paper is to refine the empirical readability of brand transgression in a specific but revealing setting. The case shows that, in a humanistic and founder-personified brand, heterogeneous accusations can converge in challenging the same symbolic core while diverging sharply in their public trajectory. It also suggests that studying brand transgression in such contexts may require attention not only to stakeholder reactions in the narrow sense, but also to the public legitimacy of accusations, the form of organizational engagement they provoke, and the post-event signals through which they become consequential.

Managerially, the case suggests that explicit moral and humanistic promises increase both symbolic strength and vulnerability to accusations of inconsistency. It also indicates that different accusation types may require different response strategies, depending on their public legitimacy and amplifiability. For such brands, managers should pay particular attention to both employees' lived experience and the informational flows through which internal organizational conditions may become publicly visible.

7. Limitations and future research

This study examines two brand transgression episodes within a contemporary time frame. Because the analysis focuses on recent and still unfolding public episodes, consumer perceptions are not investigated directly through primary data. This represents an important limitation of the study, as the analysis relies on documentary and public materials rather than on direct evidence of stakeholder interpretation. Future research could complement this perspective through survey-based, experimental, or interview-based designs capable of capturing how different audiences interpret and respond to such episodes. The two episodes also differ in evidentiary robustness, with the second requiring greater caution because it is primarily grounded in testimony-based public allegations. These limitations do not invalidate the analysis but define the scope of its contribution as mainly analytical and interpretive (Patton, 1999; Yin, 2018). Future research could also examine other cases involving multiple subsequent transgressions in high-moral-identity brands, adopting a more explicitly theory-building approach.

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Long papers

Track: Marketing



Brand Awareness as a Threshold Condition: How Attitudes Translate into Willingness to Pay for the Mountain Product Label

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Abstract

Frame of the research. *Despite its institutional value, the EU optional quality label "Mountain Product" suffers from an awareness gap among consumers and this may limit its effectiveness as a market signal. Moreover, little is known about the psychological mechanisms that translate label recognition into economic commitment.*

Purpose of the paper. *Drawing on signaling, this study investigates whether Brand Awareness activates a structured evaluative process leading to Willingness to Pay through Brand Attitude.*

Methodology. *Primary research data were gathered through a survey based on the administration of a questionnaire to a sample of Italian consumers. SEM is employed for two sub-samples segmented by self-reported awareness levels of the Mountain Product label.*

Results. *Brand Attitude drives monetary evaluation in both sub-samples, but the consumer is inclined to pay a premium price not only because of his/her degree of recognition of the label, but because there is an affective evaluation that play a role within the relationship.*

Research limitations. *Generalizability is limited by the use of a convenience sample and its cross-sectional nature.*

Managerial implications. *Results provides insights for policymakers and agri-food stakeholders enhancing the economic value of mountain-origin products. Strategic priority should be given to establish a cognitive baseline for consumers through educational contents. Afterwards, managers must focus on Brand Attitude, which serves as critical mediator for translating label recognition in economic commitment.*

Originality of the paper. *This study contributes to the consumer behaviour literature, highlighting the role of Brand Attitude in the relationship between label awareness and price premium.*

Keywords*: Mountain Product Label, Brand Awareness, Brand Attitude, Willingness to Pay, SEM.*

1. Introduction

In the contemporary food market, there is an escalating consumer demand for products characterized by authenticity, local provenance, and a well-defined geographical identity (Feldmann & Hamm, 2015). This trend is exceptionally prominent for foodstuffs originating from mountainous regions, which are widely recognized for their high-quality artisanal production that mirrors the unique biodiversity, traditional landscapes, and rich cultural heritage of these territories. Despite this prestige, mountain areas represent a paradox of high ecological value coupled with extreme socio-economic vulnerability (Duglio et al., 2022; Sturaro et al., 2013). These regions face systemic challenges, including harsh climatic conditions, complex topography, and persistent phenomena such as depopulation and land abandonment. Such adverse factors not only hinder market competitiveness but also threaten the maintenance of traditional farming methods and the survival of the socio-ecological systems they support (Dax et al., 2021).

To address these challenges and safeguard the livelihoods of mountain communities, the European Union introduced the Mountain Product optional quality term under the Regulation 1151/2012 on quality schemes for agricultural products and foodstuffs. This represented a significant evolution in the European regulatory landscape, shifting the institutional focus toward the enhancement of mountain-origin foodstuffs through a powerful valorization tool.

The Mountain Product label is exclusive to products intended for human consumption originating

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from mountain areas, distinguishing itself from traditional certification schemes, since it operates within the broader regulatory framework of food labeling, without technical production specifications and certifications.

The Mountain Product label serves a dual strategic purpose: supporting the local economy, particularly the agri-food sector, while providing consumers with assurances regarding the origin and authenticity of these goods. By promoting unique characteristics and traditional production methods, the label allows producers to differentiate their products in a crowded marketplace, offering consumers verified indicators of quality, authenticity, and sustainability.

However, despite the strategic potential of the label, empirical evidence raises questions about its market effectiveness. Recent studies consistently highlight a pervasive awareness gap, showing that a vast majority of European consumers remain unfamiliar with the designation (Oliveira et al., 2021; Staffolani et al., 2023). Research suggests that while the label embodies attributes highly desired by consumers, such as healthiness, safety, and environmental stewardship, its signaling function is often compromised by the lack of cognitive salience (Oliveira et al., 2021; Staffolani et al., 2023). Moreover, the existing literature has confirmed a general positive Willingness to Pay (WTP) for mountain-labeled goods (Stiletto and Trestini; 2022; Bentivoglio et al. 2020) but the internal psychological mechanisms that translate initial signal recognition into an economic premium remain insufficiently explored. Specifically, there is a lack of research on how Brand Attitude (ATT) plays a role within the relationship between Brand Awareness (AWA) and Willingness to Pay.

This study addresses this gap by proposing a model where Brand Attitude acts as a pivotal bridge between awareness and economic commitment. Furthermore, acknowledging that the consumer base is not monolithic, we provide an original contribution by investigating the heterogeneity of this signaling process. More specifically, we test whether the behavior mechanism operates differently across segments with different levels of prior knowledge. This approach allows us to determine if high awareness not only increases the likelihood of purchase, but also fundamentally alters the strength and coherence of the Attitude-WTP nexus, offering a more granular understanding of how institutional labels can be effectively leveraged in complex food markets.

The paper is organized as follows: Section 2 develops the theoretical background; Sections 3 and 4 detail the hypotheses, sample and methodology; Section 5 reports the empirical results; and Sections 6 and 7 discuss conclusions and implications for policy-makers and stakeholders.

2. Theoretical Background

This section establishes the theoretical foundation for investigating the market value of the Mountain Product optional quality term. It employs Signaling Theory to explain the cognitive mechanisms, specifically Brand Awareness (AWA) and Brand Attitude (ATT), that translate into Willingness to Pay (WTP), used to determine consumers' economic commitment. A conceptual model is then proposed to test how these structural relationships vary across different levels of consumer awareness.

2.1 The Mountain Product Label to Support Resilience in Mountain Areas

In the last decades, the European agri-food system has undergone a radical transformation, shifting its focus to territorial specificities and differentiated quality. Within this context, the Common Agricultural Policy (CAP) has played a pivotal role, evolving from an economic support mechanism into a vital driver of resilience for marginal territories like mountainous regions, which hold immense significance, as they cover over a third of the total European territory and house approximately 20% of its population. However, despite their importance, these regions have faced a severe process of deruralization, resulting in the widespread abandonment of mountainous land, the decline of traditional farming activities and significant depopulation. Consequently, this led to the breakdown of the economic, cultural, and social systems that are traditionally unique to these territories (Bucci, 2017). Unsurprisingly, mountain areas have been historically identified by the European Union as

Less Favoured Areas (LFAs) under Article 18 of EC Regulation No. 1257/1999. This designation is specifically attributed to regions characterized by high costs of agricultural activity due to unfavorable climatic conditions related to altitude and complex morphological constraints, such as steep slopes, which make the mechanization of production processes challenging or even infeasible, and the typical lower soil fertility compared to lowland counterparts.

To address these systemic challenges, the European Union's regulatory landscape underwent a significant evolution with the introduction of Regulation 1151/2012 on quality schemes for agricultural products and foodstuffs, marked by the incorporation of Optional Quality Terms. Within this framework, the Mountain Product designation stands out, representing a powerful tool for the enhancement of mountain-origin foodstuffs. To qualify, the label requires that products are intended for human consumption, with both the raw materials, animal feedstuffs and the processing stages strictly located within defined mountain territories.

Unlike Protected Designations of Origin (PDO) and Protected Geographical Indications (PGI), which safeguard specific names linked to strict production specifications, the Mountain Product label serves as a more transversal and optional indication, designed to emphasize the unique characteristics of products originating from areas where challenging natural and production conditions prevail, leveraging the rich traditions and local knowledge related to food processing. The flexibility and simplified nature of the label is reflected by the absence of technical complex production specifications, certifications, and the lack of involvement of certification bodies typical of formal certification schemes. These characteristics make the label a more accessible instrument for local producers to leverage authenticity as a competitive advantage.

The underlying policy objective of the label extends far beyond simple consumer protection, representing an institutional territorial branding strategy. By promoting the distinctiveness, the label aims to generate added value for local producers, thereby compensating for the diseconomies of scale typical of these agricultural systems. Ultimately, the label acts as an instrument of resilience: the goal is to effectively transform geographical disadvantages into competitive advantages and support the socioeconomic resilience of mountain communities, counteracting critical phenomena such as land abandonment, loss of biodiversity, and rural depopulation (Gragnani, 2013).

2.2 The Mountain Product Label in Consumer Research

The literature on the topic and the empirical research conducted over the last decade reveals a complex and often contradictory market landscape. A shared consensus on the existence of a significant awareness gap with respect to the label is present among scholars: despite its institutional status, the label remains partially unknown to the general public, posing a substantial barrier to the label's effectiveness as a quality signal (Oliveira et al., 2021; Staffolani et al., 2023), with limited understanding of its existence and the certification process. However, insights from Staffolani at al. (2023) suggest that once consumers become aware of the label, their perception of it is comparable to that of the Protected Designation of Origin (PDO).

Interestingly, the literature highlights that consumers consider mountain food products as intrinsically associated with highly positive attributes, such as naturalness, environmental sustainability, healthiness, and the preservation of traditional cultural heritage (Bassi et al., 2021; Bassi et al., 2022). Consumers perceive these goods as premium items, often evoking idyllic and pure imagery of mountain landscapes (Stiletto and Trestini, 2022). This positive image translates into a generally favorable attitude once the consumer is exposed to the label, because they tend to perceive the Mountain Product label as a hallmark of authenticity, safety, and traditional craftsmanship (Bassi et al., 2022). Moreover, factors such as personal attachment to mountain regions, tourism experiences, and a general green consumption orientation have been found to significantly strengthen these positive attitudinal dispositions (Bassi et al., 2021; Staffolani et al., 2023).

Academic literature also focused on the relationship between these perceptions and economic behavior, with a large portion of studies investigating consumers' Willingness to Pay. Despite the aforementioned low awareness, consumers consistently demonstrate a readiness to pay a price

premium for products bearing the Mountain Product designation compared to unlabeled alternatives. This premium has been empirically quantified in various food categories and it is consistently driven by the perceived added value of sustainable and traditional production methods (Stiletto and Trestini, 2022; Bentivoglio et al., 2020). Notably, the Mountain Product label has shown a capacity to generate utility levels comparable to more established schemes like the Protected Designation of Origin (PDO), suggesting its potential as a strategic differentiation tool for producers who do not fall under PDO specifications (Staffolani et al., 2023).

However, the efficacy of this value-creation chain, from recognition to price premium, is not uniform. Existing research points to significant heterogeneity in consumer responses based on socio-demographic factors and levels of cognitive engagement (Stiletto and Trestini, 2021; Bentivoglio et al., 2020). This variability underscores the complex interplay between consumer perceptions, product attributes, and label regulations in shaping the effectiveness of the Mountain Product scheme.

2.3 Decoding Quality: The Role of Labels in Food Consumption

In the contemporary food market, characterized by an escalating demand for quality and authenticity, Signaling Theory provides a robust framework for understanding how quality labels and quality schemes can act as extrinsic cues. Within this paradigm, labels can serve as strategic instruments to mitigate market and information asymmetry between producers, who possess full knowledge about the intrinsic quality of a product, and consumers, who would have to face prohibitive costs in verifying such attributes, that, as credence qualities, remain largely unobservable even post consumption (Javeed et al., 2022; Mardumyan et al., 2023).

This theoretical lens is particularly relevant for mountain food products, which are fundamentally defined by their credence attributes, namely qualities that remain unverifiable even post-consumption. Consequently, Geographical Indications (GIs) and the *Mountain Product* act as institutional proxies for *terroir* and provenance, transforming unobservable production standards into market signals (Artencio et al., 2022; Aprile et al., 2022; Proi et al., 2025).

The Mountain Product label encapsulate a multidimensional array of credence attributes to remain credible, functioning as a proxy for complex socio-ecological dimensions. By synthesizing these qualities into a single extrinsic cue, quality schemes act as potent instruments for product differentiation, effectively isolating mountain-origin foodstuffs from generic alternatives (Staffolani et al., 2023; Bispini et al., 2025; Mazzocchi and Sali, 2022).

Empirical evidence indicates that the successful transmission of these signals can catalyze a significant increase in Willingness to Pay. Specifically, consumers often exhibit a propensity to accept a price premium for certified mountain products compared to unlabeled counterparts, as the label mitigates the perceived risk associated with unobservable quality (Staffolani et al., 2023; Mazzocchi and Sali, 2022). This premium is particularly pronounced among psychographic segments characterized by high green involvement or a strong territorial attachment, where the label aligns with the consumer's internal value system (Staffolani et al., 2026; Schäufele-Elbers et al., 2024).

However, the efficacy of the signal is fundamentally moderated by the consumer's cognitive engagement and prior knowledge. Despite the inherent *halo* of tradition and purity associated with the mountain quality scheme (Mazzocchi and Sali, 2022), the role as value-drivers is compromised by asymmetries in consumer awareness (Staffolani et al., 2023; Bispini et al., 2025). When awareness is deficient, the signal remains undecoded, failing to activate the evaluative frameworks necessary to justify a premium price (Staffolani et al., 2026). This highlights a critical challenge, because poorly understood claims erode institutional trust (Hemar-Nicolas et al., 2024; Ray et al., 2022; Hasan et al., 2024). Such limitations underscore that the signal's ultimate impact is highly contingent upon the heterogeneous interpretive frameworks and awareness levels of the target audience (Xu, 2025).

2.4 From Cognitive Recognition to Economic Valuation: The Role of Brand Attitude

Building upon the framework of signaling theory, the effectiveness of a quality scheme is fundamentally rooted in a hierarchical cognitive process where Brand Awareness acts as a

foundational and functionally necessary precursor to the formation of any evaluative judgement. From a cognitive perspective, for a signal such as the *Mountain Product* designation to exert any influence over consumer evaluative processes, it must first be perceived and recognized. Within this hierarchical process, Brand Awareness ensures that the consumer not only notices the label but also processes it as a credible extrinsic cue; otherwise, without this initial cognitive salience, the signal remains latent and fails to trigger the mental associations necessary to shape a structured Brand Attitude (Menzel and Teubner, 2024; Lee et al., 2022).

The logical necessity of awareness is explained by the role of quality labels as heuristics in markets defined by information asymmetry. As discussed in the previous paragraph, brands and quality schemes serve as mental shortcuts that reduce the complexity of evaluating unobservable credence qualities (Jain et al., 2022; Seonbo et al., 2026). In this sense, the Brand Awareness of the label represents the essential entry point for these heuristics to operate: only once a label is recognized and its presence is cognitively validated, the consumer can proceed to form specific beliefs and affective evaluations (attitudes) based on the perceived credibility and symbolic meaning of the cue.

However, signaling theory alone does not fully account for the internal psychological mechanisms that translate a signal into a behavioral or economic response. In the agri-food sector, empirical evidence identifies Brand Attitude as the critical mediating variable linking the recognition of external quality cues to final purchase outcomes and pricing strategies (Di Domenico et al., 2022), bridging the gap between signal recognition and Willingness to Pay.

As underscored by Di Domenico et al. (2022), Brand Attitude represents a pivotal variable in marketing research, serving as a reliable predictor of purchasing preferences and a frequently employed mediator in the analysis of consumer buying behavior.

The *Signal-Attitude-Behavior* nexus is expected to exhibit significant heterogeneity based on the depth of the consumer's cognitive engagement, that is the level of Brand Awareness with respect to the *Mountain Product* label. In instances of low awareness, the signal's diagnostic capacity is attenuated, leading to fragmented or superficial attitude formation that may fail to translate into economic commitment. Conversely, high awareness facilitates a more coherent alignment between the label's values and the consumer's belief system, potentially strengthening the predictive power of Brand Attitude on Willingness to Pay. This theoretical heterogeneity necessitates to investigate how value creation differs fundamentally between low-awareness and high-awareness segments.

3. Hypotheses Development and Conceptual Model

Based on the theoretical framework and the empirical evidence previously discussed, this study explores the cognitive-evaluative path that leads consumers to valorize mountain-origin products. While Brand Awareness is a fundamental prerequisite for signal recognition, we posit that its impact on Willingness to Pay is not only potentially direct but is significantly processed through the consumer's evaluative framework. In the agri-food sector, quality labels act as cues that foster trust and positive perceptions. These perceptions merge into a Brand Attitude, which serves as a psychological bridge. A consumer accepts a price premium (WTP) because the label has successfully shaped a positive attitude that justifies the higher expenditure.

In addition, the literature emphasizes a persistent awareness gap regarding the Mountain Product label. This heterogeneity suggests that the signaling mechanism may not function uniformly. In high-awareness segments, the signal is decoded more effectively, potentially strengthening the link between attitude and economic commitment. Conversely, for consumers with low awareness, the signal may remain ambiguous, leading to a weaker attitudinal impact on WTP. To test this structural difference, we propose a model in which the sample is divided into two different and separated groups: one with low levels of knowledge of the Mountain Products and the other one with high levels of familiarity.

Consequently, we test the following hypotheses for both sub-samples separately:

H_1: Brand Awareness (AWA) has a positive effect on Brand Attitude (ATT), therefore AWA is an antecedent of affective evaluations.

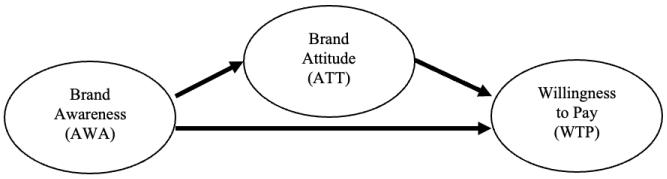
H_2: Brand Attitude (ATT) has a positive effect on Willingness to Pay (WTP), therefore we expect that ATT drives monetary evaluation.

H_3: Brand Awareness (AWA) has a positive and direct effect on Willingness to Pay (WTP).

H_4: Brand Attitude (ATT) positively affects the relationship between AWA and WTP, therefore we expect the consumer being inclined to pay a *premium price* (WTP) for Mountain Products not only because of his/her degree of recognition of the label (AWA), but because there is an affective evaluation (ATT) that play a key role within the relationship.

Figure 1 illustrates the proposed theoretical framework.

Figure 1. Theoretical model



Source: authors' elaboration

4. Data and Empirical Strategy

A survey was performed administering a structured questionnaire to a convenience sample of consumers. People have been approached just after the entry of a hypermarket in Italy and a total number of 317 questionnaires were collected on different days/weeks.

The final sample consists of 317 respondents, that are found being mainly women (68.1%), born between 1931 and 2005, and living in families composed mainly of two (37.9%), three (20.8%) or four (20.5%) members. Finally, around 40.1% of the sample states a family monthly income between 1,301 and 2,600 euro.

Measurement items included in the questionnaire were derived from the extant literature and adapted to the context of the study, assessed using a 7-point Likert scale anchored by *strongly disagree - 1* and *strongly agree - 7*.

Finally, Structural Equation Modeling (SEM) has been employed to test the forementioned hypotheses for two different sub-samples: one with very-low/low self-reported levels of brand awareness (i.e., all the three items of the latent variable ATT with a score lower than 4), and one with high/very-high self-reported levels of brand awareness (i.e., all the three items of ATT with a score higher than 4).

5. Empirical analysis and findings

Standardized loadings and p-values demonstrate that the measurement model provide evidence of robust convergent validity and internal reliability. Factor loadings are higher the threshold of 0.70 (Hair et al., 2010). We found statistically significant coefficients and this demonstrate a robust relationship between the items and their corresponding latent constructs (Table 1).

For all the three latent constructs (AWA, ATT, WTP) the convergence validity is assessed by the Average Variance Extracted (AVE) across all items associated with a construct. The AVE is higher than the recommendation of 0.5 for all latent variables, meaning that they explain more than 50% of the variance of their items (Hair et al., 2017a, 2017b).

For what concerns Cronbach's alpha and McDonald's omega, they always exceed the threshold, denoting a very good level of internal consistency of the chosen indicators (Hair et al., 2017a).

Table 1. Measurement Models Results

		Low AWA (1-2-3) N. 88		**High AWA (5-6-7) N. 110**	
Latent Constructs	Items	Standardized Factor Loadings		Standardized Factor Loadings	
Brand Awareness (AWA)	**AWA1**: I know the *Mountain Product* label. **AWA2**: I can distinguish the *Mountain Product* label. **AWA3**: I believe to be an expert of the *Mountain Product* label.	1.00*** 0.87** 0.80***	AVE: 0.80 Cronbach's alpha: 0.92 McDonald's omega: 0.92	0.90*** 0.94*** 0.74***	AVE: 0.75 Cronbach's alpha: 0.89 McDonald's omega: 0.90
Brand Attitude (ATT)	How do you consider buying food products with the *Mountain Product* label? **ATT1**: 1 negative – 7 positive **ATT2**: 1 very bad – 7 very good **ATT3**: 1 useless – 7 useful	 0.96*** 0.98*** 0.97***	AVE: 0.94 Cronbach's alpha: 0.98 McDonald's omega: 0.98	 0.94*** 0.97*** 0.97***	AVE: 0.92 Cronbach's alpha: 0.97 McDonald's omega: 0.97
Willingness to Pay (WTP)	**WTP1**: I buy *Mountain Products* even though they are more expensive. **WTP2**: I am willing to pay more to buy *Mountain Products*. **WTP3**: I believe it is fair to pay a higher price to buy *Mountain Products*.	0.92*** 0.99*** 0.92***	AVE: 0.89 Cronbach's alpha: 0.96 McDonald's omega: 0.96	0.88*** 0.91*** 0.90***	AVE: 0.80 Cronbach's alpha: 0.93 McDonald's omega: 0.93

Switching to the structural models, we find acceptable fit indices for both models (Hu and Bentler, 1999):

- Model 1 for low self-reported levels of knowledge of the label: CFI=1.00, TLI=1.00, SRMR=0.052 and CD=0.999[4];
- Model 2 for high self-reported levels of knowledge of the label: CFI=0.968, TLI=0.951, SRMR=0.061 and CD=0.932.

Starting from the sample of consumers reporting a low level of knowledge of the Mountain Product label, results show that the only statistically significant relationship is the one from affective evaluations (ATT) and Willingness to Pay (WTP) with a β coefficient equals to 0.68. Therefore, self-reported low AWA leads to not significant relationships, despite the direct one ATT WTP.

Conversely, for those consumers' who are aware of knowing very well the Mountain Product label, all hypotheses are supported. Table 2 reports the relationships at work for the structural models.

Table 2. Structural Models Results

	Low AWA (1-2-3)		**High AWA (5-6-7)**	
Relations	β	Hypotheses	β	Hypotheses
H_1: AWA → ATT	-0.11 (n.s.)	Not supported	0.47***	Supported
H_2: ATT → WTP	0.68***	Supported	0.34***	Supported
H_3: AWA → WTP	0.07 (n.s.)	Not supported	0.30**	Supported
H_4: AWA → ATT → WTP	-0.15 (n.s.)	Not supported	0.21**	Supported

Note: *p < 0.05, **p < 0.01, ***p < 0.001

[4] Such a well-fitted model may be due to the small sample size or small correlations.

6. Discussion and Implications

This study investigates how Brand Awareness (AWA) and Brand Attitude (ATT) interact to generate Willingness to Pay (WTP) for the EU optional quality term *Mountain Product*. By distinguishing between low- and high-awareness consumers, we uncover a stage-dependent decision architecture that refines existing models of brand signaling.

The empirical findings reveal two structurally distinct decision regimes.

In the low-awareness segment, Brand Awareness does not significantly influence either Brand Attitude or Willingness to Pay. The only robust relationship observed is the direct effect of ATT on WTP. This suggests that when the *Mountain Product* label is not cognitively salient, it does not function as a diagnostic quality signal. Instead, economic commitment appears to be driven by general affective evaluations rather than by structured interpretation of the institutional cue.

On the contrary, in the high-awareness segment, the signaling mechanism becomes fully operative. Brand Awareness positively influences Brand Attitude and exerts both direct and indirect effects on WTP. This indicates that once awareness surpasses a minimum familiarity threshold, the label activates a coherent cognitive–evaluative process.

These findings suggest that AWA does not operate as a simple linear predictor of WTP. Rather, it functions as a threshold condition enabling the transformation of institutional recognition into economic value. Three main theoretical contributions can be derived from our findings.

First, we demonstrate that in markets defined by high-complexity credence attributes, the effectiveness of institutional signals is contingent upon consumer cognitive maturity. Awareness acts as a structural activation mechanism, without which the signal remains economically inert. By identifying ATT as a pivotal variable, the study contributes to the literature by proving that a quality signal must undergo an evaluative transformation into an attitudinal disposition before it can generate a price premium. In doing so, this study extends Signaling Theory by demonstrating that a signal's effectiveness depends not only on its credibility but also on its cognitive accessibility. A signal that is not recognized cannot reduce information asymmetry.

Second, identifying awareness thresholds enable us to prove that the diagnostic power of a quality signal is basically influenced by the recipient's prior cognitive engagement. The divergence between low- and high-awareness segments is also consistent with dual-process theories (Petty & Cacioppo, 1986). In low-awareness conditions, decision-making appears peripheral and affect-driven. In high-awareness conditions, the evaluative process becomes more central and cognitively elaborated, integrating awareness into price justification. Thus, awareness does not merely amplify attitudes, it alters the decision architecture underlying WTP.

Third, ATT acts as a pivotal mediator, transforming signal recognition into economic value. In fact, the findings confirm that Brand Attitude is not merely a byproduct of awareness, but the central mechanism translating recognition into monetary commitment. In high-awareness conditions, ATT partially mediates the relationship between AWA and WTP, reinforcing its role as a value-conversion engine.

Regarding implications, our findings may be particularly insightful for policymakers and institutional actors. In fact, our results indicate that the Mountain Product label cannot generate price premiums autonomously: without sufficient awareness, the signal fails to activate structured consumer evaluation. Thus, awareness-building initiatives should be considered a foundational investment rather than a complementary marketing activity. Policy-makers should fund large-scale institutional campaigns to help the label cross the cognitive threshold identified in the analysis: without public support to increase basic awareness, the label fails to activate its potential as a tool for territorial resilience, as consumers with low awareness are less likely to translate positive attitudes into an economic premium. Educational marketing strategies are required, focused on the emotional and symbolic attributes associated with mountain farming (emotional branding, storytelling, etc.). Policy-makers must understand that promoting the label is not just a matter of origin transparency, but of building an institutional reputation. As a consequence, one-size-fits-all communication

strategies are very much likely to be ineffective and require a different approach depending on the territories. In geographical areas where awareness is high, policies can support more sophisticated valorization schemes. In regions where the label is still unknown, institutional efforts must prioritize signal salience to ensure that the label becomes a diagnostic tool for consumers.

Last but not least, assessing periodically the reached level of awareness after the communication campaign is key. If the path between ATT and WTP remains weak in certain segments, the institutional signal is not reaching its objective of creating added value for producers, requiring a recalibration of promotional investments.

For agri-food firms, the findings suggest that collective communication strategies and coordinated territorial branding are essential to unlock the economic potential of optional quality schemes. Moreover, in low-awareness markets, producers should complement the *Mountain Product* logo with clear explanatory cues on packaging (e.g., short descriptions of the label's guarantees, QR codes, or concise origin claims), as the symbol alone is unlikely to activate WTP. In high-awareness markets, instead, producers should invest in premium packaging and territorial storytelling that emphasize authenticity and tradition, leveraging positive attitudes to justify higher prices. Moreover, pricing strategies should be adjusted across regions and channels, avoiding aggressive price premiums in areas where awareness of the label remains limited.

7. Conclusions, Limitations and Future Research

This study demonstrates that the economic effectiveness of the Mountain Product label depends not only on positive consumer attitudes, but on the presence of a minimum awareness threshold that activates structured evaluative processes. Awareness is therefore not simply a communication metric, but a strategic precondition for territorial value creation.

However, beyond the contribution of this work, some limitations should be acknowledged.

The survey was undertaken in one hypermarket only; this may limit generalizability of the results. In addition, the study is cross-sectional in nature, and this does not allow to capture causal dynamics. Therefore, future research should consider a longitudinal approach to verify causality and to examine whether awareness transitions from low to high states alter decision regimes over time.

Next steps may also investigate additional mediators such as perceived authenticity or trust and can extend the analysis cross-nationally.

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Società Italiana di MANAGEMENT

Long papers

Track: Purpose-driven Businesses



Missing the Social in Entrepreneurial Team Research: A Systematic Literature Review of Social Entrepreneurial Teams

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Abstract

Social entrepreneurial teams (SETs) create and manage social ventures and need to balance economic and social objectives, traditionally competing and diverging. We conduct a systematic literature review of 49 research articles specifically focused on SETs implementing an input-mediator-output (McGrath 1964, Mathieu 2008) framework to identify research areas, and key research gaps: First, we identify that despite social entrepreneurship literature focus studied organizational dynamics, teams are not properly scrutinized. In particular, studies on SETs mostly focus on established social enterprises with lack of studies on team dynamics at the team formation stages, secondly outcomes measures are considered at organizational level leading lacking focus on team related measures. We suggest prospective research avenues that combine socio-economic research approaches (longitudinal qualitative studies) with quantitative studies using larger samples to enable a holistic system perspective on SET.

***Keywords**: Social entrepreneurial teams, SET, literature review, new social entrepreneurial teams*

1. Introduction:

Social enterprises (SEs) are organisations that seek to address persistent social challenges, including poverty, exclusion, and marginalisation, through innovative, entrepreneurial business models (e.g., Peredo & McLean, 2006; Seelos & Mair, 2005; Thompson, 2002). Motivated by these issues, SEs conduct business with an embedded social mission (Huda et al., 2019; Doherty et al., 2014) and employ revenue-generating strategies to support it (Bedi and Yadav, 2019; Pless, 2012; Santos, 2012; Mair et al., 2012). The pursuit of both social and economic objectives makes SEs hybrid organisations (Battilana and Lee, 2014) that embed dual institutional logics, i.e., the socially constructed practices, assumptions, values, beliefs, and rules by which individuals and organisations exist, organise time and space, and provide meaning to their social reality (Thornton and Ocasio, 2008).

Similar to commercial ventures, SEs are the result of the collective effort of founders (Ben-Hafaïedh & Dufays, 2021; Wolf & Mair, 2021). Each founding member imprints the venture with her own personal experiences—such as managerial, sector-specific, or community-based working experiences—that shape how social problems and related available solutions are identified and framed (Becker 1964, Haugh, 2007; Lee & Battilana, 2020; Sahasranamam et al., 2024; Marquis & Tilcsik, 2013; Mathias, Williams, & Smith, 2015; Colombo & Piva, 2018; Niu, He, & Zhu, 2022; Kim & Aldrich, 2005). Beside human capital, founders also contribute heterogeneous assets and their own networks, including access to funds, stakeholder relationship, and other forms of social capital (Kim & Aldrich, 2005, Brinckmann and Hoegl 2011, Haugh, 2007; Wolf & Mair, 2021,). In this sense, early imprinting shapes both the composition and the internal dynamics of the founding team and, through the team, the emerging new venture (Fauchart & Gruber, 2011; Waguespack et al., 2018, Johson 2007). Individuals (self) select in but also out of the founding team based on homophily, i.e., similarity of team members' characteristics (Discua Cruz et al. 2013, Francis & Sandberg 2000), and heterogeneity, with particular emphasis on functional characteristics and the wider composition of the individual's social network (Martin et al., 2003; Beckman, 2006, Davidsson & Honig 2003, Mosey & Wright 2007), ultimately identifying "who should be part of us" (Ruef et al., 2003, Beckman 2006, Ben-Hafaïedh & Dufays, 2021; Sahasranamam et al., 2024). Once assembled, the team engages in collective sensemaking — shared interpretive work through which members negotiate how to understand their environment, the nascent team and future organisation, and its mission — and identity work which

seeks to construct and maintain answers to "who are we as a team?" and "what do we want to do?" type of questions (Weick, Sutcliffe, & Obstfeld, 2005; Cornelissen & Clarke, 2010; Battilana & Dorado, 2010; Powell & Baker, 2014; Lee & Battilana, 2020). In these early phases of team emergence, individual identity and value commitments are articulated, contested, and recombined into a shared team identity that both channels and constrains personal agency—founders' capacity to act in line with their own individual value. Subsequently, founders simultaneously guide the emergence of organisational arrangements such as role structures, decision-making routines, and patterns of coordination (Howard-Grenville 2005, Lin et al., 2017, Battilana & Dorado, 2010; Smith & Besharov, 2019).

However, individual contributions are not purely idiosyncratic to the single individual founder but are institutionally shaped: founders' interpretations of problems, solutions, "appropriate" ways of doing and organising are informed by and embedded in the broader institutional environment which shapes norms, guides behaviour and the interpretation of social reality (Thornton & Ocasio, 1999; Garud, Hardy, & Maguire, 2007; Battilana, Leca, & Boxenbaum, 2009). As such, individuals are both enabled and constrained by the institutional environment (Lounsbury, Steele, & Wang, 2023; Thornton & Ocasio, 1999; Garud, Hardy, & Maguire, 2007). Individuals are agents embedded in their institutional environment and act within but independently from it (DiMaggio, 1988).

As the venture-creation process unfolds, founders' human capital and individual characteristics - such as values, work practices, and role identities - are enacted and become stabilised and imprinted on the team through everyday interactions. These personal characteristics of the founders are subsequently imprinted on the nascent organisation by guiding early structural choices (e.g., governance forms, role configurations), routine practices (e.g., how decisions are made, how stakeholders are engaged), and claims of organisational identity (e.g., how the organisation presents "who we are" and "what we stand for") (Schein, 1983, Johnson, 2007, Fauchart & Gruber, 2011; Gioia et. al., 2013, Johansen & Waldorff, 2020). In this way, institutionally shaped interpretations and identities at the individual level are translated into relatively durable organisational-level patterns that remain embedded within—and interact with—the broader institutional field, reinforcing or sometimes contesting existing logics (Garud et al., 2007; Battilana et al., 2009).

SET are relevant to be studied since they are at the foundations of collective decision-making in hybrids; they may be the source and outcome of organisational deviations from its core values (Battilana & Lee, 2014; Besharov & Smith, 2014; Dufays, 2020; McPherson et al., 2001; Klotz, 2014). Current work on SET tends to be framed as a subset of mainstream social entrepreneurship research, which typically adopts a broad organisational-level perspective on how social entrepreneurship processes unfold (e.g., Bacq & Janssen, 2011; Servantie & Rispal, 2018). Extant studies examine how social ventures are created and managed, yet they rarely develop a clear and explicit focus on SETs, instead centring the debate on social entrepreneurship, social ventures, and social enterprises more generally (Bacq & Janssen, 2011; Dacin et al., 2010; Saebi et al., 2019). Only tangentially does this literature zoom in on, or explicitly acknowledge, the relevance of SETs and the ways in which they are formed (Ben-Hafaïedh & Dufays, 2021; Mai et al., 2022; Sahasranamam et al., 2024).

In addition, existing work views SETs as undistinguished/able entities that may include founders, senior and/or top managers but also more peripheral members such as employees and/or volunteers, often conceptualised through core–periphery structures (Ben-Hafaïedh, 2021; for traditional literature see Cattani & Ferriani, 2014; Roberto, 2003). However, conceptualising SET as an undifferentiated object of analysis is problematic because it obscures differences in roles, responsibilities and influence between founders and managers, thereby producing a fragmented and internally inconsistent understanding of SET.

Despite increasing interest in hybrid organisations, our understanding of SETs remains elusive, and scholars have called for more work on the topic (Short et al., 2009; Dufays, 2016; Saebi, 2019;

Dufays, 2022; Song, 2024). SETs must navigate heterogeneous and conflicting stakeholder demands associated with the dual social and commercial mission of the ventures they create (Smith et al., 2013; Costa et al., 2022). To maintain organisational legitimacy with the diverse set of stakeholders involved in hybrids, SEs must continuously respond to and reconcile expectations anchored in both the organisation's logics (Battilana & Lee, 2014; Greenwood et al., 2011). This requires adaptive leadership, inclusive decision-making, and resource-mobilisation strategies grounded in team-level attitudes, such as a shared commitment to the social mission and a shared perseverance in pursuing it (Doherty, 2014; Makhlouf, 2011). Against this background, we ask the following research question: What are the emerging topics, contributions, and shortcomings in extant literature on social entrepreneurial teams?

To answer this question, we conduct a systematic literature review (Snyder et al., 2019; Tranfield et al., 2003) of 31 articles published between 2006 and 2024 that explicitly examine SETs, and integrate these sources with an additional 35 research papers that mention and report relevant findings on SETs. The literature review was conducted using the Input–Mediator–Output (IMO) framework (McGrath, 1964), which enables us to identify emergent themes related to team composition of SEs, mediating mechanisms, and related outcomes.

First, we organise the extant literature and identify commonly discussed topics and findings, as well as inputs, mediators, and outputs, in the SET literature. Second, we shed light on and critically analyse inconsistent findings and imbalances in overall scholarly contributions. Thus, by developing conversations on SETs, we lay the groundwork for future theorising and establish a baseline for theoretical contributions (Patriotta, 2020). Third, we illustrate that the SET literature fails to address team dynamics, as current studies focus on established SEs. We propose avenues for future research, with specific methods, questions, and theoretical anchors, to encourage research on SETs.

Building on this, we identify specific avenues for future research and outline practical implications for social entrepreneurs and organisations. In particular, our findings inform the design of co-founding support programmes, such as founder-matching events and digital matchmaking platforms (Cohen, 2013; Cohen & Hochberg, 2014), and yield actionable recommendations for building, developing, and mentoring effective SETs.

SETTING AND METHOD

Scope of the review

Literature-based articles that examine social ventures emphasise the need for more clarity on the social entrepreneurship construct (Peredo and McLean, 2006; Dacin et al., 2010; Bacq 2011; Lehner and Kansikas, 2013), or engage in a broader review of such a literature (Saebi 2019; Gupta 2020; Klarin and Suseno, 2023). However, there is increasing interest in more specific aspects of social entrepreneurship and social venturing, such as how social and economic value is created (Rispal 2016), the analysis of well-being (Kummitha 2025), and social networks (Dufays and Huybrechts 2014). Through our review, we seek to bring to scholarly attention the relevance of SETs in the social entrepreneurship field, as well as, more broadly, in hybrid organising and how individual members contribute to the creation and growth of social ventures.

To answer our research question, we implement a systematic literature review process structured into multiple steps, including sampling, coding, synthesis, analysis, and interpretation of existing studies (Tranfield, Denyer, & Smart, 2003). We then employ content analysis to recognise key themes across the examined papers (e.g., Schad, Lewis, Raisch, & Smith, 2016; Schilke, Hu, & Helfat, 2018) and follow Duriau, Reger, and Pfarrer (2007) and Krippendorff (2013).

Database driven

We followed a two-step search strategy combining a database-driven and a journal-driven approach. To sample articles, Scopus database and Web of Science are used and to provide coverage on SET literature, keyword search is run including the following keywords in the title and abstract: "founding group*", "new venture team*", "start-up team*", "Entrepreneurial team*, founding team, co-founder, venture team, "top management team*", and "TMT", and keywords related to SE, including "social entrepreneurship*", "social enterprise*", "social venture*", AND "social entrepreneur*", "social entrepreneurial team*", social venture team*, mission-driven team*. We consider only peer-reviewed English articles and exclude news articles, reviews, comments, editorial notes, and grey literature (e.g., professional reports, conference papers, policy papers) (Adams et al., 2017). Were excluded 14 articles on chemistry, agriculture, nursing, dentistry, Chemical engineering. Resulting in an initial sample of 206 articles. Because the social entrepreneurship field is relatively recent, and because a substantial share of social entrepreneurship research appears in specialized outlets such as the Social Enterprise Journal (rated 1 in the ABS Academic Journal Guide 2024) and the Journal of Social Entrepreneurship (rated 2), rather than in mainstream 3–4* management and entrepreneurship journals, only journals ranked Association of Business Schools 2024 (Chartered Association of Business Schools, 2024) level 1, or above, are included in the search, leading to an initial sample of 80 articles.

Journal driven:

In a second step, we complemented the database-driven search with a journal-driven search strategy to ensure that no other articles were missed. Based on the preliminary sample of 70 articles, we identified the main subject areas based on the ABS list, in which the initial sample of articles on social entrepreneurial teams wew published (e.g., entrepreneurship – ENT-SBM-, strategy -STRAT, finance – FINANCE, and accounting - ACCOUNT. For each subject area, we relied on the ABS Academic Journal Guide to select all the journals under these categories. We then conducted a systematic search within these journals. For each outlet, we screened all fully published articles and run advanced searches in Scopus (and, where necessary, EBSCO), restricting the search to the selected journal titles (field "Source title" / "SO – Publication name"), and applying the same keyword string and inclusion/exclusion criteria used in the database-driven phase. This procedure ensured that we captured all articles published, including those that might not have been retrieved through the initial topic-based database search.

The journal-driven search yielded 10 additional articles that met our eligibility criteria, which were added to the preliminary sample, 3 on SETs and 7 with relevant findings on SETs. The relatively small number of additional studies indicates that the database-driven search was already highly comprehensive, while the journal-driven step increases the robustness and transparency of our sampling strategy.

Reading the 90 articles (10 form the journal driven search and 80 from the database driven), we identify 31 articles that directly focus on SETs and 35 studies with relevant empirical findings and/or theoretical insights on SETs, although SETs were not their primary object of analysis, published between 2014 and 2024, drawn from 21 ABS-listed journals. Table 2 lists the sampled articles considered in the literature review, indicating their typology (conceptual or empirical).

Table 1 reports the details of this step of the literature review process.

Insert Table 1 about here

DESCRIPTIVE FINDINGS

Research on SETs began in 2014 and has grown steadily over the past 10 years, with a peak of 4 research papers published in 2022 and 2023. Figure 1 shows the trend in the number of articles published over the sampled period and integrates this with the empirical research methods used.

Insert Figure 1 about here

The studies included in our review employ a heterogeneous set of research designs, spanning conceptual, qualitative, quantitative, and mixed-methods approaches.

Research on SETs tends to be empirical with 26 percent of the articles adopting qualitative methods, 55 percent relying on quantitative approaches, and 10 percent using mixed-methods designs and the remaining 10 percent are non empirical. Qualitative studies tend to rely on case studies (n=8), four single and four multiple case studies. Quantitative contributions heavily rely on survey data (n=10, on the overall quantitative studies, 60%) or archival datasets such as GALI (1, 6%) or EDP (3, 10%), 3 articles on web crowled data. Gali is The Global Accelerator Learning Initiative (GALI) dataset, led by Emory University and the Aspen Network of Development Entrepreneurs (ANDE), collects global data on social startups applying to accelerators, while EDP Entrepreneurship Database Program (EDP), involving surveys completed by founding team members. The remaining mixed-methods articles (n=3, 10%) combine these strategies to exploit the complementary strengths of qualitative depth and quantitative breadth. Last, 5 percent of articles are literature reviews whereas and the remaining 3 (10%) are conceptual.

RESEARCH TOPICS ON SOCIAL ENTREPRENEURIAL TEAMS

We draw on the input–mediator–outcome (IMO) framework, which extends McGrath's (1964) classic input–process–output model by distinguishing team processes from other mediating mechanisms, such as cognitive, motivational and affective states (Mathieu et al., 2008). This framework is well-suited to our review because it allows us to take a broad, system-level perspective on SETs by organising the literature around inputs, mediators and outcomes, rather than focusing solely on performance (Klotz, 2014). In team research, inputs typically include members' individual attributes and team composition, such as educational background, specialisation and functional background (Amason et al., 2006), prior company affiliation (Beckman, 2006), educational prestige (Lester, Certo, Dalton, Dalton, & Cannella, 2006) and prior start-up experience (Nelson, 2003), as well as social capital. At the team level, inputs also include members' diversity. Mediators capture the dynamic interactions (communication, coordination) and emergent states (trust, shared mental models) that link inputs to outcomes. Outcomes refer to results assessed at the team or organisational level, such as team learning, innovation and effectiveness, although some studies use organisational performance as a proxy for team outcomes. For each IMO dimension, we identify the key theories, methods, and empirical results emerging from the reviewed studies.

Inputs:

Key theoretical frameworks and theories. Research on inputs to SETs primarily examines how founding and top management teams differ in functional backgrounds and prior experiences, and how this heterogeneity shapes social venture outcomes. Within the SET literature, the main theoretical lenses employed are Human Capital Theory (2 articles), the Resource-based view (2 articles; e.g., Bojica et al., 2018; Cheng, 2022), Upper Echelons Theory (4 articles; e.g., Bojica et

al., 2018; Gauthier, 2019; Lucas, 2023; Song et al., 2024), Team Production Theory (Crucke, 2021) and the Attention-based view (Lin, 2024). These 22 SET-focused articles are published mainly in 22 business and management journals, many of which are in the fields of entrepreneurship, organisation studies and innovation.

Research that draws on Human Capital Theory (Becker, 1964) conceptualises team members' backgrounds, skills and experiences as stocks of capital that can be invested in and leveraged to enhance venture outcomes. In this literature, HC theory is mainly used to theorise how specific team inputs—such as founding teams' prior entrepreneurial, sectoral or non-profit experience—translate into the social and commercial performance of social enterprises. For example, Sahasranamam et al. (2024) apply the theory to discuss that different types of founding team entrepreneurial experience constitute distinct forms of human capital whose value depends on how they align with external financing conditions and institutional logics.

Key methods.

Regarding key methods, 27 studies on inputs comprise 8 qualitative (30%), 16 quantitative (60%) and 2 mixed-methods designs (7%), and 1 conceptual (3%). Quantitative work predominantly relies on survey data collected directly from SEs through surveys (e.g., Crucke, 2021; Lin et al., 2024; Romero, 2023; Scarlata, 2016) or on data drawn from the EDP survey (Entrepreneurship Database Program) (e.g., Sahasranamam et al., 2023; Song et al., 2024; Chandler et al., 2022). Analysing research design, most quantitative articles adopt cross-sectional designs and rely on self-reported measures, often from a single informant within the social enterprise, as in Lin et al. (2024), who survey 17 social-investment experts. Such designs are particularly vulnerable to social desirability response bias — especially when assessing socially valued constructs such as social impact, mission orientation or inclusive leadership — and may therefore overestimate positive impact (Brutus et al., 2013). Single-informant data also risk masking intra-team differences in perceptions, power and role interpretations that are central to understanding collaboration, conflict and emergent states in diverse SETs (Song et al., 2024; Sahasranamam et al., 2023). The widespread use of perception-based indicators of social impact and team or enterprise effectiveness further complicates comparability across studies, as different scales and operationalisations tend to capture different performance indicators rather than a common construct. Among the 8 qualitative approaches, most use single- or multiple-case study designs based on semi-structured interviews (in European contexts or in low-income settings in Africa and Asia), complemented by archival analysis. The 2 mixed-methods studies combine archival or survey data with interviews and/or longitudinal case studies of WISEs, providing richer insight into team dynamics over time but remaining rare in the current evidence base (e.g., Almandoz, 2014; Battilana et al., 2015).

Human Capital in Social Entrepreneurial Teams

Consistent with the broader conceptualisation of human capital in economics, strategy, and management literature (Becker, 1964), the studies analysed focus on how combinations of education and experience within SETs shape problem-solving capacity, strategic vision, and the ability to address the complex dual goals typical of SEs (Sánchez, 2023). Human capital has been conceptualised as functional background, entrepreneurial and sector-specific experience, and education. Moreover, team heterogeneity and gender composition have been studied in terms of both resource acquisition and dual social–economic performance.

A first group of studies examines the functional background and prior experience of SET members. Human capital is identified as a central input for attracting external finance, gaining legitimacy, and achieving dual organisational objectives, even when key expertise is concentrated among a subset of team members (Scarlata et al., 2016; Sahasranamam et al., 2023). Non-profit entrepreneurial experience in SETs enhances SE performance, particularly when there is a strong

fit between the team's human capital and the institutional logic of external finance providers (Sahasranamam et al., 2023). Similarly, research on philanthropic venture capital (PhVC) shows that commercial experience in founding teams supports economic performance, whereas social experience supports social performance. Maximising overall performance is easier when teams combine high commercial experience with relatively lower social experience, suggesting that excessive social orientation at the top may harm financial outcomes (Scarlata et al., 2016). Complementary studies using structural equation modelling indicate that prior entrepreneurial and professional experience is among the key determinants of social entrepreneurs' success—measured by growth, profitability, and sustained financial returns—alongside environmental and psychological factors (El Chaarani, 2022).

A second set of studies examines SET's heterogeneity and human capital diversity, often drawing on Upper Echelons Theory (Hambrick & Mason, 1984) to link observable demographic and professional attributes — including functional background, organisational tenure, and education — to financial and social performance. Quantitative studies show that diversity in prior experience at the top management team (TMT) level is associated with greater and more stable social impact, as heterogeneous TMTs engage in sophisticated strategic decision-making and integrate multiple stakeholder perspectives into social value creation (Gauthier et al., 2019; Song, 2024). Heterogeneous teams provide richer cognitive resources and multiple frames of reference, which, when combined with high behavioural integration, reinforce the hybrid balance between social and economic objectives (Song, 2024). Ethnic diversity has also been identified as valuable in contexts involving refugees, as ethnically heterogeneous teams help overcome liabilities of foreignness, enhance opportunity identification and idea validation, and improve legitimacy within refugee communities and host societies, as well as access to key external stakeholders (Harima & Freudenberg, 2020). At the same time, qualitative work shows that the same heterogeneity that fosters innovation and stakeholder engagement can also generate coordination problems, communication breakdowns, and conflict, especially when underlying institutional logics differ (Bojica et al., 2018; Dufays, 2019).

A third stream considers gender composition and human capital. Studies of SETs indicate that teams with a higher proportion of women, younger members, and more highly educated founders are more strongly associated with the pursuit of social motives in new social enterprises, suggesting that founding teams with more women entrepreneurs, younger members, and greater education are positively associated with the pursuit of social motives in new ventures (Chandler, 2022). However, participation in accelerator programmes appears to attenuate the pursuit of social motives among female-dominated teams, while leaving the social orientation of younger or more educated teams largely unaffected (Chandler, 2022). Other studies show that female founders and female-led teams tend to attract less external funding than male or mixed-gender teams and are more likely to start non-profit rather than hybrid or for-profit social enterprises, highlighting gender disparities in access to finance and organisational structures (Compion et al., 2022). At the outcome level, studies of CEOs suggest that female chief executives are associated with higher social value creation but lower economic value creation relative to male CEOs, implying that gender diversity at the top is relevant in SEs (Compion et al., 2022; Lin, 2024). Taken together, this body of work highlights the importance of SETs' education and experience for social value creation, while contributing to the debate on whether heterogeneity or the presence of a particular set of experiences and backgrounds is more consequential for hybrid performance.

Finally, a conceptual strand within this stream draws on institutional logics and social imprinting to interpret how founders' initial emphasis on the organisation's social mission shapes recruitment, training, and operational processes. Beyond showing how founders initially imprint values and logics onto new organizations, recent work explains how these imprints evolve over time through processes of reinforcement, reforming, and coupling, creating 'sedimented imprints' that continue to guide action and identity even after founders' exit (De Cuyper, Clarysse, & Phillips, 2020). Building on the view of social enterprises as hybrids embedded in competing

social-welfare and commercial logics (Battilana & Lee, 2014), studies suggest that teams need exposure to both types of contexts to design and manage hybrid models effectively. Empirical studies show that logic diversity within teams can both enrich strategic innovativeness and create internal tensions: teams that successfully integrate multiple logics are better equipped to align social mission with financial viability, while unresolved differences fuel role ambiguity (uncertainty about who should prioritise which logic), decision-making issues (i.e. divergencies around investments, project choices, or growth strategies), and mission drift, where one goal progressively dominates the other (Battilana, 2015; Besharov & Smith, 2014; Pache & Santos, 2013). Complementary research grounded in value-based perspectives and stewardship theory identifies mechanisms — such as value fit, flexible structures, carefully designed partnerships, and intensive communication — that help SETs mitigate conflicts between social and commercial objectives (Eiselein & Dentchev, 2020). Overall, the composition and diversity of experiences, values, and logics within SETs are central to understanding both their capacity for innovation and their vulnerability to hybrid tensions.

Psychological Factors in SETs

Research on psychological constructs shifts attention to traits, values, and ideological orientations that shape individual behaviour, collective interpretation of the social mission, and how teams experience and manage tensions between social and commercial logics.

Entrepreneurial traits and motivational profiles, in particular the need for achievement, internal locus of control, self-efficacy, tolerance for ambiguity, risk-taking propensity, innovativeness, independence, autonomy, and optimism, are core psychological resources for social entrepreneurs because they help team members cope with the uncertainty and complexity inherent in addressing social problems through market-based mechanisms, sustain effort under resource constraints, and mobilise others around an ambitious mission. These traits are also relevant for reconciling long-term horizons for social impact with the shorter-term demands of financial performance (El Chaarani, 2022). Focusing on social imprinting and mission-related identity, and building on institutional logics and hybrid organisation research, Battilana and colleagues show that strong early imprinting around the social mission via founding values, initial recruitment criteria, and mission-centric routines enhances social performance but can damage economic productivity (Battilana, 2015). Teams that heavily privilege social related features in their early startup design choices tend to select staff, partners, and practices primarily for value alignment, which deepens mission fulfilment but may constrain efficiency, revenue generation, or scaling. To navigate this paradox, research recommends structural differentiation between social and commercial activities and the creation of "spaces of negotiation" in which team members openly discuss trade-offs and re-negotiate priorities over time (Battilana, 2015; Pache & Santos, 2013). Psychological commitment to the mission can have both positive and negative effects: it gives purpose and legitimacy but can also make the organisation rigid and resistant to changes needed for financial sustainability. A more recent line of inquiry investigates values and political ideology as foundations of team-level cognition and moral framing arguing that psychological and ideological characteristics of founding teams shape not only internal decision-making, including how the venture publicly defines what counts as "good" and "right." Drawing on Schwartz's value theory and related perspectives, Eiselein & Dentchev (2020) show that value fit within teams and between teams and stakeholders is critical for managing conflicts between social and commercial objectives and identify stewardship-oriented mechanisms—such as shared purpose, participatory structures, and open communication—that help teams to reconcile competing goals. Extending this idea, Lucas (2023) combines moral foundations theory with Upper Echelons Theory to study how founding team characteristics (i.e. political ideology), shape the moral narratives embedded in mission statements of US social enterprises. The study demonstrates that mission statements contain rich and heterogeneous moral discourse, drawing on foundations such as care, loyalty, fairness, authority, and sanctity, and that founding teams' ideological leanings systematically

predict which moral foundations are emphasised and whether missions span multiple foundations. Liberal-leaning teams are more likely to reference a broader set of moral foundations and to articulate multi-dimensional moral narratives, whereas conservative-leaning teams tend to emphasise Care and Sanctity and are more likely to omit explicit moral language (Lucas 2023).

These studies suggest that psychological factors—traits, values, and ideology—provide the deep cognitive and emotional endowments through which SETs interpret their hybridity. They influence resilience, opportunity framing, the management of paradoxical objectives, and the symbolic construction of mission, while also introducing potential fault lines, for example, when value or ideological differences remain unarticulated or unmanaged within the team.

Social Capital in SETs

Social capital is defined as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (Dean et al., 2007; Gedajlovic et al., 2013; Payne et al., 2010). Beyond the experience and education of team members, the external networks that team members bring play a pivotal role in identifying and implementing opportunities (Harima 2020), mobilising resources (Chen 2023, Crescenzo 2022, Sanchez 2023), and enhancing credibility (Crescenzo 2022).

A first set of studies focuses on network ties and access to external resources. In line with findings from traditional entrepreneurship (e.g., Baron & Tang, 2009; Zolin et al., 2011), research shows that social capital provides access to trusted external contacts who can offer strategic advice on both the business and social aspects of the venture, financial support, and even labour in the form of volunteer contributions. Strong ties to friends, family members, and former colleagues with business expertise are essential during the start-up phase, compensating for internal skill gaps and facilitating early experimentation (Lehner, 2014). In crowdfunding and impact-oriented financing settings, collaborative networks and inter-organisational partnerships act as powerful signals of legitimacy: endorsements from reputable partners, presence in professional networks, and visibility in the media substantially increase the likelihood of reaching funding goals and expanding the supporter base (Crescenzo 2022, El Chaarani 2022, Chen 2023).

A second stream highlights beneficiary proximity and co-creation as distinctive relational features of SETs. Close relational proximity to beneficiaries deepens teams' understanding of their needs and contexts, but can also heighten emotional stress and identity tensions as team members negotiate their roles against the communities they may also belong to (Dufays, 2019). In SEs involving refugees, for example, ethnically mixed teams comprising local and refugee entrepreneurs co-create opportunities through iterative phases of opportunity construction, evaluation, and pursuit, combining contextual knowledge, networks, and legitimacy from both sides (Harima & Freudenberg, 2020). This co-creation process enhances the opportunity's relevance, feasibility, and acceptance, while simultaneously revealing challenges related to communication, expectations, and power asymmetries. In the context of social crowdfunding, research shows that SC is central to success, and that funding outcomes are strongly shaped by cultural and symbolic capital—operationalised by narrative quality, signalling strategies, and media presence—because campaigns both create and test opportunities in real time through interaction with the crowd (Lehner, 2014).

A third line of work adopts a broader view of social capital. Studies show that financial support schemes, government policies, cultural norms, and professional infrastructure substantially affect the success and sustainability of social entrepreneurial initiatives (El Chaarani, 2022). Supportive ecosystems, particularly those near effective social incubators and accelerators, are crucial for achieving sustainable goals and for strengthening both social and economic performance (Sánchez, 2023). Such intermediaries provide finance and technical support, as well as relational capital through useful networks, mentoring relationships, and reputational endorsement. By embedding SETs in supportive networks, these ecosystems amplify teams' ability to access opportunities, scale impact, and withstand shocks.

SETs on social capital suggest that the relational embeddedness of social entrepreneurial teams is fundamental to understanding how they identify and develop opportunities, secure resources, and build and maintain legitimacy. Social capital operates at multiple levels—from intimate personal ties to beneficiaries, through professional and inter-organisational networks, to ecosystem-level support—each with its own benefits and tensions. High levels of social capital can compensate for internal resource constraints and enable co-creation with stakeholders, but they can also generate dependency, emotional overload, or unequal power dynamics if not carefully managed.

MEDIATORS:
Key theories adopted by scholars to study mediators are Input Process Output (IPO), Institutional theory (~2 papers), Paradox theory, Personal Values Theory (~ 1 paper), Resource-Based View (~ 2), Team Production Theory (~ 1) and UET (1), and Institutional Theory ~ (2).

Key methodologies
20 articles focuses on Mediators, and within these, 100 percent are empirical (n=20), with 2 articles applying a mixed-method quantitative and qualitative approach (Bojica, 2018, Almandoz 2014). The remaining 8 use a qualitative approach (%), including both multiple case studies (5), single case studies (3), and the remaining 10 articles are quantitative.

Research on SETs has increasingly examined the behaviour-based processes and emergent states that link team composition to outcomes. Behavioural processes include coordination, decision-making, conflict management, communication, and collective learning—activities through which members work together to transform inputs into meaningful outcomes (LePine et al., 2008). Emergent states refer to shared cognitive, affective, and behavioural properties, such as behavioural integration, cohesion, and shared understanding, that characterise the team at a given point in time and shape subsequent interaction (Marks et al., 2001). In SETs, these mediators are strongly influenced by the coexistence of social and commercial logics: heterogeneous professional and value backgrounds are a source of innovation and a generator of tensions that must be actively managed to preserve a balance between social and economic goals (Battilana & Lee, 2014; Dacin et al., 2011; Dufays, 2019).
In social enterprises, decision-making processes that allow time for deliberation and knowledge integration appear to be required. A first cluster of studies focuses on interpersonal processes in decision-making. Studies of top management teams (TMTs) show that creative decision-making, characterised by extensive information sharing and experimentation, fosters an environment conducive to employee-driven innovation, whereas very high decision speed risks sidelining employee input and constraining creativity (Cheng, 2022). Meanwhile, studies of how strategic decisions are made at the apex of hybrid organisations, Maine et al. (2024) show that in municipal hybrid corporations, the strategic apex aligns goals through iterative negotiation and compromise. Generally, SETs engage in collective sense-making to resolve ambiguities following stakeholder priorities, integrating relational and instrumental logics to remain adaptable to shifting stakeholder demands. The creation of sub-committees and dedicated strategic discussion arenas supports cohesion and provides structured spaces for addressing tensions. These findings resonate with earlier work showing that varied experiences among board and management members—for example, in politics, industry, or public organisations—facilitate acceptance of multiple underlying logics and encourage the design of team structures that promote cohesion and efficiency (Jansen et al., 2016).
A second stream examines team conflicts and their origins. In addition to macro-level tensions arising from hybridity, intrateam tensions emerge when members differ in their attraction to social versus financial logics, when their value systems diverge, or when they commit unequal efforts (Battilana & Lee, 2014; Besharov & Smith, 2014; Dufays & Huybrechts, 2016). Dufays (2019) shows that teams with overlapping professional and general interests experience identity-related

tensions, particularly when members' personal identification with the social mission clashes with organisational constraints. Larger teams, while richer in expertise, face more pronounced "performing" and "organising" tensions due to greater diversity and coordination challenges; these can be mitigated by stronger governance structures and clear role definitions, which enhance cohesion and enable more effective tension management (Dufays, 2019). Tensions that remain unmanaged can have severe consequences. Studies on impact investing relationships show that intrateam tensions and misalignment of priorities may result in unplanned termination of partnerships, changes in investee management, or non-achievement of intended social and financial goals (Agrawal & Hockerts, 2019; Alvi, 2021; Castellas et al., 2018; Glänzel & Scheuerle, 2016; Mogapi et al., 2019; Moore et al., 2012). Across these contributions, close collaboration, value and goal alignment, trust, and continuous fit-value assessment are critical to preventing tensions that could undermine the long-term mission team's attachment.
Research has identified team-level mechanisms that help balance dual missions. Eiselein and Dentchev (2020) highlight three core mechanisms: value fit, agile structures, and partnerships. First, recruiting individuals whose personal values align with organisational goals supports strategic and day-to-day decision-making and reduces the likelihood of deep conflicts. Second, agile structures—flexible hierarchies, adaptable roles, and responsive internal processes—enable teams to reconfigure responsibilities as hybrid demands evolve. Third, partnerships and strategic alliances with external stakeholders extend resource bases, enhance operational focus, and provide additional perspectives and accountability, thereby helping teams navigate conflicting objectives. These mechanisms are complemented by open and transparent communication, which bridges individual differences, aligns stakeholder expectations, and supports ongoing alignment and reflection processes, in which individual and team goals are periodically synchronised and strategies are recalibrated (Eiselein & Dentchev, 2020). A related set of studies identified external communication as a key process for engaging with the external environment. In social crowdfunding campaigns, frequent and substantive social-media updates increase backer engagement and improve funding outcomes (Chen, 2023). Moreover, communication is useful to demonstrate legitimacy by highlighting internal resources and capabilities, and maintaining consistent, credible communication, which in turn reduces information asymmetry and strengthens funders' confidence, leading to better fundraising performance (Chen, 2023). Such findings suggest that communication is both an internal coordination tool and an outward-facing mechanism for signalling quality and hybrid commitment.

Another process-level mediator examined is participation in accelerator and incubator programmes. Chandler (2022) finds that SETs' participation in accelerator programmes could diminish the positive effect of female representation in founding teams on the pursuit of social motives. Accelerators prioritise financial outcomes, weakening the influence of gender-based social role orientations on the pursuit of social objectives. By contrast, social incubators have been found to exert a strong positive impact on the efficiency and development of social start-ups, generating efficiency gains of over 35 per cent that extend beyond the start-ups' initial know-how (Sánchez, 2023). These programmes provide structured support, mentoring, and network access that enhance internal processes and accelerate capability building.
Uzuegbunam (2021) adds a cultural and gender-composition dimension to process-level dynamics. The study shows that all-male teams are most likely to pursue commercialisation, followed by mixed-gender teams. These gender-based differences are amplified in culturally tight societies, where mixed-gender teams, in turn, exhibit the highest adaptability and success in hybrid strategies. Cultural looseness reduces the predictability of gender effects on commercialisation, offering greater fluidity in team dynamics. Overall, cultural tightness moderates the effect of team composition, such that mixed-gender teams outperform homogeneous teams in balancing dual goals in tighter cultural contexts (Uzuegbunam, 2021). These findings indicate that team-level

processes cannot be fully understood without considering the broader cultural environment in which they unfold.

Beyond observable processes, studies increasingly analyse emergent team states that arise from interaction and, in turn, shape how SETs handle hybrid demands. One central construct is TMT behavioural integration, defined as the extent to which top team members engage in mutual and timely information exchange, collaborative decision-making, and joint involvement in key issues (Lubatkin et al., 2006; Hambrick, 2007). In hybrid contexts, Song (2024) shows that behavioural integration translates CEO traits into effective organisational outcomes by channelling ambition into shared, collectively vetted strategies. TMT heterogeneity also shapes the strength and direction of this effect, making the relationship between CEO personality and hybrid Organising is dynamic and context-dependent. The findings underscore the importance of building behaviourally integrated TMTs and actively managing their diversity through communication, collaboration, and inclusive decision-making. A second emergent state is bricolage behaviour. Bricolage is understood as "making do" by creatively recombining available resources and rejecting resource constraints as inherently limiting. Bojica et al. (2018) find that bricolage supports organisational growth primarily when social enterprises enjoy relatively high resource endowment and autonomy. Under these conditions, bricolage allows teams to adapt quickly to emerging challenges and overcome them in innovative ways. In contrast, in severe resource scarcity, adopting bricolage led to stagnation, especially when teams have little room to experiment. The study also reveals nuanced interactions: resource-rich settings and TMT tenure diversity reinforce the positive effects of bricolage on growth; gender diversity appears largely neutral; and diversity in prior for-profit experience can be detrimental in organisations that rely heavily on bricolage, likely because conflicting logics complicate prioritisation and compromise (Bojica et al., 2018).

A third emergent state concerns group cohesion and stewardship-like behaviour. Eiselein and Dentchev (2020) show that alignment between personal values and organisational goals is a key antecedent of cohesion in social enterprises. Through iterative processes—ensuring value fit in recruitment, maintaining effective communication, and adopting agile structures—teams build a shared sense of purpose that helps them manage conflicting objectives. Many SETs in their sample display stewardship behaviour: collective action, low power distance, high levels of trustworthiness, and shared responsibility. These attributes reinforce alignment between social and commercial goals and support long-term impact.

Across these streams, the evidence indicates that how team members interact and the emergent states they develop have substantial consequences for outcomes. Teams that address tensions openly, invest in behaviourally integrated and cohesive top teams, and develop mechanisms to align values and goals are more likely to maintain their dual mission and achieve sustainable impact over time (Dufays, 2019; Eiselein & Dentchev, 2020; Song, 2024). Conversely, when tensions rooted in divergent logics, values, or effort levels are left unaddressed, they can lead to role ambiguity, decision-making gridlock, mission drift, and ultimately relationship breakdowns or failure to reach either social or economic targets (Agrawal & Hockerts, 2019; Alvi, 2021; Castellas et al., 2018; Glänzel & Scheuerle, 2016; Mogapi et al., 2019; Moore et al., 2012). While the existing literature offers rich insights into individual mechanisms—such as creative decision-making, behavioural integration, bricolage, and stewardship—studies remain fragmented and rarely track how specific combinations of processes and emergent states unfold over time. This fragmentation suggests a clear agenda for future research: longitudinal and comparative designs that systematically link process configurations and emergent states to blended social and economic performance across the life cycle of social enterprises.

Outputs:

Of the 30 articles on outputs, 28 are empirical and 2 conceptual. Within the empirical ones, 8 qualitative – 3 single-case studies and 5 multiple-case studies, 3 apply mixed methodologies, and 17 studies are quantitative.

The articles draw on multiple theoretical lenses: 3 articles on the attention-based view and upper echelons theory link decision-makers' attention, human capital, and values to strategic choices; 4 articles on Bourdieu's forms of capital, Resource Based View, and Team Production Theory conceptualise resources and value creation; and 5 articles used Institutional Theory, Institutional Logics and imprinting, IPO, and legitimacy frameworks study ventures within broader normative and regulatory environments. Further, 4 articles adopt Gender and Social Role Theories, Personal Values Theory, Narrative Theory, and process models of opportunity recognition — highlighting how identities, values, and narratives shape which opportunities are perceived as legitimate and pursued.

Studies of SETs predominantly assess outcomes using firm-level indicators, which serve as proxies for team-level outputs and provide a comparable basis for cross-venture analysis of how team characteristics — such as Human and Social Capital — relate to performance. Revenues, employment levels, and employment growth capture both social and economic value creation, reflecting venture stability, credibility, and growth ambition (Battilana & Lee, 2014; Cassar, 2006; Pache & Santos, 2013; Sahasranamam, 2024).

However, performance is often conceptualised through aggregate constructs that do not systematically disentangle social from economic performance. As a result, the social component of value creation has been under-specified and subsumed within financial outcomes. This reflects the broader challenge of quantifying social value in a rigorous and comparable way (Ebrahim & Rangan, 2014; Emerson, 2003; Garcia-Castro et al., 2010; Hertel et al., 2022). These shortcomings have led to growing calls for integrated assessment frameworks that capture financial, social, and environmental dimensions in parallel, and for greater reliance on third-party and longitudinal data—such as certification schemes and external databases—to move beyond self-reported, perception-based performance measures. In this direction, Scarlata et al. (2016) provide a notable contribution by proposing a composite indicator of total value creation within a portfolio of venture-capital-backed social enterprises that combines economic sustainability and social experience, thereby demonstrating the feasibility of more objective, portfolio-level social return metrics.

A second cluster of research focuses on funds raised (i.e., in crowdfunding contexts) as a key output. Chen (2023) shows that team size and venture age are positively associated with the amount of funds raised in social crowdfunding campaigns, suggesting that larger, more mature teams can mobilise more internal resources, project greater legitimacy, and thereby attract more external capital. The same study finds that female-led social ventures perform worse than male-led ones in terms of pledge amounts, contradicting evidence from commercial crowdfunding and indicating that gendered perceptions and biases may operate differently in social venture settings. Complementary work by Crescenzo (2022) identifies entrepreneurial narratives as a driver of funding success. The study shows that narrative strategies deployed in crowdfunding campaigns—especially those that clearly showcase team expertise and professional alignment with the project—significantly enhance investors' perceptions of credibility and, in turn, funding outcomes. Personal attributes, such as team members' passions and interests, are effectively used to humanise the venture and deepen engagement from potential backers, while networks with stakeholders and institutions further bolster perceived legitimacy. Together, these findings suggest that funding success is not only a function of structural characteristics (e.g., team size, age), but also of how teams present and frame their human and social capital to external audiences.

Other studies examine social value creation. Lin (2024) investigates the effects of CEO gender on social and economic value creation in social enterprises and finds that social value creation tends to be higher under female CEOs, whereas economic value creation tends to be lower. Importantly, selective attention to economic goals—operationalised as shifts in the CEO's attentional focus—

mitigates the negative association between female leadership and economic value creation, suggesting that attentional strategies can partially rebalance dual goals. In this study, economic value creation is measured as perceived financial outcomes, while social value creation is measured as perceived non-financial outcomes benefiting the community or natural environment, thereby offering a more fine-grained operationalisation of dual performance.

Battilana et al. (2015) provide a complementary perspective in the context of work-integration social enterprises (WISEs). They operationalise social value as the proportion of beneficiaries who secure regular employment after exiting the programme, alongside indicators of economic productivity that capture the efficiency with which inputs are converted into economic outputs. Their results reveal a paradox in which strong social imprinting in founding teams—i.e. an early and pronounced emphasis on the social mission—enhances social value creation but is negatively related to economic productivity. This trade-off indirectly weakens the total social value created and underscores the tension between mission focus and economic sustainability that SETs must maintain over time. Lin (2024) also notes that SETs' human capital (age, education, work experience) and firm-level characteristics (i.e. firm age, mission type, prior social performance) condition social and economic value creation, reinforcing the idea that outputs are shaped by interactions between team attributes and organisational context.

Compared with firm-level indicators, team-level outputs are less often measured explicitly (1 study). One important exception comes from board-level research: Crucke (2021) finds that board service performance—reflecting how effectively boards fulfil their advisory and monitoring roles—significantly contributes to social outcomes, such as the employment of disadvantaged people. This effect is particularly strong when board members possess high stakeholder knowledge and when behavioural integration within the board is high. These findings show that high-quality team functioning at the governance level can translate directly into improved social performance, even when financial indicators are less sensitive.

More broadly, most SET studies conceptualise outcomes at the organisational level—using variables such as sales growth, profitability, number of employees, and funds raised (e.g., Crescenzo, 2022; Chen, 2023; Sahasranamam, 2024; Romero et al., 2024; Lin, 2024)—while team-level outcomes such as team effectiveness, viability, coordination quality, or psychological well-being remain underexplored. This gap is notable given evidence from research on entrepreneurial teams that team effectiveness and viability are critical precursors of sustained performance (Chowdhury, 2005; Foo et al., 2006).

Finally, some studies adopt composite or multi-dimensional measures of overall firm performance. Sahasranamam (2024), for example, uses revenues and the number of employees as key indicators of a social venture's stability and credibility, and as proxies for growth ambition, while differentiating between economic and social performance constructs. Song (2024), in examining the relationship between CEO narcissism and hybrid organising, conceptualises hybrid organising via survey items capturing the perceived social and commercial orientation of the organisation, and computes an overall hybrid organising index as the product of sociality and commerciality scores.

Across these contributions, SET outcomes extend beyond aggregate measures (to include social value creation, funding success, governance effectiveness, and hybrid organising capacity). At the same time, scholars continue the discussion of unresolved paradoxes and measurement challenges typical of SEs. Results show that strong social imprinting and female leadership, for instance, tend to enhance social outcomes but can harm economic performance unless attentional strategies or supportive structures are introduced (Battilana et al., 2015; Lin, 2024). Firm-level metrics are dominant, despite clear indications that team-level outputs—such as team effectiveness, viability, and resilience—are likely to be crucial mediators between team composition and hybrid performance. This points to a promising avenue for future research: the development and use of team-specific outcome measures that complement firm-level indicators and allow a more precise assessment of how SETs create and sustain blended value over time.

CRITICAL REFLECTIONS AND FUTURE RESEARCH PATHS

Inputs:

Our findings identify five critical research gaps in SET inputs that warrant systematic investigation. Much SE research remains founder-centric, focusing on the characteristics of individual entrepreneurs, and there is a need to deepen theoretical and empirical analysis of team formation processes in SEs. While the literature on traditional commercial ETs has developed richer frameworks to explain how entrepreneurial teams form, emerge and evolve, drawing on economic, psychological and sociological perspectives, we suggest that SETs could also yield insightful findings, given the SE hybridity that creates an interesting setting related to the mission being pursued: whereas in a traditional commercial enterprise the mission is economically centred, in SEs the mission is to pursue blended value. In this setting, an entrepreneur deciding to start a SE must navigate the decision to become a social entrepreneur, starting an enterprise with blended value purposes, and the decision to start it within a team. These complex decisions might open an interesting avenue for research. In the commercial literature, economic lenses, including human capital theory, agency theory, and resource- and capability-based views (Anton & Yao, 1995; Hellmann, 2007; Barney, 1991; Teece, 1986; Teece et al., 1997), have been used to model how founders with complementary resources and risk preferences come together, negotiate roles, and structure ownership. Applying these lenses to SETs could contribute to understanding how and why SETs are formed, the dynamics of team formation in such a hybrid context, how functional diversity and expertise are initially assembled to create social and economic value and then reconfigured over time as the start-up grows, and how these choices shape the capacity to create, scale, and sustain social impact under resource constraints and institutional complexity (Bolzani, 2019; Klotz, 2024).

Second, future work should examine how SETs balance specialised and generalist competencies across a start-up's developmental phases. This involves distinguishing between core human capital, such as experience aligned with the venture's core activities and difficult to outsource, and peripheral skills that can be acquired through external collaborations, advisors, or partnerships (Dufays, 2017; Camenzuli & McKague, 2015). Bricolage theory offers an applicable theoretical lens to explore how, in resource-constrained contexts like SEs, teams creatively combine internal and external resources. Through this lens, conceptualising the team's human capital as a resource that can be recomposed and re-skilled over time, longitudinal empirical designs would enable researchers to study how functional backgrounds, expertise, and role distributions within the team change as ventures negotiate shifting demands related to hybrid organising, scaling, and environmental turbulence typical of SEs (Sanchez-Robles et al., 2023; DeSantola & Gulati, 2017).

Finally, the discussion of SET inputs underscores the importance of integrating multiple theoretical perspectives and methodological approaches. UET and human capital theories provide robust starting points for studying team composition in relation to organisational and team outcomes. We argue that combining them with process-oriented and context-sensitive frameworks, such as bricolage, institutional logics, and hybrid organising, would capture the mechanisms and contingencies through which functional diversity and expertise shape social venture value creation. Methodologically, advancing the field will require longitudinal, multi-source, cross-cultural, and mixed-method research designs, together with more standardised measures of social and economic value creation. This can help explain how the inputs embodied in SETs contribute to the formation, evolution, and impact of SE value creation.

Inputs include age, which has been mainly used as a control variable, and ethnicity, which has been marginally considered. We argue that both age and ethnicity are significant in SEs because younger entrepreneurs might encounter significant issues linked to less experience, knowledge, or a smaller network, but they might be more flexible and innovative. However, if we

consider the team as a whole, an age gap could negatively affect the decision-making process. So we argue that age could be an interesting input influencing the value creation of such SEs.

Team processes and emergent states:

Future research on social entrepreneurial teams (SETs) should deepen understanding of how team processes and emergent states mediate the relationship between team composition and blended social–economic outcomes. Building on the input–mediator–output (IMO) framework (Marks et al., 2001), a promising first avenue concerns membership changes and evolving team composition. As social ventures grow, early founding members may no longer fit the venture's changing strategic and operational demands, due to increasing complexity, new capability requirements, or motivational decline (Boeker & Wiltbank, 2005; Clarysse & Moray, 2004). In SEs, these dynamics are exacerbated by financial constraints, which may limit the ability to offer competitive wages or undermine the retention of founders and employees, despite their strong social commitment (Gupta, 2020). At a certain point, this may be insufficient to retain them, leading to co-founder exit. Future studies should therefore examine how membership changes unfold in SETs over time, how they affect emergent states such as trust, cohesion, and shared identity, and which strategies SETs might adopt to retain or replace founders when social value alone is insufficient to keep them engaged (Mathieu et al., 2017).

A second line of inquiry concerns conflicts and tensions within SETs. Existing research has highlighted tensions arising from social and commercial objectives at the organisational level, yet there remains limited understanding of how these tensions manifest as task and relationship conflicts among team members across the pre-formation, formation, and post-formation stages of SE' development (Besharov & Smith, 2014). Future work could map the types of tensions that characterise SETs at different stages, for example, disagreements over mission priorities, resource allocation, or growth strategies, and investigate the strategies (e.g., role structuring, narrative reframing, or boundary spanning) that teams use to confront and transform these tensions. Integrating insights from social identity and social categorisation theories would enable researchers to explore how in-/out-group dynamics, status hierarchies, and gender- or ethnicity-based faultlines aggravate or mitigate such conflicts, particularly when members strongly identify with different logics or stakeholder groups.

Third, opportunity identification and implementation constitute a fertile yet underexplored domain for SET research. Although traditional entrepreneurship studies show that knowledge heterogeneity in teams can enhance opportunity recognition (Tang et al., 2012), it remains unclear how SETs collectively identify and shape opportunities amid the constraints and paradoxes of hybrid social missions. Future research could examine how team characteristics, such as prior social-sector experience, commercial expertise, or value orientations, influence the types of social entrepreneurial opportunities pursued, and how decision-making logics (e.g., effectuation versus causation) are enacted at the team level. Longitudinal designs would be particularly valuable for tracing how founding teams progress from opportunity recognition to implementation, how team composition adapts to evolving organisational needs, and how these changes feed back into emergent states and coordination quality over time.

Finally, systematic studies are needed on coordination-related emergent states and their antecedents in SETs. Prior research suggests that coordination involves not only task-related structures and routines but also alignment in values and vision, relational fit, and interpersonal cohesion (Discua Cruz et al., 2013; Francis & Sandberg, 2000; Jaskiewicz et al., 2017; Shah et al., 2019). In SEs, balancing social impact and financial viability amid evolving roles and responsibilities makes coordination particularly challenging, yet studies explicitly linking behavioural integration, shared perspectives, and trust to outcomes remain scarce. Future research could leverage behavioural integration (Hambrick, 2007; Lubatkin et al., 2006) and faultline theory to investigate how team size, diversity, and aligned attributes (e.g., function, age, nationality) shape subgroup formation, internal frictions, and communication patterns in early-

stage SETs. From a human capital perspective, it would also be valuable to identify which combinations of knowledge, skills, and abilities (KSAs) foster effective collaboration and coordination, clarifying, for instance, when background homogeneity enhances cohesion versus when heterogeneity is necessary for complex hybrid problem-solving (González-Cruz et al., 2020; Sanchez-Robles et al., 2023).

Output:

Measuring the value creation of SEs remains a central and open debate in the SE literature. Future research needs to refine both the object and the method of measurement. Existing studies rely heavily on self-reported survey data from founders and CEOs, which raises well-known concerns about overconfidence, social desirability bias, and non-response bias, as leaders may overestimate performance, answer in ways that project a favourable image, and differ systematically from those who do not respond, thereby skewing results (Cycyota & Harrison, 2006; Hirshleifer et al., 2012; Podsakoff et al., 2003). To enhance validity, future studies should systematically combine multiple data sources, such as administrative data, investor reports, certification databases, and impact ratings, with self-reported measures, and track outcomes longitudinally rather than through single cross-sectional snapshots (Ebrahim & Rangan, 2014; McMullen & Dimov, 2013; Rawhouser, Cummings, & Newbert, 2019; Zahra et al., 2009). Third-party assessments of social and environmental performance, including those associated with schemes such as the B Impact Assessment used for B Corp certification, offer particularly promising avenues for deriving comparable blended value indicators across organisations, sectors, and countries, and for detecting mission drift via events such as decertification (Hiller, 2013; Jackson & Harji, 2013; Rawhouser et al., 2019).

Another relevant concept that emerges in this review is the extensive reliance on firm-level measures. Future research on SET outcomes should adopt an explicit multilevel perspective that distinguishes between firm- and team-level indicators, as existing studies assess SET outcomes indirectly through organisational outcomes such as revenue growth, profitability, employee numbers, and fundraising success, thereby assuming that firm performance is a reliable proxy for team effectiveness (Chen, 2023; Crescenzo, 2022; Lin, 2024; Romero et al., 2024; Sahasranamam, 2024). However, organisational outcomes can be strongly influenced by environmental conditions, resource endowments, and institutional support, and may fail to capture how well teams function. Building on work in entrepreneurial and top management teams, future studies should incorporate explicit team-level performance metrics, such as team effectiveness, team viability, milestone attainment (e.g., incorporation, seed funding, first product launch, first sale), speed to market, innovativeness, and coordination quality, to provide a more fine-grained view of how SET dynamics translate into value creation (Barney et al., 1996; Chowdhury, 2005; Clarysse & Moray, 2004; Cohen, 2013; Foo et al., 2006; Francis & Sandberg, 2000; Knockaert et al., 2011; Perry-Smith & Coff, 2011; Shah et al., 2019; Vohora et al., 2004). Linking these micro-level indicators to firm-level blended value measures would allow scholars to unpack when and how strong team functioning is a necessary but not sufficient condition for social and economic performance in hybrid ventures.

At the same time, future work should broaden the outcome space to include psychological and contextual dimensions that are especially salient for SETs. Research increasingly suggests that meaningful work, subjective well-being, and work–life balance are central motives for engaging in SE and can influence both persistence and performance. However, the relationship between well-being and outcomes is complex, with evidence of burnout and weak or inconsistent links between satisfaction and performance under high growth and resource pressures (Brieger et al., 2020; Hmieleski & Corbett, 2008; Lerman, 2020; Tisu et al., 2023). SEs often operate under severe resource constraints, complex stakeholder demands, and value-laden conflicts, which can generate psychological strain for founders and team members and, in turn, influence organisational value creation. Future studies should therefore triangulate subjective well-being and meaningful work

measures with more traditional performance indicators to examine how the psychological health of SETs supports or undermines their capacity to sustain blended value over time (Kummitha, 2025). Additionally, cross-country studies might be undertaken to explore how cultural norms moderate the trade-offs between social and economic objectives, for example, by fostering more competitive orientations in highly market-driven contexts or more solidarity-based orientations in others (Mafico et al., 2021). Integrating decision-making theories, human and knowledge-based capital perspectives, and institutional logics/hybrid organising frameworks will be useful for theorising how diversity, competences, and the embedded logics of team members shape both the measurable outputs of SETs and the deeper, less tangible aspects of their value-creation trajectories. More specifically, inputs have been used to explain performance; for example, SEs with larger teams and greater age performed better on pledge amounts (Chen, 2023). However, it could also be useful to consider other outcome measures. Performance on a thorough questionnaire is vulnerable to social desirability bias, particularly when measuring socially valued constructs such as social impact, mission orientation, or inclusive leadership (Brutus et al., 2013). Single-informant designs also risk overlooking intra-team divergences in perceptions, power distributions, and role interpretations, which are central to understanding collaboration, conflict, and emergent states in diverse teams (Song et al., 2024; Sahasranamam et al., 2023). The predominance of perception-based measures of social impact and team effectiveness further complicates comparability across studies, as different scales and operationalisations may capture distinct facets of performance.

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Table 1. Search and analysis process.

Research process – Stage 1 Database driven
Scopus and Web of Science core collection, all editions; all years including 2024, only English, only articles, open access Excluded grey literature n=15 Excluded 14 articles on chemistry, agriculture, nursing, chemical engineering
Keyword search:
"Founding group*" OR "new venture team*"OR "start-up team*"OR "entrepreneurial team*"OR "founding team" OR "co-founder" OR "venture team" OR "top management team*" OR "TMT" AND
"Social entrepreneurship*" OR "social enterprise*" OR "social venture*" OR "social entrepreneur*" OR "social entrepreneurial team*" OR "social venture team*"OR "mission-driven team*
Results: 225
ABS ≥ 1 + Manual examination of all articles to verify studies with central focus on SETs and those with relevant findings on SETs
Selected papers: 70
Manual differentiation of all articles to verify studies with central focus on SETs (n= 28), and those with relevant findings on SETs (n= 28) **Selected papers: 50**
Research process – Stage 2 – Journal Driven (ABS subject areas) 10 articles (findings 7, 3)
Selected papers on SETs: n = 31 **Relevant findings on SETs n= 35**
Final sample on both SETs and those with relevant findings on SETs: 66

Table 2. Sampled Articles on SET

Article	Type of paper	Empirical approaches	Sample
Almandoz, J. (2014). Founding teams as carriers of competing logics. *Administrative Science Quarterly*, 59(3), 442–473. https://doi.org/10.1177/0001839214537810	Empirical	Mixed-method (Quantitative and Qualitative)	Archival data from 225 local banks founded between 2006 and 2009, and interviews with 73 bank founders
Battilana, Julie et al. "Harnessing Productive Tensions in Hybrid Organizations: The Case of Work Integration Social Enterprises." *The Academy of Management journal*. 58.6 (2015): 1658–1685. Web.	Empirical	Mixed method (quantitative panel data and qualitative comparative case studies through interviews).	Quantitative: 641 observations from French WISEs collected between 2003 and 2007.
Ben-Hafaïedh, C., & Dufays, F. (2021). Social entrepreneurial teams: a research agenda. *Social Entrepreneurship*, 173-194.	Book Chapter - Conceptual	Literature review	14 articles on SETs
Bojica, A. M., Ruiz Jiménez, J. M., Ruiz Nava, J., & Fuentes-Fuentes, M. M. (2018). Bricolage and growth in social entrepreneurship organizations. *Entrepreneurship and Regional Development*, 30(3-4), 362–389. https://doi.org/10.1080/08985626.2018.1438526	Empirical	Mixed-method – fSQCA (Quantitative and Qualitative)	89 social entrepreneurship organizations (SEOs) in Mexico. Organizations with diverse activities such as health, education, rural development, and social consulting.
Camenzuli A, McKague K (2015), "Team micro franchising as a response to the entrepreneurial capacity problem in low-income markets". *Social Enterprise Journal*, Vol. 11 No. 1 pp. 69–88, doi: https://doi.org/10.1108/SEJ-02-2012-0008	Empirical	Qualitative – Single case study	Interviews, observation and archival documents in Tanzanian

Chandler, J. A., Short, J. C., Hasan, M. K., & Fan, G. (2022). Founding team characteristics and the pursuit of social motives: A role theory perspective. *Journal of Business Venturing Insights*, *17*	Empirical	Quantitative, multivariate statistical analysis using survey data from a multinational sample - GLM	5,393 new ventures from 180 countries (2013–2019). Data derived from the Entrepreneurship Database Program (EDP), involving surveys completed by founding team members.
Chen, Wendy D. "Crowdfunding for Social Ventures." *Social enterprise journal*. 19.3 (2023): 256–276. Web.	Empirical	Quantitative	Web-crawled dataset and statistical modelling of 3,664 Indiegogo social venture campaigns (US, 2011-2017); in-depth analysis of 300 campaigns
Cheng, Colin C.J. & Shiu, Eric C., 2022. "A two-level, longitudinal investigation into the effects of employee social entrepreneurship orientation and top management team decisions on product innovation," *Technological Forecasting and Social Change*, Elsevier, vol. 182(C).	Empirical	Quantitative	329 social enterprises in Taiwan operating in the technology sector. Data collected from 2,567 employees for eSEO metrics, TMT member for decision-making characteristics, New Product Development (NPD) manager for product innovation performance.
Crucke, S., & Knockaert, M. (2021). Stakeholder knowledge and behavioral integration in boards of social enterprises: A team production approach. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, 32(1), 90–103. https://doi.org/10.1007/s11266-020-00284-9	Empirical	Quantitative	Survey data from 175 Flemish social enterprises Focus on Work Integration Social Enterprises (WISEs) and cooperatives
De Cuyper, L., Clarysse, B., & Phillips, N. (2020). Imprinting beyond the founding phase: How	Empirical	Qualitative, ethnography	Single social venture;

sedimented imprints develop over time. *Organization Science*, 31(6), 1579–1600.			
De Crescenzo, V., Bonfanti, A., Castellani, P. et al. Effective entrepreneurial narrative design in reward crowdfunding campaigns for social ventures. *Int Entrep Manag J* 18, 773–800 (2022). https://doi.org/10.1007/s11365-021-00774-2	Empirical	Qualitative – multiple case study	16 successful social venture projects from the Eppela reward-based crowdfunding platform (2017–2021) solely in the technology sector.
Dimitriadis, S., Lee, M., Ramarajan, L., & Battilana, J. (2017). Blurring the boundaries: the interplay of gender and local communities in the commercialization of social ventures. Organization Science, 28(5), 819–839. https://doi.org/10.1287/orsc.2017.1144	Empirical	Quantitative	584 U.S. nascent social ventures, across 104 CBSAs in 44 states
Dufays, F., & Huybrechts, B. (2017). Entrepreneurial teams in social entrepreneurship: when team heterogeneity facilitates organizational hybridity. In *Edward Elgar Publishing eBooks*. https://doi.org/10.4337/9781784713263.00021	Book chapter		
Dufays, Frédéric. "Exploring the Drivers of Tensions in Social Innovation Management in the Context of Social Entrepreneurial Teams." *Management decision*. 57.6 (2019): 1344–1361. Web.	Empirical	Qualitative - Multiple case study	4 case studies of nascent social entrepreneurial teams from Belgium. Teams varied by size (small and large) and the nature of their social innovation (incremental or institutional).

Eiselein, Philippe, and Nikolay A Dentchev. "Managing Conflicting Objectives of Social Enterprises." *Social enterprise journal*. 16.4 (2020): 431–451. Web.	Empirical	Qualitative - Multiple case study	23 semi-structured interviews with key stakeholders (founders, board members, managers, and partners) across three Belgian social enterprises. Secondary data: 12 annual reports and 314 newspaper articles.
El Chaarani, H. and Raimi, L. (2022), "Determinant factors of successful social entrepreneurship in the emerging circular economy of Lebanon: exploring the moderating role of NGOs", *Journal of Entrepreneurship in Emerging Economies*, Vol. 14 No. 5, pp. 874-901. https://doi.org/10.1108/JEEE-08-2021-0323	Empirical	Quantitative - SEM cross-sectional survey design	468 social entrepreneurs, 389 valid responses from social entrepreneurs in Lebanon. Cross-sectional survey design combined with structural equation modelling (SEM).
Gauthier, Jeffrey, David Cohen, and Chris R Meyer. "Top Management Team Characteristics and Social Value Creation." *Journal of Social Entrepreneurship* 10.2 (2019): 252–263. Web.	Conceptual	Qualitative	n.a.
Harima & Freudenberg (2020) Co-Creation of Social Entrepreneurial Opportunities with Refugees, *Journal of Social Entrepreneurship*, 11:1, 40-64, DOI: 10.1080/19420676.2018.1561498	Empirical	Qualitative – Single case study	13 in-depth interviews with members of mixed social venture teams (local and refugee entrepreneurs) and 3 interviews with accelerator organizers, all within the Refugee Innovation Challenge accelerator in Hamburg (Germany).

Intindola, M. L., Pittz, T. G., Rogers, S. E., & Weisinger, J. Y. (2020). Partner selection in social entrepreneurship collectives: How team selection control can enhance satisfaction in cross-sector social partnerships. *Journal of Social Entrepreneurship*, 11(3), 343–368. https://doi.org/10.1080/19420676.2019.1641137	Empirical	Quantitative	80 respondents across seven cross-sector social partnerships (CSSPs) in New Mexico and Indiana. Teams composed of members from public, private, and nonprofit sectors.
Kher, R., Yang, S., & Newbert, S. L. (2022). Accelerating emergence: the causal (but contextual) effect of social impact accelerators on nascent for-profit social ventures. Small Business Economics, 61(1), 389–413. https://doi.org/10.1007/s11187-022-00680-z	Empirical	Quantitative	7,185 for-profit social ventures (FPSVs) that applied to 383 SIAs worldwide
Lehner, O. M. (2014). The formation and interplay of social capital in crowdfunded social ventures. *Entrepreneurship & Regional Development*, 26(5–6), 478–499. https://doi.org/10.1080/08985626.2014.922623	Empirical	Multiple case study - Qualitative (case study analysis with thematic coding).	36 crowdfunded social venture cases from platforms like Kickstarter, Indiegogo, and Crowdcube. Data collected through document analysis, interviews, and observations of crowdfunding campaigns.
Lin, H.-E., Yu, A., Choi, J., Tsao, C.-W., Stambaugh, J., & Taylor, D. L. (2024). CEO gender and social versus economic value creation of social enterprises: an attention-based view. *Gender in Management*, 39(1), 87–106. https://doi.org/10.1108/GM-06-2022-0219	Empirical	Quantitative	17 experts in social investments, representing foundations, investment funds, and commercial banks that invest in social enterprises within the Netherlands.

Lucas, David S, and U David Park. "The Nature and Origins of Social Venture Mission: An Exploratory Study of Political Ideology and Moral Foundations." Journal of business venturing 38.2 (2023): n. pag. Web.	Empirical	Quantitative	50,000 nascent nonprofits approved for tax-exempt status in the U.S. between 2018 and 2020
Maine, J., Uman, T., & Florin-Samuelsson, E. (2024). Actors constructing accountability in hybrid organisations: The case of a Swedish municipal corporation. *The British Accounting Review*, 56(1), 101207. https://doi.org/10.1016/j.bar.2023.101207	Empirical	Qualitative – Single case study	A Swedish Municipal Housing Corporation (SMHC), XHome. Data collected from board Meetings (10 observations about 43 hours) and interviews of 12 individuals (board members and management team). Additional Archival data - ownership directives and annual reports.
Pais, C. A., and Parente C. "Representations of Teamwork among Organizations with a Social Entrepreneurship Profile." *Team performance management*. 21.1–2 (2015): 65–84. Web.	Empirical	Qualitative (case study with semi-structured interviews) - multiple case study	7 socially entrepreneurial TSOs in Portugal. (Third sector organizations) 22 semi-structured interviews involving leaders, supervisors, and workers.
Sahasranamam, S., Lall, S., Nicolopoulou, K., & Shaw, E. (2023). Founding Team Entrepreneurial experience, external financing and social enterprise performance. *British Journal of Management*, 35(1), 519–536. https://doi.org/10.1111/1467-8551.12726	Empirical	Quantitative	23'368 early-stage ventures applied yo 369 social enterprise accelerator program, all over the world. Data aggregated by EDP, entrepreneurship database program at Emory University as part of the global accelerator learning initiative.

Sanchez-Robles, M., Ribeiro-Soriano, D., Puertas, R., & Guaita-Martínez, J. M. (2023). The role of social start-ups in entrepreneurial behaviour: The search for efficiency. *International Journal of Entrepreneurial Behavior & Research*, 29(9/10), 2005–2022. https://doi.org/10.1108/IJEBR-06-2023-0600	Empirical	Quantitative	Survey data collected from Spanish social start-ups and incubators, focusing on cooperatives within two cooperative federations.
Scarlata, M., Zacharakis A., and Walske J. "The Effect of Founder Experience on the Performance of Philanthropic Venture Capital Firms." *International small business journal* 34.5 (2016): 618–636. Web.	Empirical	Quantitative	43 philanthropic venture capital firms (26 in the United States and 17 in Europe). Data collected via a questionnaire with a 61% response rate.
Scarlata, M., Alemany, L., & Zacharakis, A. (2021). A gendered view of risk taking in venture philanthropy. *Journal of Social Entrepreneurship*, 15(1), 100–118. https://doi.org/10.1080/19420676.2021.1924840	Empirical	Quantitative	388 top managers of venture philanthropy firms
Song J., Peng X, Ali S., Mensah Horsey, Huang J., 2024. "The relationship between CEO narcissism and hybrid organising," *Asian Business & Management*, Palgrave Macmillan, vol. 23(5), pages 767-791, November.	Empirical	Quantitative	Survey of 258 TM of 81 social enterprises in China
Uzuegbunam, I. et al. 2021. "How Cultural Tightness Interacts with Gender in Founding Teams: Insights from the Commercialization of Social Ventures." Journal of business venturing 36.4: n. pag. Web.	Empirical	Quantitative	Global sample of 6,657 social ventures from 30 countries - EDP dataset

Table A3 – Article' details - Inputs – Mediators – Outputs and definition of the team

Article	Team	Inputs	Mediators	Outputs
Almandoz (2014)	Founding team	Founders institutional logics	Risk taking behaviours	na
Battilana et al (2015)	Founding teams of WISE (Working integration social enterprise)	Social imprinting: A founding team's early emphasis on accomplishing the organization's social mission, and economic productivity	n.d.	Social performance and economic productivity: ratio of total annual sales to n° of employees (permanent staff and beneficiaries).
Ben-Hafaïedh, C., & Dufays, F. (2021)	Nd	ND	ND	ND
Bojica, et. al. (2018)	Top Management Teams (TMTs)	TMT diversity - gender diversity, organizational tenure, and prior experience in for-profit organizations	Bricolage autonomy in the use of resource	Organisational growth - increase in employees over three years
Camenzuli &McKague K (2015)	Team of two microentrepreneurs working together	Individual inputs (prior experience, competencies and personalities), team (task	Team processes (conflict, coordination, communication, decision-making) and emergent states (skill	na

		structure and external leader influences), and organizational and external inputs (organizational design and environmental complexity)	complementarity, shared vision, perceived safety)	
Chandler, et. al., (2022)	Top 3 founders	Gender roles (i.e., founding team female presence), age roles (i.e., founding team age), and social class roles (i.e., founding team education)	nd	Pursuit of social motives in new ventures
Chen (2023)	Founding team	Team size and female leadership	na	Money raised
Cheng & Shiu 2022	TMT employee social entrepreneurship	Employee Social Entrepreneurship Orientation (eSEO): Innovativeness, proactivity, risk-taking, social mission, sustainability, and	TMT Decision-making creativity and TMT decision speed	Product Innovation Performance: Success in developing and launching new products.

		effectual behaviors at the micro-level.		
Compion 2022	Founding team	Team gender compisition (all female, mixed or all male).		External equity funding
Crucke, S., & Knockaert, M. (2021)	Board of directors	Diversity of board's members	Behavioral Integration: Defined as the degree of mutual and collective action within the board, moderating the relationship between stakeholder knowledge and board service performance – meeting frequency and behavioral integration	Board service performance (8 items) Social performance (The degree to which social enterprises engage in hiring disadvantaged people) - financial performance (return on assets ROA)
Dimitriadis (2017)	FT	Gender	ND	Commercial activity (commercial or non commercial reveneus),survival
De Crescenzo (2022)	FT	Nd	Team ability to narrate - 1) problem/need; 2) project; 3) product; 4) team; and 5) venture	Fundraising (crowdfunding)

Dufays, F. (2019)	ET/FT	Team composition in terms of diversity in expertise and team size	Idea implementation (idea assessment, prototyping and piloting); Collaborative Decision-Making; Feedback Loops	Cohesion and Resilience; Social Innovation Success
Dufays (2017)				
Eiselein & Dentchev (2020)	Board members and founders	Personal values (e.g., self-transcendence vs. self-enhancement) influencing preferences for social or commercial objectives.	Stewardship Behavior: Teams exhibit collective action, low power distances, trustworthiness, and shared responsibility, reinforcing alignment between social and commercial goals. Agile organizational structures, external partnerships, and shared leadership.	
El Chaarani & Raimi (2022)	FT	Psychological characteristics of FT: Need for achievement, locus of control, self-	nd	Success of the venture (measured by growth, profitability, financial

		efficacy, tolerance for ambiguity, risk-taking propensity, innovativeness, independence, and optimism. HC: Education, experience, leadership (competences and behaviors), and FT composition ad group cohesion. Characteristics of the founding team, including size, cohesion, and diversity. (age, education, race, sex, work experiences).		returns for several years - Five-point Linkert scale)
Gauthier et. al. (2019)	TMT	TMT functional backgrounds: - Output functions: marketing, sales, product R&D (growth- and externally oriented).	nd	Social impact: environmental, customer, workers, community impact measures

		- Throughput functions: production, process engineering, accounting (efficiency- and operations-oriented). - Peripheral functions: finance, law and similar roles not central to core operations. - Functional heterogeneity: the degree of diversity in these functional backgrounds within the TMT.		
Harima & Freudenberg (2020)	Individuals in the pre-startup phase	Personal background	Factors influencing team dynamics: shared social mission, culture, power balance.	Opportunity identification
Intindola et. al., (2020)	Decision makers	Teams perceived autonomy and influence in choosing new members after turnover;	Team justice	Team Satisfaction: stronger alignment and satisfaction among team members when selection control is

		Members' perceptions of fairness in the selection and decision-making processes		perceived as high. Job Satisfaction: Moderated by justice perceptions, with lower control offset by perceived fairness.
Kher (2023)	Founding team	Team gender composition and team education	Partecipation to SIA programs	Venture emergence
Lehner, O. M. (2014)	ET	Social capital (existing networks, relationships, trust ties). Cultural capital (storytelling skills, communication style, understanding of platform norms). Symbolic capital (legitimacy, reputation, credibility signals, certifications).	Interaction and co-creation with the crowd; Signalling and narrative work on the platform (designing the campaign, communicating values, updating, responding).	Transformation of social capital into economic capital (successful funding, amount raised, reaching funding goal)
Lin et. al., (2024)	TMT	TMT gender	Managerial attention selection (RASEG): moderating effect of	Social and financial performance measured as

			managerial attention selection (i.e. RASEG) on SEs' CEOs, as CEOs' attentional behaviors may change when managerial roles override gender roles (Brewer et al., 2002; Eagly, 2009; Lämsä et al.,2000)	perceived performance (survey)
Lucas & Park (2023)	FT	Founding team political ideology (liberal/conservative, from voter registration)	Moral discourse in mission statements (Care, Fairness, Loyalty, Authority, Sanctity)	na
Maine et. al., (2024)	SMC board of directors and management team	Institutional Logics	Negotiating resource allocation & compromising and aligning interests	Aligned accountability structures (integration of financial and relational social accountability. Decision-Making success
Pais & Parente (2015)	Other: Macro-teams (represent the entire organization) and micro-teams (Sub-units	na	Communication and conflict resolution	Team effectiveness, dysfunctions, satisfaction and engagement

	within organizations, focusing on specific tasks or projects and common objectives.			
Sahasranamam et. al., (2023)	FT	Founding team entrepreneurial experience, education, gender diversity (dummy)	nd	SE performance: revenues and number of employees (stability and credibility of social venture & proxy for growth ambition)
Sanchez-Robles et al., (2023)	FT	Founding team education, professional experience	nd	Efficiency and impact of social incubators on start-up performance - ranking of start-ups by sector based on team profiles and operational success.
Scarlata et. al., (2016)	FT	Founding team's experience commercial and social Experience:		Economic & social performance
Scarlata (2024)	TMT	Team gender composition and team experience (Human capital) - Economic and social experience.	Gender-role tensions, overconfidence and legitimacy concerns from economic experience, and	Business risk-taking orientation of the VP firm

			mission-driven caution from social experience.	
Song et. al., 2024	TMT		Behavioral Integration	Hybrid organizing (meet both objectives)
Uzuegbunam 2021	NVT	Team-Level: Gender composition of NVTs and team members' prior experience in commercial and non-profit sectors	Strategic Decision-Making	Commercialization Intent: Likelihood of pursuing profit-making alongside social impact. Legal Form: Adoption of hybrid organizational forms (for-profit social ventures).

Table A4. List of additional articles with relevant findings on SETs.

Article	Type	Empirical approaches	Sample
Aidis, R., Eissler, S., Etchart, N., & Truzzi de Souza, R. (2022). Taking small steps together: incorporating a gender lens approach for small and growing businesses - a case study. Journal of Sustainable Finance & Investment, 12(3), 724–751. https://doi.org/10.1080/20430795.2021.2012116	Empirical	Qualitative - Case Study	Small and Growing businesses and social entreprises in Latin America and central europe.

Block, J., Fisch, C., Hahn, A., & Sandner, P. (2021). Which criteria matter when impact investors screen social enterprises? *Entrepreneurship Theory and Practice*, 45(5), 1105–1133. https://doi.org/10.1177/1042258720929887	Empirical	Mixed method (Quantitative and Qualitative)	Qualitative: 12 exploratory interviews with impact investors. Quantitative: 4296 investment decisions made by 179 impact investors from Germany, Austria, and Switzerland (D/A/CH region) via a conjoint experiment.
Chang, J., A. Benamraoui, and A. Rieple. "Learning-by-Doing as an Approach to Teaching Social Entrepreneurship." *Innovations in education and teaching international*. 51.5 (2014): 459–471. Web.	Empirical	Qualitative – Case study	99 university students participating in a social entrepreneurship module. Five social enterprises and several local sponsors and facilitators involved.
Choi, Y., & Chang, S. (2020). The effect of social entrepreneurs' human capital on and firm performance: The moderating role of specific human capital. *Cogent Business & Management*, 7(1). https://doi.org/10.1080/23311975.2020.1785779	Empirical	Quantitative	72 social firms
DeSantola, A. (2021). Scaling considerations for the social franchising model. *Journal of Organization Design*, 10(3), 99-102.	Conceptual	Conceptual review	n.a.
Dufays, F. & Huybrechts, B. (2014). Connecting the dots for social value: A review on social networks and social entrepreneurship. *Journal of Social* Entrepreneurship, 5(2), 214-237.	Conceptual	Nd	Nd
Dufays, F., & Huybrechts, B. (2015). Where do hybrids come from? Entrepreneurial team heterogeneity as an avenue for the emergence of hybrid organizations. International Small Business Journal Researching	Conceptual	Nd	Nd

Entrepreneurship, 34(6), 777–796. https://doi.org/10.1177/0266242615585152			
Elfving, J. (2015). Supporting the cause – A case study on social entrepreneurial identity at the Rosenlund heritage site. *Journal of Enterprising Communities: People and Places in the Global Economy*, 9(1), 17–30. doi:10.1108/JEC-03-2013-0007	Empirical	Qualitative – Single case study	1 case study
Erro-Garcés, A. (2020). Creativity and Emotions as Drivers for Social Entrepreneurship. *Journal of Social Entrepreneurship*, 11(3), 300–316. https://doi.org/10.1080/19420676.2019.1640773	Empirical	Qualitative – multiple case study	3 cases
Estrin, S., Mickiewicz, T., & Stephan, U. (2016). Human capital in social and commercial entrepreneurship. *Journal of Business Venturing*, 31(4), 449–467. https://doi.org/10.1016/j.jbusvent.2016.05.003	Empirical	Quantitative	68,885 observations from 37 countries – GEM database
Gordon, J. (2014). A stage model of venture philanthropy. *Venture Capital*, 16(2), 85–107. https://doi.org/10.1080/13691066.2014.897014	Empirical	Qualitative - Multiple qualitative case study	4 venture philanthropy foundations created and led by high-net-worth entrepreneurs, plus their philanthropy teams and selected social enterprise/charity investees.
Gupta, S., Beninger, S., & Ganesh, J. (2015). A hybrid approach to innovation by social enterprises: lessons from Africa. Social Enterprise Journal, 11(1), 89–112. https://doi.org/10.1108/sej-04-2014-0023	Empirical	Qualitative – Multiple-case study	2 social entreprises in Africa
Healy, J., Hughes, J., Donnelly-Cox, G., & Shantz, A. (2024). A long and winding road: The hard graft of scaling social change in complex systems. *Journal of Business Venturing Insights*, 21, e00455. Available online at Elsevier. https://doi.org/10.1016/j.jbvi.2024.e00455	Empirical	Qualitative interviews	21 interviews with leaders from social innovation organizations and the systems they influence.
Herrera, M. F. F., & Murcia, M. J. (2024). Comparable yet distinct: a systematic review of social and small and medium-sized enterprises	Conceptual	Systematic literature review	194 articles

growth trajectories. Social Enterprise Journal, 21(3), 400–420. https://doi.org/10.1108/sej-10-2023-0134			
Hirschmann, M., Moritz, A., & Block, J. H. (2022). Motives, Supporting Activities, and Selection Criteria of Social Impact Incubators: An Experimental Conjoint Study. *Nonprofit and Voluntary Sector Quarterly*, 51(5), 1095-1133. https://doi.org/10.1177/08997640211057402	Empirical	Qualitative interviews	71 decision-makers from SIIs in the DACH region (Germany, Austria, and Switzerland). A total of 1,704 decision observations from a choice-based conjoint (CBC) experiment. SIIs included public and private incubators, such as Social Impact Labs and Impact Hubs.
Horsey, E.M., Song, X., Zhao, S. et al. Analyzing the effect of team exploratory and exploitative learning on social entrepreneurship orientation. *Current Psychology* 43, 954–968 (2024). https://doi.org/10.1007/s12144-023-04505-4	Empirical	Quantitative	473 social enterprise CEOs in Ghana.
Huster, K., Petrillo, C., O'Malley, G., Glassman, D., Rush, J., & Wasserheit, J. (2017). Global Social Entrepreneurship Competitions: Incubators for Innovations in Global Health? *Journal of Management Education*, 41(2), 249-271. https://doi-org.unibg.idm.oclc.org/10.1177/1052562916669965		Mixed method (quantitative survey and qualitative analysis of participant reflections).	262 participants from 111 semi-finalist teams between 2005 and 2013. 50 teams responded to surveys, representing a 45% team response rate
Kummitha, R. K. R. "Institutionalising Design Thinking in Social Entrepreneurship." *Social Enterprise Journal.* 14.1 (2018): 92–107. Web.	Empirical	Qualitative - Multiple Case Study	Three Indian social enterprises: Barefoot College, Goonj, and Gram Vikas. Data collected through 32 in-depth interviews over 11 months

Maak, T., and Nicolas Stoetter. “Social Entrepreneurs as Responsible Leaders: ‘Fundación Paraguaya’ and the Case of Martin Burt.” *Journal of business ethics*. 111.3 (2012): 413–430. Web.	Empirical	Qualitative – Single case study	22 interviews at Fundación Paraguaya
Maine J & Samuelsson E. F. & Uman T., 2021. "Ambidextrous sustainability, organisational structure and performance in hybrid organisations," Accounting, Auditing & Accountability Journal, *Emerald Group Publishing Limited*, vol. 35(3), pages 734-769, June.	Book chapter - Empirical	Mixed method (Quantitative and Qualitative)	Survey data from 82 Swedish municipal housing corporations (SMHCs), with a 26% response rate. 7 Interviews, observations, and official documents from a mid-sized housing corporation ("XHousing")
Manolopoulos, D., Salavou, H., Papadopoulos, A., & Xenakis, M. (2022). Strategic Decision-Making and Performance in social Enterprises: process dimensions and the influence of entrepreneurs’ proactive personality. *Entrepreneurship Research Journal*, 14(2), 631–675. https://doi.org/10.1515/erj-2021-0147	Empirical	Quantitative	85 social-sector organizations in Greece
Mbiru, James & Ayentimi, Desmond & Wickham, Mark. (2023). Does entrepreneurial project monitoring and controlling process matter in social enterprises? Evidence from a developing African country. *International Journal of Project Management*. 41. 102435. 10.1016/j.ijproman.2022.102435.	Empirical	Qualitative - multi-case study	28 semi-structured interviews - managers in 6 Ugandan social enterprises - Ugandan social enterprises
Mirvis, Philip, and Bradley Googins. “Engaging Employees as Social Innovators.” *California management review*. 60.4 (2018): 25–50. Web.	Empirical	Qualitative	Case studies of corporate social innovation (CSI) platforms from multiple companies worldwide (i.e. SAP, IBM, Intel, Danone, and BlackRock)

Ntamu, D. N., Balunywa, W., Nsereko, I., & Kwemarira, G. (2023). *Collective action in social entrepreneurial ventures: The role of shared meaning. Journal of Enterprising Communities: People and Places in the Global Economy*, 17(6), 1539–1560. https://doi.org/10.1108/JEC-06-2022-0086	Empirical	Quantitative	Population: 558 social entrepreneurial ventures (SEVs) certified by Kampala Capital City Authority in Uganda. Sample: 202 completed responses from founders and co-founders of SEVs.
Pandey, Sheela & Lall, Saurabh & Pandey, Sanjay & Ahlawat, Sucheta. (2017). The Appeal of Social Accelerators: What do Social Entrepreneurs Value?. *Journal of Social Entrepreneurship*. 8 10.1080/19420676.2017.1299035	Empirical	Quantitative	4,125 self-identified social ventures
Pandey, N., Bhattacharyya, S. S., & Kharat, M. G. (2023). Explicating the factors influencing firm performance: study of social enterprises in India. *International Journal of Organizational Analysis*, 31(6), 2811-2829	Empirical	Quantitative	1,214 nascent entrepreneurs identified in 2005–2006 and followed longitudinally
Renko, M. (2013). Early Challenges of Nascent Social Entrepreneurs. *Entrepreneurship Theory and Practice,* 37(5), 1045-1069	Empirical	Quantitative	PSED II (Panel Study of Entrepreneurial Dynamics II) - 1214 nascent entrepreneurs
Reid, S. W., Anglin, A. H., Baur, J. E., Short, J. C., & Buckley, M. R. (2017). Blazing new trails or opportunity lost? Evaluating research at the intersection of leadership and entrepreneurship. The Leadership Quarterly, 29(1), 150–164. https://doi.org/10.1016/j.leaqua.2017.11.005	Conceptual	Literature review	
Stahl, G., Pless, N., & Maak, T. (2012). Promoting corporate social responsibility and sustainable development through management development: What can be learned from international service-learning programs? *Human Resource Management*. https://doi.org/10.1002/hrm.21506	Empirical	Qualitative (narrative analysis of participant stories).	70 participants from PwC's "Project Ulysses" across four program cohorts (2003–2006). Teams worked in developing countries across Africa, Asia, Latin America, and Eastern Europe.

Romero, C., Rojas-Córdova, C., & Pertuze, J. A. (2024). Paradoxical founders' identity and its impact on social venture performance. *Social Enterprise Journal*., 20(5), 785–809. https://doi.org/10.1108/SEJ-10-2023-0119	Empirical	Quantitative (SEM)	112 SE founders in Chile
Sabbaghi, O., and SJ Cavanagh. "Social Entrepreneurship and Sense-Making: Evidence from the Global Social Benefit Institute." *Social Enterprise Journal*. 14.3 (2018): 289–311. Web.	Empirical	Qualitative	19 student reflection essays from 14 student fellows participating in five social enterprise immersion projects. Social enterprises span five countries: India, Nepal, Uganda, Brazil, and Paraguay.
Sharir, M., and Miri Lerner. (2006). "Gauging the Success of Social Ventures Initiated by Individual Social Entrepreneurs." *Journal of World Business:* JWB. 41.1 6–20. Web.	Empirical	Qualitative field study	33 social enterprises in Israel
Wang, J. (2012). HRD for Societal Development. Advances in Developing Human Resources, 14(3), 305–317. https://doi.org/10.1177/1523422312446145	Conceptual		4 case studies
Weerakoon, C., Gales, B., & McMurray, A. J. (2019). Embracing entrepreneurial action through effectuation in social enterprise. *Social Enterprise Journal*, 15(2), 195-214. https://doi.org/10.1108/SEJ-08-2018-0053	Empirical	Qualitative – Single case study	A single case study of the Good-Faith Learning social enterprise in Australia. Data collected from the founding entrepreneur and social media, website content, and secondary sources.
Erro-Garcés, A. (2020). Creativity and Emotions as Drivers for Social Entrepreneurship. *Journal of Social Entrepreneurship*, 11(3), 300–316. https://doi.org/10.1080/19420676.2019.1640773	Empirical	Qualitative - Multiple Case Study	3 Spanish cases

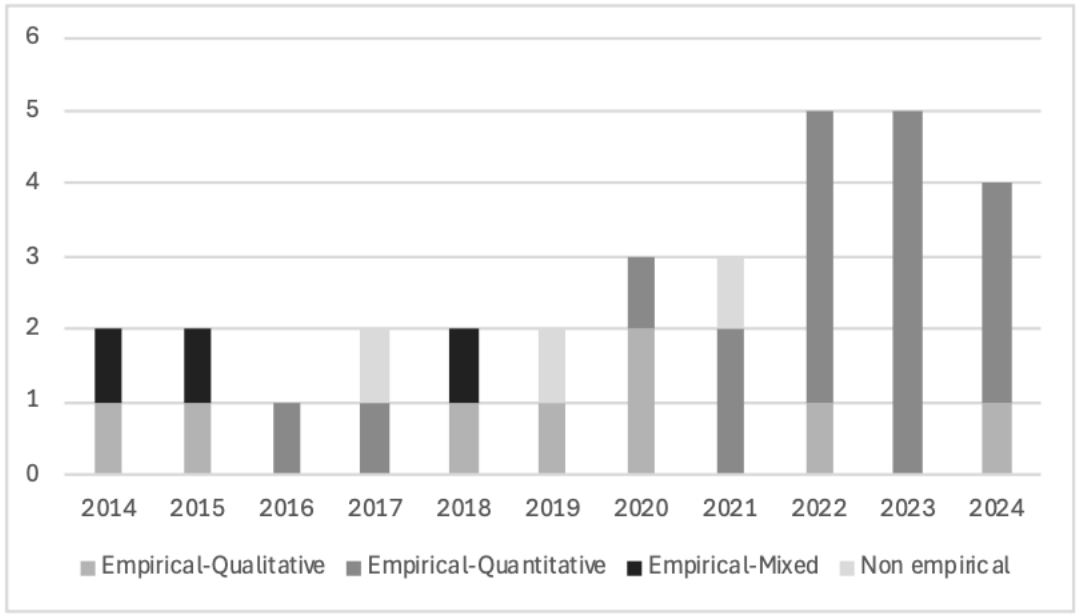


Figure 2 Distribution of final sample over time and research method
Source: articles directly focus on SETs

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Capturing Brands and Consumer Voice. A Longitudinal Study of Online Discourse on Well-Being and Healthy Eating in the Italian Grocery Retail Sector

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Abstract

Frame of the research. *The digital communication of grocery retailers on health, well-being, and healthy eating has been steadily increasing, reflecting both growing consumer interest in these topics and the strategic importance of promoting healthier lifestyles. These digital initiatives, ranging from social media content to targeted online campaigns, aim to shape consumer perceptions and encourage informed, health-oriented food choices.*

Purpose of the paper. *This study investigates how Italian grocery retailers (both discount and non-discount) address health, healthy eating, and well-being in their online communication, particularly through social media, and examines how these messages are interpreted and discussed by consumers.*

Methodology. *A longitudinal web listening methodology combining quantitative and qualitative textual analysis was applied to user-generated content and from six Italian leading retailers, collected from social media and web sources, covering the 2024-2025 period.*

Results. *Over the months considered, online conversations on health, well-being, and healthy eating grew markedly, revealing evolving consumer interests and retailer strategies. Healthy eating gained prominence, discount retailers improved communication, positive sentiment increased, negative sentiment shifted toward inflation and trust issues, and high-protein and sugar-free products dominated perceived health.*

Research limitations. *Limitations include the small retailer sample, lack of demographic data, and reliance on manual data cleaning.*

Managerial implications. *The results provide valuable insights into enhancing health-focused communication, monitoring partnership campaigns, leveraging distinctive brand strengths, and managing the trade-offs between affordability and quality.*

Originality of the paper. *This study proposes a longitudinal analysis of online-generated content, bridging retailers' digital communication strategies with consumer perception and sentiment analysis, while providing actionable insights for promoting healthier behaviors in grocery retail.*

Keywords: *digital communication; web listening; grocery retailers; well-being; health*

1. Introduction

The growing attention to health and well-being is significantly reshaping consumers' dietary behaviors and redefining the role of food retailing in promoting healthier lifestyles (Kumar et al., 2025; Scapin et al., 2025; Samoggia et al., 2019). The increasing awareness of the negative consequences associated with unhealthy eating habits has led to a rise in both the demand for and the supply of nutritionally balanced alternatives (Campo et al., 2020).

In this context, retailers are not merely commercial intermediaries, but key actors capable of concretely influencing consumers' food choices (Martinelli & De Canio, 2021; Cameron et al., 2016; Scapin et al., 2025). Through assortment decisions, product presentation, and in-store valorization strategies, they can shape individual preferences and either encourage or conversely, hinder, the adoption of healthier eating behaviours (Gaur et al., 2024; Machín et al., 2018).

Among the various levers through which retailers can influence consumers' food choices, communication shapes the meaning attributed to products and guides perceptions related to health and well-being (Dawson, 2013; Endres, 2016; Grandi et al., 2017). With the progressive diffusion of digital technologies, this capability has extended into the online context (Kumar et al., 2025), fundamentally transforming the ways in which retailers and consumers interact (Samoggia et al., 2019). Compared to traditional marketing approaches, digital communication enables real-time

interactions, message personalization, and detailed analysis of user-generated content (UGC), allowing retailers to adjust their strategies with greater precision and flexibility (Khwaja et al., 2020; Todor, 2016).

Despite extensive research on how digital communication influence consumers' attitudes toward healthy eating (e.g., Kumar et al., 2025; Dearlove et al., 2021; Zhang et al., 2023), limited attention has been devoted to the joint analysis of retailer-generated communication and consumer-generated discourse on health-related topics in grocery retailing. In particular, little is know about how grocery retailers communicate health, well-being, and healthy eatingand how consumers perceive and discuss retailers' nutrition-related marketing initiatives through digital channels (Samoggia et al., 2019; Ceccoli et al., 2025). This issue is particularly relevant, as communication influences consumer trust, brand reputation, and long-term engagement (Khamitov et al., 2024; Chierici et al., 2019; Kim, 2019), while the abundance of UGC offers an opportunity to better understand which communicative strategies are most effective in eliciting consumer engagement.

Previous studies have also highlighted that, despite a growing convergence in the reputation of different retail formats over recent years (Cardinali & Bellini, 2014; Anselmsson & Johansson, 2014), including both non-discount and discount retailers, discount formats are often penalized because their lower-priced products are perceived as less healthy (Ceccoli et al., 2025). It is therefore of interest to investigate whether such divergence persists over time and whether it is reflected in the online image of discount retailers relative to non-discount retailers, or whether the convergence between formats has mitigated this gap.

Importantly, existing research has largely overlooked the value of a longitudinal perspective in capturing how both retailer communication and consumer perceptions evolve over time.

To address these gaps, the present study adopts a longitudinal and exploratory design over two years (2024–2025), a period characterized by sustained inflationary pressures in the food sector (Statista, 2025), which may have shaped both retailers' communication strategies and consumers' online perceptions and discussions. By adopting an integrated perspective, the study jointly examines retailer-generated digital communication (across discount and non-discount formats) and the perceptions and conversations developed by consumers around health, well-being, and healthy eating. In light of this reasoning, the paper aims to fill these gaps by answering the following research questions:

RQ1: Which contents and communication strategies do Italian grocery retailers employ on health, well-being, and healthy eating in digital contexts?

RQ2: How are these messages perceived and discussed by online users?

RQ3: Do differences persist in user perception and sentiment between non-discount and discount retailers?

To answer these questions, the study adopts a web listening methodology, designed to comparatively explore online conversations generated by both Italian grocery retailers and consumers, analyzing first the data from 2024 and then from 2025 to identify temporal changes and trends. The contribution of this research is twofold. First, it advances the literature on online communication in the food retail sector by addressing a relatively underexplored domain: how Italian grocery retailers (discount vs. non-discount) leverage social media to promote healthier behaviors and how these efforts are perceived by consumers. Second, it provides actionable insights for optimizing communication strategies, enhancing consumer trust, and increasing the impact of health-related messaging, with recommendations directly derived from the patterns and dynamics observed in online conversations.

2. Theoretical background

Grocery Retailers and promotion of healthy, well-being, and healthy eating

Grocery retailers constitute a central component of the food value chain. They influence not only product availability but also consumers' choices and dietary habits (Dubowitz et al., 2015; Hillier et al., 2015; Chrisinger et al., 2018). Through assortment planning, in-store layout, promotional strategies, and product reformulation, retailers can steer consumers toward healthier options (Scapin et al., 2025; Martinelli & De Canio, 2021; Coyle et al., 2020; Jensen & Sommer, 2017). For instance, they may reduce the energy content of products or introduce healthier alternatives through private label. In this way, many retailers have expanded their assortment by including healthier alternatives or introducing entire product lines dedicated to health and well-being (Martinelli & De Canio, 2021). Packaging has also been redesigned to serve both aesthetic and informative purposes. Retailers increasingly use front-of-pack (FOP) labels, nutritional claims, and messages related to health and disease risk reduction (van't Riet, 2013; Cameron et al., 2016). These tools have been shown to influence perceived healthfulness and encourage consumers to choose healthier options (Asioli et al., 2017; Machín et al., 2018; Ballco & Gracia, 2022).

Retailers also shape consumers' access to healthy food. Pricing strategies, as well as store location, can significantly influence purchasing habits (Crawford et al., 2017; Cameron et al., 2016). In particular, discount policies and cashback mechanisms have been used to enhance the economic accessibility of healthier products (Ball et al., 2015; Cameron et al., 2016). This is especially relevant in the context of rising food prices due to inflation (Statista, 2025). Moreover, layout and display strategies play a key role. Retailers can position healthier products at eye level, place them in strategic locations, or create dedicated "health pathways" to guide consumers toward more informed choices (Van Kleef et al., 2012; Cameron et al., 2016).

Finally, communication represents one of the main levers through which retailers can promote healthier dietary habits and lifestyles (Cameron et al., 2016; Grandi et al., 2019; Graziano et al., 2025). These initiatives include in-store campaigns, traditional advertising, outdoor activities, as well as digital and social media strategies aimed at raising awareness and encouraging healthier consumption behaviors (Scapin et al., 2025; Graziano et al., 2025; Cameron et al., 2016). Such actions play a significant role in influencing decision-making processes and purchasing behaviors (Willett et al., 2006; Hecht et al., 2020).

Despite the extensive literature on nutritional, health, and well-being strategies promoted by retailers and on in-store interventions. Less attention has been devoted to how these initiatives are communicated within digital environments and how consumers engage with and interpret such messages online (Samoggia et al., 2019; Ceccoli et al., 2025). Given the growing centrality of digital platforms in shaping food-related norms, meanings, and public discussions (Kumar et al., 2025), this gap limits our understanding of how retailers' health-oriented strategies are constructed, conveyed, and interpreted within contemporary food environments.

Digital Communication and promotion of healthy, well-being, and healthy eating

In the food sector, digital media do not merely disseminate information. They actively contribute to the social construction and legitimation of food-related norms and practices (Kumar et al., 2025).

Social media and online platforms make certain dietary choices more visible and desirable. In doing so, they foster their normalization and integration into everyday life (Dearlove et al., 2021; Zhang et al., 2023).

Through visual and narrative content, platforms such as Instagram, Facebook, and TikTok illustrate how healthy eating practices can be embedded into daily routines. This enhances their perceived accessibility and appeal (Mohammad, 2020; Zhang et al., 2023). In this context, influencer marketing represents a particularly relevant lever. It relies on the perceived credibility and relational proximity of influential figures to promote dietary behaviors. As a result, it can contribute to trust-

building and, in some cases, behavioral change (De Jans et al., 2021). At the same time, the interactive nature of digital media fosters dialogue and participation between brands and consumers, giving rise to symbolic communities centered on health and nutrition (Dearlove et al., 2021). Moreover, through algorithmic systems, social media platforms enable the delivery of highly personalized content aligned with individual preferences, health goals, and specific dietary and lifestyle needs (Mo et al., 2023).

Alongside these interactive tools, the production of informative and educational content - such as blogs and news articles – plays a significant role in improving consumers' understanding of nutritional information and enhancing awareness of the importance of balanced diets (Januraga et al., 2021). Well-structured educational content can positively influence consumer perceptions and increase their willingness to modify dietary habits (Januraga et al., 2021). Furthermore, effective textual communication enhances online visibility through search engines. This expands the reach and circulation of health- and nutrition-related messages (Dearlove et al., 2021; Januraga et al., 2021).

Finally, the participatory nature of digital environments generates a continuous flow of UGC, reflecting consumers' perceptions, interpretations, and evaluations of brands' communication strategies. These digital traces represent a valuable and dynamic source of data. They provide granular insights into how health-related messages are perceived and discussed. Through systematic analysis, UGC enables a deeper understanding of consumers' meaning-making processes and behavioral responses. This, in turn, allows brands to adjust their communication strategies with greater precision and flexibility (Todor, 2016; Rajamma et al., 2020). However, from a scholarly perspective, the potential of user-generated data to inform the promotion of health, well-being, and healthy eating remains only partially explored.

Grocery Retailers' Digital Communication for healthy, well-being, and healthy eating

Prior research shows that digital marketing can support more informed food-related decisions, with positive implications for individual health and well-being (Kumar et al., 2025; Dearlove et al., 2021; Zhang et al., 2023). At the same time, retailers are recognized as key actors in shaping consumer choices through both traditional and digital communication strategies (Graziano et al., 2025; Scapin et al., 2025). Despite the growing presence of grocery retailers on digital and social media platforms, and the growing incorporation of health- and nutrition-related themes into their online communication, scholarly attention to these practices remains limited. This gap is particularly noteworthy given evidence that owned social media can elicit heterogeneous consumer responses along the purchase funnel, leading to heterogeneous effects on engagement and sales outcomes (Akpinar & Berger, 2017; Van Doorn et al., 2010; Liadeli et al., 2022).

Only a limited number of studies have examined retailers' digital communication in relation to health, well-being, and healthy eating (Samoggia et al., 2019; Ceccoli et al., 2025). Specifically, Samoggia et al. (2019) analyzed grocery retailers' messages on Twitter, showing that communication about healthy food tends to remain broad in scope, addressing broad themes such as health and sustainability. While valuable, this study focuses on a single platform and does not account for potential differences across retailer formats. Building on this stream of research, the present study extends prior work in three ways. First, rather than focusing on a single platform, it maps retailers' communication across major online and social media channels. Second, it distinguishes between discount and non-discount grocery retailers, in line with the evidence that consumer perceptions differ across these formats. Third, and most importantly, it integrates the analysis of firm-generated ("owned") messages with user-generated ("earned") discourse. This allows to incorporate consumers' interpretations and discussions into the assessment of retailers' health-oriented communication, leveraging the wealth of data generated by UGC to gain deeper insights into consumer perceptions and behaviors.

Finally, by adopting a two-year longitudinal perspective, the study captures how retailers' communicative evolve and how these are received and discussed by consumers. This dual and longitudinal approach provides a more comprehensive understanding of the dynamics between brand

communication and audience response. It also offers both theoretical insights and actionable implications for enhancing the effectiveness of nutritional communication in the grocery retail sector.

3. Methodology

The research design employed a mixed-methods approach, combining quantitative and qualitative textual analysis (Andreotta et al., 2019). The analysis was conducted using the Blogmeter Suite, a web and social intelligence platform that collects and analyzes user conversations from social media and other web sources (Facebook, Twitter/X, Instagram, YouTube, TikTok, Twitch, forums, blogs, news, and app review sites). The platform extracts textual data from a database of over 2 billion documents, collected from both the official application programming interfaces (APIs) of social networks and Blogmeter's proprietary web crawlers. This social listening research approach follows the proposal of Caliandro and Gandini (2016) and accounts for the peculiarities of qualitatively analyzing digital content relative to traditional data.

The study adopts a longitudinal design based on two consecutive and methodologically aligned waves of data collection, covering January 1st – December 31st, 2024, and January 1st – December 31st, 2025. The same data collection protocol, retailer selection criteria, keywords configuration, and analytical procedures were replicated in both waves to ensure full comparability across time. Two preliminary phases preceded the main analysis. First, the grocery retail brands most discussed online in Italy were identified, with particular attention to non-discount and discount retailers. Retailers' selection was based on the total number of messages collected during the observation period across all Italian grocery retailers. A cut-off threshold of 10,000 messages was applied, as retailers exceeding this level showed a markedly higher volume of total messages compared to the remaining retailers. This procedure initially resulted in the selection of seven brands (four non-discount and three discount). One of the discount retailers included in 2024 did not meet the cut-off threshold in 2025 and was therefore not retained for the second wave. To maintain a consistent longitudinal comparison, this retailer was also excluded from the 2024 dataset. The final sample thus comprised six retailers (four non-discount and two discount) that were analyzed across both years.

Second, the dataset was classified using the Blogmeter Suite software through a keyword-based approach. Keywords were selected by experienced social listening analysts at Blogmeter, following a structured expert-driven procedure aimed at isolating content relevant to health, well-being, and healthy eating from the broader database. The selection process accounted for different natural language formulations, including variations in grammatical gender and number in Italian, which were systematically included when instructing the software to retrace documents. This approach ensured consistency and coverage across linguistically equivalent expressions related to the topics of interest. The sets of keywords selected for the health topic, terms like "health", "healthy", "healthcare", "medical", and "prevention" were included. For the well-being topic, terms such as "well-being", "wellness", and "feel good" were considered. Finally, for healthy eating, keywords like "healthy eating", "nutrition", "nutritionist", "dietitian", and "food pyramid" were selected. Once these preliminary phases were completed, the online content was collected and subjected to the main analysis.

Upon data extraction, the datasets underwent a cleaning and refinement phase aimed at ensuring thematic relevance and coherence. This process followed a combined automatic and manual approach. The Blogmeter Suite software automatically grouped the extracted content into classes based on predefined keyword-based topics. These classes were then manually reviewed by the researchers to assess their relevance to the research objective and to exclude off-topic or ambiguous content. This iterative screening process allowed the identification of coherent subsets of data for subsequent qualitative analysis.

Following this screening, the corpus was expanded to include additional terms that emerged as related to the topics of interest. Specifically, terms semantically linked to "high-protein lines", "vegan

and vegetarian lines", "gluten-free", "organic", and "natural" were included, as these product lines frequently appeared in connection with health, well-being, and healthy eating.

For the quantitative analysis, four metrics were employed: mentions, total messages, engagement, and positive/negative sentiment. Mentions represent the total number of posts or comments that contain at least one of the keywords considered (brands and topics). Total Messages refers to the sum of all posts mentioning the keywords during the observation period, together with their associated comments. Engagement captures the aggregate level of user interactions associated with posts, including comments, likes, shares, and views (for TikTok and YouTube), and is computed in line with the native definitions provided by each social media platform through their official APIs. It should be noted that a change occurred in 2025 regarding Instagram metrics. Specifically, Meta began providing Instagram Reel view counts as part of the engagement metric to third-party platforms, such as the Blogmeter Suite, without the possibility of retroactive retrieval. To address the issue of comparability across waves, the analysis reports engagement delta values excluding the view metric. For clarity, a distinction is made between "passive" engagement, referring to views, passive because they occur automatically when content is displayed, and "active" engagement, referring to likes, comments, shares, and reactions, active because they require explicit user action. Finally, sentiment analysis was conducted using a proprietary opinion mining system implemented within the Blogmeter Suite, based on a grammar-based domain specifically developed for the Italian language and tailored to the thematic focus of the study. The system assigns positive or negative polarity and identifies interrogative forms based on the co-occurrence of predefined lexical units in proximity to the analyzed keywords.

This analytical framework provided valuable insights into the digital visibility and user engagement generated by different retail brands, allowing for a comparative evaluation of their online impact. Following the quantitative analysis, selected subsets of data were examined qualitatively to gain deeper insights into thematic emphasis and discourse patterns.

4. Results

4.1. Evolution and Structuring of Health-, Well-Being-, and Healthy Eating–Related Conversations

Between 2024 and 2025, online conversations linking grocery retailers to themes of health, well-being, and healthy eating accelerated markedly. A comparison between the overall conversation surrounding grocery retailers and discussions specifically focused on these topics reveals a 50,63% increase in the so-called thematic conversation, compared with a general increase of 5,71% in retailer-related discussion (Figure 1). The disparity between these growth rates suggests that the expansion of thematic conversation cannot be attributed merely to the overall increase in online discussion about grocery retailers; rather, it reflects a distinct and noteworthy trend. This pattern points to a rising interest in content related to healthy lifestyles, highlighting a shift in online conversation that warrants further investigation.

Figure 1 – Grocery retailer conversation growth in 2025: General Vs. Topics

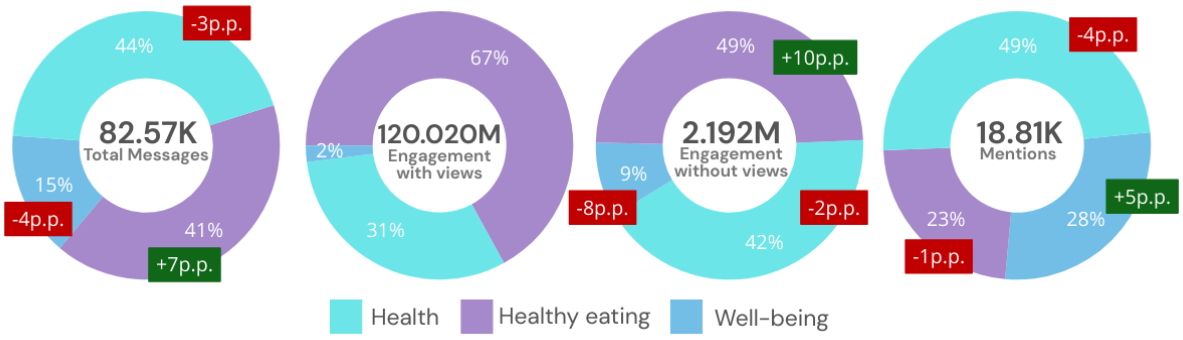


Source: our elaboration

Analyzing the individual topics, it can be observed that in 2025 they are treated more distinctly compared to the previous year. In 2024, discussions of one topic tended to encompass the others, whereas in 2025, the topics are addressed in a more specific and differentiated manner. Moreover,

considering the topics in relation to the KPIs (Figure 2), it emerges that, in terms of both Total messages and Engagement without views, healthy eating shows a significant increase between the two years. This indicates a growing public interest in content related to conscious dietary choice and nutritional practices, likely in response to informational campaigns or heightened media attention on healthy diets. Regarding mentions, the topics of health remain predominant, while well-being records an increase of 5 percentage points, suggesting a greater integration of content linking grocery retailers to the concept of well-being.

Figure 2 – Topics in relation to KPIs: 2024 vs 2025



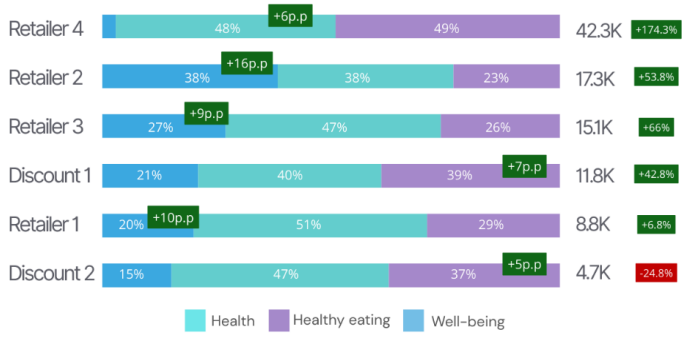
Source: our elaboration

By breaking down the topics by retailer and considering the KPI Total messages related to grocery retailer conversations that also mention the topic (Figure 3), several changes emerge compared to 2024. Notably, there is a shift in the ranking: while Discount 1 held the top position in 2024, in 2025 Retailer 4 records the most significant growth (+174.3%), largely attributable to a project on health through nutrition, responsible for the 72% of the total messages associating Retailer 4 with the topics.

Overall, if health was the predominant topic for all retailers in 2024 (except Retailer 4), in 2025, healthy eating has gained greater relevance for nearly all retailers.

Compared to the previous year, both discount retailers have increased conversations around healthy eating. In 2024, an issue had emerged regarding the perception of their offerings, which were not actively communicated, whereas in 2025 this trend appears to have reversed. Discount 1 shows growth primarily in healthy eating, driven by conversation regarding the decision to allocate more shelf space to vegan products. Discount 2 also demonstrates a proportional increase in healthy eating, despite being the only grocery retailer to show an overall decrease in association with the topics. Retailer 4, which held the largest share of healthy eating conversations in 2024, maintains its leadership on this topic but loses relevance in well-being, thereby emphasizing the centrality of health. Conversely, Retailer 1, Retailer 2, and Retailer 3 show an increase in conversation related to well-being.

Figure 3 – Total Messages on grocery retailers' conversations with topics



Source: our elaboration

4.2. Owned vs. Earned Content: Communication Strategies and Consumer Perceptions

To further investigate the origins of the conversations and better understand the dynamics underlying the construction of online discourse, a distinction was made between message sources: owned content (originating from retailers' proprietary channels) and earned content (generated by third parties). The analysis was conducted at the retailer level to assess the relative contribution of each source type to the association with the themes under investigation.

Figures 4 and 5 present the distribution of owned and earned content. Figure 4 refers to conversations related to general discussion, whereas Figure 6 focuses specifically on the selected topics (health, well-being, and healthy eating). The comparison enables an assessment of both the overall intensity of thematic communication and the degree of specificity with which individual topics are addressed.

The results reveal several noteworthy trends. With respect to earned content, general conversations generated by third parties increased for all retailers except Retailer 3, indicating a broader expansion of online discourse related to grocery retailers (Figure 4). Discount 1 remains the leader in general conversations; however, its share decreases when the focus shifts to health-related topics (Figures 4 and 5). Nevertheless, in 2025, it emerges as one of the most active players in communicating specific topics through its owned channels. A comparison with 2024 clarifies the extent of this change: although Discount 1 was already among the most active brands in terms of overall social media presence, it devoted limited attention to explicit communication on the topics under analysis. Associations between Discount 1 and health were therefore largely spontaneous and, in several cases, negative. In 2025, this dynamic changes: Discount 1 adopts a more proactive approach, significantly increasing its owned communication on health, well-being, and healthy eating (+4 pp), thereby regaining greater control over narrative construction (Figure 5). Similarly, Retailer 2 increases the share of thematic content delivered through its owned channels (+2 pp), aligning with the more proactive strategy observed for Discount 1 in 2025 (Figure 5).

Retailer 4, in turn, expands its share of earned content on the topics. However, as previously highlighted, a substantial portion of this growth is attributable to structured collaborative initiatives (Figure 5). Consequently, the increase in earned content does not necessarily reflect spontaneous consumer associations but rather the amplification of strategically planned communication. For the remaining players, owned communication on the topics remains largely consistent with the patterns observed in 2024 (Figure 5).

Figure 4 – Owned vs Earned in general

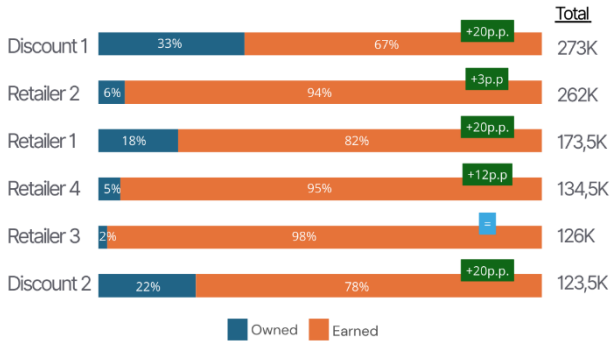
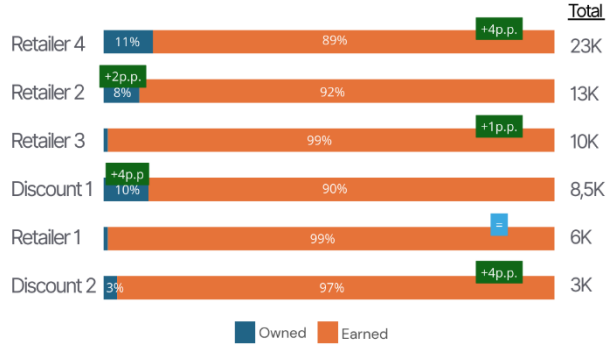


Figure 5– Owned vs Earned on topics



Source: our elaboration

Focusing on the three main players driving owned content on topics (Retailer 4, Retailer 2, and Discount 1 as shown Figure 5), Table 1 provides a qualitative summary of the key content themes, comparing both owned and earned content across 2024 and 2025.

The analysis highlights that, while the communication strategies of Retailer 4 and Discount 1 remain largely consistent over the two years, their scope and intensity expanded in 2025. Notably, the primary focus of each retailer's messaging remains unchanged. The main shift is observed in

consumer perceptions: Retailer 4 shows improved associations with product quality but experiences reputational challenges in other, non-health-related areas. Discount 1 exhibits the most pronounced change, moving from a perception of low quality to being recognized as a leading brand for vegan and vegetarian offerings in terms of price, variety, and quality.

Conversely, Retailer 2 slightly refocuses its communication, shifting from animal welfare and quality associations toward more product-centered messages and guidance on healthy consumption; however, consumers tend to take the nutritional quality of the brand's products for granted and focus their discussions primarily on recipes and taste.

Table 1 – Qualitative analysis: Owned vs Earned (2024-2025)

Retailers	Owned content 2024	Earned content 2024	Owned content 2025	Earned content 2025
Retailer 4	Promotes high-quality, sustainable products from controlled supply chains, offered at accessible prices	Consumers are skeptical about product quality	Explains how to choose higher-quality products; debunks myths about safety and quality; suggests healthy recipes presented by a nutrition expert	Consumers are generally engaged and curious about the content; rarely explicitly associate the brand with product quality or health; perceived partnerships slightly reduce trust in the content; topic-related posts trigger discussion of other negative brand aspects unrelated to health.
Retailer 2	Campaigns focused on animal sustainability and ingredient quality	Generally positive perception of product quality; minor negative mentions regarding product recalls	Slightly more "traditional" health communication: static posts with ingredients and general product images; presents ingredients linked to "well-being" or "healthy" without technical nutritional explanations; explains how to consume and store ingredients; highlights origin/provenance as a quality factor	Consumers are generally positive but not always focused on health and healthy eating; more often comment on taste and recipes
Discount 1	Sports and vegan/plant-based diet promotion	Strong negative perception due to the low price associated with low quality	Communicates "lifestyle" messages linking healthy eating and health to being athletic, interested in "fit recipes," or following a vegetarian/vegan diet	Consumers are generally positive; not always explicitly receptive to health/food content, but occasionally express positive sentiment toward the retailer; vegan/vegetarian offerings are recognized for variety and quality

Source: our elaboration

4.3. The Reputational Impact of Health-Related Conversations

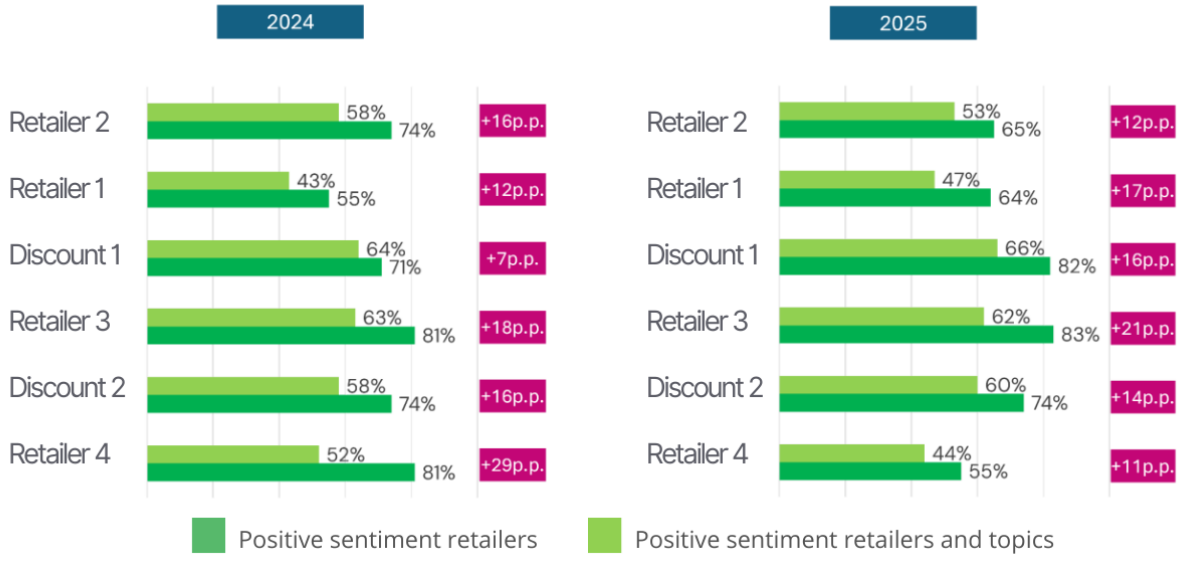
With regard to sentiment analysis, Figure 6 presents two distinct graphs, referring respectively to 2024 and 2025, comparing overall positive sentiment toward retailers with positive sentiment in conversations that simultaneously mention retailers and the selected topics. The findings show that

in both 2024 and 2025, conversations related to health, well-being, and healthy eating were associated with higher levels of positive sentiment toward retailers. In 2024, these topics corresponded to an average increase of +16.8 percentage points, while in 2025 the differential amounted to +15.1 percentage points. Although slightly lower than the previous year, the 2025 figure remains strongly indicative of a positive association, confirming that commitment to health-, well-being-, and healthy eating–related themes contributes to enhancing retailers' online reputation.

A more detailed comparison between the two years nevertheless reveals different dynamics at the individual retailer level. Retailer 4, although the most strongly associated with the topics in terms of volume, is also among those benefiting least from this association in terms of sentiment improvement in 2025 and shows a less favorable trend compared to 2024. This suggests that stronger exposure to the topics does not automatically guarantee a proportional increase in positive sentiment. Conversations around these topics may, in fact, function as discursive spaces in which users express broader evaluations of the retailer. Even when not directly related to the topics under analysis. Consequently, communication initiatives focused on health, well-being, and healthy eating, while effective, are not in themselves sufficient to structurally reshape the overall sentiment toward the retailer.

Retailer 3 records the greatest improvement across the entire pane in both 2024 and 2025, despite not being the retailer most strongly associated with the topics, nor one of the most active on these through its owned channels (Figure 5). This suggests that association with health, well-being, and healthy eating themes may stem not only from explicit communication on products or diets, but also from a broader and more coherent positioning grounded in services and initiatives linked to the concept of well-being. Finally, Discount 1 is among the retailers exhibiting the most pronounced increase in the positive differential between 2024 (+7p.p.) and 2025 (+16p.p.). While in 2024, a critical issue concerning perceived product quality, this negative association appears to have weakened in 2025. Further analysis is nevertheless required to better understand the drivers underlying this shift.

Figure 6 – Positive sentiment: general Vs topics



Source: our elaboration

In terms of negative sentiment, the qualitative analysis reveals several significant critical issues, highlighting a meaningful evolution compared to 2024.

In 2024, discount retailers were primarily affected by a negative association between low price and low quality, which had reputational implications in relation to health-related topics. This association translated into widespread skepticism regarding the quality of food products sold in

discount formats:

"Discount where convenience does NOT meet quality."

"Sorry, but you can't save on food."

"What you save at the discount store you use at the pharmacy later."

In 2025, the scenario appears to have partially shifted. Although negative comments toward discount retailers persist, particularly in relation to sensitive categories such as meat.

"I wonder how anyone can buy meat at a discount store."

The negativity is no longer confined to this format alone. Criticism has expanded across grocery retailers more broadly, indicating a perceived convergence between retail formats from the consumers' perspective.

The narrative increasingly revolves around two macro-themes: distrust toward animal welfare standards and the quality of meat derived from intensive farming, and the generalized increase in food prices. Regarding the grocery retailers, comments reflect a systemic critique directed at the entire retail sector:

"Why mention Retailer 2 when all the chickens sold in supermarkets come from intensive farming?"

Simultaneously, food inflation in 2025 (Statista, 2025) constitutes a central dimension of the discussion. Price increases are perceived as widespread and directly affect the accessibility of healthy products, which are increasingly described as unaffordable across all supermarket formats. Consumers frequently highlight a polarization between healthy products, perceived as expensive, and cheaper alternatives, which are implicitly associated with negative health consequences:

"This dynamic leads to a compression of consumption: if products become unaffordable, families will be forced to purchase smaller quantities or worse, buy lower-quality products at the expense of their health."

Within this framework, some comments question the overall quality of products sold in large-scale retail, reinforcing the perception that supermarket channels are intrinsically linked to inferior standards:

"You can buy it in 'Canicattì', but if you purchase it at the supermarket, it is still a low-quality product."

However, alongside rising prices, a partial reconsideration of discount product quality emerges. The increase in prices within non-discount retailers appears to have attenuated the sharp distinction previously perceived between formats, fostering a relative re-evaluation of discount retailers among some consumers:

"Many food products at Discount 2 are truly excellent and even better than more well-known brands."

"I shop at Discount 1 and fill my fridge with really good food."

This does not imply that discount retailers are exempt from criticism. They are likewise discussed in relation to price increases:

"Even shopping at discount stores and buying promotional items, what you could buy with €100 four years ago is now difficult to buy with €150."

Compared to 2024, the competitive landscape therefore appears more complex. Consumers actively compare inflation and total basket costs across both traditional large-scale retail and discount formats, demonstrating a more sophisticated evaluative approach. Within this context, a third competitive actor, previously marginal, gains prominence: proximity stores and small local

producers, perceived as offering higher quality, greater authenticity, and improved health standards:

"If you want chicken, go to a butcher or a trusted local farmer."

"I never buy olive oil at the supermarket; I buy it directly from the mill so I can be sure it is extra virgin olive oil."

Overall, the qualitative evidence suggested that in 2025 the discourse no longer revolved exclusively around the discount–quality dichotomy. Instead, it unfolded within a broader framework characterized by inflationary pressure, redefined hierarchies of trust, and the increasing legitimization of alternative channels to organized grocery retailers.

4.4. Which Products Mean "Health"? Exploring Consumers' Natural Associations

In comparing 2024 and 2025, the analysis of product lines associated with health and healthy eating shows substantial continuity in the categories perceived as "healthy" (Figure 7), alongside some notable shifts in their prominence and conversational volume (Figure 8). In both years, high-protein products represent the category with the highest percentage association to health topics, representing the strongest and most stable link between product attributes and perceived healthiness. Already in 2024, protein-rich products emerged as the category most strongly health-oriented, and in 2025 they maintain this apex position, registering only marginal growth while consolidating their dominant role in the health-related semantic landscape (+2p.p.; Figure 7). At the same time, organic/natural/BIO product lines further strengthened their association with health, though without surpassing the primacy of high-protein products.

The most notable discontinuity concerns sugar-free products, which in 2025 emerge as the category with the largest increase in association with health, well-being, and healthy eating, marking a particularly strong growth compared to the previous year (+35 p.p.; Figure 7). This change is even more significant when considered alongside overall conversational volumes (Figure 8): while most categories in 2025 (vegan/vegetarian, protein, gluten-free, organic) experienced a decline in total discussions, the sugar-free category represents the only exception, showing growth in absolute terms as well. Overall, the comparison suggests that, despite a general reduction in discourse attention toward many health-oriented categories, high-protein products maintain their role as a symbolic anchor of health, while sugar reduction is increasingly recognized across conversations, partially reshaping the semantic hierarchies observed in 2024.

Figure 7 – Top Claims Linked to Health

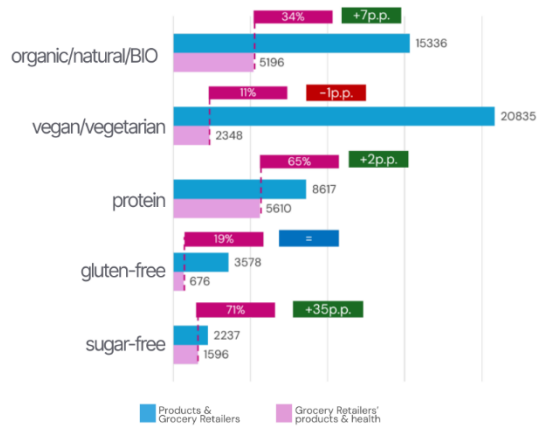
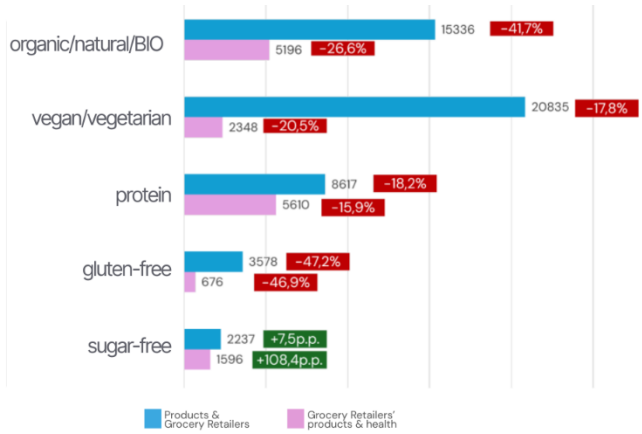


Figure 8– Volume of Conversations on Nutritional Claims



Source: our elaboration

5. Discussion

The present study aimed to jointly analyze retailer-generated digital communication (across both discount and non-discount formats) and the perceptions and conversations developed by consumers around health, well-being, and healthy eating. A longitudinal design was adopted to capture changes between 2024 and 2025. Over this period, thematic conversations increased, indicating a growing interest from both retailers and consumers.

In 2025, the topic of health, which led discussions in 2024, received slightly less attention, while healthy eating and well-being gained prominence, reflecting a more specific and targeted form of communication. This trend represents a departure from previous studies, which found that retailers tended to communicate on more generic topics to avoid reputational risks (Samoggia et al., 2019; Ceccoli et al., 2025).

Regarding editorial strategies, the study highlights the contrast between volumes of owned and earned content. Retailers generally invest relatively little in communication through their own channels on the topics analyzed, despite evidence that proprietary channel communication influences both engagement and purchasing behavior (Liadeli et al., 2022; Grewal et al., 2022). Nevertheless, Discount 1, after a particularly challenging year in 2024, increased its communication on health-related topics, emphasizing a healthy lifestyle approach. This increase in messaging was positively received by consumers, who strengthened their favorable perception of the brand regarding these topics. In particular, the vegetarian and vegan product lines were appreciated for taste, affordability, and quality. In 2025, Discount 1 achieved a reputational boost and partially mitigated the previous low-cost = low-quality perception. This case exemplifies how leveraging brand strengths can effectively improve consumer perceptions.

In contrast, despite significant efforts by Retailer 4 through projects and partnerships on healthy eating, communications were exposed to negative comments concerning other, non-topic-related decisions. This represents a critical issue, as it not only generates negative sentiment around the brand but also amplifies the visibility of such concerns. Social media algorithms tend to expose these posts to users interested in health, well-being, and healthy eating. However, these users also read the negative comments, potentially affecting overall brand opinion, reducing trust, and diverting consumers toward competitors. In such cases, monitoring comments under sponsored posts and responding with timely, targeted communication strategies is advisable (Shahbazi & Bunker, 2024).

Another relevant insight concerns the convergence of retail formats in consumer perception. In 2024, differences between discount and non-discount retailers were pronounced, with discount stores perceived as less health-oriented. In 2025, distrust extended across all formats, linked both to perceived lower quality of fresh products (e.g., meat) and supply chain issues, as well as to inflation (Statista, 2025), which rendered healthy products less accessible. Consumers, needing to balance budgets, often turned to products perceived as lower quality. Rising food prices also prompted comparisons between supermarkets and small-scale or local producers, such as butchers, highlighting a strategic insight that may reshape the competitive landscape of grocery retail (Gonzalez-Benito et al., 2005).

Finally, across both 2024 and 2025, consumers consistently perceived high-protein products as the healthiest. This trend persists despite scientific evidence cautioning against excessive consumption of processed protein (Ortega et al., 2024). Additionally, there is growing consumer interest in sugar-free products, aligning with recommendations to reduce daily sugar consumption below 10% of daily energy intake (Yan et al., 2022). Consumers value these lines because they allow for a balance between indulgence and health. However, further investigation is needed to assess whether sugar reductions are accompanied by substitutions with potentially less healthy ingredients (Sharma et al., 2025).

6. Theoretical Implications and Managerial Guidelines for Grocery Retailers

6.1.Theoretical Implications

This study contributes to the literature in several ways. First, it introduces a longitudinal perspective on retailer social listening by comparing two consecutive years. This approach provides a more comprehensive understanding of how retailer communication strategies and consumer perceptions evolve over time. The findings reveal that retailer's reputation in the health-related domains is not static but can shift significantly. In particular, the results show clear evidence of reputational reconfiguration across retail formats and brands from 2024 to 2025, suggesting that the effect of digital communication are dynamic and context-dependent. These dynamics are shaped by factors such as inflationary pressure, strategic communication adjustments, and the evolution of user-generated discourse.

Second, the research extends prior studies on the effects of online communication in the food sector (e.g., Kumar et al., 2025) by shifting the analytical focus from producers to retailers. By examining how retailer communication influences consumer discourse, this study enriches our understanding of the retailer as an active agent in the construction of health-related narratives.

Third, the study advances the literature on retailers' online communication listening by integrating both owned and earned content and by jointly analyzing brand communication and consumer reactions (Samoggia et al., 2019). In doing so, it bridges retailer-driven communication strategies with consumer-level perception and sentiment analysis, providing a more integrated framework for understanding digital interaction in grocery retailing.

Finally, the findings contribute to the literature on competitive convergence in grocery retailing by identifying the emergence of proximity stores and small local producers as perceived competitors in consumer discourse (Gonzalez-Benito et al., 2005), suggesting a shift in competitive boundaries driven not only by market structure but also by consumer perception.

6.2. Managerial Guidelines for Grocery Retailers

The following guidelines illustrate how grocery retailers can strategically align their communication with evolving consumer priorities while managing reputational and competitive risks.

Strengthening the Presence of Health-Related Themes in Owned Media

The analysis shows a clear increase in online conversations about health, well-being, and healthy eating over the two years observed. Moreover, discussions of these topics are more strongly associated with positive sentiment than conversations focused on other themes.

Despite this growing salience, the share of owned content dedicated to these topics remains limited. This indicates a gap between the evolution of consumer discourse and retailers' communication efforts. Adopting a more proactive and structured approach to health-related communication within owned media would allow retailers to better align with evolving consumer priorities and reinforce their positioning in a domain that already demonstrates comparatively advantageous sentiment dynamics.

Monitor Reactions to Partnerships and Sponsored Content

The analysis indicates that collaborations with experts and influencers can increase visibility. As these partnerships attract higher engagement, they also stimulate broader online conversations, which may extend beyond the focal topic of health, well-being, or healthy eating. Monitoring these interactions is therefore essential, as they can shape how the retailer is perceived. Notably, even critical comments on highly visible posts may contribute to keeping the topic salient in online discussions, as observed in the case of Retailer 4.

Leverage Strategic Differentiation Instead of Imitation

Emulating competitors can dilute brand positioning. Discount 1 provides a relevant example: rather than directly competing on traditional "healthy quality" narratives after criticism for low quality, it strategically expanded its vegan and vegetarian assortment. This approach allowed the

retailer to capitalize on a growing trend while preserving its competitive advantage in affordability. The vegan and vegetarian assortment is positively recognized for variety, quality, and price accessibility, dimensions not equally acknowledged for other retailers in the sector. These findings suggest that retailers can benefit more from leveraging their distinctive strengths than from replicating competitors' communication strategies.

Address the Emerging Affordability–Quality Tension

The broader context of inflation and rising prices affects consumer perceptions of grocery retailers. Healthy products are increasingly perceived as less accessible, and even discount retailers are criticized for rising basket prices. An emerging competitive threat appears to come from small proximity stores and local producers, which are perceived as offering higher quality, more genuine, and sustainable products. When price differences narrow, consumers may reconsider value perceptions and shift toward these alternatives.

Retailers should therefore actively manage the perceived trade-off between affordability and quality, particularly in the health, well-being, and healthy eating domains.

7. Limits and suggestions for future research

This study contributes to understanding online communication by grocery retailers and consumer perception on health, well-being, and healthy eating, yet it presents several limitations. First, the analysis focuses on six grocery retailers, selected based on online visibility thresholds. Although these were the most discussed online during the observation period, the limited sample constrains the generalizability of the findings. Future research could expand the scope to include a broader range of retailers to test the robustness of the observed patterns.

Second, the absence of demographic information on users limits the ability to examine variations in perception and engagement. For example, younger consumers may perceive discount retailers differently from adults due to differences in economic availability (Thangavel et al., 2022) and may be more sensitive to health, well-being, and healthy eating topics (Becerra et al., 2023; Halicka et al., 2025).

Finally, reliance on manual data cleaning may introduce subjectivity and constrain scalability. Future studies could integrate automated or machine-learning-based preprocessing to reduce potential bias and enable the analysis of larger datasets. Further research could also investigate the cultural, lifestyle, and marketing factors that drive the strong association between "high protein" messaging and perceptions of health and well-being.

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Orchestrating Digital Passenger Experience: Digital Touchpoints and Organisational Choices in a Smart Airport

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Abstract

Frame of the research. *Digitalisation is reshaping airports through digital touchpoints aimed at improving operational efficiency and passenger experience. Prior research has mainly examined individual airport technologies, user perceptions or service quality outcomes, devoting limited attention to how digital passenger experience emerges from the orchestration of digital touchpoints, data flows, organisational processes and managerial responsibilities across the passenger journey. Airports represent complex socio-technical service systems in which digital technologies operate within governance structures and operational processes.*

Purpose of the paper. *This paper investigates how digital touchpoints and organisational choices are orchestrated to shape digital passenger experience in a smart airport. The study conceptualises digital passenger experience as an organisationally orchestrated outcome rather than the result of isolated technological interactions.*

Methodology. *The research adopts a qualitative single-case study based on a theory-driven thematic analysis of ADR's Integrated Annual Report 2024, focusing on Rome Fiumicino Airport. The analysis follows the passenger journey and examines relationships between digital touchpoints, organisational arrangements, and passenger experience implications.*

Results. *Findings indicate that passenger experience depends less on the presence of digital technologies than on orchestration mechanisms governing integration, reliability, governance, and support. The study highlights trade-offs between efficiency, perceived control, trust, and inclusion in digitally mediated passenger journeys.*

Research limitations. *The study is based on documentary data and focuses on a single case.*

Managerial implications. *Results emphasise that airport managers should govern digital passenger experience as an end-to-end service system, aligning passenger-facing technologies with back-end data infrastructures, operational responsibilities, quality metrics and support mechanisms.*

Originality of the paper. *The paper advances smart airport research by framing digital passenger experience as an emergent socio-technical outcome.*

Keywords: *Digitalisation, Digital touchpoints, Passenger experience, Organisational orchestration, Smart airports.*

1. Introduction

Airports are increasingly evaluated not merely as transportation infrastructures, but as complex service systems in which passenger experience has become a central dimension of competitiveness, legitimacy and managerial performance. As air travel volumes have returned to, and in many hubs surpassed, pre-pandemic levels, airports are facing the challenge of accommodating growing demand while maintaining smooth, reliable and reassuring journeys. In this context, digital technologies such as mobile applications, biometric identification, real-time information systems, artificial intelligence and data-driven flow management have become central tools for reducing friction, increasing predictability and supporting operational resilience (Dini et al., 2023).

However, the relationship between digitalisation and passenger experience is neither linear nor unambiguously positive. Airports remain environments characterised by time pressure, uncertainty, security constraints and high emotional intensity, particularly for passengers facing disruptions, language barriers, unfamiliar procedures or reduced mobility. Digital interfaces may reduce these tensions by providing information, automation and personalised support, but they may also introduce new sources of anxiety when they fail, overload users with information, or replace human assistance

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in moments of stress. This makes the governance of digital touchpoints a central managerial challenge in contemporary airport management.

The academic literature reflects this complexity. Airport management and transportation studies have traditionally emphasised service quality, operational efficiency, congestion management and the progressive transformation of airports into smart infrastructures. In parallel, information systems and service research have examined how digital interfaces reshape customer journeys, user expectations, technology acceptance and value co-creation. These streams provide valuable insights, but they have often evolved separately. As a result, existing research tends to examine either specific technologies and their adoption, or broader service quality outcomes, while paying less attention to the organisational mechanisms through which digital passenger experience is designed, coordinated and governed across the passenger journey.

This paper addresses this gap by focusing on the interplay between digital touchpoints and organisational choices. In airports, passengers do not experience digitalisation through isolated interfaces, but through a sequence of interdependent encounters before, during and after their presence in the terminal (Patrício et al., 2008; Lemon & Verhoef, 2016). The usefulness of a mobile application depends on the accuracy of back-end data; the perceived fairness of automated security depends on transparent procedures and support mechanisms; and the reassurance provided by real-time information depends on the airport's capacity to coordinate operational responses during disruptions. Digital passenger experience emerges not simply from the presence of advanced technologies, but from the way these technologies are aligned with data flows, operational processes, managerial responsibilities and service quality metrics.

The study investigates this issue through an in-depth case study of Rome Fiumicino Airport, one of the largest and most technologically advanced hubs in Europe. Managed by Aeroporti di Roma (ADR), Fiumicino has consistently positioned digitalisation as a strategic pillar of its development, integrating data-driven operations, customer-facing platforms and innovation programmes into its broader vision of a smart and sustainable airport, in line with broader transformations toward smart and digitally enabled airports (Newbold, 2020). The case is therefore particularly informative for examining how digital passenger experience is designed and governed at scale within a complex airport service ecosystem.

Accordingly, the study addresses the following research question:

How are digital touchpoints and organisational choices orchestrated to shape passenger experience in a smart airport?

The originality of the paper lies in conceptualising digital passenger experience not as the direct outcome of single technologies, but as an organisationally orchestrated phenomenon emerging from the alignment of digital touchpoints, data flows, operational processes, responsibilities and service quality metrics along the passenger journey. Rather than evaluating the technical performance of individual systems, the study examines how front-end interfaces such as information systems, navigation tools and automated processes are connected to back-end coordination structures, data infrastructures and quality management mechanisms, and how this interaction shapes perceived control, trust and overall experience.

The analysis is guided by an integrated theoretical framework combining the Technology Acceptance Model (TAM) and Service-Dominant Logic (SDL). TAM provides a lens to understand how passengers evaluate digital touchpoints in terms of perceived usefulness and ease of use, which are particularly relevant in high-pressure environments such as airports (Davis, 1989). SDL, in turn, conceptualises the passenger journey as a process of value co-creation in which technologies, organisations and users jointly shape service outcomes (Vargo & Lusch, 2008). Together, these perspectives make it possible to theorise digital passenger experience as the result of socio-technical orchestration, not of technological deployment alone.

By answering the research question, the paper makes three contributions. First, it advances research on smart airports and digital aviation services by providing a theory-driven account of how digitalisation is operationalised across the passenger journey. Second, it contributes to service and information systems research by showing how technology acceptance is conditioned by organisational orchestration and ecosystem-level coordination. Third, it offers actionable insights for airport managers on how to design and govern digital infrastructures in ways that enhance passenger experience while avoiding new sources of friction, exclusion and mistrust.

2. Theoretical framework: digital passenger experience in smart airports

The transformation of airports into digitally mediated service environments requires theoretical lenses that can capture both individual user responses and the systemic organisation of service encounters. To this end, this study integrates the Technology Acceptance Model (TAM) and Service-Dominant Logic (SDL) to conceptualise how digitalisation is orchestrated to shape passenger experience across the airport journey. While TAM explains why passengers accept or reject specific digital touchpoints, SDL situates these interactions within a broader ecosystem of actors, technologies and organisational processes through which value is co-created.

2.1 Digitalisation and the airport as a service system

Airports have progressively evolved from infrastructure providers into complex service organisations coordinating a wide range of passenger-facing and back-end activities. This evolution has been driven by several factors, including the growth of non-aeronautical revenues, increasing passenger expectations and the need to manage high volumes under stringent security and safety constraints. Digital technologies have become central to this transformation, enabling the integration of information, the automation of processes and the real-time coordination of resources (Halpern et al., 2021).

In smart airports, digitalisation is not limited to isolated applications but takes the form of an integrated service architecture. Passenger-facing interfaces such as mobile applications, biometric gates and self-service kiosks (Bogicevic et al., 2017) are connected to data platforms, sensors and operational control centres that continuously monitor and adapt the system. This architecture allows airports to shift from reactive to proactive service management, anticipating congestion, reallocating resources and communicating with passengers in real time.

From a theoretical standpoint, this shift challenges traditional views of service delivery based on linear processes and stable roles. Instead, the airport becomes a dynamic service system in which value is produced through the interaction of heterogeneous actors and technologies. Passengers, airport operators, security agencies, airlines and digital platforms jointly contribute to the experience, often in ways that are only partially visible to one another. Understanding digital passenger experience therefore requires a framework that can accommodate both user perceptions and organisational orchestration. In line with customer journey research, digital touchpoints are treated as interdependent episodes that unfold over time and across channels; consequently, passenger experience depends on the coherence of the end-to-end journey, not only on the performance of isolated interfaces (Verhoef et al., 2015; Kuehnl et al., 2019).

2.2 Technology Acceptance Model in the airport context

The Technology Acceptance Model has been widely used to explain the adoption of information systems across a variety of contexts. At its core, TAM suggests that perceived usefulness and perceived ease of use determine users' attitudes toward a technology and their intention to use it (Davis, 1989). TAM is not used here as a predictive behavioural model, but as an interpretive lens to understand how digital service configurations shape passengers' perceived control, ease, and trust

within a broader socio-technical system. In the airport environment, these constructs acquire specific meanings shaped by time pressure, risk and emotional involvement.

In high-stakes and security-sensitive services such as airports, acceptance is also shaped by perceived fairness and privacy concerns, especially when biometric and AI-enabled systems are involved; these factors can amplify or dampen perceived usefulness and perceived control.

Perceived usefulness in airports is closely linked to the ability of digital touchpoints to reduce uncertainty and enhance predictability. Passengers face multiple sources of ambiguity, including changes in gates, delays, security procedures and unfamiliar spatial layouts. Digital tools that provide accurate, timely and personalised information can therefore be experienced as highly useful, as they support situational awareness and enable passengers to make informed decisions. Yet, when information becomes outdated, inconsistent, or difficult to interpret, digitalisation may itself become a source of anxiety rather than a mechanism for its reduction. Perceived ease of use is equally critical in this context. Airports serve a highly heterogeneous population, including infrequent travellers, elderly passengers, families and individuals with disabilities. Digital interfaces that require complex interactions, repeated log-ins or high levels of digital literacy risk excluding or frustrating significant segments of users. In such cases, even technically advanced systems may be rejected or bypassed in favour of human assistance, reducing their experiential and operational value. Importantly, TAM also implies that acceptance is shaped by the broader service environment. Consistent with this broader perspective, prior research on airport technologies highlights the critical role of privacy concerns, trust formation, and perceived fairness as additional evaluative dimensions in shaping passengers' evaluations of biometric and automated systems (Kasim et al., 2021). Passengers' perceptions of usefulness and ease of use are influenced not only by interface design but also by organisational reliability, trustworthiness and support. For example, a biometric gate may be perceived as easy to use when staff are available to assist and procedures are clearly communicated, but as threatening or unfair when errors occur without explanation. This suggests that technology acceptance in airports cannot be fully understood without considering organisational and governance dimensions (Venkatesh et al., 2003).

2.3 Service-Dominant Logic and the passenger journey

Service-Dominant Logic provides a complementary perspective by framing the passenger journey as a process of value co-creation. In SDL, value emerges through the integration of resources by multiple actors rather than being embedded in a product or technology (Vargo & Lusch, 2004, 2008). In the airport context, passengers co-create their experience by combining their own skills, preferences and behaviours with the airport's physical, digital and human resources. Digital touchpoints play a crucial role in this process by enabling new forms of interaction and resource integration. This perspective aligns with research on customer journey design, which conceptualises service experiences as emerging from the configuration and orchestration of multiple touchpoints rather than from isolated interactions (Kuehnl et al., 2019). A mobile application allows passengers to access information and adjust their plans; sensors and analytics allow the airport to adapt operations; automated systems redistribute tasks between humans and machines. These interactions create opportunities for enhanced efficiency and personalisation, but they also create dependencies and vulnerabilities. When digital systems fail or are perceived as misaligned with passenger needs, co-creation can turn into co-destruction, resulting in frustration and loss of trust.

SDL also highlights that value is context-dependent and phenomenologically determined (Vargo & Lusch, 2016). Two passengers may experience the same digital service in radically different ways depending on their goals, stress levels and prior experiences. This underscores the importance of designing digitalisation not only for average users but for diverse and sometimes vulnerable populations.

2.4 Orchestration, governance and digital experience

Integrating TAM and SDL leads to the concept of orchestration as a central mechanism in digital passenger experience. In this paper, orchestration is understood as the managerial capability to align digital touchpoints, data flows, operational processes, responsibilities and performance metrics along the passenger journey. It refers not only to the technical integration of systems, but also to the organisational work through which digital initiatives are selected, governed, coordinated and translated into passenger-facing service outcomes (Tilson et al., 2010; Lusch & Nambisan, 2015).

This distinction is important because orchestration is related to, but not identical with, integration, coordination or governance. Integration concerns the connection of systems, channels and data infrastructures; coordination concerns the alignment of actors and activities in operational processes; governance concerns decision rights, accountability mechanisms and rules for managing digital initiatives. Orchestration encompasses these dimensions, but emphasises their purposeful alignment around passenger experience across the end-to-end journey (Lemon & Verhoef, 2016). In this sense, orchestration provides the managerial link between technology acceptance and value co-creation, since digital touchpoints are more likely to be perceived as useful, easy to use and trustworthy when they are supported by coherent organisational processes and embedded in a broader service ecosystem.

In smart airports, orchestration is increasingly enabled by digital infrastructures such as Airport Operation Centers and integrated data platforms that connect security, operations, retail and mobility services. These infrastructures allow the airport to sense conditions in real time, coordinate responses and communicate with passengers, thereby shaping the experiential qualities of the journey. However, orchestration also introduces new challenges related to power, accountability and transparency, as digital platforms concentrate control over information and decision-making (Tilson et al., 2010; Constantinides et al., 2018).

From this perspective, digital passenger experience is best understood as a socio-technical outcome of how airports orchestrate their digital ecosystems. In smart airports, perceived usefulness and ease of use are not properties of individual digital interfaces alone, but emergent outcomes of the alignment between touchpoints, data flows, organisational responsibilities and operational processes. Technology acceptance and value co-creation are shaped not only by the characteristics of single technologies, but by how these technologies are embedded in the passenger journey and supported by organisational choices (Davis, 1989; Vargo & Lusch, 2008). This integrative lens allows the analysis to move beyond technology-centric explanations and to examine how managerial orchestration structures passenger experience across interconnected touchpoints.

3. Methodology

3.1 Research design

This study adopts a qualitative single-case study design to investigate how digitalisation shapes passenger experience in a smart airport. Case studies are particularly suitable for examining complex socio-technical phenomena in real-life contexts, especially when the boundaries between technology, organisation and user experience are inherently intertwined (Yin, 2018). The digital transformation of airports involves multiple interacting actors, infrastructures and governance mechanisms, making a case-based approach appropriate for capturing these dynamics in depth. Accordingly, the study adopts a theory-informed interpretive case approach aimed at understanding how digital touchpoints, organisational choices and passenger experience implications are connected, instead of testing causal effects. Rome Fiumicino Airport was selected because it represents a large European hub with a strong strategic orientation towards digital innovation and customer centricity. Consistent with case study research, the aim is not statistical generalisation, but analytical generalisation through the refinement of theoretical mechanisms (Eisenhardt, 1989). Managed by Aeroporti di Roma (ADR), Fiumicino Airport has received multiple international recognitions for service quality, security

processing and digital transformation, positioning it as a theoretically informative case for exploring how digital passenger experience is designed and governed in practice. Fiumicino can thus be interpreted as a revelatory case in which orchestration mechanisms become particularly visible.

3.2 Data sources

The empirical analysis is based on ADR's Integrated Annual Report 2024 (Aeroporti di Roma, 2024), which provides detailed accounts of digital initiatives, governance mechanisms and service quality systems. The report is treated as an institutional document, not as a neutral account of organisational performance. Following documentary analysis approaches, such sources are useful for examining how organisations frame strategic priorities, legitimise managerial choices and represent socio-technical transformation processes (Bowen, 2009). Accordingly, the report is used to analyse how digitalisation, passenger experience and service quality are framed, governed and communicated by the airport organisation.

The annual report was complemented by a limited review of publicly available ADR and Fiumicino airport web materials, used exclusively to clarify the scope and intended functions of specific digital initiatives referenced in the report. These materials were not treated as independent empirical sources, but as contextual documents supporting the interpretation of the primary data.

3.3 Analytical strategy

A theory-driven thematic analysis was conducted, guided by the conceptual framework developed in Section 2. The analysis was structured along four analytical phases of the passenger journey: (i) pre-journey and access to information, (ii) in-terminal processes and flow management, (iii) disruption management and organisational orchestration, and (iv) post-journey feedback, quality management and learning.

For each journey phase, the documentary material was organised around three analytical dimensions:

1. *Digital touchpoints*, referring to front-end technologies and interfaces through which passengers interact with the airport (e.g. apps, sensors, biometric systems, information platforms);
2. *Organisational choices*, referring to governance mechanisms, investments, coordination structures and operational processes that enable and regulate these technologies;
3. *Passenger experience implications*, referring to how these technologies and organisational arrangements are expected to influence perceived control, ease, trust and overall satisfaction, as described in the documents or proxied by recognised quality and customer experience indicators.

The analytical process involved iterative reading of the documentary material, identification of relevant passages and their organisation according to the journey phases and analytical dimensions.

Particular attention was paid to linkages between technological initiatives and organisational arrangements, in order to capture digitalisation as an orchestrated service-system process, not as a set of isolated tools.

To clarify the analytical structure, Table 1 summarises how the passenger journey phases were connected to digital touchpoints, organisational choices and expected experience implications.

Table 1. Analytical framework linking passenger journey phases, digital touchpoints, organisational choices and experience implications

Journey phase	Digital touchpoints	Organisational choices	Experience implications
Pre-journey and information access	Digital information totems; web-based indoor navigation; WhatsApp chatbot; real-time flight information	Extension of passenger communication beyond physical counters; investment in scalable and mobile information channels; integration of spatial and flight information	Increased perceived control; reduced uncertainty; lower cognitive load before and during airport access
In-terminal processes and flow management	LiDAR-based sensors; queue monitoring systems; AI-supported security screening; digital retail solutions	Data-driven flow management; dynamic resource allocation; automation of selected security and commercial processes	Shorter and more predictable waiting times; smoother transitions; potential concerns over transparency and perceived fairness
Disruption management and organisational orchestration	APOC-enabled monitoring systems; integrated operational dashboards; passenger-facing information systems	Centralised coordination of operational units; real-time decision-making; business continuity and cyber-resilience arrangements	Greater reliability during disruptions; improved reassurance; dependence on the consistency and timeliness of digital communication
Post-journey feedback and quality management	ASQ surveys; complaint management systems; customer satisfaction monitoring; quality dashboards	Formal quality management systems; use of service metrics and benchmarking; continuous improvement routines	Organisational learning; improved service responsiveness; reinforcement of trust and perceived service quality

This analytical structure supports the case analysis presented in Section 4, where each journey phase is examined by linking visible passenger-facing technologies with the organisational arrangements that enable and govern them.

3.4 Validity and limitations

The use of official corporate and institutional documents provides high consistency in terms of strategic intent and organisational positioning, while inevitably reflecting the organisation's perspective. To address this limitation, the analysis adopts an interpretive stance, treating reported outcomes not as objective performance measures, but as indicators of how passenger experience, digitalisation and service quality are framed, monitored and governed.

References to internationally recognised benchmarking systems (e.g. ASQ, Skytrax) are analysed as governance devices shaping organisational sensemaking rather than as independent validation metrics. The validity of the analysis therefore rests on the coherence between the theoretical framework, the documentary evidence and the interpretation of the case, rather than on representativeness across multiple airports. Rome Fiumicino Airport, as a highly digitalised and award-winning hub, represents an extreme and revelatory case that renders orchestration dynamics especially observable.

4. Case study: Digital passenger experience at Rome Fiumicino

Rome Fiumicino Airport, managed by Aeroporti di Roma (ADR), represents a highly developed example of digital transformation in the European airport landscape. Its trajectory is consistent with broader developments observed in digitally advanced hubs, where digital and biometric solutions are increasingly used to support more seamless passenger journeys (Miyamoto, 2022). Over the last decade, ADR has progressively repositioned the airport from a traditional transport infrastructure into

a data-driven service platform, in which passenger experience, operational excellence and sustainability are treated as interdependent strategic objectives. Digitalisation is not framed as a set of isolated projects but as a core element of how the airport manages flows, interacts with passengers and coordinates its ecosystem of actors.

ADR's strategic roadmap explicitly links technological innovation to customer centricity, operational resilience and quality of service. Within this framework, the airport has invested in a portfolio of digital initiatives that span the entire passenger journey, from pre-arrival information and navigation to security, retail and post-journey feedback. These initiatives are embedded in a broader organisational architecture that includes integrated control centres, data analytics and formal quality management systems. The case can be analysed along four main phases of the passenger journey: pre-journey and access to information, in-terminal processes, disruption management, and post-journey feedback and learning.

4.1 Pre-journey and access to information

The first layer of digital passenger experience at Fiumicino concerns how passengers access information and orient themselves before and during their arrival at the airport. ADR has invested in digital interfaces that extend beyond traditional flight information displays and static signage. In 2024, the airport introduced digital information totems that allow passengers to access terminal maps and indoor navigation services through a web-based application (Aeroporti di Roma, 2024). These tools provide spatial guidance across arrival areas, terminal buildings and transport connections, including the railway station, enabling passengers to visualise routes and plan their movements in advance. This type of digital wayfinding reflects an organisational choice to treat spatial orientation as a key component of passenger experience. Rather than relying exclusively on physical signage and staff, ADR integrates digital mapping into its service architecture, allowing information to be updated dynamically and aligned with real-time conditions. For passengers, this reduces cognitive load and uncertainty, particularly in a large and complex hub such as Fiumicino, where distances, multiple terminals and changing gate assignments can easily generate stress.

In parallel, ADR has developed a WhatsApp-based chatbot that provides push notifications on flight status and answers to frequently asked questions (Aeroporti di Roma, 2024). This tool shifts part of the communication function from physical counters and call centres to an always-on digital channel that accompanies passengers throughout their journey. From an organisational perspective, this represents a move toward scalable, automated communication that can handle high volumes of enquiries while maintaining a personalised interface. For passengers, the availability of real-time, mobile-based information enhances perceived control and reduces dependence on physical points of contact, which are often crowded or difficult to locate. Together, these tools illustrate how ADR uses digitalisation to create an informational layer that envelops the passenger journey, transforming how travellers interact with the airport even before reaching the terminal.

4.2 In-terminal processes and flow management

Once passengers enter the terminal, digitalisation becomes more deeply intertwined with operational processes. Fiumicino has invested in technologies that generate continuous data on passenger movements, congestion and waiting times. A notable example is the testing of LiDAR (Light Detection and Ranging)-based sensor systems to monitor airport traffic and flows, producing real-time and historical data on occupancy, congestion and queue lengths in different areas of the terminal (Aeroporti di Roma, 2024).

These data streams enable a shift from static planning to dynamic, data-driven flow management, reflecting the generative properties of digital data streams highlighted in prior research (Pigni et al., 2016). Rather than relying solely on scheduled capacities or manual observations, the airport can detect emerging bottlenecks and adjust resources, opening additional security lanes or reallocating staff where needed. Although these systems operate largely in the background, their effects are

experienced by passengers through shorter and more predictable waiting times, smoother transitions between checkpoints and reduced crowding in high-pressure areas such as security screening.

Digitalisation also extends to security and screening processes. ADR has tested artificial intelligence-based solutions, such as APIDS (Automated Prohibited Items Detection System) algorithms for the automatic detection of prohibited items in carry-on baggage (Aeroporti di Roma, 2024). These systems aim to increase both efficiency and consistency in security checks, reducing the need for manual inspections and the associated delays and frustrations. From the passenger's perspective, the value of such technologies lies not only in speed but also in the perceived fairness and transparency of the process, as automated systems are expected to apply rules more uniformly. At the same time, the increasing reliance on automated and data-driven systems shifts part of the passenger experience from visible service encounters to largely opaque processes, potentially affecting perceptions of reassurance and control. Beyond security, digital technologies are used to enrich the commercial and experiential dimension of the terminal. ADR has experimented with immersive and digital retail solutions, including virtual stores that allow passengers to explore products through 3D representations and predictive models that optimise commercial offerings. These initiatives reflect a broader strategy of integrating retail into the digital ecosystem of the airport, blurring the boundary between physical and online shopping and enabling more personalised and data-driven engagement with passengers.

4.3 Disruption management and organisational orchestration

A distinctive feature of Fiumicino's digital strategy is the emphasis on organisational orchestration through integrated control and coordination mechanisms. At the core of this architecture lies the Airport Operation Center (APOC), which functions as a central hub for monitoring and managing airport operations. Through the APOC, ADR supervises key processes, coordinates different operational units and manages interruption and disruption events, such as delays, weather-related issues or security incidents (Aeroporti di Roma, 2024). The APOC is not merely a technical facility but a governance structure that connects digital data to managerial decision-making. By integrating information from sensors, airline systems, security agencies and passenger-facing platforms, the APOC enables the airport to respond more quickly and coherently to changing conditions. This is particularly important during irregular operations, when the quality of communication and coordination has a disproportionate impact on passenger experience. In this sense, orchestration at Fiumicino operates not as a purely technical capability, but as a managerial practice that connects digital infrastructures, organisational routines and passenger-facing communication.

Digitalisation also underpins business continuity and cyber resilience. ADR reports that its core operational and information systems are supported by certified business continuity management processes and cybersecurity governance designed to ensure the availability and rapid recovery of critical applications (Aeroporti di Roma, 2024). In an environment where digital touchpoints are deeply embedded in the passenger journey, system failures can quickly translate into confusion, delays and loss of trust. The investment in continuity and security therefore constitutes an essential, if often invisible, component of digital passenger experience.

4.4 Feedback, quality management and learning

The final layer of Fiumicino's digital passenger experience concerns how the airport measures, evaluates and learns from customer feedback. ADR operates a formal quality management system certified to international standards (e.g., ISO 9001 and ISO 10004), which covers complaint management, customer satisfaction measurement and continuous improvement processes. Passenger experience is monitored through established instruments such as the Airport Service Quality (ASQ) survey, which collects systematic feedback on multiple aspects of the journey (Aeroporti di Roma, 2024). These data are used not only for reporting but also for guiding managerial action and investment priorities. In this sense, digitalisation supports a feedback loop in which passenger perceptions are translated into organisational learning. The airport's repeated recognition in

international programmes, such as Skytrax and ACI awards for ease of journey, security processing and digital transformation, reflects how these measurement systems are integrated into the strategic narrative and governance of the organisation.

Importantly, these awards function as external validation of the airport's digital and service strategies. While they do not provide direct causal evidence of performance, they signal that Fiumicino's approach to integrating digital technologies, operations and service design is recognised by industry bodies and benchmarking institutions. This reinforces the legitimacy of digitalisation as a core component of passenger experience management.

5. Discussion

This study examined how digital touchpoints and organisational choices interact to shape passenger experience in a smart airport, using Rome Fiumicino as an in-depth case. The findings provide empirical grounding for the patterns identified in recent integrative reviews of smart airports and digital aviation services, which emphasise that digital passenger experience emerges from the interplay between technology, organisation and user acceptance rather than from isolated digital tools.

While the case of Rome Fiumicino reflects a highly mature and award-winning approach to airport digitalisation, the findings also reveal a set of structural trade-offs inherent in the orchestration of digital passenger experience. First, increasing automation and self-service efficiency may reduce opportunities for human reassurance, particularly for passengers facing uncertainty, disruption, or low digital literacy. Second, the integration of real-time data flows and predictive systems enhances operational control and passenger flow management, but simultaneously raises issues related to perceived fairness, privacy, and transparency in how information is generated and communicated (Constantinides et al., 2018). Third, the expansion of omnichannel digital touchpoints improves informational continuity across the journey, yet it also risks cognitive overload and fragmented attention if not carefully coordinated. These structural trade-offs indicate that digital passenger experience in smart airports is not a direct outcome of technological intensity, but a contingent result of how orchestration actively balances efficiency, trust, inclusion and sense-making across interconnected service encounters.

5.1 From fragmented technologies to orchestrated digital journeys

A recurring theme in the literature on smart airports is the shift from discrete technological applications to integrated digital service systems. While many studies focus on individual solutions such as biometric boarding, self-service kiosks or mobile apps, they often underestimate the organisational work required to make these technologies meaningful from the passenger's perspective. The Fiumicino case illustrates this point clearly: digital touchpoints such as real-time information, wayfinding and automated security only contribute to a smoother experience when they are connected to data-driven coordination and decision-making structures.

This finding is consistent with research on airport digital transformation, which suggests that airports are evolving into data-centric service ecosystems in which value is generated through the orchestration of multiple technological and organisational components (Halpern et al., 2021; Dini et al., 2023). At Fiumicino, the integration of sensors, analytics and control rooms enables the airport to sense conditions and adapt operations in real time, aligning front-end passenger interactions with back-end resource allocation. This alignment is critical for transforming digitalisation from a collection of tools into a coherent passenger journey.

5.2 Reinterpreting technology acceptance in high-stakes service environments

The case also refines how the Technology Acceptance Model applies to airports. In much of the IS literature, perceived usefulness and ease of use are treated as attributes of specific interfaces. However, in the airport context these perceptions are shaped by the reliability and coordination of the

entire service system. For example, a mobile app is only perceived as useful if the underlying data are accurate and if organisational processes ensure that information is acted upon. Similarly, automated security systems are only experienced as easy to use when they are supported by clear procedures and staff intervention when needed. This suggests that in smart airports, technology acceptance is systemic rather than local. Passengers do not evaluate a single device in isolation but form expectations about the digital environment as a whole. Trust in one digital touchpoint depends on experiences with others, as well as on the airport's ability to handle disruptions and explain automated decisions. This extends TAM by embedding acceptance in organisational and governance contexts. In this sense, perceived usefulness and ease of use emerge not as properties of individual interfaces, but as systemic outcomes of socio-technical orchestration across the airport service system.

5.3 Digitalisation as a driver of co-creation and co-destruction

From a Service-Dominant Logic perspective, Fiumicino's digital infrastructure enables new forms of value co-creation by allowing passengers to access information, self-manage parts of the journey and interact with the airport through multiple channels. At the same time, the case reveals the potential for co-destruction when digital systems are perceived as opaque, unreliable or exclusionary.

Consistent with value co-destruction research, the same digital resources that enable value co-creation can also generate negative value when actors' practices, expectations, and institutional constraints are misaligned, for instance through perceived unfairness, exclusion, or heightened anxiety during disruptions (Plé & Cáceres, 2010; Echeverri & Skålén, 2011).

The airport's investment in feedback systems, quality management and international benchmarking can be interpreted as mechanisms to stabilise this co-creation process. By continuously monitoring passenger perceptions and aligning digital initiatives with recognised standards of service quality, ADR seeks to maintain a balance between automation and human-centred service. This highlights that digitalisation does not replace service management but makes it more complex, requiring ongoing calibration between technological possibilities and user expectations.

5.4 Digital governance and the politics of passenger experience

An important, and often underexplored, dimension of digital passenger experience concerns governance. The Fiumicino case shows that platforms such as the Airport Operation Center and integrated data systems concentrate significant power over how flows are managed, how information is prioritised and how disruptions are handled. These governance choices have direct experiential consequences for passengers, influencing who receives information, how quickly problems are resolved and how transparently decisions are communicated. This insight connects airport digitalisation to broader debates on platform governance and data-driven infrastructures. Even when technologies are deployed in the name of efficiency and customer centricity, they embed particular logics of control and prioritisation. Understanding digital passenger experience therefore requires attention not only to interfaces and outcomes but also to the organisational and institutional arrangements that shape how digital systems operate.

5.5 Implications for research on smart airports and digital services

By examining airport digital transformation through the case of Rome Fiumicino, this study connects conceptual discussions on smart airports with the organisational practices through which digital passenger experience is designed and governed. It shows that the transformation toward smart airports is best understood as a process of socio-technical orchestration, in which digital touchpoints, data infrastructures and governance mechanisms jointly shape passenger experience. Future research could build on these findings by comparing different airport governance models, regulatory regimes or levels of digital maturity, as well as by integrating passenger-level data with organisational analysis. Such work would further illuminate how digitalisation reshapes not only operational efficiency but also the lived, emotionally charged experience of air travel.

Building on the case evidence, this study formulates three propositions:

P1. Digital passenger experience improves when touchpoints are designed and governed as a coherent journey supported by integrated data infrastructures.

P2. Orchestration capabilities (cross-functional coordination, real-time control rooms, and shared metrics) mitigate journey fragmentation during disruptions.

P3. Perceived transparency and fairness of automated decisions moderate technology acceptance and the balance between value co-creation and co-destruction.

6. Managerial implications

The findings of this study provide several managerial implications for airport managers and policymakers engaged in digital transformation initiatives.

First, digitalisation should be approached as a service system design challenge, not merely as a technological one. The Fiumicino case shows that passengers value digital tools when they increase perceived control, reduce uncertainty and simplify decision-making. Investments in apps, sensors or AI therefore need to be evaluated not only in terms of technical performance, but also in terms of how they contribute to a coherent and intelligible passenger journey.

Second, the orchestration of digital touchpoints requires strong organisational capabilities. Real-time data on passenger flows, security and congestion are only useful if they are embedded in governance structures that enable rapid coordination and intervention. Platforms such as Airport Operation Centers play a critical role in connecting front-end experiences with back-end operations. Airport managers should accordingly invest in cross-functional coordination, data integration and decision rights that allow digital insights to be translated into concrete service improvements. From this perspective, orchestration emerges not merely as a technological coordination function, but as a core organisational capability encompassing governance, decision-making, and cross-functional integration.

Third, digital passenger experience raises critical issues related to the governance of trust, fairness and inclusion. While automation and AI can improve efficiency, they may also generate governance challenges related to privacy, transparency and the treatment of vulnerable passengers. The case suggests that formal quality management systems, business continuity planning and cybersecurity governance are not merely technical safeguards but essential components of a trustworthy digital service environment. Airports that fail to address these governance dimensions risk undermining passenger acceptance even when deploying advanced technologies.

Finally, digitalisation has implications beyond operations, affecting commercial and retail activities, mobility services and stakeholder relationships. By integrating retail, mobility and information services into a shared digital ecosystem, airports can create new opportunities for value co-creation but also concentrate control over data and access to passengers. Managers should pay particular attention to how digital platforms reconfigure power, control, and visibility across the airport ecosystem.

7. Conclusions

This paper examined how digital touchpoints and organisational choices are orchestrated to shape passenger experience in a smart airport, using Rome Fiumicino as an in-depth revelatory case. The analysis shows that digital passenger experience is not determined by technology alone, but by the way digital tools are configured within organisational structures, data infrastructures and quality management systems that govern the passenger journey.

By integrating the Technology Acceptance Model and Service-Dominant Logic, the study suggests that digitalisation enhances passenger experience when it increases perceived usefulness, ease of use

and trust, and when it supports effective value co-creation between passengers and the airport organisation. At the same time, the case highlights the trade-offs introduced by automation and platformisation, which require active governance to avoid new sources of friction, exclusion and mistrust.

The paper contributes to the literature on smart airports and digital services in three main ways. First, it advances smart airport research by framing digital passenger experience as an emergent outcome of organisational orchestration beyond the effect of isolated digital technologies. This shift redirects analytical attention from discrete touchpoints to the socio-technical coordination mechanisms through which digital journeys are stabilised and rendered meaningful. Second, by integrating the Technology Acceptance Model and Service-Dominant Logic, the paper extends technology acceptance research by demonstrating that perceived usefulness and perceived ease of use operate as systemic properties shaped by governance arrangements, data integration and operational reliability, rather than as attributes of individual technological interfaces. Third, through an in-depth revelatory case study of Rome Fiumicino Airport, the study provides an empirically grounded explanation of how digitalisation is strategically enacted within a complex service ecosystem, highlighting the structural trade-offs between efficiency, perceived control, trust and inclusion inherent in digitally mediated passenger journeys.

As with all qualitative single-case studies, the findings should be interpreted in light of the study's analytical scope. The research does not aim at statistical generalisation, but at developing analytically generalisable insights into the socio-technical mechanisms through which digitalisation reshapes airport passenger experience. The empirical material relies primarily on institutional and documentary sources, which are particularly suitable for examining managerial representations and governance logics, but do not capture passengers' or employees' direct perceptions. Future research could extend this work through comparative airport studies, interviews with airport managers and frontline employees, passenger surveys, or focus groups with different passenger segments.

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Transforming consulting services in the era of agentic AI: Evidence from leading management consultants in Italy

RAFFAELLA MONTERA[1]

Abstract

Frame of the research. *The management consulting sector faces growing challenges from the rise of agentic AI, yet there is still limited scholarly understanding of how these firms strategically adapt to such technologies.*

Purpose of the paper. *This paper explores how consulting firms adjust their value propositions in the era of the agentic economy by examining the approaches underling agentic AI-based consulting services.*

Methodology. *This study employs a qualitative multiple case design based on 15 leading consulting firms operating in Italy, drawing on corporate websites and white papers through an inductive analysis.*

Results. *Three dominant approaches through which consulting firms frame agentic AI in their service offerings are identified: a techno-centric approach centred on infrastructural integration and automation; an institutional/legitimacy approach focused on accountability and governance; and a socio-technical approach emphasizing the co-evolution of technology and human capabilities.*

Research limitations. *The number of case studies analysed within a specific set of consulting firms operating in Italy constrain the generalizability of the findings. The reliance on secondary data may introduce interpretive biases.*

Managerial implications. *The identified approaches provide consulting firms with a lens to examine their service portfolios and strategic positioning, while offering client managers clearer criteria for selecting consultants for agentic AI initiatives.*

Originality of the paper. *The paper advances a multi-level theorization of technological adaptation in management consulting, advancing three propositions that elucidate how agentic AI reshapes industry structures, organizational value propositions, and actor-level roles.*

Keywords: *management consulting firms; agentic AI; digital transformation; service portfolio; case studies*

1. Introduction

The consulting sector has traditionally been viewed as a knowledge-intensive industry in which legitimacy and economic value stem from specialized expertise, analytical problem-solving capabilities, and close engagement with client organizations (Sturdy et al., 2009; Tavoletti et al., 2019). Over the past decade, consulting firms have assumed an increasingly prominent role in the context of digital transformation, as they increasingly support organizations in evaluating and aligning their information technology strategies with overarching business objectives (FEACO, 2023). Anyway, the rapid diffusion of digital transformation across industries has significantly reshaped the environment in which consulting firms operate (Ramos et al., 2025). Clients now expect more timely insights, data-driven and evidence-based recommendations, and solutions that integrate technological capabilities, rather than relying solely on conceptual frameworks or experience-based expertise. Simultaneously, the emergence of digital-native competitors, specialized niche consultancies, and platform-based advisory models intensifies competitive pressure on established firms by offering more scalable, efficient, and analytics-enabled alternatives. Together, these developments raise critical questions regarding how consulting firms can maintain competitive advantage, cope with growing strategic complexity, and realign their value creation approaches with rapidly changing market conditions (Andersson, 2025).

The widespread adoption of artificial intelligence (AI), and the emergence of agentic AI in particular, have introduced additional challenges for the consulting industry. Consulting firms are increasingly required to address the ethical, legal, and regulatory implications associated with the use of AI, investing in compliance mechanisms to mitigate legal risks and potential reputational damage

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(Samokhvalov, 2024). At the same time, they must develop the skills and expertise necessary to effectively design, implement, and integrate AI-based solutions, not only to avoid the displacement of human consultants but also to enhance the value delivered to clients (Pattanayak, 2022). These developments entail a transformation that extends beyond the content of consulting services to encompass the organizational structures, operating models, and strategic orientations of consulting firms themselves (Tiwari, 2025). AI is not only augmenting consultants' analytical capabilities but is also reshaping how consulting services are produced and delivered, thereby opening new avenues for innovation and growth. Management consulting firms are widely acknowledged as influential actors in the spread of managerial innovations across industries (Assoconsult, 2025). The function of management consulting firms as innovation intermediaries and knowledge brokers has been extensively examined in prior research (e.g., Anand et al., 2007).

However, scholarly understanding remains limited with respect to how consulting firms adapt and innovate their own approaches in response to ongoing waves of digital transformation, leaving significant gaps in explaining how these firms navigate such changes (Tavoletti et al., 2022). Much of the existing research has concentrated on manufacturing, platform-based industries, or large technology firms, while the management consulting has received relatively limited scholarly attention and empirical investigation (Mosonyi et al., 2020; Andersson, 2025), despite its substantial growth. Since 2015, consulting services associated with digital transformation - often described as technology-driven consulting - have represented the fastest-growing segment of the management consulting market in Europe (Tavoletti et al., 2022). In response, several authors have called for further research in the area of management consulting and digital transformation, urging increased empirical inquiry by management scholars (Cerruti et al., 2019). In particular, prior studies highlight the need for qualitative research approaches (Crișan and Marincean, 2023) and for deeper examination of management consulting companies' strategies and sources of competitive advantage (Canato and Giangreco, 2011).

The paper aims to explore the adjustment of value proposition of consulting firms in the era of the agentic economy. The following research question guided the study:
RQ: How do management consulting firms design consulting services based on agentic AI?

To address the research question, this study adopts a qualitative multiple case study design (Yin, 2003) based on 15 leading management consulting firms operating in Italy and selected from the "Consulenti dell'anno 2025" list published by Il Sole 24 Ore. Data, collected from corporate communication materials and white papers published on the firms' official websites, were analysed using an inductive methodology (Gioia et al., 2013).

This study identifies three predominant approaches through which consulting firms frame agentic AI in their service offerings. A techno-centric approach emphasizes the reinforcement of organizational capacity through the deployment and deep integration of autonomous agentic systems into core operational and technological infrastructures. An institutional/legitimacy approach focuses on accountability structures and formal monitoring mechanisms to ensure that agentic AI operates within ethical, legal, and organizational boundaries. Finally, a socio-technical approach highlights the co-evolution of advanced technologies and human capabilities, stressing the integration of agentic AI with organizational processes and workforce development.

This study offers three main theoretical contributions. First, it enriches the management consulting literature that has highlighted the limited empirical understanding of consulting firms' adaptation to technology-driven change. This study focuses on consulting firms, examining how they structure and legitimize agentic AI within their service portfolios. In doing so, it responds directly to calls for more empirical and qualitative research on consulting firms' strategies and sources of competitive advantage. Second, the study advances existing research by inductively identifying three distinct approaches to agentic AI offering in management consulting. Third, the study formulates three propositions that offer a multi-level explanation of how agentic AI reconfigures the consulting field. These propositions illuminate how the diffusion of agentic AI shapes competitive differentiation at the industry level, reinforces established value propositions at the organizational level, and transforms

consultants' roles at the actor level.

From a practical perspective, the identified approaches offer consulting firms a diagnostic lens to critically assess their service portfolios, enabling them to evaluate the orientation toward which their offerings gravitate, and to examine the coherence between strategic intent and service articulation. In addition, the findings support client managers in developing clearer selection criteria when engaging consulting firms for agentic AI initiatives, by making explicit the underlying approaches embedded in consulting offerings.

The paper is structured as follows. Section 2 outlines the theoretical framework, followed by a description of the research methodology in Section 3. Section 4 presents the findings of the empirical analysis, which are subsequently interpreted and discussed in Section 5. Finally, Section 6 highlights the main theoretical and managerial contributions of the study, acknowledges its limitations, and outlines avenues for future research.

2. Theoretical background

2.1 Management consulting firms

Management consultancy refers to the provision of independent, expert advice aimed at improving organizational performance and supporting change through the application of specialized knowledge, capabilities, and innovative solutions (Christensen et al., 2013; Bronnenmayer et al., 2016). Thus, consultants play a central role in shaping strategic choices and managing change by transferring knowledge across contexts, acting as credible external advisors, and supporting decision-making under conditions of uncertainty (O'Mahoney and Markham, 2013). The value generated by management consulting companies lies in their ability to influence and reshape client organizations while developing novel ideas to address complex business challenges (Canato and Giangreco, 2011). Beyond their advisory function, consultants contribute to the diffusion, legitimation, and institutionalization of management practices, often influencing the emergence of management fashions and providing external justification for organizational choices (Sturdy, 2011).

Management consulting includes encompasses multiple specialized domains (strategy, operations, IT, HR, and financial services), each addressing distinct organizational needs (Bode et al., 2022). Across these domains, firms increasingly combine advisory and implementation support, particularly in digital and operational transformation, creating hybrid models that combine analysis and execution (Kipping and Clark, 2012).

Consulting is inherently relational and collaborative. Effective consulting depends on the interaction between consultant expertise and client engagement and is shaped by contextual factors such as organizational culture, power relations, and uncertainty. As a result, consulting is often characterized as an 'insecure' practice that requires consultants to balance credibility, trust, and ethical collaboration to enable meaningful organizational change (Block, 2000). Moreover, the reliance on intangible and cognitive inputs makes consulting outcomes difficult to measure and evaluate in the short term. As a result, the immediate benefits of consulting engagements are often hard to trace, and consultants' contributions tend to be perceived as challenging to quantify and formally account for (Mattila and Tukiainen, 2019).

2.2 The evolution of AI: toward agentic AI

Influential definitions conceptualize AI as the study and design of intelligent agents and systems that perceive their environment and act to achieve specific goals (Norvig, 2016) by replicating aspects of human cognition (McCarthy, 2007). From a management perspective, AI is often understood in functional terms as systems that interpret data, learn from it, and adapt their behavior to accomplish objectives, thereby augmenting or substituting human cognitive capabilities and influencing work, decision-making, and value creation processes (Kaplan and Haenlein, 2019).

AI is currently undergoing a significant shift, moving from passive, task-specific applications

toward more autonomous systems capable of exhibiting forms of agency, making independent decisions, adapting to changing contexts, and proactively shaping outcomes (Abou Ali et al., 2026). Contemporary agentic AI systems are characterized by their ability to plan proactively, retain contextual information, use digital tools effectively, and adapt their behavior in response to feedback from the environment (Viswanathan et al., 2025). Rather than operating solely as problem-solving tools, these systems increasingly function as collaborative partners, able to perceive complex situations, reason about goals, and coordinate sequences of actions either independently or within multi-agent settings (Du et al., 2025).

This development can be understood as the outcome of a broader evolution of AI that has unfolded across several overlapping phases. The symbolic AI era (1950s–1980s) relied on logic-based rules and explicitly encoded knowledge (Liang, 2025). The machine learning era (1980s–2010s) shifted toward data-driven models that learned from data but still required significant human input (Nithya et al., 2023). The deep learning era (2010s–present) enabled automatic learning of complex representations, advancing fields such as image recognition and language processing (Dong et al., 2021). The generative AI era (2014–present) introduced models capable of producing original content using architectures like transformers and large language models (Surbakti, 2025). Most recently, the agentic AI era (2022–present) has focused on autonomous, goal-oriented systems, increasingly organized as collaborative multi-agent arrangements (Piccialli et al., 2025).

2.3 Management consulting firms and IA within the context of digital transformation

AI is fundamentally reshaping the ways in which industries operate, and the consulting sector is no exception (Lari and Manu, 2024). Despite the body of research on this topic is far from uniform, digital transformation is consistently described as an expanding and increasingly influential phenomenon within the consulting industry (Cerruti et al., 2019; Larsson et al., 2020). Moreover, the literature converges on the view that the emergence of digital business models has become unavoidable for consultants (Jerónimo et al., 2019; Mosonyi et al., 2020).

As a result, although consulting firms have historically relied on project-based, high-touch advisory models, recent studies document a shift toward hybrid configurations that combine traditional advisory services with digital, data-driven, and scalable solutions (Nissen, 2019). Tavoletti et al. (2022) show that leading consulting firms increasingly reconfigure their value propositions by integrating end-to-end digital transformation services, spanning strategy, technology implementation, and ongoing operational support. This evolution is often supported by investments in digital assets, analytics capabilities, and ecosystems of partners, reflecting a move toward platform-oriented and multi-actor configurations. Similarly, Andersson (2025) highlights how consulting firms adopt multi-layered business models to balance relational consulting with standardized, technology-enabled offerings, allowing them to cope with rising strategic complexity and competitive pressure.

Despite these developments, the literature consistently points to heterogeneity in the adoption and depth of digital transformation across consulting firms. Crișan and Marincean (2023) identify multiple mechanisms through which digital transformation manifests in management consulting. These include the platformization of traditional consulting services, the emergence of crowdsourcing-based advisory models in which consultants act as orchestrators of distributed expertise, and the digital reconfiguration of consultant–client matching processes. Importantly, these mechanisms differ in their transformative scope, suggesting that digital transformation in consulting unfolds incrementally and unevenly rather than through uniform, industry-wide shifts. In this regard, the paradoxical role of consulting firms as both agents and objects of digital transformation becomes evident. On the one hand, consulting firms are widely recognized as key actors in promoting and diffusing digital transformation practices across industries, often through the production of reports, frameworks, and best-practice narratives (Sturdy, 2011). On the other hand, empirical evidence suggests that consulting firms themselves have historically lagged behind their clients in adopting digital tools and practices internally, creating a tension between advisory discourse and organizational reality (Bode et al., 2021). Crișan and Stanca (2021) further show that the adoption of digital

transformation within consulting firms depends on specific combinations of internal and external triggers, including client acceptance of digital consulting practices, efficiency pressures, and prior digital experience. These findings underscore that digital transformation in consulting is contingent on contextual conditions and strategic choices.

Recent work has also examined how digital transformation reshapes the nature of consulting work and the consultant's role (Sayyadi et al., 2023; Goldman, 2024). While some authors warn that AI's analytical efficiency may lead to job displacement (Kaczorowska-Spychalska et al., 2024), others frame AI as an opportunity to redefine consulting roles and value propositions rather than replace human consultants (Oppioli et al., 2023). Consistent with this view, AI and automation are largely understood as augmenting, rather than substituting, human capabilities by taking over repetitive analytical tasks and allowing consultants to focus on strategic, creative, and judgment-intensive activities (Cemaloglu et al., 2019). Empirical evidence illustrates how this augmentation unfolds in practice. Dell'Acqua et al. (2023) identify emerging AI-enabled work modes - "Centaurs" and "Cyborgs" - both of which demonstrate significant productivity and quality gains when tasks fall within AI's capability frontier. However, their findings also highlight the risks of over-reliance on AI, as performance declines when consultants uncritically adopt AI outputs for tasks beyond its effective scope. Complementing these insights, prior research conceptualizes AI as an enabling 'exoskeleton' that enhances service professionals' performance, while emphasizing the continued importance of human oversight, critical judgment, and uniquely human skills such as empathy and creativity (Wirtz et al., 2018; Sack et al., 2024).

Thus, the literature on AI in consulting highlights both efficiency gains and new sources of complexity. Generative and analytical AI systems enable faster data processing, scenario analysis, and decision support, potentially enhancing the speed and scalability of consulting services (Pattanayak, 2020). However, scholars also emphasize ethical, legal, and reputational risks associated with AI adoption, including issues of bias, transparency, data privacy, and accountability (Gînguță et al., 2023). These concerns are especially pronounced in consulting, given its reliance on trust-based relationships and its role in legitimizing managerial decisions.

Importantly, existing studies on AI in consulting largely focus on AI as a set of tools that automate or augment specific tasks, such as analysis, reporting, or knowledge management. Much less attention has been paid to how AI reshapes consulting services at a systemic level, including how it is embedded within service portfolios, organizational structures, and value propositions. Crișan and Marincean (2023) note that while digital technologies increasingly permeate consulting practices, the literature remains fragmented and predominantly descriptive, with limited insight into how consulting firms strategically frame and institutionalize advanced AI-based services. In addition, while the broader management and information systems literature has begun to examine agentic forms of AI, particularly in relation to autonomous decision-making, human-AI interaction, and organizational design (e.g., Abou Ali et al., 2025; Gonzales et al., 2026), its implications for management consulting remain underexamined. Existing research has yet to provide a deep understanding of how consulting firms articulate agentic AI within their value creation logics, a gap that motivates the present study.

3. Method

3.1 Research design and case selection

A qualitative multiple case study analysis was conducted, as this approach is particularly suitable for investigating contemporary and complex real-life phenomena (Yin, 2003). Focusing on leading Italian consulting firms, this design enabled a comparative analysis of similarities and differences in how agentic AI-related services are framed and structured, thereby contributing to theory development through pattern recognition and cross-case comparison (Eisenhardt, 1989; Corbin and Strauss, 1990; Maxwell and Chmiel, 2014).

The case selection was based on the *Consulenti dell'anno 2025* list, published by *Il Sole 24 Ore* in

collaboration with Statista. This list constitutes an authoritative and fully citable secondary source, as it is derived from a large-scale survey based on recommendations from both consultants and clients, and is designed to identify the most relevant consulting firms operating in the Italian context. Focusing on Italy provides a suitable empirical setting, as it represents a mature European consulting market characterized by the presence of both global multinational firms and established domestic players (FEACO, 2023). Using this source allowed the study to start from a structured and widely recognized population of firms, thereby reducing the risk of arbitrary selection and enhancing the overall robustness of the research design. The list comprises 69 consulting firms, characterized by heterogeneous sizes and areas of specialization.

From this initial pool, a purposive sampling strategy was employed to narrow the sample to firms that were most closely aligned with the objectives of the study. Specifically, two inclusion criteria were applied. First, firms were required to operate in sectors of have a specialization in Data Analytics, Big Data, & Artificial Intelligence, and Information Technology, as identified through the corresponding filter available in the database hosting the list (https://lab24.ilsole24ore.com/consulenti/). This criterion was adopted to ensure the selection of firms more likely to be actively engaged in advanced AI-related services, including agentic AI. Second, firms had to offer either services explicitly described as agentic or services exhibiting the agentic characteristics identified in Section 2.2 (e.g., independent decision-making, autonomous coordination of actions, participation in multi-agent systems). This criterion was manually verified through an in-depth review of the firms' official websites. Applying these criteria resulted in 15 consulting firms (Tab. 1), which are sufficiently to ensure variation and cross-case comparability, while remaining manageable for in-depth qualitative analysis.

Tab. 1: The case studies

Consulting firms	Legal headquarters in Italy
Accenture	Milan
Bain & Company	Milan
BearingPoint	Milan
BIP	Milan
Boston Consulting Group (BCG)	Milan
Capgemini	Rome
Cognizant	Milan
Deloitte	Milan
Ernst & Young (EY)	Milan
Kearney	Milan
KPMG	Milan
McKinsey & Company	Milan
NTT DATA	Milan
PricewaterhouseCoopers (PwC)	Milan
Reply	Turin

Source: our elaboration

3.2 Data collection and analysis

In December 2025, secondary data collection was undertaken. The use of secondary sources offers key advantages, including time efficiency and access to a substantial volume of data that would otherwise be difficult to gather independently (Johnston, 2017). Data were collected from official corporate communication materials published on the firms' websites, including service descriptions, practice overviews, and AI-related sections. The analysis was further strengthened through triangulation with publicly available white papers, which are increasingly recognized as valuable empirical sources in management research (Zhang et al., 2021; Fernández et al., 2023). In the

consulting industry, white papers serve as strategic documents through which firms address issues of interest to potential clients and position themselves as experts capable of understanding and solving emerging business challenges (Monod et al., 2024). In this study, white papers focused on digital transformation and/or AI were analyzed to complement the examination of corporate websites and to provide deeper insight into the approach to agentic AI.

A qualitative content analysis grounded in the Gioia methodology (Gioia et al., 2013) was adopted to analyse data. The analytical process unfolded through three main phases. First, we systematically performed an inductive, open coding of documents into first-order codes (Strauss and Corbin, 1990, p. 61). We coded a service as prominent when it was displayed in website headlines, primary landing pages, or opening paragraphs of service descriptions, indicating a higher level of strategic emphasis in the firm's official communication. This operationalization is consistent with research on corporate narrative disclosure and impression management, which highlights how the prominence and salience of themes in organizational communication reflect strategic positioning and attempts at legitimation (Vaara and Tienari, 2008; Merkl-Davies and Brennan, 2011). Second, we performed an abductive, axial coding of the identified first-order codes to group them into second-order categories (Strauss and Corbin, 1990, p. 96). Finally, first-order codes and second-order categories were integrated to derive aggregate dimensions, representing the highest level of abstraction in the analysis. These aggregate dimensions captured the core patterns emerging from the data and provided a basis for interpreting the approaches to agentic AI. To mitigate the influence of individual researcher bias and strengthened the reliability of the analytical process, a PhD student was involved in the data analysis activity (Gioia et al., 2013).

4. Results

Across the fifteen firms, agentic AI is embedded within broader service portfolios rather than presented as a standalone offering. For instance, Accenture describes agentic AI as "*accelerating our digital transformation programs*," positioning it within established transformation services. Similarly, Capgemini emphasizes "*embedding agentic AI into end-to-end intelligent industry solutions*" signaling integration into pre-existing sectoral offerings, while Deloitte refers to agentic AI as "*an extension of our advisory services into autonomous environments*".

The cross-case analysis of service portfolios revealed that firms strategically position agentic AI within their offerings through distinct emphases, leading to the identification of three overarching aggregate dimensions: Techno-centrism approach, Institutional/Legitimacy approach, and Socio-technical approach. Each aggregate dimension encompasses a conceptually coherent second-order themes, which synthesize a set of first-order codes grounded in firms' communicative framings and narratives (Fig. 1). These dimensions capture the predominant approaches to the agentic AI within consulting offerings, as described below.

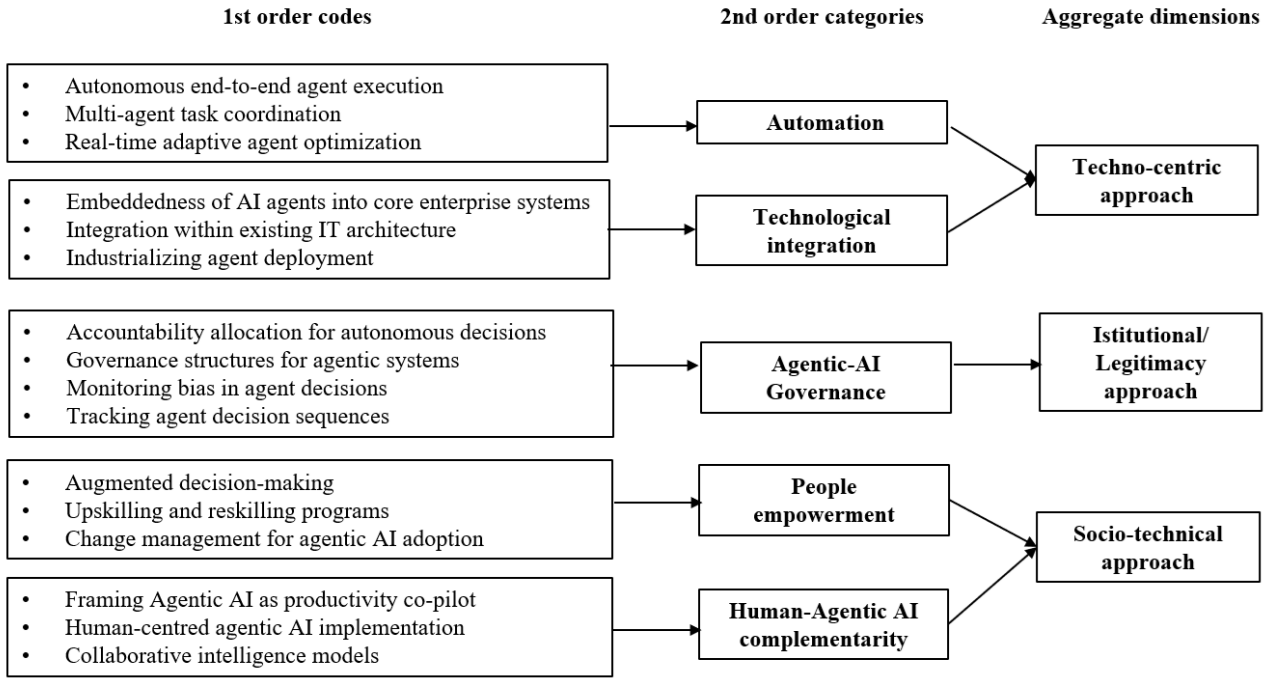
4.1 Techno-centric approach

The aggregate dimension, predominantly evident across Accenture, NTT DATA, Capgemini, Reply, Cognizant, BIP and BearingPoint, denotes a techno-centric approach to the agentic AI based on the reinforcement of organizational capacity of the client organizations through the deployment and embedding of autonomous agentic systems within their core operational and technological structures. This dimension unfolds through the second-order themes: Automation and Technological integration.

The Automation logic reflects how firms articulate agentic AI as a logic of autonomous execution and coordination across interconnected processes. Across cases, leading consulting firms position agentic systems not as isolated decision-support tools, but as autonomous infrastructures capable of managing and recalibrating multi-step operational sequences. For instance, Accenture emphasizes end-to-end automation across business processes, highlighting "*the ability of agentic systems to*

connect data ingestion, decision-making, and execution within a unified operational chain". Similarly, Capgemini stresses the orchestration of complete workflows, positioning agentic AI as capable of "*handling extended operational cycles rather than discrete tasks*". In these cases, the focus shifts from single-task automation to process-level autonomy. A recurring element in firms' narratives concerns the coordination of multiple agents within distributed environments. Reply highlights "*architectures in which agents operate across different domains while continuously exchanging information*". Likewise, Cognizant underscores the orchestration of "*distributed autonomous components to reduce operational fragmentation and enhance cross-functional synchronization*". Thus, agency is not centralized but embedded within networks of interacting agents, enabling systemic coordination across complex workflows. Another prominent feature concerns real-time adaptability. NTT DATA emphasizes the capacity of agentic systems "*to dynamically adjust decisions based on real-time data inputs, reinforcing operational responsiveness*". Similarly, BearingPoint highlights adaptive optimization mechanisms that allow agents "*to recalibrate actions as contextual conditions evolve*". Across these firms, optimization is framed as continuous and context-sensitive, suggesting that agentic AI enhances the organization's ability to respond to environmental variability. Human involvement is acknowledged, but primarily in terms of supervision, configuration, and monitoring of technical deployment. As one description notes, agentic systems are implemented to "*augment delivery capacity through automated execution under defined human supervision*" (BIP), reinforcing the view of humans as overseers of a technologically driven process. This reinforces the interpretation that infrastructural empowerment is technologically grounded, with human involvement positioned as a stabilizing mechanism within a predominantly technology-driven process.

Fig. 1: Consulting approaches to agentic AI



Source: our elaboration

While Automation emphasizes what agents do, Technological integration focuses on how agentic systems are structurally embedded within enterprise environments. Across cases, firms frame agentic AI not as an external layer of functionality, but as a component incorporated into the digital backbone of client organizations, becoming part of the underlying architecture that sustains their operations. For instance, Accenture highlights "*the integration of agentic AI directly within ERP, CRM, and*

supply-chain management platforms"; similarly, NTT DATA emphasizes "*the deployment of agentic layers within enterprise platforms, underscoring their integration into data infrastructures and core transactional systems*". Firms also stress compatibility with existing IT architectures. Capgemini underscores "*the interoperability of agentic systems with legacy infrastructures and hybrid cloud environments*", emphasizing seamless integration rather than disruptive replacement. Likewise, BearingPoint highlights integration strategies that "*align agentic deployments with existing enterprise data layers, APIs, and cloud-native environments*". Thus, technological integration enables firms to preserve architectural continuity while simultaneously extending system capabilities. By ensuring interoperability with existing infrastructures, it reduces implementation friction and strengthens overall infrastructural coherence. A further recurring element relates to the industrialization of agent deployment, that implies repeatability, modularity, and architectural standardization. Such features transform agentic AI from experimental innovation into institutionalized operational practice within the organization. In this regard, Cognizant stresses "*scalable AI engineering frameworks designed to standardize and replicate agent capabilities across business units*"; Reply describes "*modular deployment models capable of being rolled out enterprise-wide across geographies and functional domains*"; and BIP highlight "*structured deployment pipelines that embed agents within defined architectural environments, ensuring alignment with IT standards*".

4.2 Institutional/legitimacy approach

The aggregate dimension, emerging prominently across Deloitte, KPMG, EY, and PwC, reflects an Institutional/legitimacy approach to agentic AI, grounded in the structuring of accountability and the establishment of formal monitoring procedures designed to ensure that autonomous agentic systems operate within client organizations in accordance with defined ethical, legal, and organizational boundaries. Ensuring legitimacy therefore requires explicit responsibility allocation, supervisory mechanisms, and continuous control structures capable of aligning agentic autonomy with regulatory expectations and organizational norms. This dimension unfolds through the second-order theme of Agentic-AI governance.

Accountability allocation for autonomous decisions emerges as a central concern across firms which emphasize the necessity of clearly defining responsibility chains. For instance, Deloitte underscores that "*organizations must establish explicit accountability frameworks clarifying who retains responsibility for AI-driven outcomes, even when decisions are autonomously executed*". Similarly, PwC highlights that "*AI governance must specify decision ownership, escalation pathways, and board-level oversight to ensure traceability and responsibility for autonomous actions*". These narratives indicate that autonomy does not displace human accountability but instead requires its formal reconfiguration within corporate governance structures. Closely related is the code Governance structures for agentic systems, which reflects the emphasis on institutionalizing oversight mechanisms. KPMG, for example, stresses the importance of "*embedding AI governance within existing risk and compliance architectures, ensuring alignment with regulatory expectations and internal control systems*". EY likewise notes that "*agentic AI deployment should be supported by dedicated oversight committees, standardized policies, and continuous compliance monitoring across the system lifecycle*". In this perspective, governance is not an add-on, but an organizational infrastructure that legitimizes the use of autonomous agents. The monitoring-oriented codes further reinforce this legitimacy logic. Under 'Monitoring bias in agent decisions' code, firms emphasize the need for systematic evaluation of algorithmic outputs to prevent discriminatory or unintended effects. Deloitte notes that "*continuous bias testing and fairness assessments are essential to maintain stakeholder trust in autonomous systems*". Likewise, EY highlights the necessity of "*ongoing validation mechanisms capable of detecting deviations from ethical and regulatory standards in real time*". Finally, 'Tracking agent decision sequences' code reflects the importance of traceability and auditability. PwC refers to "*end-to-end traceability frameworks that document decision pathways, enabling retrospective analysis and regulatory audit*". KPMG similarly emphasizes "*maintaining*

detailed logs of agent interactions and decision sequences to support explainability and post-hoc accountability".

4.3 Socio-technical approach

The aggregate dimension, largely characterizing BCG, McKinsey, Bain & Company, and Kearney, articulates a socio-technical approach to agentic AI that places the co-evolution of advanced technologies and human capabilities at its core. Within this approach, the effectiveness of agentic systems depends on their coherent integration with decision-making processes, workforce skills, organizational culture, and broader operating models. This dimension is structured around two second-order themes, named People empowerment and Human-Agentic AI complementarity.

People empowerment reflects a shared narrative in which agentic AI is framed as a lever for enhancing human capability. Through the code 'Augmented decision-making', agentic AI is presented as expanding managerial judgment and supporting complex, multi-step decision processes. McKinsey, for instance, emphasizes that "*the real power of advanced AI lies in augmenting human judgment, enabling faster and better-informed decisions across the enterprise*". Similarly, BCG highlights that "*agentic systems expand the cognitive capacity of teams, allowing leaders to focus on strategic priorities rather than operational complexity*". Bain underscores that such systems "*act as intelligent copilots, enhancing productivity while preserving human accountability*," while Kearney stresses the importance of "*keeping human oversight central when deploying autonomous AI capabilities*". The codes Upskilling and reskilling programs further reinforce this orientation. The four firms argue that the successful deployment of agentic AI depends on large-scale capability building and organizational adaptation. BCG notes that "*building agentic AI fluency at scale is essential to unlocking sustainable value from advanced technologies*". McKinsey stresses that "*capability building and role redesign are critical to scaling agentic AI successfully*" while Bain maintains that "*organizations must invest in structured reskilling programs to ensure their workforce can fully leverage agentic AI-enabled productivity gains*". Kearney similarly frames "*capability development as fundamental to preparing employees to collaborate effectively with agentic systems and to contribute to value creation*". The 'Change management for Agentic AI adoption' code captures the emphasis these firms place on treating agentic AI deployment as an organizational transformation challenge, encompassing leadership involvement, cultural adaptation, incentive realignment, and workflow redesign, ensuring that agentic AI becomes embedded in organizational routines and mindsets. For instance, BCG highlights that "*companies must go beyond tool deployment and govern, train, and redesign workflows in ways that foster adoption and employee trust*" pointing to the importance of coherent change planning. Kearney highlights that organizations must "*build their change muscle*" to continuously adapt organizational structures and cultures in response to AI-driven shifts, suggesting that agentic AI adoption is an ongoing transformation rather than a one-off project. The 'Human–Agentic AI complementarity' category reflects the collaborative interaction between autonomous agents and human actors within organizational processes. The code 'Framing agentic AI as a productivity co-pilot' captures the widespread metaphor of AI as an embedded assistant. McKinsey describes agentic AI as "a *digital copilot integrated into daily workflows, accelerating analysis and execution*". BCG refers to "*intelligent agents operating alongside professionals to enhance speed and precision*," while Bain emphasizes that "*agentic AI should free employees from repetitive tasks so they can focus on higher-value activities*". Kearney similarly argues that "*agentic AI works best when paired with human expertise in complex and judgment-intensive environments*". The code 'Human-centred agentic AI implementation' highlights the emphasis on user-oriented design and workflow integration. For instance, BCG states that "*successful agentic AI transformations begin with redesigning workflows around how people actually work*", while Bain connects effective implementation to "*embedding agentic AI into core processes in ways that are intuitive and practical for employees*". Finally, Collaborative intelligence models reflect the broader vision of hybrid intelligence systems. McKinsey observes that "*organizations combining advanced analytics with human insight consistently outperform their peers*"; BCG highlights "*hybrid*

intelligence models where human creativity and AI precision reinforce one another", and Bain emphasizes "*orchestrating collaboration between people and machines to capture the full value of agentic AI*".

4. Discussion

Our findings give rise to three theoretical propositions, contributing to theory building (Eisenhardt and Graebner, 2007; Hollebeek et al., 2024). They explain how the consulting industry is transforming across the industry, organizational, and actor levels in response to the rise of agentic AI.

The empirical results, showing a distribution of 7 firms aligning with techno-centric approach, 4 with institutional/legitimacy approach, and 4 with socio-technical approach, strongly support this non-convergent pattern. This near-balanced distribution across distinct approaches suggests that agentic AI has not yet solidified into a singular 'best practice' or a universally adopted institutional norm within the sector. Drawing on insights from organizational theory, technological innovations can either lead to isomorphic pressures, forcing organizations to adopt similar structures and practices for legitimacy (e.g., DiMaggio and Powell, 1983), or they can be assimilated in ways that reinforce existing strategic heterogeneity (Mosonyi et al., 2020). In the context of agentic AI, consulting firms are adapting the technology to fortify their unique competitive advantages, rather than conforming to a standardized model (Yang et al., 2024). Therefore, the following proposition is conceptualized:

P1: At industry level, the diffusion of agentic AI does not trigger institutional convergence across consulting firms. Instead, it preserves and strengthens differentiated service orientations - technological, governance-based, and human-centred - as firms strategically position themselves to address heterogeneous client expectations regarding innovation, risk, and organizational change.

The study demonstrates that the integration of agentic AI within management consulting is not leading to a wholesale redefinition of firms' competitive logics but rather serves to reinforce and deepen their established value propositions. In this logic, agentic AI allows consultants to strengthen their existing competitive advantages rather than embarking on a complete strategic overhaul (Costa Climent et al., 2024). This aligns with Rigby and First (2026), who argue that AI is among the forces pushing organizations into cycles of chronic transformation that promise revitalization but may ultimately erode organizational strength. More durable progress, they suggest, derives from sustained adaptation, such as the incremental evolution of consultants' service portfolios - rather than from continuous disruption. Drawing upon the results, the different roles of agentic AI within consulting firms' service portfolios reflect a strategic effort to differentiate services in a competitive market while building upon established strengths (Yang et al., 2024). Within the techno-centric approach, agentic AI acts as a technological tool to be implemented and embedded within digital infrastructure to orchestrate workflows, automate decisions, and scale enterprise-level integration. Academic research supports this view, highlighting how agentic AI can be packaged and integrated into general workflows to create sophisticated agentic networks, handling diverse tasks from email processing to human resource recruitment and customer support (Shen, 2025). These systems are shown to automate complex, repetitive tasks, freeing human resources for more strategic activities, increasing throughput, and improving decision quality through real-time, data-driven insights (Tallam, 2025). In the institutional/legitimacy approach, agentic AI is framed as an asset requiring structured governance and responsible deployment. The increasing autonomy of AI systems, particularly agentic AI, necessitates robust responsible AI frameworks (Ackerman, 2025). The introduction of agentic AI intensifies existing challenges to traditional oversight mechanisms, requiring new governance dimensions such as cross-departmental implementation, comprehensive evaluation, enhanced security protocols, operational visibility, and systematic auditing (Schmitz et al., 2025). Ethical concerns associated with AI in business consulting include potential job losses, lack of human interaction, discrimination, privacy invasion, denial of individual autonomy, and unjustifiable results (Gînguță et al., 2023). Therefore, human oversight remains a critical component, addressing the risk of over-reliance on AI and promoting decision-making autonomy (Fischer, 2024). Within the socio-

technical approach, agentic AI plays the role of 'decision partner' that augments the human capabilities in terms of data-informed managerial judgment, execution and strategic alignment. Literature acknowledges that AI can function as an organizational strategist, improving decision quality and coordination, especially in data-rich environments (Ruokonen and Ritala, 2024). Moreover, studies suggest that human-AI collaboration within agentic systems can lead to sustainable competitive advantages (Csaszar et al., 2024). Drawing on these considerations, the following proposition is proposed:

P2: At the organizational level, consulting firms incorporate agentic AI into their existing value propositions rather than redefining them. Agentic AI is variably framed as a technological tool, governed organizational asset, or a decision partner, depending on the firm's established strategic positioning.

According to the empirical evidence, the agentic AI fundamentally reconfigures the identity and responsibilities of consultants, moving them beyond their conventional advisory capacity into more specialized and integrated roles. This illuminates the evolving nature of professional expertise and the reconfiguration of consultant roles in an AI-driven context (Bereznoy, 2024). Instead of merely augmenting existing tasks, agentic AI integration leads to a qualitative shift in the consultant's function, creating distinct roles tailored to the approaches characterize consulting services built around agentic AI. Consultants aligned with the techno-centric approach evolve into orchestrators of complex technical systems. Their expertise lies in understanding AI architectures and coordinating implementation across client infrastructures (Besker et al., 2025; Adimulam et al., 2026). This requires merging deep technical knowledge with a detailed understanding of the specific environment in which the new technologies would be applied (Iansiti and Levien, 2004) since user-centric design principles and usability are critical for AI adoption (Kaplan et al., 2024). In the institutional/legitimacy approach, consultants assume the role of stewards of accountability and compliance. They design and formalize governance frameworks that define accountability structures and decision rights, while establishing oversight mechanisms - such as auditing protocols, performance monitoring systems, and risk assessment procedures - to address the challenges posed by algorithmic autonomy. In doing so, they translate legal standards and ethical principles into operational guidelines and enforceable internal controls. This specialized function is critical for navigating the ethical, legal, and operational complexities introduced by autonomous AI (Schmitz et al., 2025), as it enables the institutionalization of responsible AI practices and ensures compliant, transparent, and accountable deployment (Gînguță et al., 2023). Within the socio-technical approach, the consultant operates as a hybrid integrator, combining relational, interpretive, and sensemaking capabilities with the ability to effectively articulate and implement the possibilities of value co-creation between the client organization and agentic AI (Herrmann and Pfeiffer, 2023; Simón et al., 2024). Consultants work within AI-enabled decision architectures to facilitate innovative solutions and augment organizational performance (Jain, 2024). This involves guiding clients in unlocking new strategic options and fostering environments where human and AI capabilities synergize (Kiron and Schrage, 2019). Follows a further proposition:

P3: At the actor level, the integration of agentic AI expands consultants' roles beyond traditional advisory functions, shifting it toward technological orchestration, accountability and compliance stewardship, and hybrid integration.

5. Conclusion and implications

This study explores the adjustment of value proposition of consulting firms in the era of the agentic economy, focusing on how consulting services centred on agentic AI are designed for client organizations. In doing so, this paper offers interesting implications for both theory and practice.

Theoretically, three significant contributions advance the management consulting literature and the broader understanding of technological innovation within professional services. First, it addresses

a notable gap in scholarly understanding regarding how consulting firms, as influential actors in spreading managerial innovations, themselves adapt and innovate their own approaches in response to advanced technologies like agentic AI (Bezuidenhout et al., 2025; Pemer et al., 2024). By shifting the focus from consulting firms as mere facilitators of client transformations to examining their internal strategic responses, this research provides novel insights into how these firms structure and legitimize agentic AI within their own service portfolios. This directly responds to calls for more empirical and qualitative research on consulting firms' strategies and sources of competitive advantage in the digital era, particularly given the historical underexploration of the consulting sector's unique characteristics regarding technology adoption (Cerruti et al., 2019; Crișan and Marincean, 2023; Yang et al., 2024). Second, the study contributes by inductively identifying three distinct approaches – techno-centric, institutional/legitimacy, and socio-technical – through which agentic AI is articulated in consulting services. By conceptualizing these approaches, the paper moves beyond generic accounts of AI adoption and offers a structured understanding of how firms frame agentic AI. Third, this study advances a multi-level theorization of technological adaptation in management consulting firms. By articulating three interconnected propositions, the paper moves beyond descriptive accounts of a value proposition based on agentic AI and demonstrates how technological change simultaneously reconfigures industry structures, organizational value propositions, and actor-level roles. Focusing on the industry level (P1) enables a deeper understanding of how the broader competitive landscape is being reshaped, with significant implications for industry evolution and firms' strategic positioning (Tavoletti et al., 2022; Costa Climent et al., 2024). Indeed, the diffusion of agentic AI carries far-reaching consequences for economic systems and competitive dynamics (Rothschild et al., 2025). Analyzing the organizational level (P2) explains the diversity in offerings and competitive strategies seen among firms. Understanding organizational adaptation to technological discontinuities involves considering how firms make choices in a dynamic environment (Carter, 2020; Srikanth and Ungureanu, 2024). The actor level (P3) is vital for understanding the cultural impact of technological change (Bozkuş, 2023) in terms of concrete changes in skills, responsibilities, and day-to-day practices for the individuals within business (Bezuidenhout et al., 2025).

From a practical perspective, the findings offer immediate and actionable insights for both management consulting firms and their client organizations. For consulting firms, the identified approaches provide a valuable diagnostic lens to critically assess their current service portfolios. Firms can evaluate whether their offerings predominantly align with one of the identified approaches and critically examine the coherence between their strategic intent and how their services are articulated in the market. Understanding these approaches can guide strategic planning, enabling firms to consciously refine their positioning, invest in specific capabilities, and develop offerings that more precisely align with their chosen competitive logic in the agentic AI landscape (Mohan, 2024; Tronnier et al., 2025). Furthermore, the study's findings support client managers in making more informed decisions when choosing a consulting partner for agentic AI initiatives. This helps clients select firms whose strategic framing of agentic AI best matches their specific organizational needs, risk appetites, and desired outcomes for AI implementation. Effective collaboration between AI experts and clients is crucial for successful AI application planning and implementation (Kim et al., 2024).

Although this study provides novel insights into how management consulting firms are bringing agentic AI into organizations, some limitations should be acknowledged. First, the qualitative design of the study constrains the generalizability of the findings. First, the number of case studies analysed (15 firms) and the focus on a specific set of consulting firms operating in Italy limit the extent to which the results can be extended to the broader consulting industry or to different national contexts. Case studies, while providing rich and meaningful data, are often criticized for their findings not being generalizable to a larger population (Tsang, 2014). Given that the adoption and regulation of agentic AI may vary significantly across countries and markets, future research should examine a more diverse and internationally comparative set of cases to enhance external validity. Second, the

reliance on secondary data analysis, while offering efficiency benefits, can lead to researcher biases that distort the evidence base, especially concerning issues like data fitness, data quality, and the clarity of the original data collection procedures (Cheong et al., 2023). The absence of a direct relationship with the participants can place the secondary analyst at risk of making incorrect interpretations, as they are not privy to the primary researcher's insider experience (Clarke and Cossette, 2000). Future studies could benefit from incorporating additional primary data sources, such as interviews or surveys involving both consulting firms and client organizations, quantitative analyses of service portfolios, or longitudinal research designs, in order to further validate and extend the findings presented here and mitigate potential biases.

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How Strategic Supply Chains Shape SMEs' Strategic Responses in the Post-Globalisation Era: An Exploratory Study

MARIAEMILIA GARBELLI

Abstract

Frame of the research. *Italy's manufacturing fabric, historically organised around industrial districts, is increasingly shifting toward more structured inter-firm arrangements here labelled Strategic Supply Chains (SSCs): governance-intensive evolutions of district-based coordination, where socio-territorial embeddedness is reconfigured through explicit governance mechanisms.*

Purpose of the paper. *The paper explores whether SMEs' participation in SSCs is associated with differentiated economic performance, strategic behaviour and adaptive capacity under heightened uncertainty.*

Methodology. *Exploratory comparative design on survey data from 52 manufacturing SMEs in Brescia (Italy), classified as SSC-embedded (N=38) or non-embedded (N=14) on three governance-based criteria. The analysis combines descriptive comparisons with Fisher's exact test and a Mann–Whitney U test on a Strategic Proactiveness Index (SPI); group dimensional comparability was verified.*

Results. *SSC-embedded SMEs report more favourable performance dynamics, more articulated market expectations and significantly higher strategic proactiveness (SPI: 2.34 vs. 0.93; p = 0.013). Sustainability practices appear largely aligned with SSC-imposed requirements (34% vs. 0% of non-embedded), while half of non-embedded firms report no planned adaptive action.*

Research limitations. *Small sample, single-territory focus and cross-sectional design limit generalisability. A residual confounder — higher internationalisation rates among embedded SMEs (82% vs. 36%) — cannot be statistically separated at the present sample size.*

Managerial and policy implications. *The critical lever appears to be the governance quality of SSC arrangements, not mere membership. Intermediate institutions can facilitate access to well-governed SSCs, thereby supporting SME capability-building.*

Originality. *The paper frames SSCs as a structured evolution of the Italian industrial district tradition; four meso-level mechanisms are proposed (governance signalling, capability upgrading, expectation coordination, territory-to-global bridging) connecting SSC participation to SME adaptive capacity.*

Keywords: *Strategic Supply Chains; Industrial Districts; SMEs; territorial embeddedness; manufacturing resilience; post-globalisation.*

1. Introduction

The contemporary economic environment is marked by persistent instability driven by geopolitical tensions, fragmented markets, and a significant reconfiguration of international economic relations (Gereffi, 2020; Kano et al., 2022). The globalisation paradigm is steadily fading, while regionalisation, nearshoring and friend-shoring are reshaping competitive dynamics for firms operating in open economies (Ivanov & Dolgui, 2020). Within this context, European and particularly Italian manufacturing systems face the urgent challenge of redefining sustainable pathways for industrial development, in ways that build upon their distinctive organisational heritage rather than simply replicate cost-driven global sourcing logics.

Italy holds a particularly relevant position in this debate. Its productive system has been historically organised around industrial districts: geographically localised clusters of SMEs combining productive specialisation, inter-firm cooperation and a dense embeddedness in the social and institutional fabric of territories (Becattini, 1990; Becattini et al., 2009; Dei Ottati, 2018). Recent data from ISTAT (2024) shows that structured inter-firm arrangements in Italian manufacturing are associated with measurable differences in value added, labour productivity and internationalisation intensity. Yet the district paradigm has undergone significant transformation over the past two decades (Bellandi & Caloffi, 2014; De Marchi & Grandinetti, 2014). Technological change, the internationalisation of lead firms and the post-pandemic reshoring wave have pushed traditional district configurations toward more structured, governance-based inter-firm arrangements that in this

paper we label as Strategic Supply Chains (SSCs).

Despite a growing scholarly attention to SSC resilience (Christopher & Peck, 2004; Wieland & Wallenburg, 2013) and inter-firm embeddedness (Granovetter, 1985; Uzzi, 1997), empirical evidence on how SME participation in SSCs operates under post-globalisation conditions is still limited. Most studies focus on large lead firms or orchestrators, treating SME benefits as spillover effects (Hortovanyi & Szepesi, 2026; Bak et al., 2020). The specific conditions under which SMEs effectively leverage SSC participation, especially within territorial systems with a strong district heritage, remain underexplored. The gap is particularly relevant for industrial systems where collaborative arrangements simultaneously represent opportunities and constraints: participation is typically associated with reduced uncertainty and greater access to markets, knowledge and standards, but it can co-exist with power asymmetries, dependency risks and reduced strategic autonomy (Poppo et al., 2008; Uzzi, 1997).

Against this background, this study focuses on the role of SSCs in shaping SME economic performance, strategic orientation and adaptive responses under conditions of market instability, through an exploratory empirical analysis. Focusing on a highly specialised Italian industrial region, the province of Brescia, the analysis compares two groups of SMEs operating within the same territorial and sectoral context: firms actively participating in one or more structured SSCs (SSC-embedded) and firms operating outside such arrangements (non-embedded). Through this comparative lens, the study examines whether and how SSC embeddedness is associated with different performance dynamics, investment behaviours, innovation and sustainability attitudes, market expectations, and strategic adaptation orientations.

Three research questions guide the analysis:

RQ1: *Are SSC-embedded SMEs associated with different economic performance dynamics and market expectations compared to non-embedded SMEs operating in the same territorial and sectoral context under conditions of high uncertainty?*

RQ2: *Is SSC embeddedness associated with different innovation-related and sustainability-related practices among manufacturing SMEs?*

RQ3: *Is SSC participation associated with different strategic orientations – proactive versus defensive – among SMEs in a specialised manufacturing territory?*

Given the exploratory nature of this study, the research questions are formulated in associative rather than causal terms. The analysis aims to identify systematic patterns of co-variation between SSC participation and the dimensions of interest, rather than to test directed causal relationships.

The paper contributes to the literature in several ways. First, it proposes and operationalises a definition of SSC as an evolution of the Italian industrial district tradition, providing conceptual clarity on a construct that has often been used ambiguously in the management literature. Second, it sets out a four-channel meso-level architecture – governance signalling, compliance-driven capability upgrading, expectation coordination through lead-firm focal points, and territory-to-global institutional bridging – through which SSC participation and SME adaptive capacity appear to evolve alongside in a territory with a strong district heritage. Also, it offers SME-focused empirical evidence on SSC embeddedness in such a territory, addressing the persistent imbalance in favour of lead-firm perspectives. Finally, it draws policy-relevant implications regarding the role of intermediate institutions (industry associations, chambers of commerce, regional development agencies) in shaping well-governed SSCs that support SME adaptation.

The remainder of the paper is organised in different sections. Section 2 develops the theoretical background, defining SSCs and locating them at the intersection of district tradition, SSC resilience and embeddedness theory. Section 3 describes the empirical context, sample, measures and analytical strategy. Section 4 presents the findings. Section 5 discusses the results in light of the theoretical background, before the paper closes with implications, limitations and avenues for future research.

2. Theoretical Background

2.1 Post-globalisation, environmental turbulence and supply chain reconfiguration

The contemporary economy is increasingly described as a post-globalisation regime, in which globally integrated markets have weakened and international economic relations are being re-organised along regional, political and strategic lines (Gereffi, 2020; Kano et al., 2022). Trade fragmentation, geopolitical tensions, reshoring and friend-shoring strategies, and recurrent systemic shocks have produced a structural transformation of the competitive environment, replacing the assumptions of stability and efficiency that characterised the previous paradigm with a condition of persistent uncertainty and discontinuity.

Environmental turbulence (the degree of instability, unpredictability and interconnectedness of a firm's external environment, in the classical formulation of Emery & Trist, 1965) has therefore become a structural feature rather than a cyclical condition. The consequences are particularly significant for SMEs, which typically operate with limited resource buffers, constrained financial slack and less formalised strategic planning processes (Lengnick-Hall & Beck, 2003; Battisti & Deakins, 2017). Under such conditions, traditional sources of competitive advantage lose effectiveness, and firms increasingly need to mobilise dynamic capabilities – sensing, seizing, reconfiguring – to absorb shocks and adapt their business models (Teece, 2007; Hortovanyi & Szepesi, 2026).

Environmental turbulence also reshapes SSC themselves, increasing the need for flexibility, modular configurations, diversified sourcing and rapid reconfiguration of inter-firm relationships (Datta, 2017; Ivanov & Dolgui, 2020). SSC resilience, understood as the capacity to anticipate, absorb, adapt to and recover from disruptive events while maintaining continuity of operations (Christopher & Peck, 2004; Ponomarov & Holcomb, 2009), increasingly depends not only on firm-level capabilities but also on network-level coordination mechanisms such as joint risk assessment, shared information systems, flexible contractual arrangements and collaborative governance structures (Scholten et al., 2014; Wieland & Wallenburg, 2013). Scholarship has progressively moved from viewing resilience as redundancy and robustness toward a more dynamic perspective that emphasises learning, collaboration and reconfiguration of inter-organisational ties (Pettit et al., 2010). As recent reviews note, however, empirical evidence on how these dynamics operate at the SME level – particularly for firms embedded in regional manufacturing systems – remains relatively limited (Bak et al., 2020).

2.2 The Italian industrial district tradition and its post-globalisation evolution

Any analysis of inter-firm arrangements in Italian manufacturing cannot leave aside the industrial district tradition. Building on Alfred Marshall's insights, Becattini (1990) redefined the industrial district as "a socio-territorial entity characterised by the active presence of both a community of people and a population of firms in one naturally and historically bounded area". Unlike a mere geographical concentration of firms, the Italian industrial district is a socio-economic construct in which productive specialisation, division of labour among SMEs, inter-firm cooperation and community-level institutions reinforce one another (Becattini et al., 2009; Dei Ottati, 2018; Sforzi, 2015). Industrial districts have historically characterised – and in many sectors continue to characterise – the competitive advantage of Italian manufacturing, particularly in the so-called "Made in Italy" industries (fashion, furniture, food, machinery, mechanical components).

The district paradigm has nevertheless undergone substantial transformation over the past two decades. Global competition, technological change, the internationalisation of leading district firms and successive crises have eroded some of the traditional foundations of the district, notably the density of local linkages and the symmetry of inter-firm relationships (Bellandi & Caloffi, 2014; De Marchi & Grandinetti, 2014). At the same time, new forms of inter-firm coordination have emerged: medium-sized district leaders increasingly structure relationships with their supplier base through explicit governance mechanisms (quality standards, certifications, information-sharing protocols),

and the boundaries of the district have become more porous, with relevant suppliers located outside the traditional territorial perimeter. As a consequence, the organisational geometry of Italian manufacturing has shifted from the classical district model – based on proximity, community and reciprocity – toward hybrid configurations in which stable, governance-rich supply relationships play an increasingly central role (Rullani, 2009).

These hybrid configurations are what we refer to as SSC in this work. In our reading, SSCs are not simply a foreign import from international supply chain management: they can also be read as an adapted and evolved version of the Italian district tradition, in which the socio-territorial embeddedness that historically characterised districts is progressively reconfigured through explicit inter-firm governance mechanisms. This framing – Italian-rooted but theoretically compatible with the international scholarship on supply chain resilience – offers a useful analytical lens for studying SME adaptation in specialised manufacturing regions.

2.3 Defining Strategic Supply Chains

The notion of "Strategic Supply Chain" (SSC) is used in the management and operations literature with considerable terminological heterogeneity, which this section aims to clarify. Three points deserve explicit attention.

First, the present paper uses the acronym SSC to refer to Strategic Supply Chains, not to Sustainable Supply Chains, for which SSC is also a common acronym. The choice reflects the theoretical focus of the study on governance and strategic orientation, rather than on environmental or social sustainability per se (although sustainability practices are among the empirical dimensions examined).

Second, SSCs as used here must be distinguished from three adjacent constructs: generic supply chains, defined by operational coordination without stable strategic alignment; Global Value Chains (GVCs), defined by cross-border governance of dispersed value-adding activities typically orchestrated by lead firms (Gereffi et al., 2005); and industrial districts in the strict Becattini sense, defined by territorial proximity and community-level embeddedness without necessarily implying explicit inter-firm governance.

Third, building on Hult et al. (2007) and on the relational view tradition (Dyer & Singh, 1998; Dyer et al., 2018), in this paper SSCs are defined as:

> *structured, multi-firm production arrangements characterised by recurrent and stabilised exchange relationships between a lead firm and one or more tiers of suppliers; by shared strategic objectives that go beyond a purely transactional logic; and by explicit governance mechanisms – quality standards, certifications, information-sharing protocols, joint planning routines – that regulate inter-firm coordination and capability development.*

This operational definition serves three purposes. It allows a clear empirical classification of firms as SSC-embedded or non-embedded (see Section 3.3); it connects the construct to the dominant theoretical traditions (supply chain resilience, relational view, embeddedness); and it makes explicit the continuity-discontinuity relationship between SSCs and the Italian industrial district tradition discussed above.

2.4 The Relational View and embeddedness in inter-firm networks

The theoretical foundations for understanding how SSC participation may affect SME behaviour are found in two complementary perspectives: the relational view and embeddedness theory. The relational view (Dyer & Singh, 1998; Dyer et al., 2018) argues that competitive advantage may reside not only in firm-specific resources but also in the routines, processes and governance mechanisms that connect firms. Relation-specific assets, knowledge-sharing routines, complementary resources and effective inter-firm governance can generate relational rents that individual firms could not achieve independently. Subsequent work has highlighted the role of collaboration and joint problem-solving in fostering innovation, efficiency and adaptability (Lavie, 2006; Poppo et al., 2008).

The application of the relational view to SMEs raises, however, a conditional question: under what circumstances do smaller firms actually appropriate relational rents? While SMEs may benefit from

access to shared resources, stable demand and technological spillovers through SSC participation, they can also face dependency risks and limited bargaining power vis-à-vis larger partners (Poppo et al., 2008). Empirical evidence on this question remains mixed, pointing to a contingency on industry structure, governance arrangements and strategic orientation.

Embeddedness theory (Granovetter, 1985; Uzzi, 1996, 1997; Gulati, 1998) provides the complementary perspective. In this view, economic action is shaped by social, relational and institutional contexts rather than being purely transactional. Management scholarship distinguishes between structural embeddedness (a firm's position within a network) and relational embeddedness (the quality and strength of inter-firm ties), both of which can enhance information access, reduce uncertainty and support learning and innovation (Gulati et al., 2009). For manufacturing SMEs, embeddedness can compensate for resource constraints by providing market access, knowledge and legitimacy (Häkansson & Snehota, 1995); excessive embeddedness, however, risks lock-in effects and over-reliance on dominant partners (Uzzi, 1997; Bak et al., 2020).

The three theoretical perspectives together – supply chain resilience, the relational view and embeddedness – offer complementary analytical lenses. SSC resilience illuminates the network-level adaptive mechanisms; the relational view explains how inter-firm arrangements generate firm-level value; embeddedness theory extends the analysis to the socio-territorial and institutional dimensions that shape SME behaviour. When considered in conjunction with the Italian district tradition, these perspectives converge on a proposition: in specialised manufacturing regions, SSC participation may operate as a territorial mechanism through which the adaptive advantages historically associated with district-based embeddedness are reconfigured under post-globalisation conditions. Table 1 summarises the constructs and their role in the empirical analysis.

Table 1. Conceptual architecture: from Italian industrial districts to SSCs

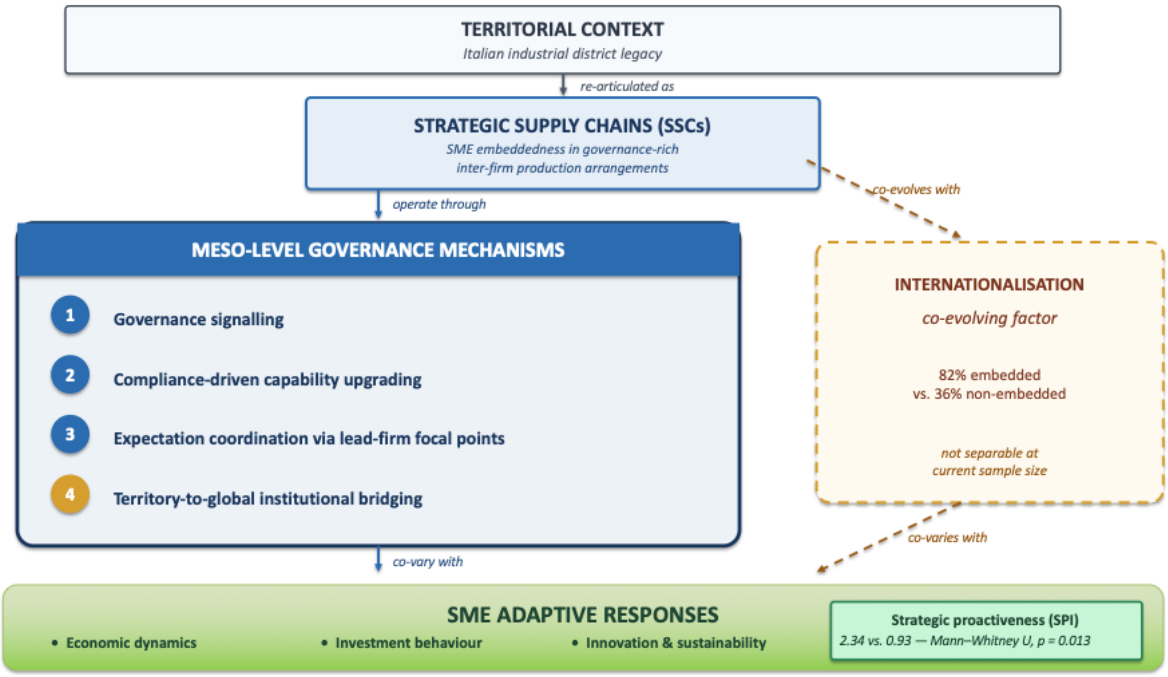
Construct	**Core idea**	**Mechanism of action on SMEs**	**Empirical dimension (RQ)**
Italian Industrial District (Becattini, 1990; Dei Ottati, 2018)	Socio-territorial entity combining community and firm population in a bounded area	Diffuse reciprocity, tacit knowledge circulation, shared identity	Context framing (not tested directly)
Strategic Supply Chain (this paper; Hult et al., 2007)	Structured multi-firm production arrangement with explicit governance	Standards, information-sharing routines, capability-building pressures	All RQs – core classification variable
Supply Chain Resilience (Christopher & Peck, 2004; Pettit et al., 2010)	Network-level capacity to absorb, adapt to and recover from shocks	Coordination, joint risk management, flexible governance	Economic performance, expectations (RQ1)
Relational View (Dyer & Singh, 1998; Dyer et al., 2018)	Competitive advantage from relation-specific routines and assets	Relational rents; knowledge-sharing routines; governance mechanisms	Strategic adaptation, investment, innovation (RQ2, RQ3)
Embeddedness (Granovetter, 1985; Uzzi, 1997)	Economic action shaped by social and relational context	Trust, reputation, institutional diffusion of norms and standards	Sustainability, innovation, expectations (RQ2)

Source: Authors' elaboration.

Figure 1 synthesises the conceptual architecture of the study, framing Strategic Supply Chains as a meso-level configuration through which territorial embeddedness is reshaped into governance-based mechanisms that occur along with SME adaptive responses. The figure shows SSC participation linked to adaptive responses: a central pathway operating through the four governance

mechanisms (articulated in Section 5.2), and a dynamic interaction lateral pathway through internationalisation, the material residual confounder discussed in Section 3.5, here re-located within the theoretical architecture rather than outside it.

Figure 1. SSC as a meso-level configuration for SME adaptive capacity



Source: Authors' elaboration. Arrows denote association / co-variation, not directed causal effects.

3. Research design and methodology

3.1 Research design

Given the limited empirical observation on SSC participation for SMEs in turbulent contexts, the study adopts an exploratory, comparative and context-based research design. The approach does not test directed causal relationships; it examines whether and how SSC embeddedness is systematically associated with differentiated patterns in economic performance, innovation and sustainability practices, and strategic orientation, holding territorial and sectoral context as constant as possible. The comparative logic, namely the comparison of embedded and non-embedded firms operating in the same territory and, predominantly, the same macro-sector, is consistent with prior research that treats inter-firm configurations as enabling or constraining conditions for firm behaviour (Uzzi, 1997; Scholten et al., 2014; Bak et al., 2020). The research questions are formulated in associative rather than causal terms, and inferential statistics are used to support descriptive patterns rather than to establish directional effects.

3.2 Empirical context: the Brescia manufacturing system

The empirical setting is the province of Brescia (Lombardy, Italy), one of the most industrially dense and export-oriented manufacturing regions in Italy. According to the Brescia Chamber of Commerce (2023), local manufacturing firms account for 3.6% of total Italian exports – ranking fourth among Italian provinces – and for 7.7% of Lombardy's total imports. In 2022, the aggregate export value of Brescian manufacturing reached €22.3 billion, with 97.3% attributable to the manufacturing sector. The local productive structure is dominated by SMEs operating in specialised industrial niches (metalworking, mechanical engineering, automotive components) and historically organised around dense inter-firm relationships that exhibit, in varying degrees, the features of the

industrial district model described in Section 2.2.

Brescia also displays a strong presence of structured supply arrangements centred on medium-sized lead firms that coordinate tiers of smaller suppliers through explicit governance mechanisms. Recent data from the local Chamber of Commerce survey (2023) documents that geopolitical tensions and post-pandemic disruptions have prompted a significant share of Brescian firms to reassess and partially reconfigure their supply relationships through nearshoring and reshoring strategies, increasing the strategic relevance of structured SSC arrangements at the local level. At the regional level, the Italian Permanent Business Census (ISTAT, 2024) confirms that Lombardy exhibits among the highest rates of declared filière participation in the Italian manufacturing sector, associated with measurable differences in value added, labour productivity and internationalisation intensity. These aggregate patterns provide a macroeconomic backdrop, aligned with the firm-level dynamics examined in this study.

It should be noted, however, that no publicly available micro-level database allows the systematic identification and classification of individual firms by their participation in structured SSC arrangements. Existing statistical sources capture filière participation through aggregate firm-level self-declaration at the territorial or macro-sectoral scale, without providing the firm-specific relational data needed to operationalise the embedded/non-embedded distinction (ISTAT, 2024). This data gap provides the rationale for the primary survey-based data collection adopted in this study.

3.3 Sample and classification criteria

Data were collected through a structured survey administered to SMEs affiliated with a local industrial association. The final sample comprises 52 manufacturing SMEs. Firms were classified as SSC-embedded or non-embedded on the basis of three explicit criteria derived from the operational definition in Section 2.3.

Firms were classified as SSC-embedded (N=38) when they simultaneously reported:

(i) recurrent and stabilised participation in one or more supply chains over at least the previous three years, with identifiable lead firms or buyers;

(ii) the presence of explicit governance elements in the relationship, operationalised as the requirement of formal standards, certifications, or quality/information-sharing protocols imposed by SSC partners;

(iii) strategic rather than merely transactional relevance of the relationship, self-reported by the respondent and cross-checked with the share of turnover generated by the main SSC(s).

Firms were classified as non-embedded (N=14) when none of the above three conditions held simultaneously: that is, when their supplier or customer relationships were predominantly market-based, lacked structured governance elements, and did not exhibit strategic continuity with identifiable partners. Borderline cases were evaluated through follow-up clarifications with respondents and conservatively assigned to the non-embedded group.

The sample distribution by dimensional characteristics is reported in Table 2. The group sizes are deliberately unbalanced, reflecting the structure of the affiliated population: in an industrially dense territory such as Brescia, the majority of SMEs operate within some form of structured SSC. This is itself a substantive finding about the territory, rather than a defect of the sampling frame. To mitigate the risk that observed differences between groups reflect pre-existing dimensional heterogeneity rather than SSC participation as such, non-parametric comparability checks were performed on employee size and annual turnover (see Section 3.5).

Table 2. Sample distribution by turnover and size

Category	**Sub-category**	**Embedded SMEs (N=38)**	**Non-embedded SMEs (N=14)**
Annual turnover	≤ 0.5 M€	5.3%	7.1%
	0.5–1 M€	2.6%	28.6%
	1–2 M€	10.5%	28.6%
	2–5 M€	34.2%	14.3%
	5–10 M€	34.2%	21.4%
	> 10 M€	2.6%	0.0%
Employees	1–5	7%	5%
	6–9	36%	3%
	10–15	36%	32%
	16–19	7%	22%
	20–49	14%	24%
	50–99	—	11%
	100 +	—	3%
Internationalisation	Share of firms exporting	82%	36%

Source: Authors' elaboration. Note: percentages for the non-embedded group are computed on firms providing complete responses for each item.

3.4 Measures and analytical approach

The survey was designed to combine objective economic indicators and subjective managerial assessments, as in prior research that emphasises the value of combining hard and soft data when analysing firm behaviour under uncertainty (Eisenhardt & Graebner, 2007; Gibbert et al. 2008).

Hard indicators captured firms' economic dynamics: trends in domestic and foreign orders, production levels, turnover, production costs, and investment dynamics during the reference period.

Soft indicators captured managerial perceptions, attitudes and intentions: innovation and R&D orientation, engagement with sustainability practices and documentation, short-term market expectations, and strategic adaptation intentions. Strategic intentions were operationalised through a multiple-response framework (non-mutually exclusive options), aligned with the compound nature of strategic decision-making under uncertainty.

To synthesise adaptive orientation, a Strategic Proactiveness Index (SPI) was constructed as a count of proactive, capability-enhancing actions reported by each firm out of nine predefined options (vertical integration; internal reorganisation or cost-efficiency measures; entry into new geographical markets; new product development or sector entry; introduction of new technologies or automation; partnerships, alliances or networks; sustainability and CSR investments; digitalisation and Industry 4.0; entry into new SSCs). Each action was coded 1 if selected and 0 otherwise; the index is the simple sum, with theoretical range 0–9. No weighting scheme was applied, as the index is intended to capture the breadth rather than the intensity of strategic responses.

Group differences were assessed using three complementary techniques. Descriptive comparisons (frequencies and cross-tabulations) highlight the distributional patterns by SSC participation. Fisher's exact test was applied to selected binary variables relevant to the research questions, given that small and unbalanced group sizes and low expected cell frequencies make this test more reliable than the chi-square test in this setting. The SPI, an ordinal/count variable, was compared between groups through the Mann–Whitney U test, appropriate for small samples and non-normal distributions. Statistical significance is interpreted, following the exploratory design, as indicative rather than

confirmatory: inferential results are used to support descriptive patterns, identify dimensions where group differences are most pronounced, and support – rather than substitute – theory-grounded interpretation.

3.5 Group comparability check and residual confounders

Because the two groups are unbalanced and may differ not only in SSC participation but also in structural characteristics, dimensional comparability was verified prior to interpreting the substantive comparisons. Non-parametric Mann–Whitney U tests were conducted on the two-dimensional variables available for both groups. Size (operationalised as the ordinal employee-count category) and annual turnover (operationalised as the ordinal revenue class) show no statistically significant differences between embedded and non-embedded firms (size: $U = 86$, $p = 0.799$; turnover: $U = 130$, $p = 0.421$), with identical median categories across groups. On these two key structural variables the two groups are broadly comparable along these dimensions, although perfect equivalence cannot be assumed.

The data also reveal one important residual non-comparability that must be acknowledged up-front. The two groups differ markedly on internationalisation: 82% of SSC-embedded firms export a non-negligible share of turnover, against only 36% of non-embedded firms (Table 2). The gap is substantive and cannot be controlled for at the current sample size, since the sub-sample of internationalised non-embedded firms (roughly five firms) is too small for stratified analysis. As a consequence, part of the differences observed in subsequent sections on performance dynamics, market expectations and strategic proactiveness could plausibly reflect the greater internationalisation of the embedded sub-sample rather than – or in addition to – SSC participation as such. Three considerations temper this caveat without eliminating it. First, internationalisation and SSC participation in the Brescia manufacturing system are not independent phenomena: they typically go together, and the theoretical framing of the study (SSC as a territorial bridge between district anchoring and extended markets, see Section 5) explicitly treats this co-occurrence as part of the mechanism, rather than as a nuisance to be netted out. Second, the most robust empirical finding of the study, namely the difference in the Strategic Proactiveness Index (SPI), concerns a composite behavioural index that is unlikely to be mechanically reducible to export intensity. Third, in Section 6 the disentanglement of the SSC and internationalisation contributions is treated as a priority avenue for future research on a larger and sectoral balanced sample. Throughout the paper, the language of the outcomes reflects this caveat: differences are systematically described as associations, not as effects.

Beyond internationalisation, the non-embedded sub-sample also exhibits higher rates of missing structural data and some residual sectoral heterogeneity, including a small number of IT and wood-processing firms alongside the metalworking core. These additionally sources of non-comparability warrant further caution and are discussed in Section 6. These additional sources of non-comparability are acknowledged as limitations of the exploratory design and are discussed in Section 6.

4. Results

4.1 Economic performance, investment behaviour and market expectations (RQ1)

The reference period was characterised by weak demand, cost pressures and persistent uncertainty across the full sample: more than half of the SMEs reported negative trends in turnover, production and domestic orders. Positive dynamics were present but limited in frequency. Within this common backdrop, however, SSC-embedded and non-embedded firms display systematically different patterns.

Table 3 reports the distribution of the main economic indicators. Embedded SMEs show a higher incidence of positive dynamics across all indicators: 43% report growing turnover (against 17% of non-embedded firms), 39% report growing domestic demand (against 8%), and 38% report growing

foreign demand (against 8%). Investment patterns show the most pronounced divergence: investment levels remain stable for the large majority of embedded firms (92%), while nearly half of non-embedded SMEs report investment contractions (48%), against only 8% of embedded firms.

Table 3. Main 2025 trends by SSC participation (survey items)

Indicator	**Level**	**Embedded (N=38)**	**Non-embedded (N=14)**
Annual turnover	Increase	43%	17%
	No variation	*9%*	*33%*
	Decrease	49%	50%
Production	Increase	32%	17%
	No variation	*18%*	*25%*
	Decrease	50%	58%
Domestic demand	Increase	39%	8%
	No variation	*15%*	*25%*
	Decrease	45%	67%
Foreign demand	Increase	38%	8%
	No variation	*28%*	*58%*
	Decrease	34%	33%
Investments (quarterly)	Increase	0%	3%
	Stable	*92%*	*48%*
	Decrease	8%	48%

Source: Authors' elaboration.

Market expectations show a recurrent pattern (Table 4). Embedded SMEs report substantially higher domestic market optimism (43% positive against 8%) and more articulated expectations on EU markets (31% positive against 0%). Non-embedded firms anticipate domestic contraction more frequently (50% against 29%). Forward-looking assessments thus appear to be shaped not only by the direct economic position of the firm but also by the relational anchoring provided by SSC participation.

Table 4. Short-term market expectations by SSC participation (survey items)

Market	**Expectation**	**Embedded (N=38)**	**Non-embedded (N=14)**
Domestic	Positive	43%	8%
	Steady	*29%*	*42%*
	Negative	29%	50%
EU markets	Positive	31%	0%
	Steady	*52%*	*100%*
	Negative	17%	0%
Extra-EU markets	Positive	9%	0%
	Steady	*68%*	*80%*
	Negative	23%	20%

Source: Authors' elaboration.

Overall, the descriptive data are consistent with RQ1: SSC-embedded SMEs display more favourable economic dynamics and more articulated forward-looking assessments than non-embedded firms operating in the same territory. These differences should be interpreted as descriptive patterns supporting the theoretical expectations, not as causal effects.

4.2 Innovation and sustainability practices (RQ2)

Innovation activity is limited across the full sample, with over 60% of firms reporting no formal R&D engagement. The result appears to be coherent with the structural characteristics of Italian manufacturing SMEs (Marchini et al., 2010; Carannante, 2021). Within this baseline, Table 5 shows that SSC participation is associated with different patterns of engagement with innovation-related activities. Non-embedded SMEs more frequently report autonomous innovation activities, such as patent filings (33% against 13%) and participation in patent-generating projects (33% against 6%). Embedded SMEs, by contrast, more frequently report use of third-party patented technologies (31% against 0%) and acquisition of licences (13% against 0%). Both groups report a substantial level of informal R&D activity without formal patenting (50% embedded, 67% non-embedded), although the strategic meaning of this category is interpretively ambiguous and is reported here for completeness.

Table 5. Innovation and patent-related activities (survey items)

Innovation activity	**Embedded (N=38)**	**Non-embedded (N=14)**
Participation in projects with potential patent outcomes	6%	33%
Filing of one or more patents in the last five years	13%	33%
Interest in collaborating in research/innovation projects with patent potential	13%	33%
Use of materials, components or technologies covered by third-party patents	31%	0%
Acquisition of licences for the use of third-party patents	13%	0%
Engagement in R&D activities generating know-how without formal patenting	50%	67%

Source: Authors' elaboration on multiple-choice item.

Turning to sustainability practices (Table 6), SSC participation is associated with substantially higher engagement in structured sustainability documentation. In particular, 34% of embedded SMEs indicate that sustainability certifications or reporting are explicitly required by SSC partners, against 0% of non-embedded firms. Non-embedded SMEs also report higher rates of non-engagement (43% against 21%). Interestingly, however, non-embedded firms show a slightly higher propensity toward voluntary sustainability adoption (21% against 13%), which suggests that where non-embedded firms do engage, the motivation is more strategically intrinsic rather than compliance-driven.

Table 6. Sustainability reporting and practices (survey items)

Sustainability-related activity	**Embedded (N=38)**	**Non-embedded (N=14)**
Subject to sustainability reporting obligations (CSRD)	5%	0%
Adoption of sustainability reporting model for micro/small enterprises (VSME)	5%	0%

Sustainability-related activity	Embedded (N=38)	Non-embedded (N=14)
Consideration of voluntary adoption of sustainability reporting tools/standards	13%	21%
Sustainability documents/certifications required by SSC partners	34%	0%
Not subject to mandatory obligations; internal monitoring of selected indicators	42%	43%
No engagement in structured sustainability reporting activities	21%	43%

Source: Authors' elaboration on multiple-choice item.

The patterns support RQ2: SSC embeddedness is associated with different – not necessarily higher – engagement in innovation and sustainability practices. In both domains, SSC participation appears to channel firm behaviour toward network-mediated and compliance-oriented modes, while non-embedded firms display a more autonomous and intrinsically motivated profile. These patterns are descriptive and should be interpreted with caution given the sample size.

4.3 Strategic adaptation and proactiveness (RQ3)

Strategic intentions differ substantially between groups (Table 7). Embedded SMEs report higher engagement across nearly all proactive actions: internal reorganisation (45% against 14%), market expansion (42% against 7%), new product development (37% against 14%), technology introduction (32% against 14%). Approximately half of non-embedded SMEs (50%) report no substantial strategic changes planned, pointing to a predominantly defensive or inertial orientation. A non-negligible share of firms in both groups report postponing strategic decisions – coherently with the pervasive uncertainty qualifying the context.

Table 7. Strategic adaptation actions (survey items)

Strategic action	Embedded	Non-embedded
Internal reorganisation / cost-efficiency measures	45%	14%
Search for or entry into new geographical markets	42%	7%
New product/service development or entry into new sectors	37%	14%
Introduction of new technologies or automation	32%	14%
Search for partnerships, alliances, or networks	21%	14%
Investments in sustainability, CSR, or certifications	21%	7%
Digitalisation projects or Industry 4.0 initiatives	18%	7%
Entry into new strategic supply chains	16%	7%
Business refocusing (reduction or redefinition of activities)	11%	7%
Decision postponed / strategic uncertainty	11%	14%
Vertical integration upstream and/or downstream	—	7%
Disinvestment / closure of low-performing business lines	3%	—
No substantial strategic changes planned	13%	50%

Source: Authors' elaboration on multiple-choice item.

The Strategic Proactiveness Index (Table 8) synthesises these patterns into a single measure. Embedded SMEs score substantially higher than non-embedded firms on both the mean (2.34 against 0.93) and the median (2.5 against 0). The Mann–Whitney U test confirms that the difference is statistically significant ($p = 0.013$). Interestingly, this difference emerges despite the relatively small sample, which makes its relevance noteworthy. This is the single statistically robust finding of the study, and arguably also the most theoretically central: it suggests that SSC participation is associated with a broader repertoire of proactive strategic responses to environmental uncertainty, not merely with better economic outcomes in absolute terms.

Table 8. Strategic Proactiveness Index (SPI)

Group	**SPI mean**	**SPI median**
Embedded SMEs (N=38)	2.34	2.5
Non-embedded SMEs (N=14)	0.93	0

Source: Authors' elaboration. Mann–Whitney U test: p = 0.013.

Together, the outcomes point to a coherent, though exploratory, picture: under conditions of heightened uncertainty, SSC-embedded SMEs report stronger current performance, more articulated forward-looking assessments, more frequent engagement with network-mediated innovation and sustainability practices, and a substantially broader repertoire of proactive strategic responses than firms operating outside such arrangements in the same territorial and sectoral context. As discussed in Section 3.5, the interpretation of these patterns must be moderated by the residual internationalisation gap between the two groups, which cannot be statistically separated at the current sample size.

5. Discussion

The findings of this exploratory study point to a consistent, though not unambiguous, picture of SSC embeddedness, associated with differentiated performance dynamics, innovation and sustainability engagement and – most robustly – strategic proactiveness among manufacturing SMEs in a specialised Italian territory. The discussion develops three implications that emerge from reading the empirical patterns through the theoretical framework outlined in Section 2: first, the reinterpretation of SSCs as an evolution of the Italian industrial district; second, the articulation of four channels through which territorial embeddedness and SME adaptation appear to evolve in this setting (governance signalling, compliance-driven capability upgrading, expectation coordination and territory-to-global institutional bridging); third, the role of intermediate institutions in supporting SME adaptation.

5.1 SSCs as a structured evolution of the Italian industrial district

The comparative evidence suggests that SSC participation in the investigated context, does not simply replicate a generic supply-chain logic imported from the international scholarship. Rather, it reconfigures – through explicit governance mechanisms such as standards, certifications, information-sharing protocols and sustainability requirements – the same socio-territorial embeddedness that historically characterised Italian districts. Embedded SMEs do not merely transact with larger partners: they participate in stabilised relationships that diffuse quality norms, sustainability certifications and strategic reference points. In this sense, SSCs appear to act as a governance-rich continuation of the district logic under post-globalisation pressures (Bellandi & Caloffi, 2014; De Marchi & Grandinetti, 2014), rather than as a substitute for it.

This suggests that the traditional district configuration is being reshaped – not dissolved – by the emergence of structured supply arrangements: the embeddedness described by Becattini (1990) and

Dei Ottati (2018) is increasingly being reshaped through explicit inter-firm governance mechanisms, rather than disappearing. Also, it suggests that the resilience and adaptation mechanisms associated with SSC participation may have deeper territorial roots than is typically acknowledged in studies focused on international supply chains and lead firms.

5.2 Territorial embeddedness as a meso-level mechanism of SME adaptation: four channels

The single statistically robust finding of the study, namely the difference in strategic proactiveness (SPI: 2.34 against 0.93; $p = 0.013$), deserves particular attention. Both groups of firms faced the same external shocks, operated in the same territory, and were dimensionally comparable on size and turnover (Section 3.5). Yet SSC-embedded SMEs reported a substantially broader repertoire of proactive responses. The pattern is coherent with the hypothesis that resilience in this context co-varies primarily with relational coordination and normative reference points, rather than with resource buffering or operational redundancy; it is also coherent with the dynamic perspective on supply chain resilience (Pettit et al., 2010; Wieland & Wallenburg, 2013) and with embeddedness theory (Uzzi, 1997; Gulati et al., 2009).

Moving beyond the aggregate pattern, the results can be interpreted through the four mechanisms through which both SSC participation and SME adaptive capacity appear to evolve in a territory with a strong district heritage. These mechanisms should be considered as an interpretive framework rather than as directly inferred from the data.

Mechanism 1 – Governance signalling. In traditional districts, coordination rested largely on tacit knowledge, diffuse reciprocity and community-level norms (Becattini, 1990; Dei Ottati, 2018). As globalisation, technological change and successive crises have eroded these informal foundations (Bellandi & Caloffi, 2014; De Marchi & Grandinetti, 2014), SSC arrangements make explicit – through certifications, quality standards, information-sharing protocols and joint planning routines – what districts used to transmit implicitly. In our data, the high share of embedded firms reporting SSC-mandated sustainability certifications (34% against 0%) and the co-existing pattern of systematically more articulated market expectations are in line with this channel: explicit governance signals appear to substitute, and at the same time re-structure, the diffuse reciprocity that has historically anchored SME behaviour in Italian industrial districts.

Mechanism 2 – Compliance-driven capability upgrading. Participation in SSCs typically requires meeting capability requirements imposed by lead firms, whether technological (process certifications, interoperability protocols) or institutional (sustainability documentation, traceability). While these requirements are compliance-driven in their origin, they appear to coincide with a broader repertoire of capability-building actions on the part of embedded SMEs: the observed differences in internal reorganisation (45% against 14%), technology introduction (32% against 14%) and digitalisation (18% against 7%) are all coherent with the interpretation that SSC-imposed standards operate as an external driver of capability upgrading. This echoes, in a more structured form, the district mechanism of "learning by osmosis" (Becattini et al. 2009) that Italian district scholarship has long documented, here reinterpreted as learning under explicit governance pressure.

Mechanism 3 – Expectation coordination through lead-firm focal points. Manufacturing SMEs operating in post-globalisation uncertainty face non-trivial interpretive ambiguity: what scenario should one plan for, what markets should one prioritise, what investments are worth making? The presence of lead firms within a structured SSC provides explicit focal points for expectations: their strategic direction, communicated through ordinary supply chain interactions, becomes a usable reference point for the smaller participants. In our data, the most striking pattern – embedded firms reporting 43% positive domestic expectations against 8% for non-embedded firms – supports this coordination-through-focal-points channel. Non-embedded firms, lacking such focal points, appear to default to the defensive-inertial pattern reported by recent scholarship on SME behaviour under uncertainty (Hortovanyi & Szepesi, 2026; Bak et al., 2020).

Mechanism 4 – Territory-to-global institutional bridging. This is the most distinctive mechanism from the perspective of Italian management scholarship, and it directly addresses the

internationalisation gap highlighted in Section 3.5. In the classical district, access to extended markets was mediated by the territorial system as a whole, through shared distribution infrastructures, trading firms and sectoral associations. As districts have weakened, SSCs appear to partially substitute this bridging role: they offer SMEs a structured relational channel through which to access international markets without having to internalise internationalisation capabilities firm-by-firm. The marked internationalisation gap observed in our data (82% against 36%) is therefore not a pure confounder to be controlled away: it is partly constitutive of the mechanism itself, since SSC participation and access to international demand evolve within the same process. Teasing apart the two contributions at the firm level would require longitudinal designs and larger samples and is flagged as a priority for future research.

The four mechanisms are not mutually exclusive and may in fact operate as a bundle: governance signalling appears to underpin compliance-driven capability upgrading; focal points work alongside expectation alignment; institutional bridging plays a connecting role between the territorial system and global markets. Interpreted through this lens, SSC participation appears as a composite inter-firm configuration that partly reconstitutes – in a more formal and governance-driven form – the adaptive advantages historically associated with the Italian industrial district tradition. The non-embedded sub-sample, by contrast, displays the defensive-inertial pattern that recent scholarship has associated with limited network embeddedness and reduced access to coordination routines (Bak et al., 2020; Hortovanyi & Szepesi, 2026).

5.3 The role of intermediate institutions and policy implications

The outcomes have implications for the role of intermediate institutions, namely industry associations, chambers of commerce, and regional or local development agencies, in supporting SME adaptation. Three points are particularly relevant for the Sinergie-SIMA conversation on post-globalisation management.

First, the evidence suggests that SSC membership in itself is not a guarantee of adaptive benefit for SMEs: the quality of inter-firm governance matters, which is precisely the object of Mechanisms 1 and 2 articulated in Section 5.2. The patterns observed in innovation and sustainability engagement, with compliance-driven adoption prevailing among embedded SMEs and voluntary engagement slightly more frequent among non-embedded firms, suggest that SSCs can diffuse minimum standards effectively but may not automatically support the deeper strategic internalisation of innovation or sustainability goals. Intermediate institutions therefore have a role not only in facilitating access to SSCs, but also in monitoring their governance quality and in supporting asymmetry-reducing mechanisms (capability-building programmes, training, shared infrastructures).

Second, the relatively high share of non-embedded firms reporting no planned strategic change (50%) points to a structural marginalisation risk for SMEs operating outside structured supply arrangements, reflecting the absence of the focal-points coordination channel described as Mechanism 3. In a specialised manufacturing region, policy attention should therefore include explicit attention to non-embedded firms, for whom district-based informal reciprocity is eroding while formalised SSC participation remains out of reach. Instruments such as territorial innovation platforms, regional development agencies and collective service centres (historically associated with district policy in Italy) could be redirected toward facilitating the transition of these firms toward well-governed SSC arrangements.

Third, the results highlight the continuing strategic relevance of territorial and institutional context in the post-globalisation era, an observation that the territory-to-global bridging channel (Mechanism 4) places at the centre of the theoretical framework. Rather than being neutralised by global reconfigurations, territorial and institutional embeddedness appears to be re-emerging – in restructured form – as a meaningful factor for SME resilience and adaptation. This is arguably a distinctive contribution that Italian management research can offer to the broader conversation on post-globalisation manufacturing, given the country's rich empirical and theoretical tradition on the inter-organisational governance of productive systems.

6. Conclusions, limitations and future research

This exploratory study has investigated whether and how SME participation in Strategic Supply Chains, understood as a structured evolution of the Italian industrial district tradition, is associated with differentiated economic performance, innovation and sustainability engagement and strategic adaptation under post-globalisation uncertainty. By comparing 38 SSC-embedded and 14 non-embedded manufacturing SMEs operating in the specialised industrial region of Brescia, the analysis shows that embedded firms exhibit more favourable economic dynamics, more articulated market expectations and – most robustly – a significantly broader repertoire of proactive strategic responses (SPI: 2.34 against 0.93; $p = 0.013$).

This paper offers four contributions to the existing literature. Conceptually, it provides an operational definition of SSCs that distinguishes them from generic supply chains, Global Value Chains and industrial districts in the strict Becattini sense, thereby addressing an ambiguity that has weakened previous empirical work. Theoretically, it frames SSCs as a post-globalisation evolution of the Italian industrial district tradition, mobilising a distinctively Italian scholarly perspective within the international conversation on supply chain resilience, the relational view and embeddedness. Analytically, it proposes a four-channel architecture – governance signalling, compliance-driven capability upgrading, expectation coordination, territory-to-global institutional bridging – as a candidate framework for interpreting SSC–SME co-evolution in specialised manufacturing regions. Empirically, it provides SME-focused observations from a specialised manufacturing region where the tension between district legacy and structured supply arrangements is particularly visible.

The study has important limitations, which should explicitly guide the interpretation of the outcomes. First, the sample is small (N=52) and deliberately unbalanced, reflecting the structure of the local SME population but limiting statistical power. Only one inferential test reaches conventional significance (SPI), and the remaining findings should be interpreted as descriptive patterns aligned with – but not proof of – the theoretical expectations. Second, as discussed in Section 3.5, a material residual confounder, namely the systematically higher internationalisation rate among embedded SMEs (82% against 36%), cannot be statistically controlled at the present sample size; the language has been calibrated accordingly, and the internationalisation channel is reinterpreted theoretically as part of Mechanism 4 rather than as a pure confounder. Also, the single-territory focus enhances internal coherence but limits external generalisability: findings may not transfer to sectors or territories with different organisational histories. Additionally, the cross-sectional design does not capture the dynamic trajectories along which SSC participation and SME adaptive behaviour evolve over time. Last, some residual sectoral heterogeneity in the non-embedded sub-sample, together with missing data on some structural indicators, constitute additional sources of caution.

Future research can extend the present study along several directions. First, larger and sectorally balanced samples would enable propensity-score matching and allow separating the SSC and internationalisation contributions, a priority given the confounder highlighted in this paper. Second, longitudinal designs could trace how SSC participation and SME adaptive trajectories develop jointly over time, and whether the observed patterns of strategic proactiveness are associated with durable performance effects. Additionally, multi-territorial comparisons across Italian regions and across European manufacturing systems with different organisational traditions (e.g., German “Mittelstand” networks, French “pôles de compétitivité”) would illuminate the extent to which the “SSC-as-district-evolution” framing generalises beyond the Italian case. Also, qualitative case studies of SSC governance mechanisms could test the four channels articulated in Section 5.2 (governance signalling, compliance-driven capability upgrading, expectation coordination, territory-to-global bridging), unpacking the specific relational and institutional processes they involve.

Last, the results support a cautiously optimistic policy implication: in post-globalisation manufacturing systems, the strengthening and governance of SSC, as structured continuations rather than replacements of the territorial and institutional embeddedness that has historically characterised European manufacturing, may represent a meaningful lever for SME resilience and adaptive capacity.

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Società Italiana di MANAGEMENT

Long papers

Track:
Strategic Communication



Measuring Internal Communication Satisfaction: Validation of the Internal Communication Satisfaction Questionnaire (ICSQ) in Italian

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Abstract

Frame of the research. *Despite the development of internal communication in Italy, historically studies focused primarily on organizational structures and managerial processes, and no psychometrically validated instrument currently exists to measure internal communication satisfaction among Italian-speaking employees.*

Purpose of the paper. *This paper aims to validate the Italian version of the internal communication satisfaction questionnaire (ICSQ).*

Methodology. *The validation has been conducted leveraging the data collected in a broad three-wave, cross-national survey study, using only the data from the Italian sub-sample (348 employees). Internal consistency reliability, structural validity and model fit were assessed.*

Results. *All eight dimensions of the ICSQ showed satisfactory internal consistency. The original eight-factor structure of the ICSQ demonstrated slightly better fit than the higher-order model.*

Research limitations. *Results highlight the tension inherent in cross-cultural measurement between structural invariance and contextual adaptation.*

Managerial implications. *The Italian ICSQ offers organizations a diagnostic and developmental tool to systematically assess communication effectiveness from the employee perspective.*

Originality of the paper. *Methodologically, the paper confirms the transferability of a multidimensional measure while illustrating the importance of contextual interpretation in cross-cultural scale adaptation. Practically, it equips Italian organizations with a structured tool for diagnosing and improving their communicative environments.*

Keywords: *internal communication; internal communication satisfaction; scale validation; internal communication satisfaction questionnaire; measurement instrument*

1. Introduction

Internal communication has a growing relevance as part of the communication discipline both at the academic and professional level (Mazzei, 2010; Men and Bowen, 2017; Tkalac Verčič *et al.*, 2012; Welch, 2012) globally and in Italy.

The development of the internal communication field requires understanding its relationships with other related constructs, such as employee engagement, employee commitment, job satisfaction, employee retention, and should be based on a reliable and valid measure of communication satisfaction (Tkalac Verčič, 2021; Tkalac Verčič *et al.*, 2021). To this end Tkalac Verčič and colleagues (2009) developed and validated the Internal Communication Satisfaction Questionnaire (ICSQ), a measurement instrument originally developed in Croatian. To expand the use of the ICSQ for studies involving employees who use English as their second language, Tkalac Verčič and colleagues (2021) translated and validated the scale in English.

One of the major implications of the validation in English is the possibility to replicate the study in other countries to generalize its results (Tkalac Verčič *et al.*, 2021). The aim of the present study is to translate and validate the ICSQ in Italian. Despite the institutional development of internal communication in Italy, no psychometrically validated instrument currently exists to measure internal communication satisfaction among Italian-speaking employees.

In Italian companies, the institutionalization of internal communication in the form of a dedicated

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function is continuously growing, as it has been documented by studies since the end of the '90s (Invernizzi 1996, 2000) and up to the current scenario (Mazzei and Quaratino, 2019, 2020; Mazzei *et al.*, 2026 in press). Institutionalization brings the growth of staff, dedicated financial resources and above all a rising strategic attention.

The field of internal communication has developed over the last 20 years with the publications of scientific studies in Italian and in English by Italian authors (e.g., Biraghi, 2015; Mazzei, 2009; Mazzei *et al.*, 2022), the presence of Italian scholars in the academic international community and the institutionalization of university courses and stable university research groups in Italy including the CERC (entre for Employee Relations and Communication), and the existence of a professional association of internal communication professionals and managers (ASCAI – Associazione per lo sviluppo della comunicazione aziendale in Italia). The increasing interest in internal communication calls for rigorous studies looking at new aspects of the internal communication phenomenon. Therefore, the availability of a measurement instrument such as the ICSQ in Italian would be essential.

This paper recalls first the development of internal communication in Italy, to give a framework useful for understanding the need for the validation of a new measurement instrument. Then it presents the methodology, the results and the discussion of a study conducted using an Italian-speaking sample of employees to validate the ICSQ. It concludes by discussing limitations, avenues for future studies, and managerial implications.

2. Literature review

2.1 Measurement instruments in Italian internal communication studies

Italy has experienced an intense process of development of the debate on internal communication since the late '80s to the mid '90s. A review of the most important research studies (Mazzei, 1994) highlighted four topics: the activities managed by the internal communication professionals, the organizational architecture dedicated to the function, the managerial methods adopted, and the level of involvement of the top management in the definition of the communication strategy. Overall these studies confirmed the "hypotheses of the organizational communication" formulated by Invernizzi, being organizational communication considered as a synonym for internal communication (Invernizzi, 1993). However, these studies focused primarily on organizational structures and managerial processes, rather than on employees' subjective evaluations of internal communication.

The field developed thanks to a series of academic publications in the '90s (e.g., Amigoni, 1991; Baccarani and Golinelli, 1992; Butera, 1990; Del Mare *et al.*, 1990; Ferri, 1993; Gabrielli and Invernizzi, 1994; Iacci and Coletti, 1991; Nelli, 1994; Quaglino, 1992; Romano and Felicioli, 1991).

The most influential framework that impacted the development of internal communication in Italian academia was framed under the *lens of organizational communication, linking the development of the communication of organizations to the evolution of the organizational theories and models*, meant as a single phenomenon intertwining internal and external environment (Invernizzi, 1996, 2000; Invernizzi and Mazzei, 1993, 1997).

Beside this conceptual development, a group of Italian scholars based at Università IULM devoted high attention to the measurement of the evolution of organizational/internal communication in Italian companies. The prevalent conceptual framework was based on the hypotheses of the "generalized diffusion of internal communication" and of the "emergence of the paradigm of organizational communication" (Invernizzi, 1996, 2000).

With the new Millennium, a new wave of studies emerged (e.g., Ancarani and Baietti, 2000; Artuso and Mason, 2008; Baglieri, 2000; Barone and Fontana, 2005; Biraghi, 2015; Fiocca, 2002; Galardi, 2024; Invernizzi *et al.*, 2020; Invernizzi and Mazzei, 2006; Marchiori, 2001; Mazzei and Butera, 2024; Minghetti and Cutrano, 2004). Among these studies, a conceptual framework has been proposed based on a multidisciplinary approach: management and its resource-based theory of the

company, public relations and its theory of publics, and organizational communication with its communicative constitution of organizations principle (Mazzei, 2004, 2009, 2010, 2025). This perspective puts at the center of internal communication the role of all organizational members as communicators, strategic or adversarial, and the role of the internal communication function as the creator of an enabling work context (Mazzei, 2014). The role of employees as procompany or anticompany communicators has been investigated as an output of the level of engagement and related to the work context conditions in terms of employee relationship management, organizational justice and human resources practices (Mazzei *et al.*, 2019; Mazzei *et al.*, 2025).

In this flourishing of studies, some topics attracted particular attention in the Italian internal communication community, leading to studies again involving managers and practitioners in the field: internal crisis communication (e.g. Mazzei and Butera, 2021; Mazzei and Ravazzani, 2011) and diversity management (Mazzei and Ravazzani, 2012; Ravazzani, 2016). Again, on these topics the qualitative and quantitative instruments were focused on the managerial perspective, mapping and analyzing practices of communication related to specific issues at the organizational level.

From the operational point of view researchers developed measurement instruments to map the evolution of internal communication in Italy. In 2011 and 2017 ASCAI investigated the presence and the staffing of a dedicated function, channels and tools, budget, team, planning, aims and strategies, measurement (Nelli, 2017). While these instruments provide valuable benchmarking data, they do not constitute psychometrically validated measures of internal communication satisfaction at the employee level.

In 2019 and 2025-2026, two studies conducted at the research center CERC (Centre for Employee Relations and Communication) of Università IULM depicted the state of the art of internal communication in Italian companies (Mazzei and Quaratino, 2019, 2020; Mazzei *et al.*, 2026 in press). Some of the themes covered by this questionnaire are the *existence of a formal function* dedicated to internal communication, the *involvement of top management* into the definition of aims, *staffing*, *aims* of internal communication, the *role of employees as communicators* across the organizational borders, and the *managerial methods* to plan and evaluate internal communication. In the hypotheses of these studies internal communication impacts the level of employee engagement and it has the role to enable employees to perform procompany communication behavior.

All in all, considering the studies about internal communication in Italy according to the classification by Downs (1994 in Tkalac Verčič *et al.* 2021), the Italian tradition confirms the use of comprehensive instruments that "analyze communication practice on a macro level" (Tkalac Verčič *et al.* 2021: 592). These instruments are useful to map the state of the art of a profession or of an organizational area to diagnose the phase of development and maturity as for example the CCI Study (Goodman and Hirsh, 2010) or the European Communication Monitor (Tench *et al.*, 2025).

To evaluate the effects of internal communication on employees, there are some psychometric scales validated in Italian that can be used to assess a series of constructs that can be influenced by internal communication. For instance, there are scales available that have been validated in Italian in order to measure employee engagement in specific industries (Pisanti *et al.*, 2008), or to measure perceived organizational support (Battistelli and Mariani, 2011). Similarly, scales are available in Italian to assess job satisfaction, which also include some items specifically referred to the satisfaction of employees with communication issues (Platania *et al.*, 2021).

The need to study internal communication thoroughly is strictly related to the fast pace of its development in Italian companies. In 2019, the study conducted by CERC of Università IULM to assess the state of the art of internal communication in Italy showed that 56% of the companies surveyed had a formal function dedicated to internal communication, 30% had had this function in place for 11 to 20 years and 5% for more than 20 years (Mazzei and Quaratino, 2019, 2020). In the second edition of this study, 79% of the companies surveyed have a formal function dedicated to internal communication, 30% have had this function in place for 11 to 20 years and 10% for more than 20 years (Mazzei *et al.*, 2026 in press).

As emerged from the above, Italian studies on internal communication focused on applied

research, the development of validated managerial practices, and guidelines. This is coherent with a normative approach typical of corporate communication (Christensen and Cornelissen, 2011), the background of most Italian communication scholars. This kind of research led to the development of benchmarking tools such as the "Enabling Model of Internal Communication" (Mazzei and Quaratino, 2019). Therefore in Italy there is no tradition of academic studies conducted with Italian psychometric instruments and in particular related to internal communication satisfaction.

The need to expand the number and the quality of psychometrically validated employee-level measurement instruments is strictly related to the institutionalization of the professional field and the academic discipline of employee communication.

Measuring employee communication contributes to identify and validate methods, tactics, tools and messages that are effective or not (Men and Bowen, 2017). Efforts in employee communication are tied to important employee outcomes such as job attitudes, behavioral changes, productivity, organizational performance and these should be measured (Mazzei, 2025; Men and Bowen, 2017) to sustain the relevance of these efforts, the investments, and the legitimization of the function. There are a lot of obstacles and resistance in measuring employee communication (Men and Bowen, 2017) and companies signal that they have no formal assessment tool to evaluate the success of employee communication campaigns (Men and Berger, 2012). Therefore, having measures for constructs such as employee engagement, employee communication satisfaction, and the like, is crucial to overcome these difficulties and ease the process.

The quest arriving from the professional field is clear and strong, considering the organizational need to measure the results of internal communication activities (Mazzei and Quaratino, 2019; Mazzei *et al.*, 2026 in press; Men and Bowen, 2017). Therefore, academia and universities have an opportunity and the duty to develop scales that can measure psychometric constructs, as it is common in other fields such as psychology of organizations. The translation into local languages is essential to develop instruments that are easy to adopt for professionals.

Also, from the academic point of view, having psychometrically validated employee-level measurement instruments is an opportunity to carry out studies that can explore quantitative hypotheses with a culturally-based approach.

The aim of this study is therefore to start to fill this gap by examining the psychometric properties of the Italian version of the internal communication satisfaction questionnaire (ICSQ), as already done for the Croatian and English versions of the same instrument (Tkalac Verčič *et al.*, 2009; Tkalac Verčič *et al.*, 2021).

2.2 Internal communication and internal communication satisfaction

Internal communication is widely recognized as a strategic management function that shapes organizational cohesion, alignment, and performance. Contemporary scholarship in public relations and organizational communication moves beyond the traditional "sender–receiver" model and conceptualizes internal communication as a relational and participatory process through which meaning is co-created among employees and management.

Within this broader framework, Internal Communication Satisfaction (ICS) represents the evaluative outcome of internal communication processes. ICS refers to employees' subjective evaluation of the quality, clarity, adequacy, and usefulness of communication within their organization (Tkalac Verčič *et al.*, 2025). Unlike structural indicators such as channel frequency, communication flows, or message design, ICS captures how employees psychologically experience and interpret the communicative environment in which they work. It is therefore an attitudinal construct that reflects employees' perceptions rather than managerial intent or technical communication quality.

Conceptually, ICS is grounded in broader theories of satisfaction as an evaluative response to environmental conditions (Hecht, 1978; Spector, 1997). In organizational settings, it represents an affective–cognitive judgment about whether communication is timely, transparent, responsive, and meaningful. Employees form such judgments through daily interactions with supervisors and

colleagues, exposure to leadership messages, participation in meetings, feedback processes, informal exchanges, and increasingly through digital communication tools. ICS thus reflects employees' holistic appraisal of the communicative climate.

Historically, research on communication satisfaction emerged from studies of communication climate and message directionality (Downs and Hazen, 1977). Contemporary approaches conceptualize ICS as a multidimensional construct encompassing satisfaction with feedback, communication climate, supervisory communication, horizontal communication, corporate information, communication media, informal communication, and communication during meetings. This multidimensionality acknowledges that communication operates across hierarchical levels and functional contexts.

Theoretically, ICS is frequently explained through Social Exchange Theory (SET). From this perspective, internal communication functions as a relational signal. Clear, respectful, and informative communication communicates organizational investment in employees and strengthens perceptions of reciprocity and fairness. Empirical research demonstrates that Perceived Organizational Support (POS) and Psychological Contract Fulfillment (PCF) predict ICS, suggesting that employees who feel valued and believe organizational promises are honored evaluate internal communication more positively. ICS therefore reflects the perceived quality of the employee–organization relationship as enacted through communication.

In digitally mediated workplaces, ICS is also shaped by employees' perceptions of communication technologies. Drawing on the Media Affordances Perspective, research shows that employees' adaptability to and acceptance of digital communication tools significantly contribute to ICS. When communication platforms are perceived as usable, flexible, and aligned with task requirements, employees report higher communication satisfaction. Importantly, ICS does not merely reflect exposure to digital tools, but rather employees' evaluations of how well those tools support meaningful and relational interaction. Previous research has linked internal communication satisfaction to employee engagement and broader well-being outcomes (Tkalac Verčič *et al.*, 2025). In sum, internal communication satisfaction represents employees' integrated evaluation of their communicative work environment. It bridges relational, structural, and technological dimensions of communication and serves as a key explanatory construct in understanding how internal communication influences engagement, well-being, and broader organizational outcomes. The ICSQ operationalizes this multidimensional conceptualization and provides a structured measure of employees' evaluations of internal communication (Tkalac Verčič and Verčič, 2026).

2.3 Theoretical framework and construct positioning of internal communication satisfaction

The present validation effort is grounded in a multilevel theoretical framework integrating organizational communication theory, relational perspectives in public relations, and attitudinal theories of satisfaction**.** This framework clarifies both the nature of internal communication satisfaction (ICS) as a construct and the rationale for its psychometric validation.

First, from the perspective of organizational communication theory, internal communication is conceptualized as a constitutive process through which organizations are enacted and maintained (Mazzei, 2010). Communication is not merely a transmission mechanism but a system of interactions that shapes meaning, coordination, and organizational reality. Within this paradigm, employees are not passive recipients but active participants in communicative processes. Consequently, any assessment of internal communication must account for how communication is *experienced* by organizational members. ICS emerges as a key construct capturing this experiential dimension.

Second, the study draws on relational and public relations perspectives, particularly the view that communication reflects and sustains the quality of relationships between organizations and their members. In this sense, ICS functions as an indicator of the employee–organization relationship, as it reflects employees' evaluations of transparency, reciprocity, responsiveness, and inclusion in communication processes. This positioning aligns ICS with constructs such as trust, perceived organizational support, and relationship quality, while maintaining its distinct focus on

communication-specific evaluations.

Third, ICS is theoretically grounded in attitudinal theories of satisfaction, which conceptualize satisfaction as an evaluative judgment resulting from the comparison between expectations and perceived experiences (Hecht, 1978; Spector, 1997). Within organizational settings, ICS represents a domain-specific satisfaction construct, analogous to job satisfaction but focused exclusively on communication processes. It integrates both cognitive evaluations (e.g., clarity, adequacy of information) and affective responses (e.g., feeling informed, included, respected).

Building on these perspectives, ICS can be defined as a multidimensional latent construct representing employees' overall evaluative appraisal of the organizational communicative environment**.** Its multidimensionality reflects the complexity of communication processes, which operate across hierarchical levels (e.g., top management, supervisors), functional domains (e.g., feedback, coordination), and communication channels (e.g., formal, informal, digital).

Importantly, this theoretical positioning provides the foundation for the validation of the ICSQ. From a measurement perspective, ICS is treated as a reflective latent construct, where observed variables (items) represent manifestations of an underlying evaluative perception. The validation process therefore tests whether the empirical structure of the instrument corresponds to the theoretically defined dimensions of communication satisfaction. In this sense, confirmatory factor analysis is not merely a statistical procedure but a theory-testing approach, assessing the extent to which the proposed multidimensional model aligns with observed employee perceptions.

Finally, ICS occupies a central position within organizational communication research as a mediating and explanatory construct. It links communication processes to key organizational outcomes such as employee engagement, well-being, and behavioral alignment. By capturing how communication is interpreted and evaluated by employees, ICS provides a critical mechanism through which internal communication influences organizational effectiveness. The validation of the ICSQ in Italian therefore contributes not only to measurement development but also to the theoretical advancement of internal communication research by enabling systematic empirical testing of these relationships.

3. Methodology

The Italian subsample formed part of a broader three-wave, cross-national survey study designed to test a theoretically grounded process model of ICS and its organizational, technological, and psychological antecedents and outcomes (Tkalac Verčič *et al.*, 2025). For the purposes of this study, only the Italian data were used to assess the psychometric properties of the Italian version of the ICSQ. Data were collected between July and September 2025 using a structured online questionnaire administered through a professional polling agency. The validation focuses primarily on the wave in which internal communication satisfaction was measured, while additional variables from the broader project were used to examine theoretically expected associations.

3.1 Sampling and participants

Participants were recruited using stratified quota sampling to ensure representation across key demographic and organizational characteristics, including age, gender, industry sector, and organizational size. Eligibility required respondents to be employed (full-time or part-time) at the time of data collection. The Italian validation sample consisted of 348 employees. Of these, 181 (52.0%) were male and 167 (48.0%) were female. Participants ranged in age from 20 to 65 years, with a mean age of 45.62 years (SD = 10.39), indicating a professionally experienced workforce. In terms of education, the majority of respondents reported higher education qualifications. Specifically, 188 participants (54.0%) held a university degree, 83 (23.9%) reported post-secondary education below the university level, 52 (14.9%) held postgraduate qualifications, and 25 (7.2%) reported other forms of education. Participants were employed across a range of organizational contexts, positions, and industries, contributing to the heterogeneity of the sample and enhancing the relevance of the

findings for diverse organizational settings within Italy. The sample size exceeds commonly recommended thresholds for confirmatory factor analysis and psychometric validation, supporting the adequacy of the dataset for testing the structural and reliability properties of the Italian ICSQ.

3.2 Measure

ICS was measured using the ICSQ, a 32-item multidimensional instrument originally developed and validated in Croatian and subsequently validated in English. The ICSQ operationalizes ICS as employees' evaluative perception of internal communication within their organization and comprises eight dimensions: communication climate, relationship to supervisor, organizational integration, media quality, horizontal communication, organizational perspective, personal feedback, and communication with top management. Items are assessed on a 7-point Likert-type scale ranging from 1 (very dissatisfied) to 7 (very satisfied). A sample item is: "Information about changes in the organization." Higher scores indicate higher levels of ICS. The full 32-item structure was retained for validation in the Italian sample in order to examine the stability of the original dimensional configuration.

Perceived organizational support, psychological contract fulfillment, digital communication adaptability, employee engagement, and life satisfaction were measured using established multi-item scales. All instruments were translated into Italian using a back-translation procedure to ensure linguistic and conceptual equivalence between the original and Italian versions.

3.3 Data analysis

Data analysis proceeded in several stages to evaluate the psychometric properties of the Italian version of the ICSQ. Descriptive statistics, including means and standard deviations, were calculated for each of the eight dimensions and for the overall ICS score. Internal consistency reliability was assessed using Cronbach's alpha coefficients for each dimension and for the overall index, with values above .70 considered acceptable. Structural validity was examined through confirmatory factor analysis testing the original eight-factor model and a higher-order model specifying ICS as a second-order construct. Model fit was evaluated using chi-square, comparative fit index, Tucker–Lewis index, root mean square error of approximation, and standardized root mean square residual. In addition, associations between ICS and theoretically related constructs, including perceived organizational support, psychological contract fulfillment, digital communication adaptability, employee engagement, and life satisfaction, were examined using regression analyses in order to evaluate whether ICS behaved in accordance with theoretical expectations. All analyses were conducted on the Italian sample (N = 348).

4. Results

4.1 Descriptive statistics and reliability

Descriptive statistics and internal consistency coefficients for the eight dimensions of the ICSQ and for the overall ICS index are presented in Table 1. Mean scores across dimensions ranged from 4.34 (organizational integration) to 4.80 (communication climate), indicating moderate to relatively high levels of internal communication satisfaction in the Italian sample. The overall ICS mean was 4.58 (SD = 1.14), suggesting that respondents evaluated internal communication in their organizations positively, though not at the highest end of the scale. Cronbach's alpha coefficients ranged from .74 (organizational integration) to .89 (media quality). All eight dimensions exceeded the recommended threshold of .70, indicating satisfactory internal consistency. The overall ICS index demonstrated excellent reliability ($\alpha = .97$), reflecting a high degree of internal coherence among the 32 items.

Tab. 1: Descriptive statistics and reliability of the Italian ICSQ dimensions and overall internal communication satisfaction

Dimension	Mean	Standard deviation	Cronbach's alpha
Communication climate	4.80	1.11	0.76
Relationship to supervisor	4.49	1.33	0.85
Organizational integration	4.34	1.18	0.74
Media quality	4.49	1.41	0.89
Horizontal communication	4.74	1.30	0.83
Organizational perspective	4.52	1.15	0.80
Personal feedback	4.66	1.31	0.83
Communication with top management	4.62	1.18	0.79
Overall ICS	4.58	1.14	0.97

Source: our elaboration

All reliability coefficients exceeded the recommended threshold of .70, confirming satisfactory internal consistency for each dimension and excellent reliability for the overall ICS index.

4.2 Confirmatory factor analysis

Confirmatory factor analysis was conducted to test the original eight-factor structure of the ICSQ in the Italian sample. In addition, a higher-order model specifying ICS as a second-order construct was examined. Fit indices for both models are presented in Table 2. For the eight-factor model, results were as follows: $\chi^2(436) = 1353.13$, CFI = .893, TLI = .878, RMSEA = .078, and SRMR = .160. The higher-order model yielded $\chi^2(456) = 1436.21$, CFI = .885, TLI = .875, RMSEA = .079, and SRMR = .161. The RMSEA values for both models fall within the acceptable range, though close to conventional upper thresholds. The CFI and TLI values are slightly below the commonly recommended cutoff of .90, indicating that model fit is marginal rather than optimal. The SRMR values exceed typical acceptable levels, suggesting suboptimal absolute fit. Overall, the eight-factor model demonstrates slightly better fit than the higher-order model, though both models show only moderate adequacy.

Tab. 2: Confirmatory factor analysis fit indices

Model	chi-square (chi2)	df	CFI	TLI	RMSEA	SRMR
Eight-factor model	1353.13	436	0.893	0.878	0.078	0.160
Higher-order model	1436.21	456	0.885	0.875	0.079	0.161

Source: our elaboration

Interpretation: RMSEA is in the acceptable range (borderline). CFI and TLI are slightly below common cutoffs (.90). SRMR is not acceptable. The eight-factor model fits slightly better than the higher-order model.

4.3 Standardized factor loadings

Standardized factor loadings for the eight-factor model are presented in Table 3. Most items loaded satisfactorily on their intended dimensions, with standardized loadings ranging from .579 to .867. Two items fell below the conventional .50 threshold: QICS.11 (organizational integration; $\lambda = .407$) and QICS.21 (organizational perspective; $\lambda = .489$). All remaining items exceeded .58, indicating acceptable to strong relationships with their respective latent factors. The strongest loadings were observed within the media quality, horizontal communication, and personal feedback dimensions. Taken together, the pattern of loadings suggests that the original dimensional structure of the ICSQ is largely replicated in the Italian sample, although certain items demonstrate weaker contributions and may warrant further examination in future research.

Tab. 3: Standardized loadings for the eight-factor ICSQ model

Item	Factor	Std. loading
QICS.1	CC	0.764
QICS.2	CC	0.614
QICS.3	CC	0.679
QICS.4	CC	0.648
QICS.5	RS	0.778
QICS.6	RS	0.849
QICS.7	RS	0.751
QICS.8	RS	0.609
QICS.9	OI	0.694
QICS.10	OI	0.688
QICS.11	OI	0.407
QICS.12	OI	0.808
QICS.13	MQ	0.752
QICS.14	MQ	0.800
QICS.15	MQ	0.844
QICS.16	MQ	0.796
QICS.17	HC	0.658
QICS.18	HC	0.867
QICS.19	HC	0.796
QICS.20	HC	0.621
QICS.21	OP	0.489
QICS.22	OP	0.639
QICS.23	OP	0.736
QICS.24	OP	0.700
QICS.25	PF	0.804
QICS.26	PF	0.819
QICS.27	PF	0.860
QICS.28	PF	0.707
QICS.29	TM	0.738
QICS.30	TM	0.801
QICS.31	TM	0.716
QICS.32	TM	0.579

Source: our elaboration

Key point: the claim “all loadings exceed .50” is not supported in the Italian data. Two items fall below .50 (QICS.11 = 0.407; QICS.21 = 0.489). Everything else is ≥ 0.58.

Overall, the Italian data provide general support for the original eight-factor structure of the ICSQ. Internal consistency was satisfactory across all dimensions, and the majority of items demonstrated adequate factor loadings. However, global model fit indices indicate marginal fit, and two items exhibited loadings below .50. The Italian version therefore broadly replicates the original structure, though not without minor psychometric limitations that should be acknowledged.

5. Discussion

The present study examined the psychometric properties of the Italian version of the Internal Communication Satisfaction Questionnaire (ICSQ) and aimed to assess whether the original multidimensional structure could be replicated in an Italian-speaking organizational context. Overall, the findings provide substantial support for the structural integrity and reliability of the instrument while simultaneously revealing several nuances that are typical of cross-cultural scale adaptation.

Rather than indicating structural failure, the results suggest partial adaptation effects that merit closer interpretation.

5.1 Interpretation of the CFA results and meaning of "marginal fit"

Confirmatory factor analysis largely supported the original eight-dimensional configuration of the ICSQ, with most items loading satisfactorily on their intended constructs and internal consistency indices exceeding recommended thresholds. However, global fit indices indicate what can be described as marginal model fit, a result that requires careful interpretation.

In psychometric validation studies, marginal fit does not imply that the theoretical structure is incorrect; rather, it indicates that the empirical covariance structure reproduces the data adequately but not optimally according to conventional statistical benchmarks. In the Italian sample, RMSEA values fall within the acceptable range, suggesting that model approximation error remains within tolerable limits. In contrast, CFI and TLI values fall slightly below the commonly referenced .90 cutoff, while SRMR values exceed preferred thresholds. Taken together, these indices suggest that the factorial structure is broadly supported but that certain item relationships or residual correlations differ from those expected under the original specification.

Importantly, marginal fit should be interpreted comparatively rather than absolutely. The original Croatian validation demonstrated strong structural coherence, while the English validation also reported acceptable but not perfect fit indices, reflecting the complexity inherent in measuring communication satisfaction across organizational and linguistic contexts. The Italian results therefore align with an emerging pattern in which the ICSQ structure remains stable across adaptations, yet minor deviations appear as the instrument enters new cultural environments. Such outcomes are common in multidimensional organizational scales, where contextual interpretations of communication practices inevitably influence response patterns.

From a substantive perspective, the marginal fit may also reflect the inherently contextual nature of internal communication satisfaction. Unlike personality traits or cognitive abilities, communication satisfaction is shaped by organizational norms, managerial styles, and culturally embedded expectations regarding hierarchy, feedback, and information sharing. Consequently, slight departures from ideal model fit can be interpreted as evidence of contextual sensitivity rather than psychometric weakness.

5.2 Interpretation of weaker items in the Italian context

Two items exhibited standardized loadings below the conventional .50 threshold (QICS.11 and QICS.21), indicating weaker associations with their respective latent constructs. While statistically notable, these results should not be interpreted as simple measurement deficiencies; instead, they invite reflection on linguistic and contextual explanations specific to the Italian organizational environment.

The weaker loading of QICS.11 within the organizational integration dimension may reflect differences in how Italian employees interpret organizational information and role clarity. Italian organizational culture has historically emphasized relational coordination and informal communication networks alongside formal structures. Employees may therefore evaluate integration less through explicit informational clarity and more through interpersonal interaction or managerial mediation. If the translated wording emphasizes formal organizational alignment, respondents may interpret the item differently from its intended conceptual meaning.

Similarly, the lower loading of QICS.21 within organizational perspective may indicate cultural variation in perceptions of strategic communication from the organization. Italian employees may experience organizational vision and long-term perspective as mediated through leadership credibility or local managerial interpretation rather than through centralized communication messages. As a result, satisfaction with organizational perspective may overlap conceptually with other relational dimensions, slightly weakening its statistical distinctiveness.

Linguistic factors may also contribute. Even with rigorous back-translation procedures, subtle

semantic shifts can occur when translating evaluative constructs such as satisfaction, clarity, or organizational outlook. Italian language usage often allows broader interpretive nuance, which may increase variability in responses and reduce item–factor alignment without altering the underlying construct itself.

Importantly, the presence of only two weaker items within a 32-item instrument suggests localized rather than systemic measurement issues. The overall loading pattern remains strong, supporting retention of the full scale while encouraging future research to monitor these items across additional Italian samples.

5.3 Comparison with Croatian and English validations

When positioned within the broader validation trajectory of the ICSQ, the Italian findings reinforce the cross-cultural robustness of the instrument. The Croatian validation established the original factorial structure and demonstrated strong psychometric performance within the cultural context in which the scale was developed. The English validation extended the instrument's applicability to an international research environment and confirmed structural stability despite linguistic adaptation.

The Italian validation represents a further step in this trajectory. Consistent with earlier studies, reliability coefficients remain high and the multidimensional structure is preserved. At the same time, the slightly weaker global fit and isolated item deviations illustrate a predictable pattern of incremental variation as the instrument moves across linguistic and institutional contexts. Rather than weakening the scale, this progression strengthens its empirical credibility by demonstrating that the ICSQ retains conceptual coherence while remaining sensitive to contextual differences.

In this sense, the Italian results contribute to cumulative validation evidence: the instrument appears structurally stable across Southern European and Anglo-language contexts while allowing culturally specific response dynamics. Such findings support the use of the ICSQ as a comparative research tool capable of capturing both universal and context-dependent aspects of internal communication satisfaction.

5.4 Analytical reflection on limitations

The limitations of the present study should be interpreted analytically rather than as isolated methodological constraints. First, marginal model fit highlights the tension inherent in cross-cultural measurement between structural invariance and contextual adaptation. While the original structure is retained, the Italian data suggest that communication satisfaction may manifest through slightly different relational emphases, pointing to the need for continued validation rather than structural revision.

Second, the presence of two weaker items underscores the importance of examining semantic equivalence beyond literal translation. Measurement instruments assessing organizational perceptions are particularly sensitive to culturally embedded communication expectations. Future studies should therefore explore whether the observed item behavior reflects linguistic nuance, organizational norms, or sample-specific variance.

Third, reliance on self-reported survey data introduces common-method considerations, yet this limitation is intrinsic to research on satisfaction constructs, which are inherently subjective evaluations. Rather than a methodological flaw, self-reporting represents the appropriate epistemological approach for measuring perceived communication quality.

Finally, although embedded within a broader cross-national research project, the present analysis focuses exclusively on the Italian subsample. Consequently, conclusions concern validation within Italy rather than cross-cultural equivalence testing. Future comparative analyses may further clarify measurement invariance across national contexts.

5.5 Managerial implications and diagnostic use in Italian organizations

Beyond its methodological contribution, the Italian ICSQ offers concrete practical value for organizations. The instrument enables Italian companies to move from descriptive assessments of

communication activities toward systematic diagnosis of employees' communicative experiences.

Specifically, organizations can use the ICSQ diagnostically in several ways. First, the multidimensional structure allows managers to identify strengths and weaknesses across distinct communication domains, such as supervisory communication, feedback processes, media quality, or communication with top management. Rather than relying on general employee climate surveys, organizations can pinpoint which communication processes require intervention.

Second, repeated administration of the instrument enables longitudinal monitoring of communication initiatives. Italian organizations undergoing digital transformation, hybrid work implementation, or organizational change can track whether communication improvements translate into increased satisfaction across specific dimensions.

Third, the ICSQ provides a structured basis for dialogue between communication professionals, HR departments, and leadership. Results can inform targeted managerial training, redesign of feedback mechanisms, or refinement of leadership communication practices. In this sense, the instrument functions not merely as a measurement tool but as a decision-support mechanism.

Finally, the availability of a validated Italian version facilitates benchmarking across organizations and industries. As internal communication continues to institutionalize within Italian companies, standardized measurement can contribute to professionalization of the field by linking communication practices to measurable employee outcomes.

6. Limitations and future research

Future avenues based on the validation of the ICS in Italian include the possibility to explore in the Italian context connections and interrelations among a series of constructs.

Just to mention some that are urgent in the Italian context: the link between the perceived quality of internal communication (ICS) and organizational citizenship / prosocial and proactive safety (communication) behavior; or the link between ICS and the level of employee engagement or DEI communication behavior.

Furthermore, the study on the state of the art of employee communication conducted by CERC at Università IULM in 2025 indicates the priorities of employee communication for Italian companies that deserve more investigation: the digitalization of internal communication, the integration of artificial intelligence, the adoption of the digital workplace in the framework of hybrid work contexts, leadership and informal communication in the context of hybrid workplaces, the change processes. All these topics affect, and their successful implementation is affected, by internal communication satisfaction. Therefore there are avenues for studies considering these correlations that will be relevant both for theory advancement and from a managerial point of view.

From the methodological point of view, in Italy it is desirable to extend the study on internal communication with the typical explorative approach of the organizational communication discipline, mainly by qualitative methods. And at the same time, to improve the number and the value of quantitative studies, expected (although not exclusively) by the disciplines of corporate and strategic communication. The development of validated scales represents the first step and an incentive to proceed in this direction.

7. Conclusions and managerial implications

This study set out to translate and validate the Internal Communication Satisfaction Questionnaire (ICSQ) in the Italian context, addressing a long-standing gap in Italian internal communication research: the absence of a psychometrically validated instrument capable of measuring employees' evaluations of internal communication. The results indicate that the Italian version of the ICSQ largely preserves the original multidimensional structure and demonstrates satisfactory reliability across all eight dimensions. Despite marginal global model fit and minor item-level deviations, the

overall findings support the conceptual coherence and empirical applicability of the instrument within Italian organizations.

From a scholarly perspective, the validation contributes to the cumulative international development of internal communication research by extending the ICSQ validation trajectory beyond its Croatian origin and English adaptation. The Italian findings reinforce the proposition that internal communication satisfaction constitutes a stable multidimensional construct that can be meaningfully assessed across linguistic and institutional environments. At the same time, the observed variations highlight the contextual sensitivity of communication perceptions, confirming that measurement instruments in organizational communication must balance structural stability with cultural adaptability.

The study also contributes to the evolution of Italian internal communication scholarship. Historically, Italian research has focused primarily on organizational structures, managerial practices, and professional benchmarking. While these approaches have significantly advanced the institutionalization of internal communication, they have provided limited insight into employees' subjective experiences of communication processes. The availability of a validated Italian ICSQ enables a shift toward employee-centered empirical research, allowing scholars to examine internal communication not only as a managerial function but also as a perceived organizational environment.

Beyond its academic contribution, the Italian ICSQ offers practical value as a diagnostic and developmental tool for organizations. Internal communication in Italy has increasingly acquired strategic relevance, yet evaluation practices often remain limited to descriptive indicators such as channel usage, communication outputs, or managerial perceptions. The validated instrument allows organizations to systematically assess communication effectiveness from the employee perspective, thereby strengthening evidence-based communication management.

First, the multidimensional structure enables diagnostic analysis of internal communication systems. Organizations can identify which specific communication domains function effectively and which require improvement. For example, relatively lower scores in organizational integration or feedback dimensions may signal insufficient clarity regarding roles, expectations, or performance communication. Such differentiated insights allow targeted interventions rather than generalized communication initiatives.

Second, the ICSQ can support organizational change management**.** Italian organizations increasingly face transformations linked to digitalization, hybrid work arrangements, and evolving leadership practices. Communication satisfaction serves as an early indicator of how employees interpret and accept organizational change. Periodic measurement can therefore help managers detect emerging communication gaps before they translate into disengagement or resistance.

Third, the instrument facilitates managerial learning and leadership development**.** Several dimensions of the ICSQ directly relate to supervisory and top-management communication. Results can inform leadership training programs by highlighting areas where communication behaviors influence employees' perceptions of transparency, accessibility, and support. In this way, communication measurement becomes integrated into broader organizational development processes.

Fourth, the ICSQ provides a foundation for strategic benchmarking**.** As more Italian organizations adopt standardized measurement approaches, comparisons across departments, organizational units, or industries become possible. Benchmarking enables communication professionals to demonstrate the organizational value of internal communication using comparable data rather than anecdotal evidence.

Finally, the instrument encourages a shift from reactive to evidence-informed communication governance**.** By linking communication satisfaction to broader organizational outcomes such as engagement, trust, or well-being, managers can position internal communication as a measurable organizational capability rather than a purely operational activity.

In sum, the Italian validation of the ICSQ represents both a methodological and practical advancement. Methodologically, it confirms the transferability of a multidimensional measure of internal communication satisfaction while illustrating the importance of contextual interpretation in

cross-cultural scale adaptation. Practically, it equips Italian organizations with a structured tool for diagnosing and improving their communicative environments.

As internal communication continues to evolve in response to technological change and organizational complexity, the ability to measure employees' communicative experiences becomes increasingly central. The Italian ICSQ provides a foundation for this development, enabling future research and practice to move toward more systematic, comparative, and evidence-based approaches to internal communication.

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Beyond Disclosure: Evidence from the Italian Banking System on the Role of Digital in the Bank–Stakeholder Relationship

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Abstract

Frame of the research. *In this article, we assess how Italian banks disclose digital-related topics in their non-financial reports.*

Purpose of the paper. *In particular, we explore how disclosures of digitalization and digital transformation within the field of Italian banks are related to the three roles that the "digital" plays within the relationship between bank and its stakeholders: enabler, enhancer, and structurer.*

Methodology. *We do it primarily by means of geometric data analysis, a methodology that combines in-depth exploration of geometric space constructed and a subsequent interpretation of resulting relationships and structural homologies.*

Results. *By means of GDA we have constructed and analyzed the structural homologies within the field of Italian banks with respect to how digital types and digital roles are disclosed in banks' non-financial reports.*

Research limitations. *The limitations of our results are related primarily to the interpretative nature of the methodology.*

Managerial implications. *To achieve genuine digital transformation, Italian retail banks should strive to integrate complex market-engaged activities, like private banking and proprietary trading, to evolve into "structurers" of their stakeholder environment while balancing digital growth with the reputational risks of branch closures.*

Originality of the paper. *This research bridges a significant gap in banking management studies by analysing how digital disclosure functions as a holistic positioning strategy within the complex landscape of Italian banking enterprises.*

Keywords: *digital; non-financial reporting; structurer; banks; Italy; geometric data analysis*

1. Introduction

The rapid evolution of the financial services landscape, precipitated by the proliferation of information and communication technologies (ICTs) and accelerated by the post-pandemic digital imperative, has fundamentally altered the relationship between banking institutions and their stakeholders (Bofondi & Gobbi, 2017; Calderon-Monge & Ribeiro-Soriano, 2024; Niemand et al., 2021). While the literature has extensively documented the technical adoption of digital tools, there remains a critical lack of understanding in how these advancements are communicated and strategically positioned within banks' non-financial reporting. This study addresses a significant research gap by investigating the narrative construction of digital strategies within the complex ecosystem of Italian banking. In particular, we analyze how the disclosure of digitalization and digital transformation in banks' non-financial reports can be mapped onto the complex filed/ecosystem of Italian banking institutions as defined by a heterogenous combination of structural, managerial, and institutional factors.

Italy provides a uniquely pertinent context for our research goal due to its heterogeneous banking structure comprising large international groups, regional commercial entities, and deeply rooted cooperative banks. All of the above are currently navigating the transition from the Non-Financial Reporting Directive (NFRD) to the more stringent Corporate Sustainability Reporting Directive (CSRD). Despite the systemic importance of this sector, the disclosure of digital transformation as a non-financial performance indicator remains under researched. Therefore, a proper understanding of

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how banks signal their digital maturity to mitigate information asymmetry and secure social legitimacy constitutes an important research gap worthy of further investigation.

To begin with, we posit that there exists a substantial conceptual and empirically grounded distinction between the two categories that are often conflated in the management discourse: *digital transformation* and *digitalization*. We posit that digitalization entails tactical enhancements to operational efficiency (Pagani & Pardo, 2017), whereas digital transformation signifies a holistic, strategic shift that redefines a bank's value proposition (Naimi-Sadigh et al., 2022). We also explore how these two distinct categories are related to the three roles that the "digital" plays within the relationship between banks and their stakeholders: enabler, enhancer, and structurer. In brief, a bank that is engaged in the enabler's role focuses on providing access by means of digital tools, including removing physical barriers and creating new touchpoints between the institution and customers (Plekhanov et al., 2023; Zachariadis & Ozcan, 2022). The role of enhancer focuses on quality of said relationship, including increasing frequency of interactions, the build-up of trust, and personalization of services (Chandna & Ubba, 2026; Lóska & Uotila, 2024). Finally, the most important role with respect to the digital transformation aspects is that of structurer which focuses on redefining the very ecosystem of bank by means of digital tools (Baptista & Nunes, 2026). Our research synthesizes these fragmented perspectives into a cohesive typology to analyze the strategic "roles" of digital disclosure in bank's non-financial reports.

As our study is largely an in-depth exploration of a complex ecosystem of Italian banks with respect to both the role and the type of "digital" that these disclose in their non-financial reports, we do not rely on an a priori hypothesizing. Instead, the primary goal of our article can be better expressed in the form of a research question that we try answering by means of advanced exploratory techniques.

RQ. How do digital transformation and digitalization relate to the three roles of "digital" within the relationship between Italian banks and their stakeholders, and how do these categories jointly interact within the complex field of Italian banking institutions?

The originality of the work is threefold: it introduces a Bourdieusian perspective into the management studies of banking companies. In this respect, it allows digital transformation to be interpreted not as a merely technical choice or isolated organizational variable, but as a positioning strategy within a structured space of relationships, capital and institutional actors. In addition to enriching the literature on digital dissemination and banking management studies, the paper adopts a structural perspective on the banking field, highlighting the gap between transformation narratives and actual practices and identifying the conditions in which digital transformation becomes a positioning strategy in the Italian banking system. Second, only a small number of studies have so far analyzed the disclosure of "digital" in banks' non-financial reports (Bernini et al., 2022; Diener & Špaček, 2020; Shehadeh, 2025). Our study, therefore, is one of the few existing tapping into this important research gap. Finally, the methodology of geometric data analysis (GDA), although particularly suitable for the study of complex system-level interactions, is not yet widespread within business and management research. Indeed, it has been, so far, applied mostly within sociology for the construction and understanding of homologies within complex social fields (Boelaert & Ollion, 2025). We posit that a proper systemic view of a complex phenomenon **(**Barile & Saviano, 2011), like that of "digital" disclosure within a diverse field of banking institutions call for a methodology that intentionally disregard "the most parsimonious model" approaches of standard inferential statistics but instead treat complexity holistically. Coincidentally, this is precisely what GDA strives to accomplish (Roux & Rouanet, 2004).

We start with a brief literature review that elaborates more in-depth on the above concepts. In particular, we emphasize the conceptual distinction between digital transformation and digitalization, outline the difference between the three digital roles and review how the "digital" is approached in non-financial reporting of Italian banks. Then, after a detailed description of how we constructed the sample, we proceed with exploring the geometric space of Italian banks with respect to the digital role and the digital type categories. We conclude the article with a detailed discussion and implications of our results for both practitioners and researchers.

2. Literature review

2.1 Digitalization and digital transformation: similarities and differences

In recent years, among the challenges that have led to in-depth changes in traditional business models, operational processes and stakeholder relations, a particularly important role has been played by the rapid proliferation of digital technologies (Bofondi & Gobbi, 2017; Calderon-Monge & Ribeiro-Soriano, 2024; Niemand et al., 2021). In this scenario, the banking sector represents a significant example when rapid digital development has taken place that has led to a profound change in the ways in which banks offer cutting-edge products and services (Akatkin et al., 2017). Concerning the digital, however, it is necessary to make a conceptual distinction between the term digitization and the term digital transformation.

Digitalization concerns the conversion of data into digital format and the use of information technologies to improve the efficiency of existing processes (Pagani & Pardo, 2017). Furthermore, according to Nguyen et al. (2023), the bank digitalization is the incorporation of digital technology into all banking areas that alters the way banks operate and communicate with customers.

Digital transformation, instead, represents a broader and more strategic change: a process through which digital technologies generate discontinuities that push organizations to review their value creation methods, while addressing structural changes and organizational resistance that influence their outcomes (Vial, 2019). In addition to all this, digital transformation facilitates the disclosure of corporate social responsibility activities, increasing a relationship with stakeholders based on greater trust, transparency, and credibility.

The difference, therefore, is substantial and is isomorphic to a broader distinction between any kind of organizational change and the disruptive innovation (Schilling, 2013). In other words, digitalization implies any advancement in the usage of digital tools in the banking sphere, be it creation of an online platform, an introduction of a chatbot at the level of customer service, etc. Conversely, digital transformation, definitionally, implies an out-of-scale change brought about by the introduction and proper strategic leveraging of digital tools, for instance, a shift toward agenetic AI (Elgendy et al., 2025), embedded finance (Hensen & Kötting, 2022), and digital assets (Loukil et al., 2025).

This distinction is also relevant at the level of banks' non-financial reporting. In contemporary banking literature, a critical distinction is maintained between digitalization and digital transformation, though the terms are frequently conflated in casual discourse. Digitalization refers to the tactical integration of digital technologies into existing business processes to enhance operational efficiency and data accessibility (Diener & Špaček, 2020). In a non-financial banking report, this typically manifests as the automation of manual back-office tasks or the transition from paper-based records to digital databases. Conversely, digital transformation represents a holistic, strategic shift that redefines the bank's entire value proposition and organizational culture (Naimi-Sadigh et al., 2022). It is not merely an upgrade of legacy systems, but a fundamental reimagining of how the banking institution engages with customers and generates revenue in a platform-driven economy (Alqararah et al., 2025; Verhoef et al., 2021). While digitalization optimizes the current business model, digital transformation creates a new one, often leveraging artificial intelligence and ecosystem partnerships to move beyond traditional transactional banking toward integrated financial experiences. As such, the banks able to advance a proper digital transformation act as *structurers* able to redefine and guide their entire ecosystem by means of innovative and strategic use of digital tools (Baptista & Nunes, 2026). As a result, while digitalization affects short-term technical and operational processes, a profound cultural change (also based on learning) is needed for a digital transformation that can support a long-term evolutionary dynamic (Nadkarni & Prügl, 2021).

2.2 The three roles of "digital" within the relationship between bank and its stakeholders

In order to empirically interpret how "digital" affects the relationship between the bank and its stakeholders, in this article we primarily rely on the affordance perspective (Faraj & Azad, 2012;

Leonardi, 2011), which highlights how technology can produce different effects depending on how it is integrated into organizational practices. Following this theory, we conceptualize that the "digital" can be considered an infrastructure that can act as an *enabler, enhancer,* or *structurer* with respect to the relationship between the bank and its stakeholders.

It acts as a relationship *enabler* because it fosters the activation of previously nonexistent relationships through new touchpoints (home banking, apps, chatbots, etc.), or that were before objectively infeasible due to the lack of physical proximity (Lemon & Verhoef, 2016; Magatef et al., 2023). It also fosters customer loyalty, which demands increasingly advanced and high-quality products and services (Schmidt et al., 2017), reduces coordination/control costs, and fosters collaborative relationships based on trust (de Reuver et al., 2018; Papathomas & Konteos, 2023; Plekhanov et al., 2023; Zachariadis & Ozcan, 2022).

When it comes to the role of *enhancer*, in addition to creating relationships, digitalization strengthens existing ones through personalized and more frequent interactions, leveraging the benefits of the integration between physical and digital channels (Chandna & Ubba, 2026; Lóska & Uotila, 2024). All of this is reinforced by the needs of customers who increasingly demand sustainable products and services (Taneja et al., 2024).

To all the above we must add that digital technologies act as a *structurer* of the relationship because they broaden the operating environment, organize it in a systemic and stable perspective, transforming the network of stakeholders, the roles and stimulating the creation of digital platforms and ecosystems (Baptista & Nunes, 2026).

In this respect, we posit that assuming the role of *structurer* is crucial so that a proper digital transformation can take place as the two are definitionally linked (i.e., digital transformation entails the restructuring of an entire organizational field, including the very relationships with stakeholders by means of ICTs). However, we do not exclude that some banking institutions could be tempted to bring about *digital transformation* topic in their non-financial reports in an elaborated attempt at the institutional entrepreneurship in order to convince the stakeholders that actual transformative activities are taking place when what is actually happens is mere digitalization processes (Beloglavec & Zdolšek, 2026; Mihaylova & Blumer, 2025).

2.3 Digitalization and digital transformation in the non-financial reporting of Italian banks: A Signaling and Legitimacy Perspective

Given the multiple pressures, including the obligation of compliance, the demands of the market and the unremitted pace of technological development, including that of ICTs and AI (Todupunuri, 2025), the complex ecosystems of EU banking institutions has, for year, been undergoing in-depth structural transformation (Stefanelli & Manta, 2023). This is primarily true with respect to the European regulatory framework for reporting that, over the last two decades, has undergone a substantial evolution, also with respect to banking institutions which, due to their importance, has been increasingly subject to ever stricter non-financial reporting constraints (Biancone et al., 2025). In the Italian context, non-financial reporting has been reshaped by the transition from the Non-Financial Reporting Directive (NFRD) to the Corporate Sustainability Reporting Directive (CSRD). This shift significantly expands the population of entities subject to reporting requirements and mandates the use of European Sustainability Reporting Standards (ESRS) to harmonize and enhance the quality of sustainability-related data (Biancone et al., 2025; Veltri, 2023). Moreover, it has expanded the typology of banking entities that are required to report under the guise of the European Sustainability Reporting Standards advanced by the European Financial Reporting Advisory Group (Fedele et al., 2025).

Among heterogenous themes and topics that banks chose to disclose in their non-financial reports, the disclosure of digitalization and digital transformation processes and strategies is among the most prominent and important (Mohsen et al., 2024). Such disclosure, indeed, often reflects the level of digital maturity of a banking entity and the related ability of the upper management to navigate complex processes of organizational change (Mohsen et al., 2024; Niehoff, 2022).

This perspective is perfectly aligned with signaling theory (Connelly, et al., 2011; Spence, 2002). According to Spence (2002), for companies (including those in the banking sector) non-financial disclosure takes on the role of information with a multidimensional value: as a strategic tool, to communicate to the market (including all relevant stakeholders) their long-term strategic vision, their skills and their financial stability. A primary intent, therefore, is to stand out from the competition, improving the perception of primary stakeholders, mitigating the existing conditions of information asymmetry and therefore the uncertainty perceived by the market (Diebecker & Sommer, 2017; López-Santamaría et al., 2021).

To strengthen the interpretative key, signaling theory must be associated with legitimacy theory. According to the latter, the non-financial report, in addition to reducing information asymmetries, actively contributes to the creation and strengthening of the social legitimacy of the banking enterprise. Conversely, it is well known that organizations prepare the content of their reports in accordance with the values, regulations, regulatory and social expectations of the reference context to ensure business continuity and to build consensus around their strategic choices. From this perspective, disclosures on digitalization and digital transformation in banks' non-financial reports may function not only as accounts of technological change but also as instruments of symbolic transparency and legitimacy seeking, potentially widening a digital disclosure-practice gap (Tariq, 2025).

3. Sample and methods

The data collection proceeded in several steps.

To construct the initial pool of observations, we downloaded the list of banking enterprises operating on the Italian territory from the Banca d'Italia site. Subsequently, the 339 banking enterprises were divided into those that belonged to a banking group and those that were independent (i.e., not a part of a banking group). The decision to discriminate between the two categories comes from the fact that banks that are the part of banking groups share consolidated financial statements, including the respective non-financial statements. Subsequently, we have excluded banking enterprises that, at the time of the issuing the report, did not yet follow Corporate Sustainability Reporting Directive (CSRD) that reinforced the reporting standards also for the banks already under the Non-Financial Reporting Directive (NFRD). This selection criterion reduced the initial sample size to 257 banking enterprises. From these, given the high cost of manually going through the entirety of non-financial, we have selected a random sample of 50 banks. The respective non-financial reports were then downloaded directly from the official repositories (i.e., banks' own websites).

The selection of this sample was motivated by the need to analyze the leaders of the Italian banking sector who are currently fully transitioned toward new reporting standards. By focusing on banks already adhering to the Corporate Sustainability Reporting Directive (CSRD), we aimed at capturing the most up-to-date practices of digital disclosure which, we posit, provides a more adequate benchmark for the industry's strategic direction compared to a hypothetically diluted overview of smaller entities with minimal reporting requirements. The year 2024 was selected as the primary observation period because it represents a pivotal "year zero" for mandatory sustainability reporting under the CSRD framework. This allows for the analysis of digitalization and digital transformation discourse at its most mature and regulated stage, ensuring that the qualitative data extracted reflects current strategic priorities of Italian banking sector.

To acquire basic structuring information about Italian banking field for the successive exploratory and confirmatory data analyses, we relied on the secondary data consisting of both quantitative and qualitative variables denoting heterogenous structural, managerial, and institutional characteristics of banks. In particular, the acquisition of qualitative and quantitative data (location of registered office, legal form, specialization, number of branches and rank with respect to assets) for the construction of

the dataset was carried out using the Moody's-Orbis database (Bureau van Dijk), which provides structuring information acquired from official and verified sources.

We then proceeded to complement the obtained dataset with additional structuring information. In particular, we have coded the specialization for each bank (*specialization* variable) in line with taxonomy as proposed by Qi et al. (2025) who divided banks into three macro categories: commercial banks, cooperative banks, and non-depository institutions (each of these are further divided into sub-categories some of which were pertinent to our sample, see Table 1). Likewise, the information about banks' business models has been obtained following Savona's (2024) taxonomy distinguishing focused retail business model, diversified business model, market engaged business model, and wholesale-retail business model (for their further explanations see Table 1).

Finally, the information on whether banks emphasize digitalization or digital transformation in their non-financial reports and what kind of role the "digital" play in the relationship between banks and their stakeholders was collected by means of a qualitative content analysis (QCA) (Krippendorff, 2018). QCA is a systematic research method used to interpret the meaning of text data. Unlike quantitative analysis, which focuses on counting words or frequencies, QCA dives into the context, nuances, and themes within (written) communication. It is widely used in social sciences, marketing, and healthcare to analyze interviews, focus groups, open-ended surveys, or media content (Vourvachis & Woodward, 2015), as means to classify information in determinate categories (Guthrie et al., 2004). Moreover, lately, it has been increasingly popular and validated within business and management studies (Gaur & Kumar, 2018; Lock & Seele, 2015; Ruel, 2017), including in analyzing non-financial reports of banks in the context of Italy (Pesci & Costa, 2014).

In particular, the fifty non-financial reports were then imported into qualitative data analysis software (MAXQDA, version 24.11.1) where we have subsequently carried out the QCA. Particularly, to simplify the procedure, we have searched the term "digital" in all texts simultaneously. The total number of occurrences extracted was 4948. Upon eliminating duplications and non-pertinent text segments, 2801 text snippets were manually assessed and analyzed. In particular, we have applied deductive coding (Fife & Gossner, 2024). As such, the coding categories were defined in advance and then reported in the respective coding manual to which all the coders subsequently adhered.

Particularly, at the upper level, the coding categories distinguish between the type of the "digital" processes and strategies as reported in non-financial reports (*digitalization* vs *digital transformation*) and the role that these are playing within the relationship between banks and their stakeholders (*enabler*, *enhancer*, and *structurer*). While the more detailed description of five lower-level categories is provided in the *Literature Review* section, Table 1 recapitulates the essential information about all the variables used for the subsequent analyses as well as in which analyses these were used.

Table 1: Variables used in subsequent analyses. Source: own elaboration

Where used	**Variable**	**Modalities/values**	**Explanation**
Active variables in MCA, structuring variables in ascending hierarchical clustering	*business_model*	*diversified SI* *focused-Retail* *market-Engaged* *wholesale-Retail Hybrid*	Diversified: these institutions function within global markets, primarily focusing on issuing loans that are funded through a combination of retail deposits and various debt securities. Focused retail: these banks concentrate on their home market, centering their business model on conventional banking activities such as gathering deposits and providing credit to local customers. Market-engaged: these entities prioritize investment activities in stocks and bonds alongside interbank lending, frequently engaging in cross-border financial operations. Wholesale-retail hybrid: these organizations bridge the gap between sectors by facilitating large-scale financial deals conducted among professional market participants and institutional entities.

	specialization	*Bank holding company* *Commercial bank* *Cooperative bank* *Investment bank* *Savings bank*	Bank holding company: a central corporate entity that maintains a majority stake in one or more banking institutions without directly offering financial services to the public. Commercial bank: a mainstream financial provider dedicated to managing business and consumer accounts, issuing loans, and offering various banking products to the general population. Cooperative bank: a financial organization owned by its members, who act as both clients and shareholders to democratically manage the institution for improved rates and mutual benefit. Investment bank: a specialized firm that assists governments and large corporations in securing capital through security underwriting, issuance, and strategic guidance on mergers and acquisitions. Savings bank: an institution centered on individual consumer banking, primarily focusing on the collection of personal deposits and the provision of residential mortgages and small-scale financing.
	location	*south* *center* *north*	The geographic location of the headquarters in Italy.
	legal_form	*S.C.p.A* *S.P.A* *Soc. Coop*	Società Consortile per Azioni. Analogue to Joint Venture (JV) Corporation or a Consortium Company. Società per Azioni. Analogue to PLC and Inc. Società Cooperativa. Analogue to Co-operative Society and Co-op.
	rank_quart	*very low* *low* *high* *very high*	Country rank by assets. This qualitative variable was transformed into categorical according to bank's position with respect to four quartiles of related quantitative variable.
	branches_quart	*very low* *low* *high* *very high*	The overall number of branches. This qualitative variable was transformed into categorical according to bank's position with respect to four quartiles of related quantitative variable.
Supplementary variables in MCA, Variables used in chi-square independence testing of respective contingency table	*digital_type*	*digitalization* *digital transformation*	Digitalization refers to the tactical integration of digital technologies to automate existing processes and improve efficiency, such as transitioning from paper records to digital databases or launching a mobile app. Digital transformation is a holistic, strategic shift that redefines the bank's entire business model and culture, leveraging technology to create entirely new value propositions and customer-centric ecosystems.
	digital_role	*enabler* *enhancer* *structurer*	Enabler: focuses on access (removing physical barriers and creating new touchpoints like apps). Enhancer: focuses on quality (increasing frequency, trust, and personalization). Structurer: focuses on framework (redefining roles and building entire digital ecosystems).
Quantitative variables used in multinomial logistic regression	*rank_assets*	discrete variable	Overall rank of the bank by assets in Italy. Should be read in reverse: higher values indicate lower rank.
	world rank assets	discrete variable	Overall rank of the bank by assets globally. Should be read in reverse: higher values indicate lower rank.
	branches	discrete variable	Number of branches that bank has.
	focused-retail	binary variable	A dummy variable coding whether bank's business model is retail focused (= 1) or no (= 0)

Source: own elaboration

From the initial 2801 coded snippets, we then only selected those jointly reporting information both on the type of the "digital" disclosure (digitalization and digital transformation) and the role that digital play in the relationship between banks and its stakeholders (enabler, enhancer, structurer). In total, 224 segments were extracted. It is also worth noting that while 224 coded segments and the related information about 50 banks entered the dataset, because of the methodological constraints of multiple correspondence analysis (see the following section), we had to eliminate rows with missing values in order to proceed. Accordingly, 20 rows (each denoting an information about particular extract from the non-financial report and the respective structuring information about the bank) were eliminated. In the final instance, 204 coded segments and the complementing structural, managerial, and institutional information about banks entered the analysis.

4. Results

In order to explore what types of homologies exist between digitalization/digital transformation themes in banks' non-financial reports and the structural, managerial, and institutional factors of those banks, we performed a multiple correspondence analysis (MCA) as it is applied within the framework of geometric data analysis (GDA) (Hjellbrekke, 2018; Roux & Rouanet, 2004). In particular, MCA is a dimensionality reduction technique similar to principal component analysis (PCA) but applied exclusively to the categorical data (both nominal and ordinal, as in our case). What makes its application unique within the framework of GDA is a specific kind of reasoning that prioritizes in-depth exploration of the resulting clouds of individuals and modalities and how these can be interpreted given the additional structuring information projected onto them. In brief, one reason in terms of complex homologies between heterogenous clusters of variables (Hjellbrekke, 2018).

In our case, six variables (Q = 6) entered the analysis as active variables, meaning that their modalities (K = 26) contributed to the creation of the geometric space of Italian banks. The active variables included *business_model, location, rank_quart, legal_form, specialization,* and *branches_quart.* Two variables (*digital_type* and *digital_role*) with two modalities each were chosen as supplementary, hence, these did not contribute to the definition of space but were subsequently used to reveal the presence of homologies between the type of "digital" initiatives as discussed in the non-financial reports / the three identified roles that "digital" play in a bank's relationships with stakeholders and the underlying plethora of structural, managerial, and institutional factors that, conversely, actively contributed to the creation of the geometric space of Italian banks.

After running the PCA, a representation over the first two axes was considered optimal. Indeed, according to the common criterion, the number of dimensions sufficient for the interpretation in MCA should cumulatively explain at least 80% of (adjusted) variance (Hjellbrekke, 2018). The latter is expressed in terms of Benzécri's modified rates which are a correction to eigenvalues necessary to account for the mathematics of MCA (essentially, MCA creates a high-dimensional space that tend to inflate the total unadjusted inertia). In our case, the first two dimensions cumulatively accounted for 85.7% of modified inertia rates (see Table 2).

Table 2: Eigenvalues and explained inertia. First two dimensions. Q = 6, K = 26

Dim	Eigenvalue	Var	Benzécri's modified rates	Cum%
1	0.721	20.6	73.7	73.7
2	0.390	11.2	12	85.7
3	0.328	9.4	6.2	91.9
4	0.298	8.5	4.1	96
5	0.272	7.8	2.6	98.6
6	0.238	6.8	1.2	99.8
7	0.190	5.4	0.1	99.9
8	0.167	4.8	0.0	99.9

Source: own elaboration

To interpret the two dimensions, it is useful to look at which categories has contributed the most to the creation of the two axes. In particular, these are modalities of active variables with more than an average contribution to the definition of axes (i.e., >1/K; hence > 3.8% in our case). Table 3 reports these categories and their contributions as well as respective coordinates on the graph of modalities/categories.

Table 3: Modalities with more than average contribution to the construction of axes.

Dim. 1 (+)	**Ctr**	**Coord**	**Dim. 1 (-)**	**Ctr**	**Coord**
specialization: Cooperative bank	15.6	1.9	business_model: Diversified SI	4.5	-0.79
legal_form: S.C.p.A	15.4	2.06			
rank_quart: very low	12.6	1.42			
branches_quart: very low	9.5	1.24			
location: south	9.4	2.27			
business_model: focused-retail	7.8	0.93			
Dim. 2 (+)	**Ctr**	**Coord**	**Dim. 2 (-)**	**Ctr**	**Coord**
rank_quart: low	13.7	1.09	branches_quart: very high	15.1	-1.15
branches_quart: very low	13.3	1.2	rank_quart: very high	11.4	-1.17
business_model: Market-Engaged	11.7	1.35	specialization: Commercial Bank	10.1	-1.164
			business_model: Diversified SI	8.4	-0.79

Source: own elaboration

In brief, the most contributing (first dimension) opposes local cooperative banks on it positive side (Dim1+) and those with diversified business model (and hence with marked international presence) on the negative side (Dim1-). The second dimension, in turn, opposes small banks with low number of branches that are leaning toward market-engaged business model (Dim 2+) and large commercial banks with high rank and high number of branches (Dim2 -).

We have then proceeded with the exploration of likely homologies between types of "digial" disclosed in non-financial reports and the structural characteristics of the banks. We have therefore projected two supplementary variables (*digital_type* and *digital_role*) onto space reporting the cloud of individual observations (i.e., single coded segments). The results are shown in Figure 1 and Figure 2.

Figure 1: Structural homology and confidence ellipses. "Digital" type.

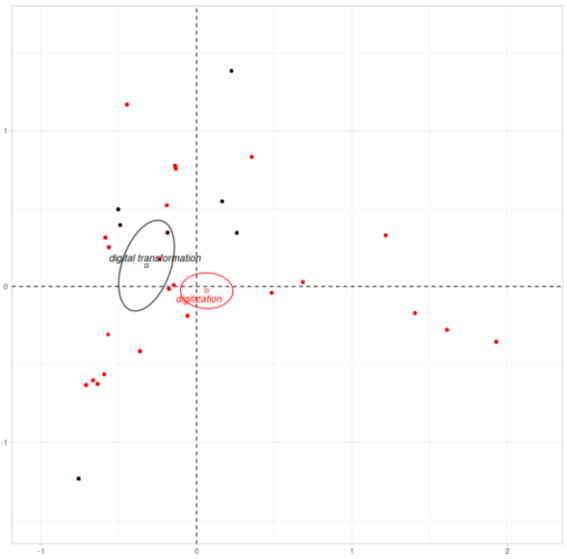
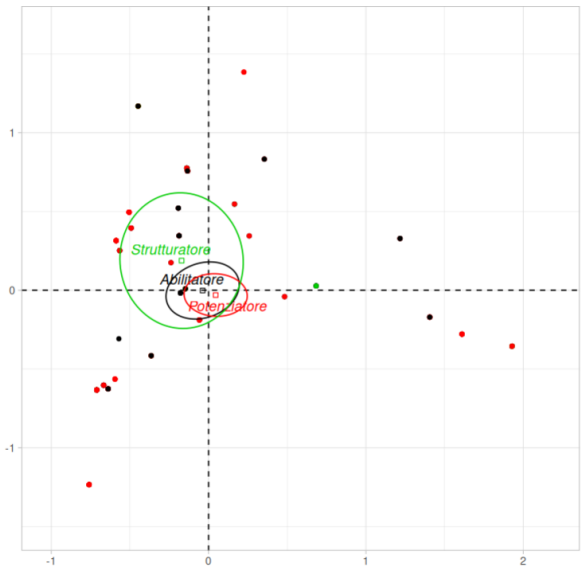


Figure 2: Structural homology and confidence ellipses. "Digital" role.



Source: own elaboration

Figures 1 and 2 depict the local barycenters pertinent to the respective categories of supplementary variables as well as confidence ellipses around them. The barycenters as such denote local centers of "gravity" around which observations with that specific profile tend to be located. Accordingly, even if supplementary variables did not partake in the definitions of the axes, what we might observe is a certain homological tendency between specific profiles of banks within the space (as identified by the combination of structural, managerial, and institutional factors that defined the very space) and the characteristics captured by the supplementary variables. Conversely, confidence ellipses denote areas of uncertainty around the position of a category's true mean point. Substantially, these are the extensions of confidence intervals to the two dimensions. As in the case of confidence intervals, overlapping ellipses suggest that there is no statistically significant distinction between banks' profiles with respect to the projected categories of a supplementary variable.

This, indeed, was the case for the *digital_role* variable whose modalities had overlapping confidence ellipses (Figure 2). On the contrary, *digital_type* variable turned out to be of homological-structuring importance. As can be seen in Figure 1, the local barycenter for "digitalization" almost coincided with the global barycenter (denoting a hypothetical bank with the "average" profile of factors). Hence, the most typical bank Italian bank in terms of its profile (as structured by the six factors as described above) is not that different from a bank that mentions "digitalization" in its non-financial reporting.

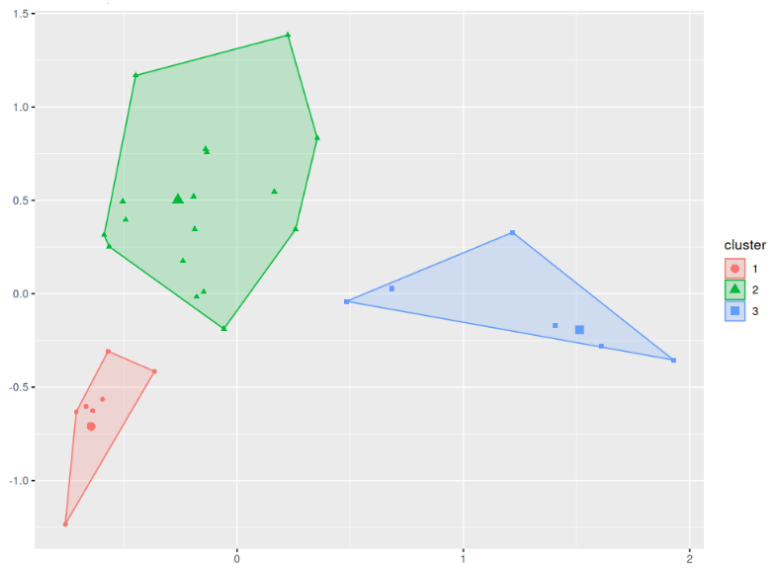
Yet, the case is opposite for banks that emphasize "digital transformation" in their non-financial reports. The two modalities are indeed significantly different (at 5% level), as suggested by non-overlapping confidence ellipses. Moreover, the confidence ellipse for the "digital transformation" category does not intersect the origin of axes, suggesting that respective bank profiles are more idiosyncratic and, therefore, are different from a factor profile of an "average" Italian bank. Given the position of the local barycenter for the "digital transformation" category (upper left quadrant), the types of banks that tend to emphasize digital transformation in their reports are therefore defined in terms of following combination of variables (see Table 3):

Dim 1(-): *business_model: Diversified SI*

Dim 2(+): *rank_quart: low, branches_quart: very, low business_model: Market-Engaged*

To better understand the unique profile of "digital transformation"-leaning banks, we performed an ascending (agglomerative) hierarchical clustering (AHC) on the results of MCA. This, indeed, is a common supplementary procedure in GDA to enhance the interpretation of its results (Roux & Rouanet, 2004). In particular, we have combined Ward's Method with Squared Euclidean distance measure, as is standard in AHC (Hjellbrekke, 2018). Ward's method minimized the total within-cluster variance by joining the clusters in a way that the result in the smallest possible increase in the sum of squared errors. The number of clusters to retain for further interpretation was calculated automatically by the software (*Factoshiny* package in R) (Vaissie et al., 2025) by setting the cut-off point at the level immediately before the disproportionate "jump" in variance resulting from the ascending merging of clusters. Three clusters of banks were identified in this manner (Figure 3).

Figure 3: Three clusters projected onto MCA plane.



Source: own elaboration

By observing the disposition of resulting clusters on the factor map in Figure 3, and by confronting it with the results in Figure 1, we might conclude that banks in cluster 2 (the green one in Figure 3) match most closely the profile of banks that engage in "digital transformation" according to their respective reports. To understand what kind of banks are these, it is useful to see what categories have contributed the most to the definition of the second cluster. Table 4 shows the most contributing categories to the composition of three clusters.

Table 4: Top 5 most contributing categories in each cluster (p.value < 0.05).

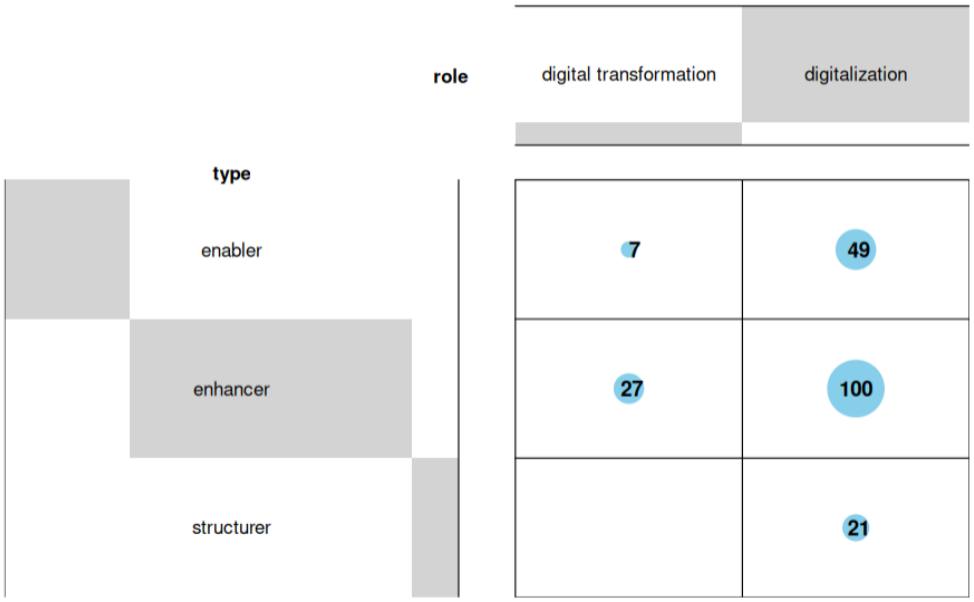
cluster 1 (+)	**cla/mod**	**mod/cla**	**global**	**cluster 1 (-)**	**cla/mod**	**mod/cla**	**global**
branches_quart: very high	100	90	26.47	business_model: Focused-Retail	0	0	39.21
business_model: Diversified SI	73.44	78.33	31.37	branches_quart_low	0	0	26.96
rank_quart_very high	82.5	55	19.61	rank_quart_low	0	0	26.96
specialization: Commercial Bank	100	30	8.82	rank_quart_very low	0	0	26.96
location = north	50	45	26.47	branches_quart_very low	0	0	21.57
cluster 2 (+)	**cla/mod**	**mod/cla**	**global**	**cluster 2 (-)**	**cla/mod**	**mod/cla**	**global**
rank_quart_low	100	54.46	26.96	branches_quart_very high	0	0	26.47
business_model: Market-Engaged	100	30.69	15.19	legal_form: S.C.p.A	0	0	15.67
branches_quart_high	88.24	44.55	25	specialization: Cooperative bank	5.26	1.98	18.63
branches_quart_very low	90.91	39.6	21.57	rank_quart_very low	21.82	11.88	26.96
location: north	60.65	93.07	75.98	specialization: Commercial Bank	0	0	8.82
cluster 3 (+)	**cla/mod**	**mod/cla**	**global**	**cluster 3 (-)**	**cla/mod**	**mod/cla**	**global**
rank_quart_very low	78.18	100	26.96	location: north	5.81	20.93	75.98
Specialization: Cooperative bank	94.74	83.72	18.63	legal_form: S.P.A	5.74	16.28	59.8
legal_form: S.C.p.A	100	74.42	15.69	specialization: Commercial Bank	3.77	9.3	51.96
branches_quart_low	70.91	90.7	26.9	business_model: Diversified SI	0	0	31.37
business_model: Focused-Retail	53.75	100	39.26	rank_quart: rank_quart_low	0	0	26.96

Source: own elaboration

As can be seen in the table, cluster 2 is composed by middle-to-low ranked banks (by assets) with either high or low number of branches whose headquarters are typically located in North of Italy, and whose business model is focused on equity and bond investments and interbank transactions, including international transactions (i.e., Market-Engaged business model). These, according to the homology revealed by MCA, are also more prone to mentioning "digital transformation" in their non-financial reports.

While GDA did not reveal homologies between the three roles of the "digital" in the relationship between bank and its stakeholders, and bank's combination of structural, managerial, and institutional factors, a secondary relationship between the two can still be deduced by looking at the distribution of *digital_role* supplementary variable with respect to the *digital_type* variable (that is itself constitutive of a homology as described above). The two categorical variables, indeed, resulted significantly associated as revealed by the Pearson's Chi-square test (X-squared = 6.8291, df = 2, p-value = 0.03289). Figure 4 displays the respective balloon plot. It is worth noting that the numbers inside each cell do not stand for individual banks but rather for the number of coded segments displaying that particular combination of two categories.

Figure 4: Digital role and digital type. Balloon plot.



Source: own elaboration

Across all three roles digitalization is significantly more common than digital transformation. Among the three roles, enhancers are most frequently associated with this category (100 coded instances). These are followed by enablers (49) and structurers (21). Notably, all three roles are covered when it comes to more digitalization. This is not the case when it comes to digital transformation. In fact, while enhancer is still the most frequent associated role (27 coded segments) followed by enabler (7 segments), the role of structurer is entirely absent in the analyzed sample. Hence, structurer appears to be the role strictly confined to digitalization and, as such, it represents a domain of theoretical possibility concerning digital transformation activities.

To reiterate, digital technology acts as a structurer when it moves beyond simple interaction and begins to redefine the very organizational landscape, for instance, by means of expanding operating environment, systematic organization, network transformation and creation of ecosystems. Yet, surprisingly, given the definitionally transformative nature of such activities, no coded segment in the dataset was jointly defined by "digital transformation" type and the "structurer" role.

Given this practical gap and the respective space of theoretical possibility that it opens, it is also interesting to understand what kind of structural change would be needed for "digital transformers" to be able to switch the roles from enables to structurers and from enhancers to structurers. To explore this, we run a multinomial logistic regression with digital role as a dependent variable (three modalities: *enabler*, *enhancer*, and *structurer*) and considering structurer as a reference level. The covariates were quantitative variables denoting the number of branches, bank's global rank by assets, Italian rank by assets, and the dummy variable denoting whether the bank is focused on retail or not (1 = retail-focused). Choosing structurer as the reference level substantially means that the statistical model is "standing" on the structurer category to look at the other two. Hence, every coefficient in the output is telling how a specific characteristic moves a bank away from being a structurer and toward being an enabler or enhancer. The results, however, can be interpreted in the opposite direction.

To begin with, a low R-squared does not mean the model is necessarily unfit. If predictors have significant p-values ($p<.05$), the model is still successfully identifying statistically significant relationships, even if it doesn't predict every outcome perfectly. This is rather expected in our case, as there is a degree of underlying structural complexity behind the data, as reified in a banking ecosystem whose determinations cannot, in any case, be determined by only few key variables. Indeed, since the value of R-squared is 0.0295, it merely indicates that while the model has identified real trends, there are many other factors not included in the model that influence a bank's digital role.

Among the factors (i.e., covariates) analyzed, however, only one respective coefficient turned out to be statistically significant: that of the *focused-retail* variable denoting whether the bank's overall business model is retail oriented (= 1) or not retail oriented (= 0). This is valid however, only for the passage from structurer to enabler and viceversa. Hence, nothing can be concluded given the data when it comes to the structurer-enhancer path.

Tab 5. Multinomial logistic regression results.

Model Fit Measures

Model	Deviance	AIC	R^2_{McF}
1	350	370	0.0295

Note. Models estimated using sample size of N=204

Model Coefficients - digital_role

digital_role	Predictor	Estimate	SE	Z	p
enabler - structurer	Intercept	1.40926	0.1553	9.076	< .001
	branches	−2.80e−4	1.75e−4	−1.604	.109
	World rank by assets	−0.00140	6.80e−4	−2.063	.039
	Rank-assets	0.04109	0.0253	1.626	.104
	focused-retail	0.78862	0.1931	4.083	< .001
enhancer - structurer	Intercept	1.98408	0.1900	10.442	< .001
	branches	−1.56e−4	1.56e−4	−0.997	.319
	World rank by assets	−3.37e−4	5.98e−4	−0.563	.573
	Rank-assets	0.01013	0.0239	0.424	.671
	focused-retail	0.26218	0.2182	1.201	.230

Source: own elaboration

To recapitulate, banks that tend to emphasize digitalization in their non-financial reports have significantly different distribution of three roles (enabler, structurer, enhancer) than those banks that emphasize digital transformation. In particular, while in the role of enhancer is most predominant for two digital types (digitalization and digital transformation) followed by enabler, the role of structurer is absent with respect to "digital transformation" types. This gap, therefore, represents a theoretical possibility for banking enterprises engaged in digital transformation activities. In particular, a multinomial linear regression suggests one possible path from the enabler to the structurer role: the

incorporation of additional non-retail elements in their business models. This result can also be interpreted in reverse: enterprises that already perform the role of structurer (both with respect to digital transformation and digitalization categories) can reinforce their "enabler" roles by incorporating more retail-focused elements in their business models.

5. Discussion

Since we have relied on a complex set of methodological tools to explore the field of Italian banks with respect to how these approach the "digital" in their non-financial reporting, a brief summary of the results is useful when it comes to the proper discussion. To begin with, the results of multiple correspondence analysis within the framework of geometric data analysis (Roux & Rouanet, 2004), revealed a significant structuring factor according to which the complex geometric space of Italian banks can be described and understood: the distinction between digitalization and digital transformation in non-financial reports. Particularly, banks that emphasize mere digitalization processes and strategies in their reports are similar in their profiles to an "average" bank profile as revealed by MCA. Hence, digitalization emphasis is common and more or less equally distributed within the complex filed of Italian banking institutions. Conversely, banks that emphasize a more in-depth and consequential digital transformation (in terms of the very re-structuring of the field of banking institutions around digital technologies), tend to follow a more idiosyncratic factors profile. A joint reading of the results of MCA and that of ascending hierarchical clustering (in particular, the composition of the cluster two) show precisely what characteristics of their profile apropos the average profile of an Italian banking institution are distinct and, hence, stand out. In particular, banks that engage in digital transformation narratives in their non-financial reports are precisely banks with low number of branches, located mostly in Northern Italy that typically follow a market engaged business model. Accordingly, these are the banks that move away from the traditional banking models and position themselves as a bridge between corporations and capital markets. The particularities of their business model also explain (and correlates) with the low number of branches: rather than focusing on a vast network of local branches, these types of banks prioritize investment banking, private banking, and sophisticated proprietary trading.

One possible explanation worthy of further academic exploration is that these banks use digital transformation as a legitimacy tool. Because they lack the physical presence that individuals traditionally associate with banking security (Mammah & Ohazurike, 2025), they might use the non-financial reports to emphasize that their digital infrastructure makes them more modern, efficient, and globally connected than the traditional regional banks. Moreover, the results hint at the (unsurprising) "digital divide" (Bergantino et al., 2025; Gioacchino et al., 2015; Lera-Lopez et al., 2021) within the country, as, according to the literature, banks in Northern Italy tend to (1) invest more in R&D, which is necessary for a proper digital transformation activities (Garavaglia, 2014), (2) face higher labor costs pushing them toward "digital transformation" narratives to ensure profitability by successfully adopting a low-branch model. The latter dynamic, indeed, has been recently confirmed by the report of Banca D'Italia on the reduction in bank branches and rising digital reliance (Marini et al., 2025).

When it comes to the three roles that the "digital" plays within the relationship between banks and their stakeholders, no direct structural homology was found with respect to the field of Italian banks as constructed thorough MCA. However, we have detected one such structural homology indirectly, by relating the two digital types as discussed above (*digital transformation* and *digitalization*) and the three roles as distributed across the non-financial reports of banks (*structurer*, *enhancer*, *enabler*) via a contingency table. According to the Chi-square test of independence, the two variables, denoting respectively, digital type and role, were deemed dependent across their modalities. In particular, the distribution of roles remains similar across the modalities of *digitalization* and *digital transformation;* however, in absolute terms, across all three roles, *digitalization* is significantly more common than *digital transformation.* More interestingly, all three roles are fully represented with respect to

digitalization narratives in non-financial reporting. Yet, when it comes to *digital transformation,* the role of structurer is entirely absent and, hence, it remains a theoretical possibility not yet fully practiced by banks pursuing digital transformation.

To recapitulate, the role of structurer in the relationship between the "digital" and bank's stakeholders consists in broadening, by means of advanced ICT tools, the operating environment, organizing it in a systemic and stable perspective, transforming the network of stakeholders, and stimulating the creation of digital platforms and ecosystems (Baptista & Nunes, 2026; Faraj & Azad, 2012). Hence, one might tentatively conclude that digital transformation subsume the role of structurer by its very definition. This is, however, not true from an empirical standpoint. Such a practical gap, instead, opens a space of theoretical possibility for banks that practice digital transformation to pursue the structurer role more actively. Indeed, one might argue that such role is foundational when it comes to the proper reification of digital transformation activities beyond mere narration and strategic signaling in the non-financial reviews (Di Chiacchio et al., 2025).

6. Conclusion, implications, limitations, and suggestions for further research

According to our results, banks that already incorporate non-retail elements in their business models are precisely those that emphasize digital transformation in their non-financial reports; yet, with respect to those, no structurer role was detected in the respective reports. What it could mean, substantially, is that banks adhering to market engaged business models (mostly those with low number of branches and from Northern Italy) tend to primarily rely on *digital transformation* narrative in non-financial reports as a legitimacy-seeking tool (Maroun, 2018). Conversely, such narrative is rarely translated into concrete steps that would ensure banks' pivotal role as structures within the complex ecosystem of Italian financial institutions.

To move beyond mere institutional signaling, we suggest that management of these banks align their digital narratives with the structurer role (as described in this article) as only through a proper reification of such a role a proper digital transformation can take place, including building of digital ecosystems and platforms that could re-define, in a truly transformational way, the very essence of how banking is conducted (Baptista & Nunes, 2026).

Our empirical evidence suggests that the path to becoming a structurer (a bank that structures the stakeholder environment, including by means of proper digital transformation) requires moving away from retail-centric models. Hence, to achieve proper digital transformation, managers of retail-heavy banks should more actively integrate private banking and proprietary trading into their business models as such banking activities provide the necessary complexity to trigger true transformational processes. This, however, do not mean that retail-centric models are inherently worse because they are not conducive to an adequate digital transformation. The proper way forward would be to complement the existing retail-oriented models with elements of market engaged model in order to leverage both. Indeed, since *digital transformation* narrative can also be misused as an institutional shield for branch closures (Marini et al., 2025), banks face a reputation risk if stakeholders perceive this as a cost-cutting excuse rather than a genuine service evolution.

To transition from symbolic institutional signaling toward a substantive structurer role, bank management must systematically align their digital narratives with concrete business model reconfigurations that move beyond a retail-centric focus. Specifically, managers should integrate high-complexity activities such as private banking and proprietary trading into their digital platforms to ensure the technical sophistication necessary for a true ecosystem-level transformation. This operationalization requires the development of open-banking infrastructures and API-led ecosystems that position the bank as a central node for fintechs and SMEs, thereby reifying the digital narrative through tangible stakeholder integration. Finally, managers must ensure that non-financial reporting accurately reflects the bank's internal architectural capabilities, particularly regarding the integration

of generative AI and automated risk assessment, to achieve intersubjective validity between public claims and organizational reality.

On a theoretical level, this study extends the literature by conceptualizing "digital" not merely as a technological asset, but as a new proxy for institutional robustness that replaces the traditional physical presence of bank branches as a sign of stability. In particular, we identify a critical theoretical gap where the conceptual definitions of digital transformation in existing literature fail to account for the actual technical capabilities of institutions, suggesting that current definitions may be overly optimistic or misaligned with empirical reality. By introducing the structurer role within the context of non-financial reporting, the study offers a bridge between institutional view of the role of "digital" in non-financial reporting of banks (i.e., digital narratives serve as symbolic resources for legitimacy) and a relational view (i.e., true transformation is achieved only when narrative claims are reified through the building of digital ecosystems and platforms). Consequently, we posit that the structurer role represents a necessary theoretical tool for understanding how banks can move beyond symbolic signalling to fundamentally redefine their role within a complex financial ecosystem.

Our study is not without limitations. To begin with, the digitalization narrative is highly contingent on external events, including the pace of development of ICTs. Accordingly, the choice of the year with respect to which non-financial reports were extracted potentially constitutes a limit to the generalizability of the results. In particular, as mentioned in the methodology section, we have analyzed the last available non-financial reports of banks published in 2025 and related to 2024. Given the increasing pace of development at which AI, and in particular large language model-based technologies are integrated into organizational structures (Al-kfairy, 2025; Romeo & Lacko, 2025; Rudko et al., 2025), the picture might entirely change in 2026 (hence, as related to reports covering the year 2025). Finally, some limitations are merely of technical nature: MCA results, which are, by design, of exploratory nature, rely heavily on the Interpretation. While our individual interpretations have been validated collegially, the result is, at best, intersubjective. Similarly, the choice of the active variable determines the overall shape of the resulting cloud of individuals and modalities. If different/additional structuring variables were chosen as active variables, we do not exclude that the resulting dimensions would have been structured differently. Similar considerations apply to clustering. We have selected a particular clustering method: an ascending hierarchical clustering based on Ward's method as applied with respect to the Euclidean distance measure. This particular clustering algorithm is a golden standard when it comes to complementing the MCA interpretations within the geometric data analysis framework (Roux & Rouanet, 2004), as it prioritizes a balance partitioning of clusters in terms of numerosity. Yet, we do not exclude that clustering results might have been different if we were to choose other clustering methods.

As already suggested, the substantive limitations of this study open up a possibility for future research efforts. In particular, it would be interesting to see whether Italian banks field is identically structured in the year 2026 (with respect to the reports pertaining to the year 2025). Indeed, we suspect that the *digital transformation* could become more relevant apropos *digitalization*, given the transformative nature of AI technologies that are increasingly frequently integrated into organizational processes and strategies (Rudko et al., 2025). In this respect, we could also except the growing relevance of the *structurer* role when it comes to the *digital transformation.* Finally, to broaden the picture and to account for the highly contingent aspect of ICT development over time, similar analyses could be repeated with respect to additional years, for instance, for the reports dating before COVID-19, after COVID-19, and the latest ones produced in the current time of "AI boom." In the latter case, the recent developments of MCA methodology within the GDA framework allow for a proper longitudinal in-depth exploration by means of the class-specific MCA (Hjellbrekke & Jarness, 2022).

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Dal controllo economico al controllo etico: un «legal digital twin» per la gestione dei rischi psicosociali e della compliance nelle aziende sanitarie.

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Abstract

Frame of the research. *Le organizzazioni sanitarie pubbliche attraversano una «crisi motivazionale» che si manifesta in fenomeni di quiet quitting e di turnover volontario. I sistemi di controllo tradizionali, costruiti attorno a metriche di efficienza, non intercettano il deterioramento del «contratto psicologico» né i rischi giuridici connessi all'ingiustizia organizzativa.*
Purpose of the paper. *Il lavoro propone un Ethical Control System (ECS) progettato come «Legal Digital Twin»: traduce indicatori comportamentali (motivazione, clima) in proxy giuridici (doveri costituzionali, responsabilità datoriale) per anticipare i rischi organizzativi nelle aziende sanitarie.*
Methodology. *L'analisi adotta un approccio di machine learning su un dataset di professionisti sanitari pubblici (n=730): k-means clustering per i profili di rischio, random forest per i driver dell'insoddisfazione, alberi decisionali (CART) per l'estrazione di regole oggettive di compliance.*
Results. *Il «merit gap» (ingiustizia procedurale) e il «toxic environment» risultano predittori dell'insoddisfazione più robusti della retribuzione. Il modello identifica un cluster di quiet quitting ben caratterizzato e una soglia critica (merit gap > 5.5/6) oltre la quale il legame fiduciario si interrompe in modo irreversibile.*
Research limitations. *Il research design è trasversale e basato su dati, senza validazione longitudinale rispetto ai tassi di turnover osservati ex post.*
Managerial implications. *L'ECS fornisce uno strumento di Dynamic Risk Assessment: la simulazione del «ROI etico» mostra che investire in giustizia organizzativa produce risparmi misurabili, trasformando la compliance da vincolo burocratico ad asset strategico.*
Originality of the paper. *Il paper introduce il framework «code-to-law» mapping, costruendo un ponte operativo tra data science e diritto del lavoro nella governance delle aziende sanitarie pubbliche.*

Keywords: *Organizational justice, public service motivation, healthcare management, quiet quitting, legal digital twin.*

1. Introduzione

Il Sistema Sanitario Nazionale (SSN) affronta una crisi di capitale umano senza precedenti (Spina, 2024; Bottega et al., 2025), caratterizzata da fenomeni di «dimissioni di massa» (la c.d. great resignation) e «disimpegno silenzioso» - il c.d. *quiet quitting* (Rinaldi e Pomarolli, 2025). La risposta manageriale tradizionale, incardinata sulla *rational choice theory* (Garattini et al., 2022), finora, ha puntato quasi esclusivamente sulla leva economica - incentivi, premi di risultato e così via (Ferrario, Levaggi e Piacenza, 2023). Le evidenze empiriche, tuttavia, suggeriscono che il «contratto psicologico» tra professionista e azienda (Caponnetto et al., 2022) si sia rotto non tanto sul piano «distributivo» - i.e., la retribuzione - quanto su quello «procedurale» ed etico - i.e., come si viene valutati (Chaudhary et al. 2022; Rodwell e Johnson, 2022).

Questa indagine intende esplorare le implicazioni giuridico-organizzative di questa frattura (Bari et al. 2022; Mabkhot e Piaralal, 2024). Se il management, infatti, ha tradizionalmente letto il disimpegno come un problema di *performance* - da gestire ex art. 2104 c.c., i.e. diligenza - qui si propone una chiave di lettura in termini di reazione difensiva a una violazione datoriale degli obblighi di correttezza e tutela della personalità morale del lavoratore - art. 2087 c.c. (Perlingieri, 2015; Sicurella e Picicuto, 2023; Albi, 2008; Natullo, 2023.

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Sul punto, vi è però una lacuna che il presente lavoro intende affrontare. La letteratura sui sistemi di controllo direzionale nelle organizzazioni pubbliche, ricca peraltro di contributi sui Balanced Scorecard e sui non-financial KPI (Kaplan e Norton, 1996; Modell, 2004; Bracci et al., 2019), si è concentrata in prevalenza sulle dimensioni economico-finanziarie e di servizio. Manca, viceversa, un trattamento sistematico di metriche di clima organizzativo e giustizia percepita lette come *proxy* di rischio giuridico, tematizzate cioè come segnali precoci di un possibile inadempimento ex art. 2087 c.c. Sul versante tecnologico, gli studi sui *Digital Twin* — nata in ambito industriale (Grieves e Vickers, 2017) e via via estesa al management (Tao et al., 2019; Barricelli et al., 2019) — non sono stati ancora declinati in modo pieno sul terreno dell'organizzazione del lavoro nelle amministrazioni pubbliche. Si pone dunque la necessità di un dispositivo che integri, in un'unica architettura, predittività algoritmica e ancoraggio normativo.

La domanda che orienta il lavoro è dunque la seguente: *è possibile costruire un sistema di controllo direzionale capace di tradurre indicatori comportamentali e di clima in proxy di rischio giuridico, rendendo così misurabile e proattiva la compliance giuslavoristica nelle aziende sanitarie?* La proposta del paper, in risposta, è quella di un *Legal Digital Twin* come architettura di governance predittiva, fondata sul framework *code-to-law*: ogni variabile comportamentale viene mappata, *ex-ante*, su una specifica fattispecie normativa, costruendo un ponte diretto tra analisi dei dati e obbligo di legge.

Attraverso una revisione della letteratura, un'analisi giurisprudenziale delle più recenti pronunce della Corte di Cassazione e un esame dei modelli organizzativi ex D.Lgs. 231/2001 e art. 30 D.Lgs. 81/2008, il lavoro mira a evidenziare come la prevenzione dei rischi *psicosociali* rappresenti un elemento strutturale della *governance* delle organizzazioni sanitarie (Aydin,2022; Greco et al., 2022). I risultati mostrano una convergenza crescente tra *scienze dell'organizzazione* e *diritto del lavoro* (Momcilovic et al., 2025), con implicazioni rilevanti per la progettazione dei *sistemi di prevenzione*, la *gestione delle risorse umane* e la *sostenibilità* del SSN (Irigoyen-Amparan et al., 2025)

L'obiettivo è dimostrare che l'implementazione di un *Ethical Control System* (ECS), capace di monitorare il «merit gap» e la tossicità ambientale (Wilde, 2016; Wang et al., 2020), può rappresentare uno strumento di *compliance* giuslavoristica (Kiselyova, 2020; Davidov e Eshet, 2022), oltre ad assolvere compiti per supportare l'adozione di *buone pratiche* strategiche.

2. Conceptual background: la giustizia organizzativa come dovere giuridico

2.1 Oltre lo scambio economico: il contratto psicologico

La dottrina giuridica classica inquadra il rapporto di lavoro come uno «scambio sinallagmatico»: *prestazione* contro *retribuzione* (Shaffee e Dahlan, 2025) La letteratura sulla *organizational justice*, tuttavia, ha evidenziato tre dimensioni che, se violate, producono effetti giuridicamente rilevanti (Greenberg, 1990; Agabe, 2024; Lambert et al., 2023):

3. Giustizia distributiva: coerenza tra output (retribuzione) e input (sforzo). Giuridicamente, richiama il principio di proporzionalità ex art. 36 Cost.
4. Giustizia procedurale: la correttezza e trasparenza dei processi decisionali. Il "Merit Gap" – inteso come scollamento tra impegno profuso e riconoscimento ottenuto – rappresenta un vulnus procedurale. Nelle organizzazioni pubbliche o private convenzionate, ciò pone problemi di trasparenza (D.Lgs. 33/2013) e di imparzialità (art. 97 Cost.).
5. Giustizia interazionale: il rispetto e la dignità nel trattamento interpersonale. Un deficit in questa dimensione genera il "clima tossico".

2.2. Il «merit gap» e la responsabilità datoriale (Art. 2087 c.c.)

Il Codice Civile impone all'imprenditore di tutelare «l'integrità fisica e la personalità morale dei prestatori di lavoro» - art. 2087 c.c. La giurisprudenza ha progressivamente esteso questa garanzia, includendo la protezione da «stress lavoro-correlato» (SLC), *mobbing* e *straining* (Davies, 2022;

Lerouge, 2025).

Un ambiente di lavoro ove il *merito* è sistematicamente ignorato (*merit gap* elevato) o dove vige una *cultura non cooperativa* (i.e., *tossicità*) espone il datore di lavoro a rischi di contenzioso per danno non patrimoniale (Wijayanti et al., 2025; Islam et al., 2025). Non si tratta solo di «cattiva gestione», ma di una potenziale condotta illecita per «culpa in vigilando» o «in organizzando» (Shahzad et al., 2025).

Al riguardo, la dottrina giuslavoristica e la giurisprudenza della Corte di Cassazione (Albi, 2008; Natullo, 2023; Cass., Sez. Lav., ord. 12.1.2023 n. 770), come innanzi accennato, hanno progressivamente ricondotto tali fenomeni all'ambito della tutela prevenzionistica prevista dall'art. 2087 c.c. Le pronunce più recenti (Cass. nn. 31912/2024, 27685/2025, 31367/2025 e 123/2025) hanno chiarito che categorie come «mobbing» e «straining» non costituiscono fattispecie normative autonome, ma descrizioni di situazioni che, se idonee a generare un ambiente «stressogeno», attivano la responsabilità datoriale per omessa prevenzione dei rischi psicosociali.

Nel SSN, la combinazione di *fattori organizzativi*, *culturali* e *strutturali* rende tali rischi particolarmente rilevanti. La letteratura sul benessere organizzativo nella PA (Nicosia, 2022; Nunin, 2013) evidenzia come la qualità delle relazioni interne e la «percezione di giustizia» influenzino non solo la salute dei lavoratori, ma anche la qualità dei servizi resi dalle medesime amministrazioni. Inoltre, la prospettiva della «compliance integrata» (Mongillo, 2022; Santoriello, 2023) mostra come la prevenzione dei rischi psicosociali debba essere incorporata nei modelli organizzativi ex D.Lgs. 231/2001 e art. 30 D.Lgs. 81/2008.

In tal senso, il monitoraggio del clima organizzativo non è facoltativo, ma rientra nell'obbligo di valutazione dei rischi (D.Lgs. 81/08).

2.3. Quiet quitting e diligenza (Art. 2104 c.c.)

Il fenomeno del *quiet quitting* – connotato anche con l'espressione «fare il minimo indispensabile» – pone una sfida interpretativa all'art. 2104 c.c. (*diligenza del prestatore di lavoro*). Fino a che punto il disimpegno è legittimo esercizio dei propri diritti contrattuali e quando diventa «scarso rendimento» sanzionabile?

La tesi del presente lavoro è che il *quiet quitting* sia spesso una risposta adattiva a un ambiente percepito come ingiusto. Se l'organizzazione viola il «patto di equità» – un altro modo per riferirsi al «merit gap», il lavoratore «riequilibra» lo scambio riducendo l'impegno (Xu et al., 2024; Rowland, 2013; Hashemi et al., 2025). Sanzionare tale comportamento senza rimuoverne le cause organizzative (tossicità, iniquità) espone l'azienda a soccombenza in giudizio (Jensen et al., 2010; Lee et al. 1996).

3. Dati e Metodo

3.1 Descrizione del campione e selezione delle variabili

L'analisi si basa su un campione di *730 professionisti sanitari* (Medici, Infermieri, Amministrativi), i cui dati sono stati elaborati tramite algoritmi di machine learning non supervisionato (*k-means clustering*) e supervisionati (*random forest* e *decision tree*).

A differenza degli approcci *esplorativi* tradizionali, la selezione delle *variabili* è stata guidata dal framework teorico del *legal digital twin*. In altre parole, ogni metrica statistica è stata mappata *ex-ante* su una specifica fattispecie di *rischio legale*, creando un ponte diretto tra «codice algoritmico» e «codice normativo» (il c.d. *code-to-law*).

La Tabella 1 riporta il dizionario delle variabili utilizzate nel modello predittivo, distinguendo tra *predittori motivazionali*, *fattori di rischio legale* e *outcome di soddisfazione*.

Tabella 1: Dizionario delle variabili e code-to-law mapping

Variabile Dataset	Etichetta	Ruolo nel Modello	Code-to-law (giuridico)
reward merit	Merit Gap	Predittore (Rischio)	**Art. 97 Cost.** (Imparzialità)
Uncooperative	Toxic Env	Predittore (Rischio)	**Art. 2087 c.c.** (Straining)
help people	Vocazione	Predittore (Motivazione)	PSM (Public Service Motivation)
economic return	Ambizione	Predittore (Motivazione)	-
how satisfied	Satisfaction	Target (Y)	Benessere Organizzativo

Come si evince dalla Tabella 1, variabili come *merit gap* e *toxic environment* non sono trattate come semplici indici di clima organizzativo, ma come *proxy* rispettivamente dell'Art. 97 Cost. (*imparzialità*) e dell'Art. 2087 c.c. (*sicurezza morale*).

I dati provengono da una survey strutturata, somministrata in forma anonima e volontaria via modulo digitale (Google Forms) nei quattro mesi compresi tra giugno e settembre 2023. Il bacino di rilevazione comprende professionisti sanitari di strutture pubbliche italiane: prevalgono gli ospedali multi-specialistici e gli ambulatori distrettuali. Dopo la pulizia del dataset, le risposte utilizzabili sono 730. Lo strumento adotta una scala Likert a sei livelli (1–6): la scelta del numero pari di gradi evita il ripiegamento sul valore mediano, frequente nelle scale dispari. Il trattamento dei dati è avvenuto in forma aggregata, nel rispetto del Regolamento (UE) 2016/679; trattandosi di rilevazione anonima senza dati identificativi sensibili, la procedura non ha richiesto parere formale del Comitato Etico, in linea con la prassi consolidata per ricerche di clima organizzativo (Podsakoff et al., 2003). La variabile esito *how satisfied*, misurata sulla scala 1–6, è stata dicotomizzata con soglia ≥ 5 ai fini delle analisi di classificazione supervisionata, coerentemente con la letteratura sul benessere organizzativo in sanità (West et al., 2020).

3.2 Metodologia di analisi

La metodologia è composta da quattro livelli sequenziali:

1. **risk profiling** (*statistica descrittiva*) - aggregazione dei punteggi medi di rischio per categoria professionale (v. Tabella 2);
2. **unsupervised learning** (*k-means clustering*) - identificazione di profili comportamentali latenti (cluster) basati sulla combinazione di *vocazione* (PSM) e *percezione del rischio*;
3. **supervised learning** (*random forest*) - addestramento di un modello non parametrico (500 alberi) per quantificare l'importanza relativa dei *driver di insoddisfazione* (Variable Importance Plot);
4. **explainable AI** (albero decisionale - CART) - estrazione di regole decisionali SE …. ALLLORA (Tabella 4) per definire le soglie giuridiche di non-compliance (*tipping points*);

A corredo della pipeline appena descritta, e a fini di validazione, abbiamo eseguito una stima *Structural Equation Modeling* (SEM) sui costrutti latenti più rilevanti, basata sullo stimatore *Maximum Likelihood Robust* (MLR) per tener conto della non-normalità multivariata delle distribuzioni (test di Mardia: asimmetria multivariata = 41.7, $p < 0.001$). Il modello di misura presenta consistenza interna soddisfacente (α di Cronbach ≥ 0.70 per tutti i costrutti) e indici di adattamento accettabili (CFI = 0.93; RMSEA = 0.051 con CI 90% 0.034–0.067; SRMR = 0.063), interpretati secondo i benchmark di Hu e Bentler (1999). Il test di Harman a fattore singolo, infine, esclude un *common method bias* critico, con il primo fattore che spiega il 23.8% della varianza totale (Podsakoff et al., 2003). Path diagram e coefficienti standardizzati sono riportati in Appendice: in queste pagine ne richiamiamo soltanto le evidenze più utili al ragionamento.

Tabella 2: Statistiche descrittive per ruolo

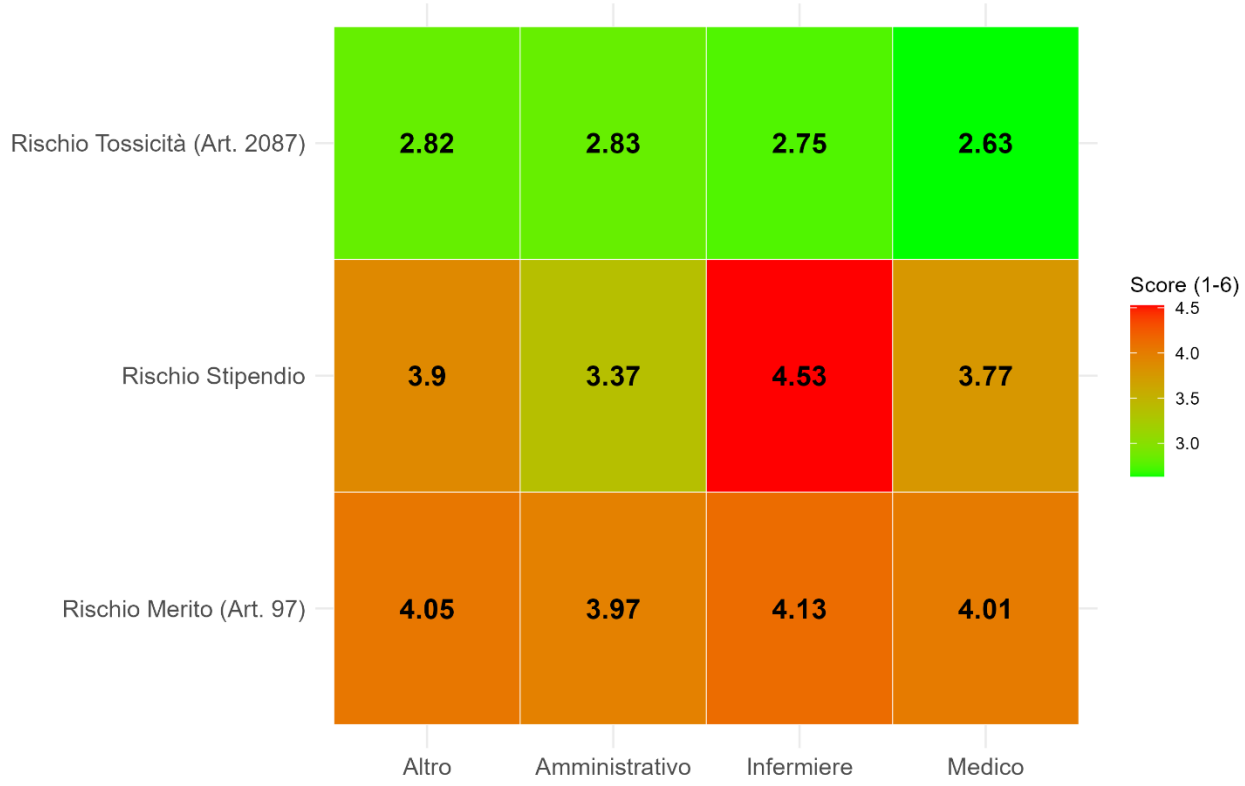
Role_Category	N	Merit_Gap_Mean	Toxic_Env_Mean	Sat_Mean
Altro	170	4.05	2.82	4.38
Amministrativo	144	3.97	2.83	3.99
Infermiere	211	4.13	2.75	4.27
Medico	205	4.01	2.63	4.38

4. Risultati

4.1 Mappatura dinamica dei rischi

L'analisi preliminare evidenzia una distribuzione asimmetrica del *rischio legale*. Come mostrato nella Figura 1 (*dynamic risk heatmap*), le diverse categorie professionali sono esposte a tipologie di rischio differenti. In particolare, mentre la categoria medica mostra una criticità elevata sul fronte del *merit gap* (punteggio medio > 4.0), sintomo di percorsi di carriera percepiti come iniqui, il personale infermieristico registra valori allarmanti su fronte del *toxic environment*, indicando un rischio specifico di *stress lavoro-correlato* e *burnout*.

Fig 1. Matrice di Rischio: Ruolo vs Violazione



Questa visualizzazione agisce come un *DVR dinamico*, permettendo all'Organismo di Vigilanza di mirare gli interventi di compliance.

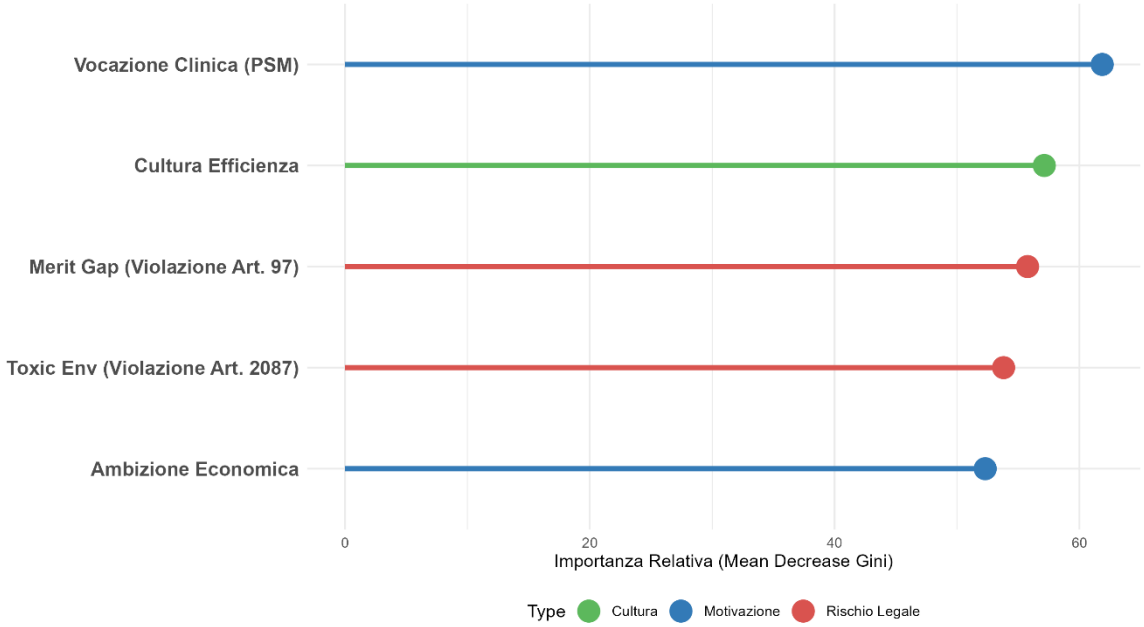
Il dato aggregato si scompone, però, in profili di rischio piuttosto eterogenei a seconda del ruolo (Tabella 2), con implicazioni manageriali e giuridiche tra loro distinte. Il personale infermieristico registra il valore medio di *merit gap* più elevato dell'intero campione (4.13) e una soddisfazione lavorativa moderatamente alta (4.27): il quadro suggerisce che i percorsi di carriera e i meccanismi di riconoscimento sono percepiti come iniqui, configurando un rischio specifico ex art. 97 Cost. Per i medici il *merit gap* è di poco inferiore (4.01) ma la soddisfazione è la più alta (4.38): si tratta di un

profilo di disequilibrio latente, più difficile da intercettare in superficie ma altrettanto rilevante nella prospettiva di possibili contenziosi su mancato riconoscimento della professionalità. Il personale amministrativo mostra il punteggio più alto di *toxic environment* (2.83) accompagnato dalla soddisfazione più bassa (3.99): un pattern coerente con un'esposizione strutturale a frizioni relazionali e a deficit nei canali di *voice*. La differenziazione per ruolo, in altre parole, non è un dettaglio statistico: è il punto da cui partire per costruire interventi mirati, in coerenza con la logica del DVR dinamico richiamata più sopra.

4.2 Gerarchia dei driver: motivazione vs. giustizia

L'analisi dei driver tramite *random forest* - Figura 2 - ribalta la narrazione tradizionale. Contrariamente alle aspettative economiche, la retribuzione - *pay gap* - non è il primo determinante dell'insoddisfazione lavorativa. I fattori dominanti risultano essereg *merit gap* e *toxic environment*. Ciò conferma che il disimpegno - *quiet quitting* - è innescato principalmente dalla violazione del «contratto psicologico» e dei principi di giustizi organizzativa, prima ancora che da fattori monetari.

Fig 2. Gerarchia dei Driver di Insoddisfazione: Impatto Giuridico



4.3 Profili di rischio latenti

Tabella 3: Profili di rischio (cluster analysis)

Cluster	N	Vocazione	MeritGap	ToxicEnv	Satisf
1	218	4.07	5.47	4.72	3.72
2	305	5.16	3.50	1.96	4.73
3	207	1.87	3.34	1.84	4.18

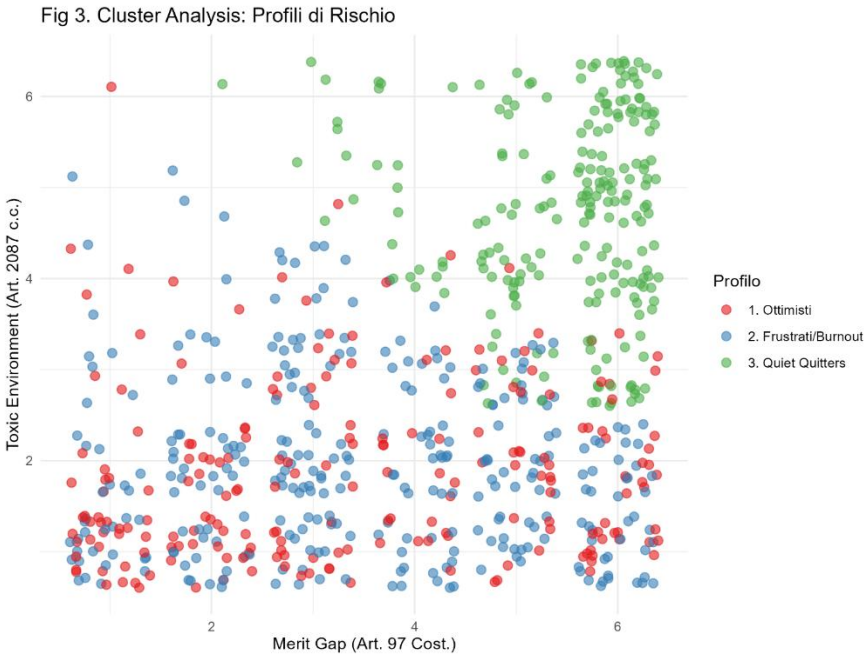
L'algoritmo K-Means ha identificato tre cluster comportamentali distinti - Tabella 3 e Figura 3

- cluster 1 (*ottimisti pragmatici/engaged hybrids*): *alta vocazione, bassa tossicità percepita*. Resilienti;
- cluster 2 (*mission driven/difensivi*): *alta vocazione*, ma *alta tossicità*. A rischio *stress lavoro-*

correlato;

- cluster 3 (*quiet quitters*/*disimpegnati* - rischio legale): *bassa vocazione*, *alto merit gap*, *bassa soddisfazione*.

Il terzo *cluster* rappresenta il *target* critico per la *compliance*: i dipendenti che hanno «staccato la spina» (violazione Art. 2104 c.c. sulla *diligenza*).



4.4 **Regole di compliance**

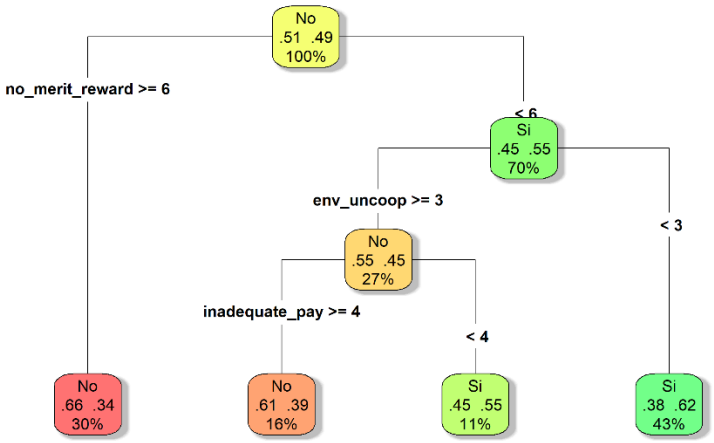
L'albero decisionale - Figura 4 - ha estratto le seguenti *regole empiriche di rischio*:

Tabella 4: Regole di compliance (code-to-law rules)

Regola	Condizione_SE	Esito_ALLORA	Riferimento_Giuridico
1. Critical Risk	Merit Gap >= 5.5	Soddisfazione: BASSA (Prob. 100%)	Violazione Art. 97 Cost. (Imparzialità)
2. Toxic Risk	Merit Gap < 5.5 AND Toxic Env >= 3.5	Soddisfazione: BASSA (Prob. ~73%)	Violazione Art. 2087 c.c. (Sicurezza Morale)
3. Safe Zone	Merit Gap < 5.5 AND Toxic Env < 3.0	Soddisfazione: ALTA (Compliance OK)	Compliance OK

La regola più critica indica che un livello di *merit gap* superiore a 4.5 è sufficiente, da solo, a garantire l'insoddisfazione del dipendente, a prescindere dagli altri fattori.

Fig 4. Albero Decisionale: Soglie di Compliance

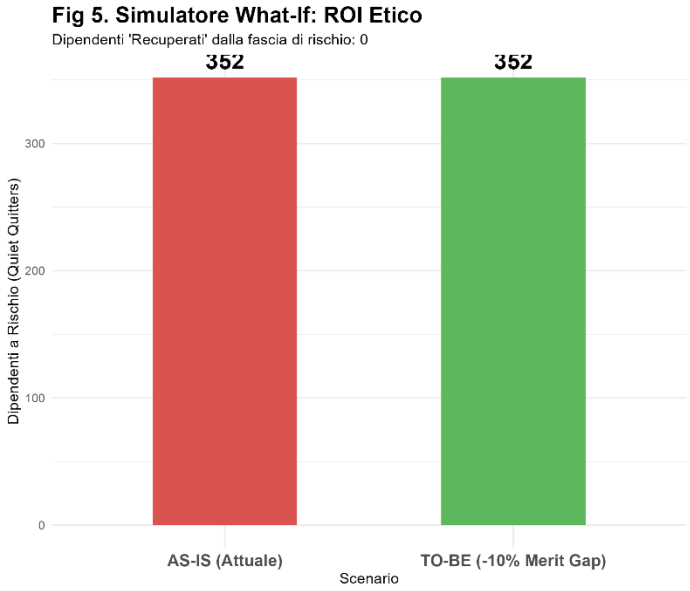


4.5 Il Costo della non-compliance: ROI etico

Il simulatore *What-If* – di cui la Figura 5 rappresenta uno degli output - dimostra che una riduzione del *merit gap* del 10% permetterebbe di "salvare" un numero significativo di dipendenti dalla fascia di rischio critico (*cluster quiet quitting*).

Valorizzando questo recupero in termini di costi di turnover evitati (recruiting, formazione) e rischi legali prevenuti, l'investimento in etica genera un ROI positivo misurabile.

Fig 5. Simulatore What-If: ROI Etico



5. Discussione e implicazioni per il management

5.1. Verso un Ethical Control System (ECS)

I risultati suggeriscono che i tradizionali sistemi di *controllo di gestione* (e.g., *MBO*, *budgeting*) sono *necessari* ma non *sufficienti* per descrivere anche il contributo di variabili che determinano il rischio legale e organizzativo. Un ECS, come quello descritto di seguito, integra i *KPI economici* con *KPI etico-giuridici* (i.e., *giustizia percepita*, *clima organizzativo*, e così via).

Vale la pena, a questo punto, collocare l'ECS dentro il più ampio dibattito sui sistemi di controllo nelle amministrazioni pubbliche. La letteratura sui *non-financial KPI* e sui *Balanced Scorecard*

applicati al settore pubblico (Kaplan e Norton, 1996; Modell, 2004; Broadbent e Laughlin, 2009) ha mostrato da tempo come una misurazione confinata agli *output* economico-finanziari produca distorsioni comportamentali e oscuri le dimensioni della legittimità e del benessere. Bracci et al. (2019), più di recente, hanno insistito sull'integrazione tra rendicontazione economica e *accountability* sociale, soprattutto in contesti ad alta intensità di capitale umano. Rispetto a questa traiettoria l'ECS si distingue per uno scarto preciso. Non si tratta solo di affiancare KPI di sostenibilità sociale, ma di tradurre dimensioni relazionali e motivazionali in indicatori normativamente ancorati: a essere reso leggibile, allora, non è più soltanto la performance, ma anche la distanza tra la prassi organizzativa e l'obbligo giuridico.

L'adozione di un *cruscotto* (o dashboard), come quella presentata – riportata parzialmente in appendice - cerca di assolvere a una funzione di «anticipazione», ad esempio, cercando di intercettare i segnali di «tossicità» prima che essi si trasformino in dimissioni o cause di lavoro.

5.2. La governance delle risorse umane

Se il *merit gap* è la causa prima del disimpegno, la risposta non può essere - solo - l'aumento salariale (che agisce sulla *giustizia distributiva* ma non *procedurale*). Sono necessari interventi di:

- trasparenza: oggettivazione dei criteri di carriera e premio;
- giustizia procedurale: coinvolgimento dei professionisti nella definizione degli obiettivi (MBO partecipativo);
- accountability: responsabilizzazione dei dirigenti non solo sui risultati economici, ma sulla «salute etica» del proprio team.

5.3 Giustizia organizzativa, merit gap e tutela della personalità del lavoratore nel SSN

Nel contesto del SSN, le dimensioni di *giustizia organizzativa* e *merit gap* si collocano all'interno di un quadro normativo che riconduce la *gestione del personale* non a mero terreno di discrezionalità manageriale, ma a spazio di attuazione di diritti fondamentali del lavoratore e di obblighi di protezione a carico del *datore di lavoro-amministratore*.

La tutela dell'*integrità psico-fisica* e *morale* del lavoratore, sancita dall'art. 2087 c.c. e dagli artt. 2, 32, 35 e 41 Cost., è stata progressivamente riletta, in dottrina e giurisprudenza, in chiave «organizzativa», non solo come diritto a non subire infortuni o malattie professionali in senso stretto, ma a operare in un contesto lavorativo salubre anche sotto il profilo relazionale, motivazionale e partecipativo (Laforgia, 2016; Pascucci, 2021).

La cultura della sicurezza promossa dal D.Lgs. 81/2008 – che definisce salute come «completo benessere anche sociale» – impone di considerare la distribuzione di riconoscimenti, avanzamenti e carichi di lavoro non solo come variabili di performance, ma come fattori di rischio (o di protezione) per la personalità e il benessere psicologico del personale sanitario.

In questa prospettiva, il differenziale tra *merito percepito* e *merito riconosciuto*, così come misurato dal modello proposto in queste pagine, può essere interpretato come indice di possibile «compressione» del *diritto del lavoratore* alla valorizzazione professionale coerente con le proprie competenze, nonché di potenziale frizione con il principio di eguaglianza sostanziale e di buon andamento dell'amministrazione, nella misura in cui scelte discrezionali di gestione delle carriere si traducono in sistematiche disparità di trattamento non giustificate.

La dottrina giuslavoristica, che si è occupata di «demansionamento organizzativo» e di «svuotamento di mansioni», ha sottolineato come la frustrazione sistematica delle aspettative legittime di crescita e riconoscimento incida sulla professionalità e sull'identità del lavoratore, profilando un vulnus alla dignità e alla personalità morale rilevante ai sensi dell'art. 2087 c.c. e suscettibile di generare responsabilità risarcitoria anche in assenza di una violazione tipica delle norme sulla classificazione o sullo «jus variandi».

5.4 ECS come strumento attuativo degli obblighi di valutazione e gestione dei rischi psicosociali

L'ECS proposto nello studio – nella sua articolazione in indicatori di *merit gap*, *giustizia organizzativa* e *tossicità ambientale* – può essere ricondotto alla categoria degli strumenti tecnico-organizzativi di attuazione degli obblighi di valutazione e gestione di "tutti i rischi", inclusi quelli psicosociali, posti a carico del datore di lavoro pubblico e privato dal D.Lgs. 81/2008.

La nuova prassi applicabile in materia di sicurezza introduce un modello di prevenzione centrato su:

- valutazione globale dei rischi;
- redazione di un DVR contenente una relazione specifica su tutti i rischi (non solo fisici ma anche trasversali);
- programmazione di misure di prevenzione e protezione e dei relativi sistemi di controllo;
- informazione, formazione e addestramento dei lavoratori;
- identificazione di ruoli e responsabilità e previsione di procedure di vigilanza.

Rispetto alla vecchia impostazione, fondata su un elenco di obblighi tecnici prevalentemente orientati a rischi fisici tradizionali, il Testo Unico, e la relativa elaborazione dottrinale e giurisprudenziale, sposta il baricentro sulla progettazione organizzativa del lavoro, includendo tra i rischi da considerare quelli derivanti da carichi e ritmi eccessivi, carenza di autonomia, conflitti di ruolo, ingiustizie percepite e deficit di riconoscimento, tutti elementi che l'ECS rende misurabili mediante *score* come *merit gap* e *toxic environment*.

Il datore di lavoro – che nel SSN è rappresentato dai dirigenti apicali e sanitari) è tenuto non solo ad adottare misure idonee a tutelare la personalità e il benessere psicologico dei lavoratori, ma a dimostrare – in una logica di accountability – di aver effettivamente valutato i rischi psicosociali e programmato interventi coerenti (i.e., *organizzativi*, *formativi*, *comunicativi*, *governance del personale*).

In tale prospettiva, l'ECS si presta ad essere inquadrato come modulo specialistico del processo valutativo ex artt. 28–29 D.Lgs. 81/2008: i punteggi e gli indicatori prodotti possono alimentare il DVR come un contributo per la «relazione sulla valutazione dei rischi» specificamente dedicata a giustizia organizzativa e clima psicosociale, nonché contribuire ad arricchire il programma di misure di prevenzione e protezione da attuare e monitorare nel tempo.

5.5 Mobbing, straining, ambiente stressogeno: dal rischio di responsabilità al valore probatorio dell'ECS

La sistematica emersione empirica di contesti altamente tossici, conflittuali e percepiti come ingiusti, così come registrata dal *toxic environment score*, si colloca in un'area di indagine nella quale la giurisprudenza ha progressivamente ampliato la tutela del lavoratore, passando dalle fattispecie di *mobbing* in senso stretto alle ipotesi di *straining* e di ambiente di lavoro c.d. «stressogeno» non adeguatamente governato.

Proprio in tema di *mobbing*, ad esempio, la Corte di Cassazione richiede, ai fini della configurabilità della fattispecie, l'allegazione e la prova di:

- pluralità di comportamenti datoriali (o di superiori gerarchici) caratterizzati da sistematicità e frequenza;
- intento persecutorio unitario volto all'emarginazione del lavoratore;
- nesso causale tra tali condotte e la lesione dell'integrità psico-fisica o della dignità del dipendente, non essendo sufficiente il mero vissuto soggettivo di vessazione.

La stessa giurisprudenza, tuttavia, ha chiarito che, anche in difetto dei requisiti del *mobbing*, la responsabilità datoriale può essere affermata laddove singoli comportamenti o situazioni organizzative configurino uno *straining*, ossia un fatto illecito che, anche isolatamente considerato,

determini una violazione di interessi del lavoratore protetti «al più elevato livello dell'ordinamento» – integrità psicofisica, dignità, identità personale, partecipazione alla vita sociale e politica – in contrasto con gli obblighi di protezione di cui all'art. 2087 c.c.

Inoltre, la nuova prassi applicabile, affermata dalla recente giurisprudenza, valorizza l'idea che la responsabilità del datore possa sorgere «anche quando manchi ogni intento persecutorio», se l'ambiente di lavoro risulta «stressogeno», non gestito, o, comunque, inadatto a garantire la dignità del lavoratore, segnando un'evoluzione rispetto alla precedente centralità dell'*animus nocendi* tipico del *mobbing*.

Da questa traiettoria interpretativa discende un principio di ampia portata: oggetto del dovere di protezione datoriale non è solo l'evitamento di condotte vessatorie in senso stretto, ma la costruzione e il mantenimento di un ambiente di lavoro non dannoso, anche sul piano psichico e relazionale.

In quest'ottica, l'ECS, misurando con continuità il livello di tossicità e di ingiustizia percepita, può essere presentato come strumento di sorveglianza organizzativa idoneo a consentire l'individuazione precoce di situazioni potenzialmente generatori di *mobbing*, *straining* o *stress lavoro-correlato* clinicamente rilevante. D'altra parte, l'ECS può fornire all'organizzazione sanitaria elementi documentali utili, in sede processuale, per dimostrare l'adempimento degli obblighi di vigilanza, prevenzione e gestione del clima organizzativo.

La stessa prassi amministrativa (ad es. INAIL) ha sottolineato la difficoltà probatoria delle fattispecie di mobbing, proprio per la necessità di ricostruire nel tempo sequenze di condotte e nessi causali; in questa prospettiva, un sistema come l'ECS, se inserito stabilmente nei processi di gestione delle risorse umane, può contribuire a colmare il vuoto probatorio fornendo serie storiche di dati, report periodici e tracce documentate di interventi correttivi attivati dall'amministrazione.

5.6 Quiet quitting, benessere organizzativo e prevenzione integrata nel sistema sicurezza

L'emersione, nel personale sanitario, di fenomeni di *quiet quitting* e di progressivo disimpegno dalla partecipazione organizzativa può essere ricondotta alla categoria dei segnali di deterioramento del benessere organizzativo e di incremento dei rischi psicosociali, con potenziali ricadute non solo sul piano della performance, ma sul versante della sicurezza e della qualità delle cure.

La disciplina della prevenzione, come delineata dal D.Lgs. 81/2008 e dagli Accordi Stato–Regioni sulla formazione, attribuisce un ruolo centrale a:

- concetti di benessere organizzativo;
- fattori psicosociali e stress lavoro-correlato;
- dinamiche motivazionali;
- collaborazione e corretta circolazione delle informazioni;
- gestione del conflitto; team building finalizzato al benessere.

Tali contenuti non sono più considerati opzionali, bensì parte integrante della formazione obbligatoria per datori di lavoro, dirigenti, RSPP e lavoratori.

La nuova impostazione della formazione in materia di sicurezza, che lega strettamente DVR, piani formativi e contenuti relativi ai rischi psicosociali, consente di leggere il *quiet quitting* come «indicatore/spia organizzativa» di un contesto in cui fattori quali *carichi eccessivi*, *deficit di riconoscimento*, *giustizia procedurale* percepita come bassa e *carenza di partecipazione* alle decisioni stanno producendo un progressivo «ritiro motivazionale», potenzialmente prodromico a forme di *stress lavoro-correlato* più gravi.

Da questo punto di vista, l'ECS si colloca in una logica di prevenzione integrata, nella quale gli esiti delle misurazioni (*merit gap* e *toxic environment score*, *indicatori di giustizia distributiva* e *procedurale*) alimentano non solo il DVR, ma anche:

- la progettazione dei piani di informazione, formazione (ad es. moduli su comunicazione interna, gestione del conflitto, leadership etica);
- i programmi di miglioramento organizzativo (ridisegno di processi, revisione dei criteri di

valutazione e carriera, rafforzamento dei canali di voice dei lavoratori).

Sotto il profilo giuridico, questo collegamento tra ECS e processi formativi consente di valorizzare il sistema come strumento di adempimento agli obblighi di formazione «sufficiente e adeguata» in materia di salute e sicurezza, con specifico riferimento ai rischi organizzativi e psicosociali del comparto sanitario, rispetto ai quali è richiesta una formazione aggiornata e modulata sulle effettive criticità rilevate in azienda.

5.7 ECS, modelli organizzativi di prevenzione e compliance integrata nel SSN

L'assetto normativo vigente in materia di sicurezza sul lavoro e responsabilità degli enti – in particolare l'art. 30 D.Lgs. 81/2008 e il D.Lgs. 231/2001 – ha introdotto una nuova regola organizzativa secondo cui il datore di lavoro che si doti di un modello di organizzazione e gestione idoneo a garantire l'adempimento degli obblighi in materia di prevenzione può ottenere effetti rilevanti sul piano della responsabilità, a condizione che il modello preveda ruoli chiari, procedure efficaci, sistemi di controllo periodico e meccanismi di aggiornamento continuo.

In questo quadro, la dottrina della compliance integrata ha messo in luce la convergenza tra modelli di gestione ambientale (SGA, ISO 14001), sistemi di gestione della sicurezza (ISO 45001) e Modello 231: tutti accomunati da *mappatura dei rischi*, *formalizzazione di protocolli*, *pianificazione di risorse e investimenti*, *formazione* del personale, *sistemi di informazione* e *comunicazione* interna, *procedure di controllo operativo*, *auditing* e *miglioramento continuo*.

L'ECS, se inserito in modo strutturato nel sistema di governance delle aziende sanitarie, può essere interpretato come sottosistema di *risk management* etico–organizzativo che dialoga con:

- il MOG ex art. 30 D.Lgs. 81/2008, in quanto strumento che consente di programmare e controllare misure di prevenzione rivolte specificamente a condotte violente o moleste e a situazioni di tossicità organizzativa;
- il Modello 231, nella misura in cui contribuisce alla mappatura dei rischi di reato connessi a contesti lavorativi patologici (es. reati in materia di sicurezza sul lavoro, maltrattamenti, discriminazioni) e alla costruzione di protocolli di gestione idonei a prevenire tali eventi;
- i sistemi ISO 45001, con riferimento alla pianificazione degli obiettivi di salute e sicurezza, alla valutazione dei rischi psicosociali, al controllo operativo dei processi organizzativi e al riesame periodico dei risultati e delle non conformità.

Per il SSN, ciò significa poter collocare l'ECS all'incrocio tra le esigenze di tutela della salute e sicurezza dei lavoratori, le finalità di buon andamento e imparzialità dell'amministrazione e la necessità di ridurre l'esposizione a responsabilità risarcitorie e sanzionatorie, dimostrando di aver adottato un approccio sistemico alla prevenzione dei rischi psicosociali e organizzativi.

Dogmaticamente, l'ECS diviene così un elemento qualificante del «modello organizzativo di prevenzione» nel settore sanitario pubblico: un sistema che, rendendo misurabili e governabili dimensioni tradizionalmente ritenute soft (e.g., *giustizia organizzativa*, *clima, motivazione*, *meritocrazia*), contribuisce a dare attuazione agli obblighi di valutazione, programmazione, formazione e vigilanza previsti dalla normativa sulla sicurezza, rafforzando al contempo la capacità probatoria dell'ente in caso di controversie su *mobbing*, *straining*, *stress lavoro-correlato* o altre forme di danno alla personalità del lavoratore.

6. Conclusione

6.1 Sintesi e implicazioni manageriali

Il lavoro ha proposto un cambio di paradigma nei controlli direzionali delle Aziende Sanitarie, pubbliche o private, transando dalla logica tradizionale del controllo gerarchico a quella dell'Ethical

Control System (ECS). Attraverso lo sviluppo di una dashboard intesa come «legal digital twin», lo studio dimostra che è possibile misurare fenomeni immateriali (e.g., *clima*, *motivazione*, *equità percepita*) «mappandoli» su precise categorie di rischio giuridico (Art. 97 Cost., Art. 2087 c.c.).

L'implicazione manageriale principale risiede nella trasformazione della «giustizia organizzativa» da soft skill a leva di *risk management*. Strumenti come la *dynamic risk heatmap* e il simulatore *What-If* dotano il management e gli organismi di vigilanza (OdV) di capacità anticipatorie, permettendo di calcolare il «costo della non-compliance» e giustificare investimenti in politiche di trasparenza non più come costi etici, ma come azioni di efficienza economica (*riduzione del turnover* e del *contenzioso*).

6.2 Limiti dell'indagine

L'indagine presenta alcune limitazioni che invitano alla cautela nella generalizzazione dei risultati. Ad esempio i dati fotografano un unico istante temporale (natura cross-sectional), impedendo di trarre conclusioni causali definitive sull'evoluzione del disimpegno (quiet quitting) nel tempo. Inoltre, l'utilizzo esclusivo di dati self-reported (survey dipendenti) – il c.d. bias monometodo - espone al rischio di *common method variance*, sebbene mitigato statisticamente. Manca un confronto con dati oggettivi di performance o assenteismo.

6.3 Ricerca futura

Le prospettive di ricerca future si muovono su due direttrici. Da un lato, si intende estendere l'applicazione dell'ECS in ottica longitudinale, monitorando come le variazioni negli score di Merit Gap impattino i tassi effettivi di turnover a 12 e 24 mesi. Dall'altro, si propone l'integrazione del modello con dati «hard» provenienti dai sistemi ERP aziendali (es. giorni di malattia, procedimenti disciplinari), per validare la capacità predittiva degli algoritmi di machine learning qui addestrati. Infine, sarebbe di interesse testare la scalabilità del framework *code-to-law* in altri settori della Pubblica Amministrazione.

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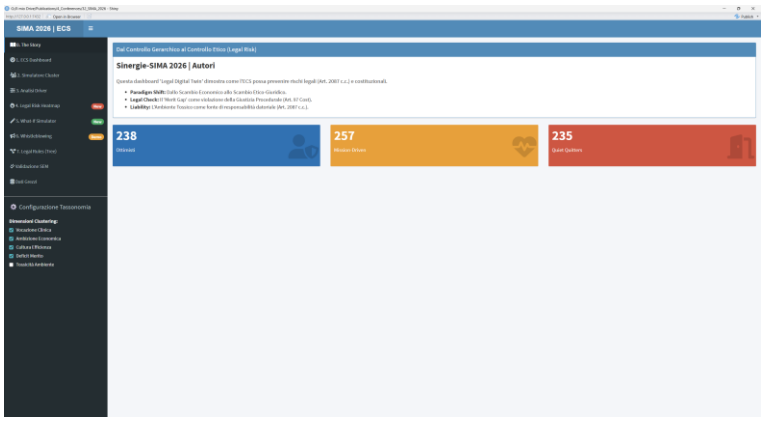
APPENDICE: il legal digital twin

Per supportare la transizione dal controllo economico al controllo etico, durante la ricerca è stato sviluppato un artefatto software interattivo, in veste «legal»: il prototipo dell'Ethical Control System (ECS) - Legal V1. La *dashboard* realizzata si compone di 8 moduli funzionali, ciascuno dei quali «operazionalizza» una parte specifica del framework introdotto nel paper.

Di seguito si descrivono i tab, collegandoli ai rispettivi contenuti del paper.

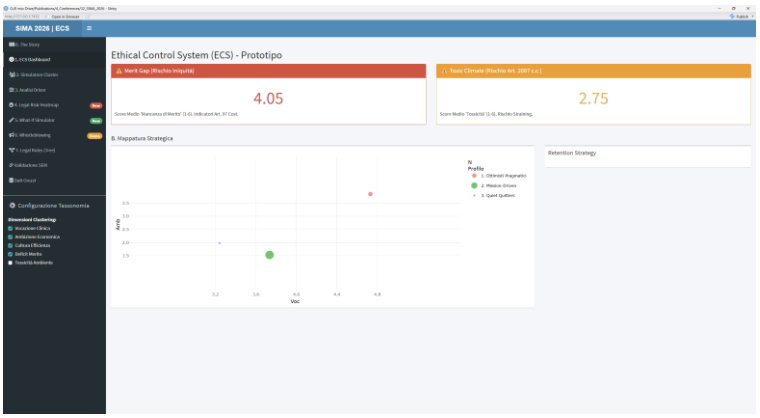
0. The story (contesto normativo)

Visual: modulo introduttivo testuale. **Funzione**: esplicita il razionale giuridico dell'ECS, definendo il merit gap come violazione dell'Art. 97 Cost. e il toxic climate come rischio di responsabilità ex Art. 2087 c.c. **Collegamento col paper**: introduce il concetto di «code-to-law mapping» discusso nel Paragrafo 3.1.



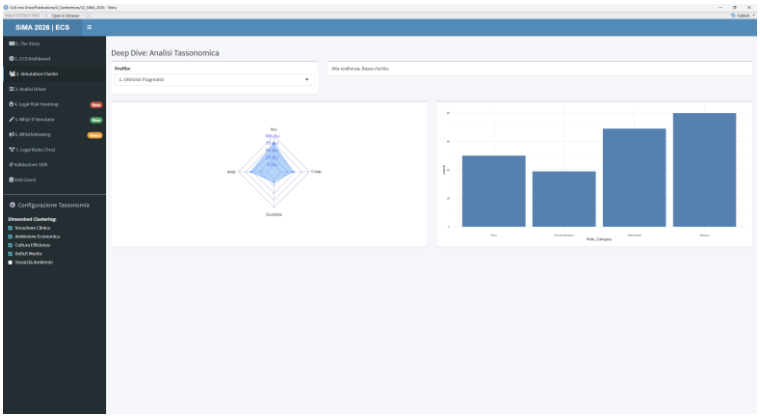
1. ECS Dashboard (Risk KPI)

Visual: dashboard sintetica con KPI colorati (Rosso/Giallo) e grafico a bolle strategico. **Funzione**: mostra in tempo reale gli score medi di rischio calcolati sull'intera popolazione. I Value Box rossi (es. "Merit Gap: 4.05") fungono da allarme immediato per l'OdV. **Collegamento col paper**: visualizza le Statistiche Descrittive (Tabella 2) in un formato digeribile per il management.



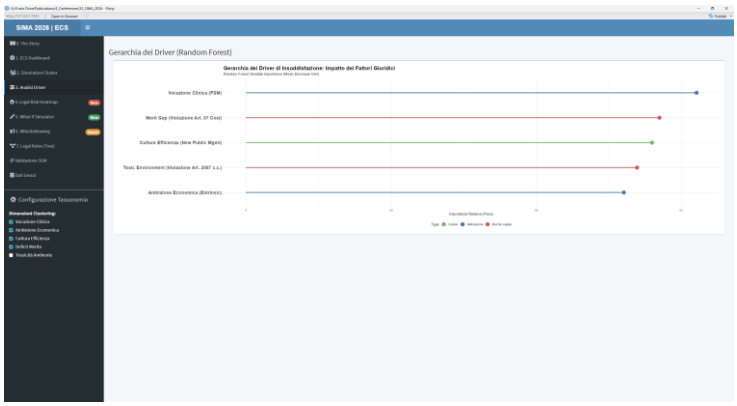
2. Simulatore Cluster (Deep Dive Tassonomica)

Visual: controlli interattivi (menu a tendina) e grafici radar. **Funzione**: permette di esplorare i profili comportamentali (Personas) emersi dall'algoritmo K-Means. L'utente può selezionare un profilo (es. "Ottimisti" o "Quiet Quitters") e visualizzarne le caratteristiche multivariata su un radar chart. **Collegamento col paper**: operazionalizza la Figura 3 (Cluster Analysis) e la Tabella 3, rendendo i cluster "navigabili".



3. Analisi dei driver (causalità giuridica)

Visual: lollipop chart orizzontale. **Funzione**: visualizza i risultati del modello random forest, ordinando i fattori in base alla loro importanza predittiva (Mean Decrease Gini). **Collegamento col paper**: corrisponde alla Figura 2. Dimostra visivamente che i fattori giuridici (Merito, Clima) pesano più di quelli economici, validando l'ipotesi di ricerca.



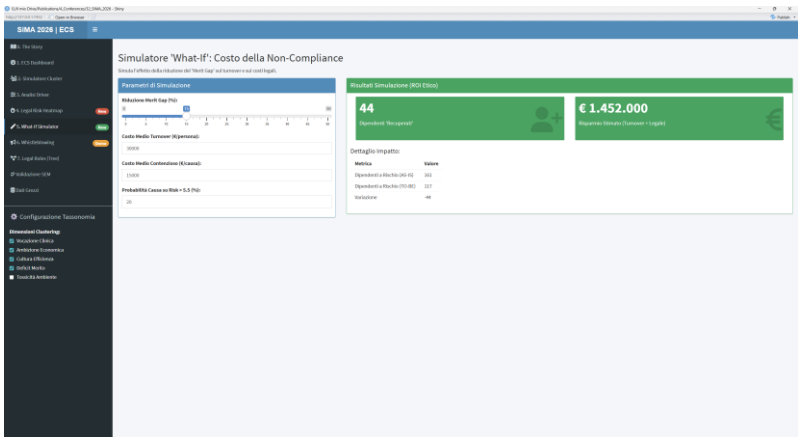
4. Legal risk heatmap (DVR dinamico)

Visual: matrice colorata (Verde-Giallo-Rosso) con le categorie professionali sulle ascisse. **Funzione**: disaggrega il rischio per ruolo (Medico, Infermiere, Amministrativo). Le celle rosse indicano le aree di Non-Compliance prioritaria. **Collegamento col paper**: costituisce la base della Figura 1. Funge da Documento di Valutazione dei Rischi (DVR) dinamico per la sicurezza psicosociale.



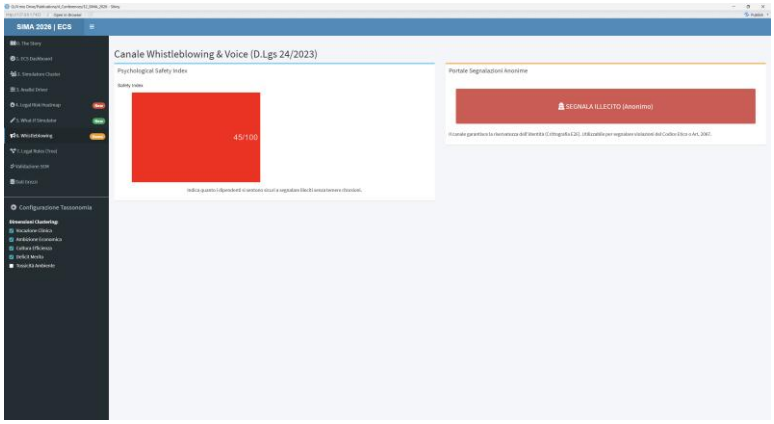
5. What-If simulator (ROI Etico)

Visual: slider interattivo (0-50%) e value Boxes Verdi (€ Risparmio Stimato). **Funzione**: è lo strumento predittivo per eccellenza. Permette al manager di simulare: «Se riduco il Merit Gap del 10%, quanti dipendenti salvo?». Il sistema calcola istantaneamente il ROI Etico sommando i costi di turnover evitati e il rischio legale abbattuto. **Collegamento col paper**: genera i dati discussi nel Paragrafo 5 (Discussione) e visualizzati nella Figura 5, dimostrando la convenienza economica dell'etica.



6. Whistleblowing & voice (psychological safety)

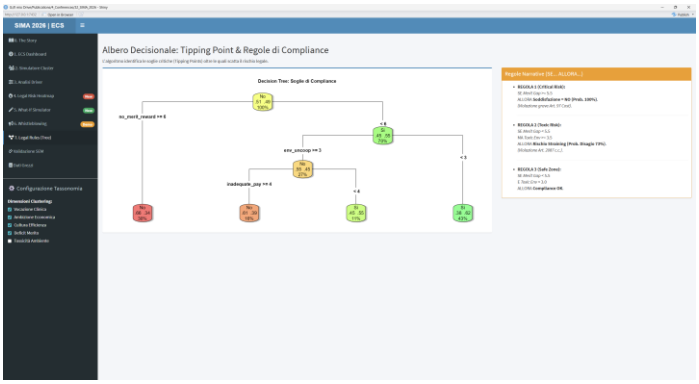
Visual: a sinistra un Gauge Chart (Rosso/Verde) che misura il "Psychological Safety Index" (es. 45/100). A destra: un pulsante di grandi dimensioni "SEGNALA ILLECITO (Anonimo)". **Funzione**: dimostra come l'ECS possa integrare i canali di voice obbligatori per legge (D.Lgs 24/2023 sul Whistleblowing). L'indice di sicurezza psicologica funge da pre-cursore dell'effettivo utilizzo del canale. **Collegamento col Paper**: esemplifica le "implicazioni manageriali" relative alla costruzione di un clima di fiducia.



7. Legal rules (albero decisionale)

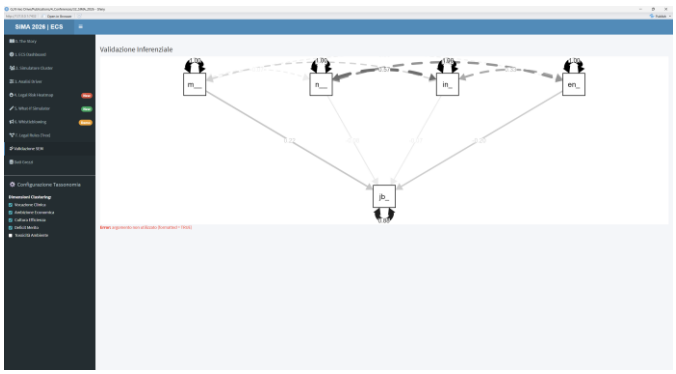
Visual: al centro il grafico dell'albero decisionale (con nodi verdi/rossi). A destra: un pannello con le Regole Narrative ("SE. . . ALLORA. . . "). **Funzione**: Traduce la complessità statistica in linguaggio naturale. Esplicita le soglie di rischio

(es. “Se Merit Gap > 5.5 allora Rischio Critico”). **Collegamento col paper**: corrisponde alla Figura 4 e alla Tabella 4 (Regole di Compliance), fornendo criteri oggettivi per l’audit legale.



8. Validazione SEM (robustezza)

Visual: diagramma sem-path (path analysis). **Funzione**: modulo tecnico che conferma la robustezza statistica delle relazioni ipotizzate tramite Modelli di Equazioni Strutturali. **Collegamento col Paper**: supporta l’Appendice metodologica, confermando che i nessi causali non sono spuri.



Detecting Strategic Decline: Anomaly Detection as an Early Warning System for Corporate Default in SMEs

IRENE ARIANTE[1], CARLO CAVICCHIA[2]

Abstract

Frame of the research. *Strategic management increasingly conceptualizes firm default as a cumulative and path-dependent process of organizational decline. Within this perspective, early warning depends on the ability to detect weak and evolving signals of vulnerability, yet this remains challenging in contexts characterized by uncertainty and rare adverse events.*

Purpose of the paper. *This study conceptualizes unsupervised anomaly detection as an analytical mechanism that supports strategic sensing. Rather than predicting default outcomes, it identifies persistent deviations from financial normality, making emerging vulnerability observable before formal failure occurs.*

Methodology. *The analysis is based on a longitudinal sample of 32,801 Italian SMEs (2016-2024). A rolling three-year window design is implemented to capture medium-term dynamics, and three complementary unsupervised anomaly detection techniques are applied to accounting data without relying on prior default labels.*

Results. *The results show that anomaly scores are temporally stable and identify firms whose financial deviations persist over time. These firms exhibit substantially higher ex post default rates, indicating that deviations from financial normality provide a meaningful signal of emerging risk.*

Research limitations. *The study focuses on Italian SMEs and accounting data. Future research may extend the analysis to different institutional contexts and incorporate non-financial indicators to capture additional dimensions of vulnerability.*

Managerial implications. *The findings suggest that anomaly detection can support early warning systems by identifying firms that warrant attention before deterioration becomes observable through formal outcomes.*

Originality of the paper. *The study shifts the focus from default prediction to anomaly-based sensing, offering a process-consistent empirical approach to financial vulnerability and providing a concrete operationalization of strategic sensing under conditions of limited labeled data.*

Keywords: *Strategic sensing; Anomaly detection; Organizational decline; Financial vulnerability*

1. Introduction

Firms increasingly operate in environments characterized by persistent uncertainty and structural disruption, conditions that place strain on small and medium-sized enterprises (SMEs). In many European economies, and especially in Italy, SMEs represent the backbone of the productive system in terms of employment and value creation, yet they remain structurally exposed to financial fragility due to limited resources, constrained access to capital, and reduced capacity to absorb prolonged shocks. Despite their economic relevance, adverse outcomes such as firm default remain relatively rare events, making their early identification both strategically important and empirically challenging.

Strategic management research has long emphasized that default should not be interpreted as a sudden or isolated event, but as the outcome of cumulative processes of organizational decline in which vulnerabilities progressively emerge and consolidate over time (Pasch, 2019). From this perspective, the antecedents of failure are embedded in subtle and often ambiguous deviations that precede formal default and remain difficult to identify ex ante. While this process-based view is well established at the theoretical level, translating it into empirical tools capable of supporting early detection remains problematic.

A central limitation of the existing literature lies in its predominantly retrospective orientation. Much of the empirical evidence on organizational decline reconstructs trajectories of deterioration

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after adverse outcomes have already occurred (Mellahi, 2005). Although such approaches provide valuable insight into the mechanisms underlying failure, they offer limited guidance on how emerging vulnerabilities can be identified prospectively, particularly in contexts characterized by ambiguity and weak signals. Early manifestations of decline tend to be noisy, gradual, and embedded in routine organizational and financial fluctuations, making them difficult to distinguish from normal variation in performance (Korol, 2020).

Within this context, the challenge of early warning cannot be reduced to a purely technical problem of outcome prediction. Rather, it involves the ability to identify and interpret deviations from expected patterns before they become clearly associated with adverse events. This shifts the focus from prediction to sensing, understood as the capacity to make latent signals of vulnerability visible and to support managerial attention under conditions of uncertainty.

This study adopts this perspective by conceptualizing default as a progressive deviation from evolving patterns of financial normality. Instead of modelling failure as a binary outcome, it investigates how unsupervised anomaly detection can be used to identify firms that systematically diverge from prevailing financial configurations. In doing so, the study isolates the sensing dimensions of early warning, focusing on the detection of emerging anomalies independently from subsequent outcome realization.

Empirically, the analysis is based on a longitudinal sample of Italian SMEs observed over the period 2016-2024. The choice of this context reflects both its economic relevance and its structural vulnerability, which make it particularly suitable for examining early manifestations of financial fragility. A rolling three-year window design is implemented to capture medium-term dynamics, and multiple unsupervised anomaly detection models are applied to accounting data to generate firm-level anomaly scores over time.

Building on this framework, the study addresses the following research questions:

RQ1. How can unsupervised anomaly detection support the identification of emerging financial vulnerability in contexts characterized by rare events and high uncertainty?

RQ2. How do different anomaly detection logics contribute to the identification of persistent deviations from financial normality?

By addressing these questions, the study contributes to strategic management literature in two ways. First, it provides a process-consistent operationalization of organizational decline based on longitudinal deviations rather than discrete outcomes. Second, it conceptualizes anomaly detection as an analytical infrastructure that supports strategic sensing and attention allocation, offering a complementary perspective to outcome-based approaches.

The paper is structured as follows. Section 2 develops the theoretical background by integrating insights from the literature on organizational decline, early warning signals, and strategic sensing. The subsequent section outlines the research context, data, and methodological design. Section 4 presents the empirical results, followed by a discussion of their theoretical and managerial implications.

2. Theoretical Background

Firm default can be broadly defined as a condition in which a company experiences significant difficulties in meeting its financial obligations (Aliaj, Anagnostopoulos, and Piersanti, 2019). This definition encompasses not only formal insolvency, but also situations of severe financial distress in which firms remain solvent only through extraordinary measures, delayed payments, or debt renegotiation (Geoffrey, 2020). Such a broad conceptualization allows default to be interpreted not as a discrete event, but as the observable outcome of a progressive deterioration in financial sustainability unfolding over time.

This interpretation is consistent with a well-established tradition in strategic management that conceptualizes failure as a process of organizational decline. Early contributions describe decline as

the cumulative result of misaligned strategic decisions, increasing rigidity, and the gradual erosion of the firm's capacity to generate adequate cash flows (Billings, Milburn, and Schaalman, 1980). Financial deterioration rarely emerges abruptly. Rather, it develops through incremental and often ambiguous changes that precede the formal manifestation of default by several periods (Korol, 2020). Default therefore appears as a dynamic and cumulative phenomenon rather than as a sudden outcome.

Process models of decline further clarify the mechanisms through which vulnerability evolves over time. Weitzel and Jonsson (1989) describe decline as a sequence of stages that include blindness, delayed recognition, inadequate response, and progressive deterioration. A central implication of this model is that early phases of decline are characterized not by clearly negative indicators, but by difficulties in interpreting emerging signals. In these stages, changes in the relationships between resources, operations, and performance remain subtle and are often indistinguishable from background variation, becoming evident only in retrospect (Mellahi, 2005). Consistently, research on corporate failure has described decline as a downward spiral in which internal conditions and external pressures reinforce one another, progressively constraining adaptive capacity (Hambrick and D'Aveni, 1988).

Subsequent contributions emphasize the role of decision sequences and delayed responses, highlighting how unsuccessful turnaround attempts contribute to the consolidation of decline trajectories (Sheppard and Chowdhury, 2005). Integrative perspectives have further argued that failure should not be interpreted as an isolated event, but as the final outcome of accumulated vulnerabilities (Mellahi and Wilkinson, 2004). This view aligns with broader models of organizational development, which suggest that growth phases generate tensions that, if not addressed, may lead to rigidity and decline (Greiner, 1998). Taken together, these perspectives converge on a common insight. The antecedents of default are embedded in gradual and often ambiguous deviations that emerge over time and are difficult to identify in their early stages.

Within this framework, the problem of early detection becomes central. Early manifestations of vulnerability are typically weak, noisy, and embedded in routine organizational and financial fluctuations, making them difficult to distinguish from normal variation in performance (Korol, 2020). As a result, organizations frequently recognize deterioration only when it has already intensified and strategic options have narrowed. The identification of weak but persistent deviations is therefore not only an analytical issue, but also a problem of attention and interpretation.

Early warning systems have been proposed as mechanisms to address this challenge by transforming dispersed signals into potentially actionable information (Miles, 2010). Their function is not to eliminate uncertainty, but to support the identification and prioritization of emerging areas of concern. However, their effectiveness depends on the ability to balance sensitivity and robustness. Systems that are too sensitive may generate excessive false alarms, whereas systems that are too rigid may detect signals only when deterioration is already advanced (Divi et al., 2024). In addition, many existing approaches rely on predefined indicators or outcome-based calibration, which may limit their ability to capture heterogeneous and evolving forms of vulnerability, particularly in contexts characterized by rare adverse events.

The Attention-Based View provides a theoretical lens to understand how early warning signals are translated into strategic action. Given the limits of managerial attention, organizations rely on structures and processes that selectively direct attention toward issues perceived as relevant (Joseph et al., 2024; Love, 2024). Signals do not possess intrinsic meaning. Their relevance emerges through processes of selection, interpretation, and prioritization. In this sense, the challenge of early warning is closely related to the ability to make certain signals visible and salient within a broader field of information.

These considerations are closely related to the dynamic capabilities framework, which conceptualizes adaptation as the outcome of organizational capabilities associated with sensing, seizing, and reconfiguring (Teece et al., 1997). Among these, sensing refers to the ability to identify and interpret emerging threats and opportunities. Under conditions of uncertainty, effective sensing requires mechanisms that allow organizations to detect deviations from expected patterns and to

interpret their potential implications while preserving space for managerial judgment (Ben Selma et al., 2025). However, while the concept of sensing is well developed at a theoretical level, its empirical operationalization remains limited.

Despite the richness of these theoretical perspectives, a gap remains in understanding how early signals of decline can be identified prospectively in contexts characterized by ambiguity and rare adverse events. Much of the existing evidence relies on retrospective analyses that reconstruct warning signals after outcomes have occurred, thereby introducing interpretive bias. Approaches such as temporal bracketing have improved the analysis of process dynamics, but they presuppose that relevant phases can be identified in advance, an assumption that is difficult to sustain in the presence of heterogeneous and evolving trajectories (Monazzam and Crawford, 2024). As a result, there is limited longitudinal evidence on how signals of vulnerability emerge, persist, or dissipate over time (de Metz et al., 2024).

Within this theoretical space, anomaly detection offers a potential analytical approach for addressing these limitations. Anomaly detection systems are designed to identify observations that deviate from patterns of normality without requiring the prior specification of an outcome variable (Olateju et al., 2024). Unsupervised approaches are particularly suitable in contexts where adverse events are rare and observable only ex post, and where vulnerability emerges through heterogeneous configurations of signals rather than through a single dominant pattern (Shaukat et al., 2021).

From a strategic management perspective, anomaly detection can be interpreted as a mechanism that supports sensing by making latent deviations visible. Rather than providing deterministic predictions, it enables the identification of observations that diverge from prevailing patterns and may therefore warrant further attention. In this sense, anomaly detection contributes to structuring the field of attention by concentrating focus on a limited subset of potentially relevant cases. This function is consistent with the Attention-Based View, as it supports processes of selection and prioritization, and with the sensing dimension of dynamic capabilities, as it facilitates the identification of emerging vulnerabilities under uncertainty.

3. Research Design

3.1 Research context and data

This study focuses on small and medium-sized enterprises (SMEs), which constitute a central component of contemporary economic systems in terms of value creation and employment, while remaining structurally exposed to environments characterized by uncertainty, disruption, and systemic shocks (Otokiti et al., 2022). Compared to larger firms, SMEs typically operate with more limited financial resources, a reduced capacity to absorb prolonged adverse conditions, and less formalized risk management structures. These characteristics contribute to a higher sensitivity to fluctuations in financing conditions, access to credit, and broader macroeconomic instability (Akpe et al., 2022).

Periods of systemic uncertainty tend to further amplify these vulnerabilities, often inducing firms to prioritize short-term liquidity and operational continuity over longer-term investments. This reallocation of resources may affect the accumulation and maintenance of strategic assets, with implications for future competitiveness and resilience (Badykova and Dinmukhametova, 2025). Within this context, the identification of emerging financial fragility becomes particularly relevant, yet empirically challenging.

To examine these dynamics, the study relies on accounting items and financial ratios as the primary source of information. Financial statement data provide a standardized and systematically available representation of firm-level conditions, reflecting the cumulative outcome of strategic and operational decisions as well as their interaction with the external environment (Beaver et al., 2012). Prior research suggests that financial deterioration tends to emerge through gradual changes in profitability, liquidity, and capital structure rather than through abrupt shifts (Tran et al., 2023). Accounting-based

indicators are therefore suitable for capturing latent and progressive signals of vulnerability over time.

The empirical analysis is based on a longitudinal sample of 32,801 Italian SMEs observed over the period 2016-2024. The observation period from 2016 to 2024 provides a homogeneous and longitudinally consistent dataset, allowing for the analysis of financial dynamics across firms and over time under comparable reporting conditions.

Financial information is retrieved from the Orbis database and includes a set of accounting variables and derived financial ratios capturing complementary dimensions of firm performance. The dataset also contains basic firm characteristics, including industry classification according to NACE Rev. 2 and firm size. A binary default indicator is included and used exclusively for ex post validation purposes (Modina and Pietrovito, 2014; Cheraghali and Molnar, 2025).

The variables cover key dimensions of liquidity, capital structure, profitability, efficiency, and asset composition, allowing for a comprehensive representation of firms' financial configurations. This structure is consistent with an analytical approach focused on identifying deviations from patterns of normality rather than predicting discrete outcomes. Firms operating in the financial, insurance, and real estate sectors, as well as those in public administration and highly regulated industries, are excluded from the analysis in order to preserve comparability in accounting structures and risk dynamics (Arcuri and Levratto, 2020).

Micro-enterprises are not included due to differences in reporting standards that limit the comparability and informational richness of their financial statements. The classification of small and medium-sized enterprises follows the European regulatory framework (2003/361/EC) and related provisions that define size thresholds in terms of employment and turnover.

3.2 Methodology

Given the process-oriented and exploratory nature of the study, the research design adopts an unsupervised learning approach aimed at identifying deviations from patterns of financial normality rather than predicting discrete outcomes. This choice is consistent with the conceptualization of organizational decline as a gradual and heterogeneous process, in which early manifestations of vulnerability are not directly observable through predefined labels. Within this framework, anomaly detection is interpreted as an analytical mechanism that supports strategic sensing by enabling the identification of observations that diverge from prevailing financial configurations.

Unsupervised anomaly detection techniques do not rely on labeled outcomes and are therefore particularly suitable for contexts in which the event of interest, such as firm default, is rare and observable only ex post. These methods assume that anomalous observations occur less frequently than regular ones and that deviations from dominant patterns may signal emerging instability (Hilal, Gadsden, and Yawney, 2023). In the present study, the incidence of default is below one percent, a condition under which supervised classification models are often affected by class imbalance and instability in estimation (Shyalika, Wickramarachchi, and Sheth, 2024).

Prior to model implementation, financial data are preprocessed to ensure comparability and robustness. Given the heterogeneity of firms across industries and the presence of missing values, data imputation is conducted using a sector-based approach. Missing values are replaced with the median computed within each NACE Rev. 2 sector, preserving sector-specific financial structures while limiting the influence of extreme observations.

To account for the multidimensional nature of financial vulnerability, the analysis employs three complementary anomaly detection models, each reflecting a different representation of normality. Rather than relying on a single technique, the use of multiple models is motivated by the recognition that deviations can emerge through different configurations of financial indicators and may not be fully captured by a single analytical perspective. In addition, a multi-model approach allows the analysis to address the uncertainty associated with reliance on any single specification, strengthening the robustness of inference and supporting the interpretation of complex and heterogeneous patterns of financial abnormality (Giustolisi et al., 2007; Henley et al., 2020)

Isolation Forest identifies anomalies based on structural rarity, assigning higher anomaly scores to observations that can be isolated with fewer partitioning steps in the feature space (Liu, Ting, and Zhou, 2008). Autoencoders, implemented as neural network models, identify anomalies through reconstruction error, capturing observations whose financial configurations deviate from patterns learned from the data (Boukerche et al., 2020). One-Class Support Vector Machines define a boundary of normality in the feature space and classify observations falling outside this boundary as anomalous (Schölkopf et al., 2000).

From a strategic perspective, these models can be interpreted as alternative analytical lenses through which financial vulnerability becomes observable. Their joint application enables not only the assessment of convergence in anomaly signals, but also the identification of differences that reflect distinct representations of deviation. Convergence across models can be interpreted as an indication of robust and persistent anomalies, whereas differences may highlight specific dimensions of vulnerability that are emphasized under particular assumptions about normality.

All models are implemented within a longitudinal rolling-window framework with a fixed three-year window. For each evaluation year, models are trained exclusively on data from the preceding three years and then applied to the subsequent year. This approach allows the analysis to adapt to evolving economic conditions while maintaining temporal consistency. The three-year horizon reflects a balance between responsiveness to recent changes and the need to capture medium-term dynamics consistent with a process-based interpretation of financial deterioration (Howard and Otobo, 2025).

Consistent with the unsupervised and sensing-oriented nature of the study, model evaluation does not rely on traditional classification metrics such as accuracy or AUC, which are not well suited to contexts characterized by rare events and the absence of reliable labels (Sørbø and Ruocco, 2023). Instead, a multidimensional evaluation framework is adopted, focusing on temporal stability, persistence, cross-model convergence, and ex post economic relevance.

Temporal stability is assessed through rank-based correlation measures, specifically Spearman's rho and Kendall's tau, which allow the comparison of ordered anomaly scores across periods without imposing arbitrary thresholds (Bereta, 2024). The persistence of anomalous observations is evaluated using the Jaccard index, which measures the overlap of top-ranked firms across consecutive years and captures the extent to which a stable set of firms repeatedly exhibits anomalous characteristics (Alvarez et al., 2022). Cross-model convergence is examined by comparing the overlap of anomalous firms identified by different models, providing an indication of the robustness of detected signals.

At the same time, differences across models are interpreted as potentially informative rather than purely methodological noise. Variations in anomaly detection outcomes may reflect alternative representations of financial deviation and contribute to a richer understanding of emerging vulnerability. This interpretative approach is consistent with the conceptualization of anomaly detection as a mechanism that supports strategic sensing, where the objective is to make deviations visible and interpretable rather than to produce a single definitive classification.

Finally, the economic relevance of anomaly scores is assessed through an ex post enrichment analysis. The incidence of observed default within the top anomalous firms is compared with the baseline default rate, and a lift measure is computed. Although default outcomes are not used for model training, this analysis provides an indication that detected anomalies are associated with higher realized risk, supporting the validity of anomaly detection as an analytical approach for identifying emerging financial vulnerability under conditions of extreme class imbalance (Řezáč and Řezáč, 2011).

4. Results

This section reports the empirical results obtained from the rolling three-year window implementation of the anomaly detection models. In line with the methodological design, the analysis

focuses on the temporal behavior, persistence, convergence, and ex post economic relevance of anomaly scores.

To assess the temporal coherence of anomaly signals, the stability of firm-level rankings across consecutive years is evaluated using rank-based correlation measures. Specifically, Spearman's rho and Kendall's tau are computed between anomaly score rankings obtained in adjacent periods. Table 1 reports the average rank correlations for each anomaly detection model across the full observation window.

The results show that all three models generate rankings that exhibit a consistent degree of temporal stability, although differences emerge in terms of magnitude across techniques. This pattern indicates that anomaly signals are not driven solely by year-specific fluctuations, but instead display continuity over time. Such continuity is consistent with a process-based interpretation of organizational decline, according to which financial vulnerability develops through gradual and cumulative deviations rather than through isolated shocks. From a sensing perspective, the temporal stability of anomaly rankings suggests that detected signals reflect underlying structural conditions rather than transient noise.

Tab. 1: Temporal stability of anomaly rankings

Model	AVG. Spearman	AVG. Kendall
Isolation Forest	0.729	0.551
Autoencoder	0.625	0.451
OCSVM	0.542	0.542

Source: our elaboration

Beyond rank correlation, the analysis examines whether the most anomalous firms remain consistently identified across periods. For this purpose, the persistence of the top 1 percent of firms ranked by anomaly score is evaluated using the Jaccard similarity index between consecutive years. Table 2 reports the average persistence values for each model.

The results indicate that a subset of firms repeatedly appears among the most anomalous observations over time, although the degree of persistence varies across detection techniques. This finding suggests that extreme deviations are not isolated occurrences, but tend to recur across consecutive periods. This pattern aligns with process models of decline, which emphasize the cumulative and self-reinforcing nature of financial deterioration. Persistent anomaly signals can therefore be interpreted as indications of structural vulnerability that progressively consolidates, rather than as episodic deviations. From a strategic perspective, the recurrence of anomalous observations highlights the potential of anomaly detection to support sustained attention to firms that exhibit ongoing divergence from prevailing financial patterns.

Tab. 2: Average persistence of top 1% anomalous firms

Model	AVG. TOP-1% Persistence
Isolation Forest	0.229
Autoencoder	0.196
OCSVM	0.237

Source: our elaboration

To evaluate the robustness of anomaly detection outcomes across different methodological assumptions, the overlap between the sets of top anomalous firms identified by different models is examined. Pairwise Jaccard indices are computed for the top 1 percent of firms within each year and then averaged across the observation period. Table 3 reports the average cross-model overlap values.

Tab. 3: Average Jaccard overlap across models

Model Pair	AVG. Jaccard
Autoencoder – Isolation Forest	0.385
Autoencoder - OCSVM	0.506
Isolation Forest – OCSVM	0.524

Source: our elaboration

The results indicate partial convergence among models, with some pairs exhibiting higher levels of overlap than others. This convergence suggests that, despite relying on distinct detection logics, different approaches identify a shared subset of firms characterized by pronounced deviations. At the same time, the absence of full convergence indicates that each model captures specific dimensions of financial abnormality. From a theoretical perspective, this pattern supports the view that vulnerability does not manifest through a single dominant configuration, but rather through heterogeneous and context-dependent forms. The coexistence of convergence and divergence across models is therefore consistent with a sensing perspective in which multiple analytical lenses contribute to a richer interpretation of emerging signals rather than to their reduction to a single classification.

Although default outcomes are not used during model training or calibration, an ex post analysis is conducted to assess whether firms identified as highly anomalous exhibit higher observed default rates. For each year, the default incidence within the top 1 percent of anomalous firms is compared with the baseline default rate in the full sample, and a lift measure is computed.

Table 4 reports average baseline default rates, average default rates within the top anomalous group, and the corresponding lift values across the observation window. The results show that firms classified among the most anomalous display substantially higher default incidence relative to the population average. This enrichment indicates that anomaly scores capture deviations that are economically meaningful, even in the absence of outcome information during model estimation.

From a strategic perspective, this finding suggests that anomaly detection can identify firms that are not only statistically distinct, but also associated with materially higher ex post risk. This supports the interpretation of anomaly detection as a mechanism that contributes to early sensing by highlighting observations that warrant attention before adverse outcomes become observable. At the same time, the fact that anomaly detection does not rely on predefined labels implies that such signals remain open to interpretation and require integration with contextual and managerial knowledge.

Tab. 4: Default enrichment and lift

Model	AVG. Baseline Default Rate	AVG. TOP-1% Default Rate	AVG. Lift
Isolation Forest	0.00082	0.073	89.4
Autoencoder	0.00082	0.050	61.2
OCSVM	0.00082	0.064	78.0

Source: our elaboration

The results provide consistent evidence that anomaly detection models identify patterns of financial deviation that are temporally stable, persistent, and partially convergent across different detection logics. These properties support the interpretation of anomaly scores as indicators of evolving vulnerability rather than isolated statistical irregularities, in line with a process-based view of organizational decline and with the conceptualization of anomaly detection as a mechanism that supports strategic sensing under conditions of uncertainty.

5. Discussion and Conclusions

The empirical evidence presented in this study supports a process-based interpretation of financial vulnerability, in which firm default emerges as the observable outcome of a gradual and cumulative deviation from prevailing patterns of financial normality. Across the observation window, anomaly scores exhibit temporal stability, persistence among the most anomalous firms, and partial convergence across alternative detection logics, while also displaying a strong association with ex post default incidence. These properties indicate that the detected anomalies do not correspond to isolated statistical irregularities or transitory fluctuations. Rather, they capture recurring configurations that remain observable across time and are systematically associated with higher realized risk. In this sense, the findings provide empirical grounding for the view that financial deterioration unfolds through progressive and partially latent processes rather than through discrete events.

The temporal stability of anomaly rankings is particularly informative in relation to the literature on organizational decline. Prior research has emphasized that early stages of decline are characterized by weak and ambiguous signals embedded within routine organizational and financial dynamics. If such signals were predominantly driven by short-term shocks or measurement noise, one would expect limited continuity in firm-level anomaly rankings across adjacent periods. The observed stability suggests instead that a relevant portion of financial abnormality reflects underlying conditions that evolve gradually. This pattern is consistent with process models in which deterioration emerges through incremental misalignments between resource allocation, operational structures, and environmental conditions. By identifying deviations that persist across time, anomaly detection provides a way to observe these dynamics prospectively, without relying on retrospective reconstruction after failure has occurred.

The persistence of firms within the upper tail of anomaly rankings further reinforces this interpretation. The repeated presence of a subset of firms among the most anomalous observations indicates that extreme deviations tend to recur rather than dissipate. This finding aligns with theoretical accounts that describe decline as a cumulative and self-reinforcing process. Once firms enter a condition of sustained abnormality, their capacity to reconfigure and return to a state consistent with prevailing financial patterns may become progressively constrained. While persistence does not imply inevitability of failure, it signals the presence of trajectories in which vulnerability consolidates over time. Persistent anomaly status can therefore be interpreted as an observable manifestation of the dynamics described in the literature on downward spirals and delayed organizational response.

The analysis of cross-model convergence provides further insight into the nature of financial abnormality. The partial overlap among anomaly detection techniques indicates that different analytical representations identify a shared subset of firms characterized by pronounced deviations. At the same time, the absence of full convergence suggests that vulnerability does not manifest through a single, uniform configuration. Each model captures specific aspects of deviation, reflecting different assumptions about the structure of financial normality. This coexistence of convergence and divergence is consistent with the view that organizational decline is heterogeneous and may unfold through multiple pathways. From this perspective, the use of multiple detection logics reflects the multidimensional nature of financial abnormality and enables the identification of distinct yet partially overlapping patterns of deviation.

The ex post enrichment analysis provides an additional layer of validation. Firms identified within the top percentile of anomaly scores exhibit default rates that are substantially higher than the baseline observed in the full sample. This result indicates that deviations from financial normality are not only statistically identifiable, but also economically meaningful. Importantly, this association emerges without the use of default information during model estimation. This finding supports the interpretation that default represents the observable endpoint of a broader and earlier process of deterioration, and that anomaly detection can capture elements of this process before it becomes fully visible through formal outcomes. In this sense, the results reinforce a distinction between detecting

vulnerability and predicting failure, showing that the former can be empirically grounded even in the absence of explicit labels.

Taken together, these findings contribute to the literature on early warning systems by extending the analytical focus from outcome prediction to the identification of evolving deviations. Traditional approaches have often relied on predefined indicators or supervised models calibrated on historical failure events. While effective in settings where failure patterns are well specified, such approaches may be less suited to contexts characterized by rare events, heterogeneous trajectories, and limited availability of labeled data. The results of this study show that early warning can be grounded in the detection of persistent deviations from financial normality, allowing the identification of potentially vulnerable firms independently of predefined outcome categories. This perspective complements outcome-based approaches by enabling the prospective observation of vulnerability at earlier and less codified stages of its development. This shift also clarifies the theoretical role of anomaly detection within strategic management. The study conceptualizes anomaly detection as an analytical infrastructure that supports the sensing dimension of organizational adaptation. The findings provide empirical support for this interpretation by showing that anomaly detection enables the systematic identification of deviations that are stable, recurrent, and associated with higher realized risk. In doing so, it operationalizes sensing as the detection of departures from evolving patterns of normality, rather than as the identification of predefined warning signals. This reframes sensing as a data-driven process grounded in longitudinal observation and extends its empirical specification beyond its predominantly conceptual treatment in the literature.

Within the Attention-Based View, this mechanism can be interpreted as a means of structuring the allocation of managerial attention. Organizations operate under conditions in which relevant signals are dispersed and often difficult to distinguish from background variation. The results indicate that anomaly detection can reduce this complexity by identifying a limited subset of firms that exhibit persistent and pronounced deviations from prevailing financial patterns. This filtering function does not determine how signals are interpreted or acted upon, but it increases their visibility within the organizational field of attention. In this sense, anomaly detection contributes to the selective process through which issues become candidates for managerial consideration, while remaining distinct from subsequent processes of interpretation and action. A similar interpretation applies within the dynamic capabilities framework. The findings suggest that sensing can be operationalized as the identification of recurring deviations that signal potential misalignment between the firm and its environment. Anomaly detection contributes to this function by enabling the prospective observation of such deviations without presupposing their final outcomes. It therefore provides an analytical mechanism that supports the sensing component of broader organizational capabilities by expanding the informational basis on which subsequent processes of evaluation and response can be developed.

From an interpretive standpoint, the use of disaggregated financial indicators allows the detection of complex configurations of deviation that may not be reducible to predefined financial dimensions. At the same time, interpretation requires a distinct analytical step following detection. Once anomalous firms have been identified, their financial profiles can be examined ex post in relation to broader areas such as liquidity, capital structure, profitability, efficiency, and asset composition. This separation between detection and interpretation preserves the configurational nature of anomaly identification while enabling a more structured understanding of the underlying sources of deviation, without constraining the detection process through ex ante aggregation.

The practical implications of the study follow from this analytical logic. The proposed approach produces a ranking of firms based on the extent of their deviation from financial normality, rather than a binary classification of failure risk. This ranking can support monitoring activities by highlighting firms whose financial configurations warrant closer examination. Its applicability is facilitated by the use of accounting data that are widely available and standardized across firms. At the same time, the implementation of such models requires analytical capabilities that may not be uniformly distributed. In many cases, their use is more likely to be concentrated within intermediaries such as financial institutions, advisory organizations, or collective monitoring bodies, where anomaly

signals can be integrated with qualitative assessment and domain-specific knowledge. In this context, anomaly detection contributes to structuring the diagnostic process by identifying cases that merit attention, while remaining complementary to managerial judgment.

The study is subject to several limitations. The empirical analysis focuses on Italian SMEs, a context characterized by specific institutional and economic conditions. While this setting is appropriate for examining financial vulnerability, the extent to which the observed patterns generalize to other contexts remains an open question. In addition, the analysis relies exclusively on accounting data, which may not fully reflect early changes in governance, organizational structure, or market positioning. Finally, while the multi-model approach allows for a richer representation of financial abnormality, the study does not provide a formal decomposition of anomaly signals into interpretable components. These limitations suggest several avenues for future research. Integrating non-financial indicators with accounting-based anomaly detection may provide a more comprehensive representation of emerging vulnerability. Further work may also explore methods for systematically linking anomaly outputs to broader financial dimensions, thereby enhancing interpretability while preserving the configurational logic of detection. Comparative analyses across different institutional settings and firm populations may help assess the robustness of the observed relationships under varying conditions.

In conclusion, the study shows that unsupervised anomaly detection can support the identification of emerging financial vulnerability in contexts characterized by rare events and high uncertainty. By focusing on temporal stability, persistence, cross-model convergence, and economic relevance, the analysis demonstrates that deviations from financial normality can be observed prospectively and interpreted as indicators of evolving risk. Taken together, these findings address the two research questions by showing that unsupervised anomaly detection can support the prospective identification of emerging financial vulnerability and that alternative detection logics capture complementary forms of deviation from financial normality. In doing so, it shifts the unit of analysis from discrete failure events to persistent patterns of deviation, providing a process-consistent empirical lens on organizational decline and positioning anomaly detection as a rigorous analytical mechanism for supporting strategic sensing under conditions of uncertainty.

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From Rhetoric to Reality: Configurational Pathways to Duty-Based Corporate Purpose in European Firms

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Abstract

Frame of the research. *Contemporary corporate governance faces a fundamental tension between the rhetorical embrace of stakeholder-oriented governance and the persistent structural dominance of shareholder primacy. This creates a persistent 'enactment gap' where firms adopt purpose-driven language without altering their decision-making architecture.*

Purpose of the paper. *This study investigates the governance configurations that enable large European firms to credibly enact a Duty-Based Corporate Purpose. We address the theoretical limitations of linear regression models by employing a configurational approach that captures the complex, interdependent nature of governance attributes.*

Methodology. *We employ fuzzy-set Qualitative Comparative Analysis (fsQCA) on a dataset of Euro Stoxx 50 firms. We measure purpose orientation via computer-aided text analysis and examine six governance conditions: ownership concentration, board size, gender diversity, board independence, CSR committees, and ESG-linked compensation.*

Results. *The analysis reveals three equifinal pathways to purpose: (1) Independent Monitoring, where board independence drives purpose in dispersed ownership firms; (2) Diverse Stewardship, where gender diversity counterbalances concentrated ownership; and (3) Pluralistic Consensus, where diversity overcomes inertia in large boards. Crucially, CSR committees and ESG-linked pay consistently appear as core 'hardware' across all high-purpose configurations, while board independence and gender diversity largely function as context-dependent substitutes.*

Research limitations. *The cross-sectional design captures governance at a single point in time, limiting insights into the dynamic evolution of purpose. Additionally, the focus on 50 big European firms constrains generalizability to smaller enterprises or non-European contexts.*

Managerial implications. *Findings challenge mimetic governance design: boards should calibrate their composition to the firm's ownership context, prioritizing gender diversity in concentrated-ownership firms and board independence in dispersed-ownership firms, rather than relying on uniform best-practices.*

Originality of the paper. *By demonstrating that governance mechanisms function as bundles, this study offers novel insights into the substitutability of monitoring mechanisms, effectively bridging agency and stewardship theories.*

Keywords: *corporate purpose; duty-based governance; fuzzy-set qualitative comparative analysis; board diversity; ownership concentration; ESG governance*

1. Introduction

The enactment of corporate purpose represents one of the defining governance challenges of the contemporary corporation (Davis, 2021; Tafuro and Piccaluga, 2025). We are witnessing a fundamental 'Purpose Turn' in the theory of the firm, a shift from the monistic primacy of shareholder value toward a pluralistic conception where the corporation is viewed as a social institution embedded in a complex ecological and societal system (Gartenberg et al., 2019). This paradigmatic transition was symbolically codified in 2019 when the Business Roundtable (BRT) formally abandoned its adherence to shareholder supremacy, committing instead to deliver value to all stakeholders (Business Roundtable, 2019). This declaration, echoed by the British Academy's "Future of the Corporation" program (Ebert and Hurth, 2022), suggests a move from an instrumental view, where social benefits are a by-product of profit, to a constitutive view, where solving societal problems is the firm's existential reason for being (Mayer, 2021).

However, a significant gap has opened between this normative rhetoric and empirical reality. A growing stream of critical literature documents a persistent enactment gap, a deep disconnect between high-level purpose statements and the operational mechanism of corporate decision-making. Bebchuk

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and Tallarita (2020; 2022) argue that without binding legal or structural constraints, stakeholderism remains an "illusory promise" (Bebchuk and Tallarita, 2022, p. 1042), serving primarily to insulate management from accountability while delivering negligible benefits to third parties. Similarly, Westphal (2023) characterizes the current landscape as systemic symbolic management, where firms adopt the lexicon of purpose to garner legitimacy while retaining governance architectures designed for short-term financial extraction. In this landscape, even when firms adopt a "Duty-Based" purpose (George et al., 2023), these commitments risk being reduced to "cheap talk" (Smulowitz et al., 2025), because the underlying governance configurations remain aligned with shareholder primacy. This enactment crisis remains theoretically unsettled, and addressing it requires focusing on corporate governance as the critical institutional lever that determines whether purpose becomes a binding constraint or remains symbolic rhetoric. Governance structures encompassing ownership, board composition, monitoring mechanisms, and incentive systems constitute the organizational fabric through which managerial discretion is either disciplined toward stakeholder interests or left unconstrained (Levillain and Segrestin, 2019; Bebchuk and Tallarita, 2022). Understanding which governance configurations enable credible purpose enactment is therefore essential. However, as Misangyi et al. (2017) argue, organizations are not aggregations of independent variables but complex bundles of interconnected attributes. The failure of a single mechanism, such as a CSR committee, may often stem not from its inherent inefficacy but from the absence of complementary attributes, for example, specific ownership structures or board compositions, required to activate it. By treating these mechanisms in isolation, prior literature has obscured the configurations that enable the credible enactment of purpose.

Our paper addresses this theoretical gap by asking the following research question: *Under what governance conditions does corporate purpose shift from rhetoric to reality?*

We aim to answer by exploring the equifinal pathways through which different firms navigate the structural tensions of governance. Drawing on the "Governance Trilemma" framework, which posits inherent trade-offs between board independence, stakeholder responsiveness, and market efficiency (Claassen, 2025; Corrigan, 2025), we propose that credible enactment requires specific bundles that align the firm's legal, monitoring, and incentive structures.

To investigate this, we employ fuzzy-set Qualitative Comparative Analysis (fsQCA) on a dataset of Euro Stoxx 50 firms. This method is particularly well suited to identify the asymmetric and conjunctureal causes of purpose enactment. Our analysis identifies three distinct governance logics: *Independent Monitoring*, relying on dispersed ownership and board independence; *Diverse Stewardship*, leveraging blockholder power and gender diversity; and *Pluralistic Consensus*, utilizing diversity to overcome the inertia of large boards.

This study contributes to the institutional, stewardship and agency theories by reframing their classical problems in purpose-driven governance. We demonstrate, for example, that standard mechanisms like ESG pay are necessary but insufficient 'hardware' that must be activated by the 'software' of specific board compositions. By mapping these configurations, we move beyond the binary debate of shareholder vs. stakeholder to reveal the structural conditions under which purpose transitions from a symbolic gesture to a binding constraint. In doing so, the article makes three contributions. First, it specifies the governance structures that appear necessary for duty-based purpose to be credibly enacted in large European firms. Second, it shows how different combinations of ownership concentration and board composition enable distinct, equifinal pathways to the same outcome. Third, it connects these pathways to the governance trilemma, clarifying how firms relax different dimensions of efficiency, accountability, and representation. In fact, the article adopts the governance trilemma as an orienting lens rather than as a problem to be normatively solved. Claassen (2025) and Corrigan (2025) conceptualize this trilemma as a structural impossibility of simultaneously maximizing market efficiency, managerial accountability, and broad stakeholder representation within a single governance arrangement. Any concrete governance design must relax one of these dimensions in order to preserve the other two. The three configurational paths identified in this study can therefore be interpreted as distinct adaptive responses to the trilemma: independent

boards in widely held firms prioritize accountability and efficiency at the expense of direct stakeholder representation; diverse boards in blockholder-controlled firms enhance stakeholder voice while accepting some concentration of control; and large, pluralistic boards trade off decisional efficiency for representation, relying on diversity and formal purpose hardware to preserve accountability. Ultimately, the article positions its contribution as an empirical illustration of how large European firms navigate, rather than resolve, the governance trilemma.

2. Literature Review

2.1 Defining Corporate Purpose

The outcome of interest in this study is Corporate Purpose, specifically the degree to which a firm aligns with a "Duty-Based" orientation as opposed to a "Goal-Based" orientation. This distinction is derived from the influential theoretical framework proposed by George et al. (2023) and further elaborated in recent management literature (Tafuro and Piccaluga, 2025). Corporate purpose is often conflated with mission or vision, yet it represents a distinct construct answering the fundamental question: "Why do we exist?" (Tafuro and Piccaluga 2025, p. 3). George et al. (2023) categorize purpose into two dominant logics. The first is Goal-Based Purpose, which is instrumental, strategic, and typically centered on market leadership, competitive advantage, and shareholder value maximization. It views purpose as a target to be achieved. The language associated with this logic emphasizes dominance, profit, growth, strategy, and leadership. The second is Duty-Based Purpose, which is normative, ethical, and multi-stakeholder oriented. It views purpose as a moral obligation to society and the environment, distinct from pure profit generation. It emphasizes the firm's role in a broader ecosystem. The language associated with this logic emphasizes stakeholders, ethics, planet, society, and in general sustainability.

In the context of the Euro Stoxx 50 companies, investigating which governance configurations lead to a Duty-Based Purpose is critical for understanding how firms are responding to the growing regulatory and societal pressure to integrate stakeholder and societal concerns into corporate governance (Huang, 2022). It is important to distinguish this from simple CSR activity; purpose is foundational and existential, whereas CSR can be peripheral. A Duty-Based purpose implies that the firm’s core reason for being is tied to societal welfare, not merely that it performs charitable acts as a side activity. Throughout the paper, this tension between stated purpose and organizational practice is referred to as an enactment gap. The gap emerges when firms articulate duty-based commitments in their corporate discourse but fail to implement governance arrangements that embed those commitments as binding constraints on decision-making. In other words, purpose remains rhetorical when it does not shape actual managerial behavior, and becomes substantive only when supported by institutional structures that make it enforceable.

2.2 Governance configurations

The transition from a symbolic adoption of purpose to a duty-based enactment represents the central tension in contemporary governance scholarship. A substantial body of research indicates a persistent enactment gap where firms adopt the rhetoric of broad stakeholder commitment while retaining decision-making structures that prioritize shareholder primacy (Bebchuk and Tallarita, 2022). This phenomenon, described as "systemic symbolic management" by Westphal (2023), suggests that without specific safeguards, the pressure of the market for corporate control tends to produce mission drift (Levillain and Segrestin, 2019). Consequently, scholars argue that voluntary principles or "cheap talk" in annual reports are insufficient to constrain managerial discretion; instead, credible commitment requires the implementation of a "Constitutive Configuration" of governance mechanisms (Smulowitz et al., 2025; Levillain et al., 2024). This configuration necessitates a ‘hardware’ of specific structural devices, such as specialized Corporate Social Responsibility (CSR) committees and executive compensation linked to ESG targets, that translate abstract normative goals

into binding fiduciary constraints (Dell'Erba and Ferrarini, 2024).

However, the efficacy of this structural hardware is contingent upon the broader ownership environment and the monitoring capacity of the board. In firms characterized by dispersed ownership, the primary agency problem involves managerial shirking, in the classical sense of agency theory, and the risk that stated purpose becomes decoupled from actual strategy to appease short-term market sentiment (Westphal, 2023). In this context, independent directors serve as the critical 'trustees' of the corporate purpose, tasked with ensuring that the structural mechanisms of the CSR committee and ESG pay are not merely performative but effectively insulate the firm from the pressures of short-termism (Kershaw and Schuster, 2022; Mahoney, 2023). High board independence, when coupled with these structural safeguards, creates a zone of insulation that allows the 'hardware' of purpose to function, ensuring that the firm maintains coherence between its intentions and its actions (Morrison and Mota, 2023).

Conversely, the governance logic shifts significantly in the context of concentrated ownership, a prevalent feature in many large European enterprises. While blockholders and long-term owners often exhibit a longer temporal horizon consistent with stewardship theory, effectively mitigating the pressure for quarterly returns (Gartenberg, 2023), they introduce a distinct "Governance Trilemma" regarding stakeholder responsiveness (Claassen, 2025). The central risk in concentrated ownership is not short-termism, but rather a form of insularity or "tunnel vision" where the dominant owner's utility function overshadows the interests of broader societal stakeholders (Corrigan, 2025). In such scenarios, structural 'hardware' alone is insufficient; it requires a 'software', a mechanism to broaden the cognitive diversity of the board and challenge the dominant coalition. Board gender diversity functions as this critical counterbalance. Beyond the argument of fairness, the presence of a critical mass (Torchia et al., 2011) of female directors has been associated with a more comprehensive adjudication of stakeholder trade-offs and a higher sensitivity to ethical obligations. In constitutive governance configurations dominated by blockholders, gender diversity disrupts the homogeneity of the board, forcing a more rigorous debate on the firm's social function and ensuring that the "duty-based" orientation is not subsumed by the private benefits of control, in line with Segrestin and Levillain's (2023) argument that purpose needs legal and governance safeguards beyond shareholder primacy.

Finally, the enactment of purpose faces unique coordination challenges in firms with large board sizes, a structural characteristic often mandated by the complex two-tier board systems found in several European jurisdictions. The influence of board size on company performance has historically been a subject of debate (Yermack, 1996). While large boards theoretically offer greater representation, they are structurally prone to high coordination costs, which can impede the decisive action required to implement a transformative "duty-based" strategy (George et al., 2023). The "Governance Trilemma" suggests that maximizing representation often comes at the cost of efficiency and clear accountability (Claassen, 2025). To overcome the inertia inherent in large groups and prevent the regression toward a lowest common denominator consensus, which typically defaults to financial safety rather than ethical orientation, the composition of the board becomes crucial. In this specific configuration, board gender diversity acts not merely as a representation tool but as a catalyst for more inclusive and critical deliberation (Klettner et al., 2026), reducing the risk that large boards regress to lowest-common-denominator compromises. The inclusion of diverse perspectives within a large board prevents the calcification of decision-making processes, ensuring that the structural mechanisms of the CSR committee and ESG incentives are actively engaged rather than passively administered. Thus, within the constraints of a large board, diversity is the active ingredient that transforms structural potential into the substantive enactment of a social mission (Levillain and Segrestin, 2019).

The present paper treats these three governance logics as configurational expectations that will be assessed and refined through the fsQCA. Throughout the paper, in fact, we distinguish between governance hardware and governance software. By hardware, we mean the formal structural mechanisms (such as CSR committees or ESG-linked compensation schemes) that create binding

procedural constraints on decision-making. These are governance devices that, once institutionalized, impose monitoring obligations, information flows, and accountability triggers independent of who populates the board. By software, we mean the compositional attributes of the board (such as ownership concentration, independence levels and gender diversity) that determine the cognitive frames, interests, and power dynamics through which those procedural constraints are interpreted and enforced. This distinction builds on the concept of constitutive governance, where purpose becomes enforceable only when formal architecture (hardware) is animated by boards possessing both the incentives and cognitive diversity (software) to resist short-term financial pressures. Our configurational approach thus examines how different combinations of software activate or neutralize the same hardware, explaining why structurally identical governance mechanisms produce divergent outcomes across firms.

3. Methodology

To address the causal complexity of corporate purpose, this research employs fuzzy-set Qualitative Comparative Analysis (fsQCA). Unlike regression analysis, fsQCA assumes asymmetry and equifinality, allowing for the identification of multiple governance configurations leading to the same outcome (Ragin, 2009).

3.1 Sample selection and data collection

The empirical setting for this study is the Euro Stoxx 50, the leading blue-chip index for the Eurozone. This index represents the most capitalized and liquid stocks across the Eurozone, providing a crucial case design due to high institutional pressure for ESG compliance (Omenihu et al., 2025).If any substantive shift beyond shareholder primacy is occurring, it should be most visible in these elite firms, which face the highest exposure to the EU sustainable governance agenda (Coluccia et al. 2018).
The dataset was constructed by merging structured quantitative data from Refinitiv Workspace with unstructured textual data extracted automatically from corporate annual reports.
The final sample consists of 50 unique firm observations (N=50) with no missing data (Tab. 1).

Tab. 1: Euro Stoxx 50 firms included

Company Name	**Market Cap**
Anheuser-Busch Inbev SA	€ 106.178.589.411
Koninklijke Ahold Delhaize NV	€ 30.190.188.423
Adidas AG	€ 28.773.000.000
Adyen NV	€ 43.939.523.646
Airbus SE	€ 172.376.409.288
L'Air Liquide Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude SA	€ 92.321.321.569
Allianz SE	€ 144.787.432.198
argenx SE	€ 42.955.707.019
ASML Holding NV	€ 453.398.255.890
AXA SA	€ 82.162.561.366
BASF SE	€ 39.797.563.293
Bayer AG	€ 40.785.335.764
Banco Bilbao Vizcaya Argentaria SA	€ 119.602.894.265
Bayerische Motoren Werke AG	€ 54.633.607.928
BNP Paribas SA	€ 97.470.533.338
UniCredit SpA	€ 113.221.921.554
Danone SA	€ 51.444.372.115
Deutsche Boerse AG	€ 39.750.130.000
Deutsche Bank AG	€ 64.099.924.678

Deutsche Post AG	€ 54.993.000.000
Deutsche Telekom AG	€ 132.685.395.262
Enel SpA	€ 95.691.977.633
Eni SpA	€ 52.188.742.162
Siemens Energy AG	€ 117.368.599.778
EssilorLuxottica SA	€ 125.649.109.430
Hermes International SCA	€ 231.376.792.227
Iberdrola SA	€ 125.867.786.162
Infineon Technologies AG	€ 54.757.273.274
ING Groep NV	€ 73.197.024.843
Intesa Sanpaolo SpA	€ 103.515.966.287
Industria de Diseno Textil SA	€ 174.231.558.777
LVMH Moet Hennessy Louis Vuitton SE	€ 303.426.646.588
Mercedes-Benz Group AG	€ 56.637.995.810
Muenchener Rueckversicherungs-Gesellschaft in Muenchen AG	€ 68.849.952.417
Nordea Bank Abp	€ 57.705.702.122
L'Oreal SA	€ 205.586.137.375
Prosus NV	€ 126.988.235.486
Ferrari NV	€ 58.196.442.050
Rheinmetall AG	€ 87.496.819.668
Safran SA	€ 134.267.447.469
Banco Santander SA	€ 154.887.017.606
SAP SE	€ 248.342.130.499
Sanofi SA	€ 98.587.986.781
Schneider Electric SE	€ 135.815.887.747
Vinci SA	€ 68.387.523.843
Compagnie de Saint Gobain SA	€ 41.567.851.590
Siemens AG	€ 208.200.000.000
TotalEnergies SE	€ 125.431.519.230
Volkswagen AG	€ 50.742.812.723
Wolters Kluwer NV	€ 20.393.561.462

Source: our elaboration

3.2 Measure of the Outcome: Duty-Based Purpose

To measure the latent construct of "Duty-Based Purpose", we employed a Computer-Aided Text Analysis (CATA) approach. We analyzed the full text of the latest available Annual Reports and Sustainability Reports for all 50 companies using RStudio. This approach captures the projected identity of the firm beyond simple mission statements. We constructed two mutually exclusive Bag-of-Words dictionaries based on keywords found in purpose-related literature (George et al., 2023; Tafuro and Piccaluga, 2025):

1. Duty-Based Dictionary: stakeholder, society, sustainability, ethics, community, responsibility, planet, inclusive, diversity, environment, purpose, values, long-term, future, generations, impact, non-financial, esg, climate, social, human rights.
2. Goal-Based Dictionary: shareholder, profit, dividend, margin, revenue, growth, performance, return, equity, earnings, capital, market, dominant, competitive, sales, ebitda, net income, cash flow.

The algorithm calculated the raw frequency of terms for each firm. To control for varying document lengths, we computed a Duty-Orientation Ratio (DOR) using the following formula:

$$DOR_i = \frac{\text{Count(Duty Terms)}_i}{\text{Count(Duty Terms)}_i + \text{Count(Goal Terms)}_i}$$

This continuous variable serves as the raw input for the outcome calibration.

3.3 Measurement of causal conditions

We selected six conditions representing the core dimensions of corporate governance: Ownership Structure (Concentration), Board Composition (Size, Diversity, Independence), Monitoring Structures (CSR Committee), and Incentive Structures (Executive Pay). All raw data for these conditions was sourced from Refinitiv.

To ensure precision, we manually calculated ownership concentration as the ratio of "Closely Held Shares" (shares held by insiders and strategic investors) to "Total Shares Outstanding". This provided a precise continuous measure of blockholder control, ranging from dispersed ownership to highly concentrated structures.

Board size is measured as the total number of directors on the board at the fiscal year-end.

Board gender diversity is measured as the percentage of female directors on the board.

Board independence is measured as the percentage of independent board members.

CSR Sustainability Committee is a binary variable taking the value of 1 if the company has a dedicated CSR or Sustainability committee, and 0 otherwise. In the Euro Stoxx 50 sample, all firms possess such a committee (FS_COMM = 1), reflecting isomorphic adoption of sustainability governance structures among Europe's largest listed companies. This universal presence defines a scope condition: we examine firms that have already institutionalized this baseline mechanism. Consequently, FS_COMM does not discriminate between high and low purpose orientation within our sample, but its ubiquity suggests that a CSR committee may constitute a necessary threshold for purpose enactment, though clearly not sufficient on its own.

ESG Compensation is a binary variable taking the value of 1 if the company's executive compensation policy is explicitly linked to ESG performance targets (Refinitiv "Policy Executive Compensation ESG Performance"), and 0 otherwise.

The following table summarizes the operationalization of the six causal conditions and the outcome variable, linking them to their respective data sources and definitions (Tab. 2).

Tab. 2: Summary of causal conditions

Variable Label	Condition Name	Data Source	Definition
FS_OWN	Ownership Concentration	Refinitiv Worldscope	Calculated Ratio: Closely Held Shares / Total Shares Outstanding
FS_BSIZE	Board Size	Refinitiv ESG	Board Size: total number of directors on the board at fiscal year-end.
FS_BGD	Board Gender Diversity	Refinitiv ESG	Board Gender Diversity Percent: percentage of female directors on the board.
FS_INDEP	Board Independence	Refinitiv ESG	Independent Board Members %: percentage of independent directors.
FS_COMM	CSR Committee	Refinitiv ESG	CSR Sustainability Committee: existence of a board-level CSR team or committee.
FS_PAY	ESG Compensation	Refinitiv ESG	Policy Executive Compensation ESG Performance: executive pay linked to ESG targets.
PURPOSE	Duty-Based Purpose	Manual scraping and Text Mining	Duty-Orientation Ratio: calculated via text mining of annual reports.

Source: our elaboration

Taken together, these six conditions operationalize the governance architecture introduced in section 2.2. CSR committees (FS_COMM) and ESG-linked compensation (FS_PAY) constitute the enforcement ‘hardware’ that, in our conceptualization, translates duty-based commitments into binding decision rules, directly addressing the risk of cheap talk highlighted by Smulowitz et al. (2025). Ownership concentration, board size, board gender diversity and board independence

(FS_OWN, FS_BSIZE, FS_BGD, FS_INDEP) capture the contextual 'software' through which this hardware is either activated or neutralized. The configurational analysis therefore examines bundles of governance devices and contextual features.

3.4 Calibration procedures

We employed the Direct Method of calibration, that requires the specification of three qualitative anchors:

1. Full Membership (0.95): the threshold above which a case is considered fully in the set.
2. Crossover Point (0.50): the point of maximum ambiguity, where a case is neither clearly in nor out of the set.
3. Full Non-Membership (0.05): the threshold below which a case is considered fully out of the set.

Given the lack of universal thresholds for pan-European governance, we adopted sample-dependent anchors. Following the guidelines of Pappas and Woodside (2021) and standard practice in business research (Nikou et al. 2024), we utilized the 95th, 50th, and 5th percentiles of the sample distribution as the anchors for full membership, crossover, and full non-membership, respectively.

For the binary variables (FS_COMM and FS_PAY), calibration was crisp: True was coded as 1 and False as 0. For the continuous variables (FS_OWN, FS_BSIZE, FS_BGD, FS_INDEP, and the outcome PURPOSE), the percentile-based anchors in Tab. 3 were applied.

Tab. 3: Calibration Thresholds (Anchors)

Condition Set	**Raw Variable**	**95th %ile (Full Membership)**	**50th %ile (Crossover)**	**5th %ile (Full Non-Membership)**	**Calibration Rationale**
FS_OWN	Closely Held Shares (%)	79.8%	0.22%	0.0%	The median is extremely low (0.22%), reflecting the high liquidity of the index. High values capture the distinct blockholder model.
FS_BSIZE	Board Size (Count)	20	14	9	20 represents the large supervisory boards of German co-determination models; 9 represents smaller unitary boards typical of Dutch/French governance.
FS_BGD	Board Gender Diversity (%)	51%	40%	25%	The 40% crossover aligns with the French Copé-Zimmermann quota and proposed EU directives for gender balance.
FS_INDEP	Independent Members (%)	95%	70%	30%	70% acts as a robust crossover, distinguishing 'super-majority' independent boards from those with significant insider presence.
PURPOSE	Duty-Orientation Ratio (0-1)	0.85	0.55	0.25	Derived from the distribution of text mining scores; >0.55 indicates a discourse tipping towards duty-based logic.

Source: our elaboration

To address cases falling exactly on the 0.5 crossover point, we applied a random jitter procedure (adding a noise constant of 0.00001) to continuous variables prior to calibration. This prevents the artificial loss of cases during truth table minimization (Fiss, 2011). The analysis was performed using the QCA package in R. We utilized the Truth Table algorithm with a frequency threshold of n >= 1 and a raw consistency threshold of 0.80.

To assess the sensitivity of our findings to calibration choices, we replicated the analyses using a more conservative set of anchors at the 10th, 50th, and 90th percentiles of each distribution. The resulting fuzzy sets were then re-analyzed with the same truth table procedure, allowing us to compare solution consistency and coverage across calibration schemes.

4. Results

4.1 Descriptive analysis

Before proceeding to the configurational results in the subsequent section of the paper, it is essential to contextualize the dataset. The Euro Stoxx 50 sample represents a highly capitalized, heavily regulated, and scrutinized cohort, but it contains significant internal heterogeneity. The sample is divided between the two-tier board systems of Germany (e.g., BMW, Siemens, Adidas), characterized by large supervisory boards (N=16-20) with employee representation, and the one-tier systems of France and the Netherlands (e.g., LVMH, ASML), which tend to have smaller, more streamlined boards (N=10-15). This structural variability confirms the utility of board size (FS_BSIZE) as a differentiator within the model.

Regarding ownership, the dichotomy between firms with concentrated and dispersed ownership is evident. Entities such as Sanofi and TotalEnergies exhibit low closely held shares (<10%), operating under a dispersed shareholder model akin to US firms. Conversely, firms including Hermès International and BMW retain significant family control (>50% closely held), challenging the assumption that 'modern' corporations must be widely held. This variance provides the necessary empirical fuel for the fsQCA, allowing us for example to test if a configuration of "Family Ownership + ESG Pay" serves as a valid alternative path to Purpose compared to the traditional "Dispersed Ownership + Independent Board" model.

Finally, the fact that 100% of the sample possesses a CSR Sustainability Committee (FS_COMM) is a significant descriptive finding. It suggests that in the upper echelons of European business, the structure of sustainability governance has become isomorphic: a 'must-have' for legitimacy. Consequently, the fsQCA is not expected to find that a CSR committee alone is sufficient for a Duty-Based Purpose. Given that FS_COMM is present in all firms, any configurational difference in the outcome must be driven by how this committee interacts with other variables, such as whether it is empowered by ESG-linked pay or independent oversight. This confirms the appropriateness of the configural approach: the presence of the committee alone explains nothing (as it is constant), but its combination with other factors may explain the outcome.

4.2 Configurational analysis

The fsQCA began with an analysis of necessity to explore conditions that might be required for the outcome. In line with the descriptive statistics, CSR Sustainability Committees (FS_COMM) and ESG-linked Executive Compensation (FS_PAY) exhibit high consistency as potential necessary conditions, and in the sufficiency solution they appear as core components of all configurations. These elements therefore constitute the structural baseline for a Duty-Based Purpose in this sample.

The sufficiency analysis generates an intermediate solution with an overall solution consistency of 0.680 and an overall solution coverage of 0.804. This indicates that the identified configurations collectively cover about 80.4% of the empirical instances of a high Duty-Based Purpose, providing substantial explanatory power in a complex governance setting, albeit with moderate overall consistency. The analysis reveals three equifinal configurations, or 'recipes', which represent distinct

governance logics.

The first configuration (Path 1), which we can label as the *Independent Monitoring* logic, combines high board independence (FS_INDEP) with the structural baseline of committees and incentives (FS_COMM * FS_PAY). With a consistency of 0.698, a raw coverage of 0.634, and a unique coverage of 0.204, this path represents the most prevalent route in the sample. It is populated mainly by firms with low membership in the set of concentrated ownership, consistent with the widely held ownership model described in section 4.1, and it reflects a logic where high board independence acts as the primary driver ensuring that the structural 'hardware' of sustainability governance is effectively utilised.

The second configuration (Path 2), labelled as the *Diverse Stewardship* logic, combines high ownership concentration (FS_OWN) with high gender diversity (FS_BGD), supported by the requisite committees and pay structures (FS_COMM and FS_PAY). This path yields a consistency of 0.786, a raw coverage of 0.436, and a unique coverage of 0.049. It is populated by firms that, as described in the descriptive analysis, exhibit a classic blockholder or family-controlled pattern of ownership. In this context gender diversity acts as a critical counterbalance to concentrated ownership, suggesting that stewardship is achieved not through independence, but through the interplay of dominant owners and a diverse board composition.

The third configuration (Path 3), labelled as the *Pluralistic Consensus* logic, combines large board size (FS_BSIZE) with high gender diversity (FS_BGD), alongside the standard structural variables (FS_COMM and FS_PAY). This path demonstrates the highest individual consistency at 0.808, with a raw coverage of 0.483 and unique coverage of 0.059. This configuration implies that in larger, potentially more complex or two-tier board structures, gender diversity facilitates the consensus-building required to orient the firm towards a Duty-Based Purpose.

A comparative assessment of these paths highlights an important mechanism regarding board composition. While the *Independent Monitoring* logic relies on independent directors to drive the outcome, the *Diverse Stewardship* logic and the *Pluralistic Consensus* logic rely on gender diversity (FS_BGD). In Paths 2 and 3, gender diversity functions as a crucial mechanism that counterbalances either a dominant owner or the inertia of a large board. Consequently, FS_INDEP and FS_BGD function as context-dependent substitutes: in the absence of high gender diversity, board independence becomes the primary driver for purpose, and vice versa. Tab. 4 presents the sufficient configurations derived from the fsQCA. Following standard notation (Fiss, 2011), black circles (●) indicate the presence of a condition, while blank spaces indicate that the condition is causally irrelevant for that specific configuration.

Tab. 4: Sufficient configurations for Duty-Based Purpose

Causal Conditions	**1. Independent Monitoring**	**2. Diverse Stewardship**	**3. Pluralistic Consensus**
Ownership Concentration (FS_OWN)		●	
Board Size (FS_BSIZE)			●
Board Gender Diversity (FS_BGD)		●	●
Board Independence (FS_INDEP)	●		
CSR Committee (FS_COMM)	●	●	●
ESG Compensation (FS_PAY)	●	●	●
Raw Coverage	0.634	0.436	0.483
Unique Coverage	0.204	0.049	0.059
Consistency	0.698	0.786	0.808
Overall Solution Coverage	0.804		
Overall Solution Consistency	0.680		

Source: our elaboration
Note: ● indicates the presence of a condition. Blank spaces indicate 'don't care' conditions, meaning the outcome occurs regardless of the specific value of that condition.

4.3 Robustness checks

As anticipated in the previous section, to probe the robustness of these findings, we re-estimated the model using an alternative calibration scheme based on the 10th, 50th and 90th percentiles of each distribution. The intermediate solution under this more conservative calibration yields a set of recipes that closely mirrors the structure of the main model. CSR committees and ESG-linked pay remain present in all sufficient configurations, confirming their role as constitutive 'hardware' for duty-based purpose. Overall solution consistency increases to 0.800, while solution coverage remains substantial (0.635–0.638), albeit lower than in the baseline calibration (0.804). The stability of both the core conditions and the fit statistics indicates that the configurational results are not an artefact of a particular calibration choice. Compared to the main solution, the robust model introduces additional conjuncts that refine the three core governance logics. The first and third recipes in Table 5 are structurally consistent with the *Pluralistic Consensus* and *Diverse Stewardship* paths, but make explicit that these logics are more cleanly observed under, respectively, dispersed ownership combined with large, gender-diverse boards and concentrated ownership combined with smaller, gender-diverse boards. The second recipe mirrors the *Independent Monitoring* logic, but shows that its most robust instantiation under stricter calibration occurs in dispersed firms with relatively large boards. The fourth and fifth recipes represent hybrid designs in which diversity and independence are simultaneously high; these are relatively rare but substantively plausible configurations in which the enforcement hardware of CSR committees and ESG pay is embedded in boards that score strongly on both monitoring dimensions. In line with Schneider and Wagemann's (2006) distinction between proximate and remote conditions, these additional conjuncts are best interpreted as scope conditions that narrow the empirical domain within which each governance logic is most reliably associated with a duty-based purpose, rather than as fundamentally new causal mechanisms.

Tab. 5: Robust solution under 10–50–90 calibration

Robust configuration	**Outcome**	**Consistency**	**Coverage**
~FS_OWN_ROB * FS_BSIZE_ROB * FS_BGD_ROB * FS_COMM * FS_PAY	PURPOSE_ROB	0.821	0.390
~FS_OWN_ROB * FS_BSIZE_ROB * FS_INDEP_ROB * FS_COMM * FS_PAY	PURPOSE_ROB	0.860	0.323
FS_OWN_ROB * ~FS_BSIZE_ROB * FS_BGD_ROB * FS_COMM * FS_PAY	PURPOSE_ROB	0.843	0.360
FS_OWN_ROB * FS_BGD_ROB * FS_INDEP_ROB * FS_COMM * FS_PAY	PURPOSE_ROB	0.852	0.286
S_BSIZE_ROB * FS_BGD_ROB * FS_INDEP_ROB * FS_COMM * FS_PAY	PURPOSE_ROB	0.857	0.299
Overall solution		0.800	0.635–0.638

Source: our elaboration

4.4 Most representative cases for each configuration

To ground these abstract configurations, it is useful to briefly indicate some representative firms for each path.

In the Independent Monitoring configuration, companies such as Koninklijke Ahold Delhaize, Adyen, Airbus, Allianz, ASML, BASF, UniCredit, Danone and Deutsche Post combine dispersed ownership structures with highly independent boards, dedicated sustainability committees and ESG-linked pay policies.

The Diverse Stewardship path includes blockholder-controlled firms such as AXA, BNP Paribas, Deutsche Telekom, Enel, Eni, Siemens Energy, EssilorLuxottica, Hermès, Industria de Diseño Textil, LVMH, Safran, Vinci and Saint-Gobain, where concentrated ownership is balanced by a comparatively high share of women directors alongside the same purpose-related hardware.

The Pluralistic Consensus configuration is exemplified by large-board firms such as AXA, Bayer, Deutsche Telekom, Siemens Energy, Infineon, LVMH, Munich Re, Safran, Schneider Electric and Siemens, where gender-diverse supervisory boards work through sustainability committees and ESG

incentives to coordinate deliberation across a broad set of stakeholder claims.

It is also noteworthy that a small subset of firms are 'members' of more than one path. For example, Adyen, Enel, Eni and Vinci are classified both under Independent Monitoring and Diverse Stewardship, while AXA, Deutsche Telekom, LVMH and Safran meet the criteria for both Diverse Stewardship and Pluralistic Consensus. Siemens Energy and Schneider Electric satisfy the conditions for Independent Monitoring and Pluralistic Consensus, and Siemens Energy uniquely appears in all three configurations. These overlaps indicate that some big european firms implement hybrid governance designs that simultaneously approximate multiple logics, combining elements of dispersed and concentrated ownership or different board structures while always retaining the same enforcement hardware of CSR committees and ESG-linked pay. These boundary cases illustrate how the underlying governance logics can coexist within the same institutional setting.

5. Discussion

Our findings directly engage with a central paradox animating contemporary scholarship on corporate purpose: why does the rhetorical proliferation of stakeholder commitments so persistently fail to translate into substantive organizational change? Scholars such as Westphal (2023) have documented what he terms "systemic symbolic management" whereby corporations engage in ritualistic displays of purpose adoption (such as establishing sustainability committees, issuing public commitments, publishing codes of conduct) while leaving unchanged the fundamental incentive architectures that structurally privilege shareholder returns. Meanwhile, Bebchuk and Tallarita (2022) have demonstrated that even high-profile corporate pledges, such as the Business Roundtable's 2019 statement on corporate purpose, amount to what they dismiss as "illusory promises", devoid of any legal force or governance consequence. The implication of this critique can be read as follows: purpose-talk risks amounting to little more than managerial hypocrisy, a cynical public relations tactic that masks unchanged behavior.

Our configurational analysis, however, reframes this debate by rejecting the assumption that the enactment gap is primarily a question of managerial sincerity or moral failure. Rather, our results suggest that a key reason why the gap persists is a structural mismatch between governance design and organizational context. The central contribution of our study lies in revealing that the 'hardware' of governance structures must be precisely calibrated to the 'software' of board composition and ownership context. Where prior literature treats governance mechanisms as universally applicable best practices to be mimetically adopted, our fsQCA results reveal that successful purpose enactment requires contextually specific configurations, in accordance to the literature on configuration bundles (Misangyi et al., 2017). CSR Sustainability Committees and ESG-linked pay consistently appear as core components across all high-performing configurations and, in our sample, no high-purpose configuration occurs without them, but their sufficiency is contingent upon distinct combinations of independence, diversity, and ownership concentration. The enactment gap does not close through moral appeals or reputational pressure. It closes only when there is constitutive alignment between the formal apparatus of governance and the underlying distribution of power and voice within the firm. Viewed through the lens of the governance trilemma, the three configurations found can be interpreted as empirically grounded ways in which large European firms choose which dimension of the trilemma to relax. Independent Monitoring corresponds to designs that preserve market efficiency and strong managerial accountability, while accepting limited direct representation of stakeholder groups at board level. Diverse Stewardship shows how concentrated ownership can be reconciled with a duty-based purpose when representation is strengthened through gender-diverse boards that discipline the dominant owner. Pluralistic Consensus makes representation the priority in large, often two-tier boards, and relies on diversity and formal purpose hardware to compensate for lower decisional efficiency. In each case, the trilemma is not resolved but made tractable through a specific bundle of ownership, board and incentive mechanisms. The robustness analysis reinforces this

interpretation. When the calibration anchors are made more conservative, the three governance logics do not disappear but become more context specific. The *Independent Monitoring* configuration is most robustly observed in widely held firms with relatively large boards, *Diverse Stewardship* in blockholder-controlled firms with smaller but gender-diverse boards, and *Pluralistic Consensus* in dispersed or mixed-ownership firms combining large, gender-diverse supervisory boards with the same enforcement hardware. In other words, raising the calibration thresholds does not generate qualitatively new paths, but clarifies the ownership and board-structure contexts in which each logic most reliably supports a duty-based purpose. Finally, the case-level evidence confirms that these governance logics are not mutually exclusive types but can coexist within the same firm. A small number of large European corporations, including Adyen, Enel, Eni, Vinci, AXA, Deutsche Telekom, LVMH, Safran, Siemens Energy and Schneider Electric, satisfy the membership criteria of more than one sufficient configuration. Siemens Energy, for instance, meets the thresholds for all three paths. In set-theoretic terms this is fully consistent with the principle of equifinality: firms can activate multiple governance logics simultaneously, combining elements of independent monitoring, diverse stewardship and pluralistic consensus. Substantively, these hybrid cases are best understood as boundary designs that sit at the intersection of ideal-typical configurations, further underscoring that purpose governance in practice is assembled from overlapping bundles (Misangyi et al., 2017) of ownership structures, board compositions and enforcement mechanisms rather than from isolated best practices.

5.1 Theoretical implications

Our study offers three theoretical implications[2] grounded in the configurational pathways we identified for duty-based purpose enactment.

First, we contribute to institutional theory by demonstrating that CSR committees and ESG-linked pay function as necessary governance hardware for purpose enactment. Neo-institutional scholars have long debated whether sustainability governance structures constitute substantive innovations or merely symbolic gestures adopted to secure legitimacy (Westphal, 2023). Our fsQCA analysis resolves this tension empirically: all high-purpose configurations include both CSR committees and ESG-linked pay, and no configuration achieved high purpose adherence in their absence. This finding directly challenges the decoupling thesis that dominates institutional literature (Meyer & Rowan, 1977) and supports Levillain and Segrestin's (2019) argument that purpose constitutes a fiduciary problem requiring formal governance structures. We extend this reasoning by specifying that these mechanisms function as constitutive hardware: institutional safeguards that prevent purpose from degenerating into illusory promises (Bebchuk and Tallarita, 2022) or cheap talk (Smulowitz et al., 2025). Dell'Erba and Ferrarini (2024) similarly argue that ESG-linked compensation embeds duty-based objectives as enforceable fiduciary constraints. Our configurational evidence demonstrates that without this hardware, purpose statements remain vulnerable to mission drift under market pressure (Levillain and Segrestin, 2019; Mayer, 2021), regardless of board composition or ownership structure.

Second, we extend stewardship theory by revealing that ownership concentration enables purpose enactment only when coupled with board gender diversity. Traditional stewardship theory posits that

[2] It's important to underline that these implications rest on configurational patterns that proved robust to alternative calibration choices. As reported in Table 5, re-estimating the model with 10–50–90 anchors preserves both the governance hardware and the core substitution patterns between independence and diversity.
In addition, it's worthwhile to note that in our sample, 100% of firms possess CSR Sustainability Committees. This variable therefore function not as discriminating causal conditions but as scope condition (Schneider & Wagemann, 2006) that define our population: large European firms that have already adopted the minimal structural apparatus of purpose governance. This universal presence validates institutional critiques of mimetic isomorphism (Meyer & Rowan, 1977): CSR committees have become governance ornaments that secure legitimacy but guarantee nothing. The enactment gap persists precisely because these structures are everywhere yet differentially activated. Our configurational analysis reveals which additional governance attributes transform this baseline apparatus from symbolic into credible enforcement mechanisms. This finding reframes the governance-purpose debate: the question is not whether firms need CSR committees (as they all have them), but under what conditions these committees function as substantive oversight bodies rather than empty facades.

blockholders naturally foster long-term orientation and stakeholder consideration (Miller and Le Breton-Miller, 2006). Gartenberg and Serafeim (2023) exemplify this view, showing that firms with committed long-term owners more easily sustain purpose and profitability by resisting short-term market pressures. Our Diverse Stewardship pathway qualifies this assumption: ownership concentration appeared sufficient for duty-based purpose only when combined with high gender diversity. This result exposes a theoretical blind spot in classical stewardship literature, which overlook principal-principal conflicts inherent in concentrated ownership (Claessens et al., 2000). Blockholders may pursue private benefits or exhibit insularity that marginalizes broader stakeholder interests. Gender diversity functions as a counterbalancing mechanism that broadens board cognitive perspectives (Adams & Ferreira, 2009; Bear et al., 2010; Klettner et al., 2026), transforming ownership concentration from potential tunnel vision into genuine stakeholder stewardship. We therefore contribute by demonstrating that stewardship theory must be reformulated in conditional terms: concentrated ownership enables purpose enactment only when disciplined by diversity.

Third, we contribute to agency theory by demonstrating the context-dependent substitutability of monitoring mechanisms. Agency theory has traditionally emphasized board independence as the universal solution to managerial opportunism (Jensen & Meckling, 1976). Corporate governance codes, from the UK Corporate Governance Code to the OECD Principles, treat independence as a best practice to be maximized across all firms. Our configurational analysis reveals that independence and diversity function as context-specific substitutes. In the Independent Monitoring path, characterized by dispersed ownership, board independence emerged as critical. In the Diverse Stewardship path, where ownership is concentrated, independence disappeared while gender diversity became central. This asymmetry extends agency theory's understanding of governance fit by revealing that the source of potential agency costs, whether managerial shirking in dispersed firms or owner entrenchment in concentrated firms, determines which monitoring configuration enables purpose enactment. We contribute by demonstrating that effective governance architectures must calibrate monitoring mechanisms to ownership context rather than applying universal prescriptions.

5.2 Managerial implications

The practical implications of these findings are substantial, yet they fundamentally challenge the mimetic logic that dominates contemporary governance practice. The conventional approach to governance design treats best practices as universally portable: firms benchmark against peer organizations, adopt the governance structures most prevalent among high performers, and pursue compliance with prescriptive codes. This mimetic orientation is visible in the homogenization of board composition, the proliferation of identical committee structures, and the relentless focus on achieving independence quotas. The implicit assumption is that governance excellence is achieved through conformity to an idealized template.

Our configurational findings reject this isomorphic mentality and call instead for what we term diagnostic governance design. The message to nomination committees and board chairs is clear: effective governance for purpose enactment begins not with benchmarking but with diagnosis. Before designing board composition or committee mandates, directors must examine the firm's capitalization table. Is ownership dispersed among passive institutional investors, or is there a controlling family or founder? This single question determines which governance path is viable. For firms such as LVMH, Hermès, or other family-controlled enterprises, maximizing board independence is strategically misguided. Independence offers little value when the dominant owner controls both strategy and director selection. What these firms require is a critical mass of gender diversity, directors who can introduce stakeholder perspectives and challenge the closed-mindedness that comes with concentrated ownership. Nomination committees in such firms should prioritize diversity over independence, seeking board members with the cognitive distance and fiduciary courage to represent interests beyond the owner's immediate preferences.

Conversely, for firms such as Danone, Allianz, or other corporations with dispersed ownership, the traditional emphasis on independence remains appropriate. In these contexts, the board must

function as a body of independent trustees capable of disciplining professional management. Gender diversity may contribute value, but it is not sufficient to overcome the agency problem posed by managerial discretion. These firms require directors with no material ties to the executive team, individuals who can credibly threaten intervention when management drifts from the stated purpose in pursuit of short-term financial targets.

For chairmen and chief executives, the implications concern what might be termed the license to operate. Our findings demonstrate that CSR Sustainability Committees and ESG-linked pay are no longer distinguishing features or optional enhancements to purpose. They are instead the baseline. In our evidence, firms that lack these structures appear structurally poorly equipped to enact purpose. Without a dedicated committee tasked with monitoring mission alignment, and without material incentives that tie executive compensation to non-financial performance, purpose commitments remain cheap talk, vulnerable to erosion whenever financial pressures intensify. A possible policy implication is that regulators and standard-setters should cease treating these mechanisms as voluntary guidelines and begin conceptualizing them as minimum governance requirements for firms that publicly claim a duty-based orientation.

5.3 Limitations and future research

While this study makes significant contributions to our understanding of purpose governance, it is subject to significant limitations that also suggest avenues for future research. The first concerns sample size and composition. Our analysis focused on Euro Stoxx 50 firms, a deliberately selected sample of Europe's largest and most visible corporations. While this focus allows for detailed configurational analysis of elite firms operating under comparable institutional pressures, it necessarily constrains generalizability. The sample size of fifty cases, while appropriate for fsQCA methodology, limits the number of configurations that can be empirically detected. It is plausible that alternative governance paths to purpose enactment exist but remain unobservable in our data due to their rarity within the specific population we chose. These limitations also mean that our claims about the necessity of particular governance mechanisms should be interpreted as empirically grounded within this specific population, rather than as universal laws.

A second limitation concerns the cross-sectional nature of our research design. Our analysis captures governance configurations at a single point in time, providing a snapshot of how firms are currently organized rather than tracing the dynamic processes through which configurations emerge, stabilize, or dissolve. This temporal constraint is particularly significant given that purpose enactment is not a static achievement but an ongoing organizational accomplishment, subject to drift as leadership changes, ownership structures evolve, and market conditions shift. Future research should employ longitudinal fsQCA designs to examine how firms transition between governance paths. Do firms begin with one configuration and gradually shift toward another as they professionalize or as founding families relinquish control? Under what conditions do firms experience configuration 'collapse', whereby a previously coherent governance architecture fragments and purpose commitments erode? Addressing these questions would spread light not only on which configurations work, but how they are constructed and maintained over time.

Third, our operationalization of duty-based purpose captures what could be termed as discursive enactment rather than behavioral enactment. The Duty-Orientation Ratio (DOR) measures the linguistic emphasis on stakeholder commitments in regulated annual reports, quantifying the degree to which duty-based purpose has been institutionalized in firms' official identity and accountability apparatus. We do not directly observe resource allocation decisions, stakeholder consultation processes, or how trade-offs are resolved in practice. However, language in mandatory disclosure documents is not costless cheap talk: it creates reputational sanctions, litigation risks, and raises stakeholder expectations. Our measure therefore captures a necessary intermediate stage, the institutionalization of purpose in corporate discourse, that represents the foundation upon which behavioral enactment depends. Future research should integrate observational data on actual managerial decisions to validate the governance-to-behavior link. Case studies examining how boards

deliberate, how CSR committees exercise oversight, and how conflicts between financial and mission objectives are resolved would provide crucial micro-level evidence of whether the configurations we identified actually orient firms to purpose.

6. Conclusions

This study posed a question central to contemporary corporate governance: under what governance conditions does corporate purpose shift from rhetoric to reality? Our configurational analysis provides a structural answer. Purpose shifts from rhetoric to discursive enactment when three elements align: i) enforcement hardware, such as CSR committees and ESG-linked compensation that embed purpose as a procedural constraint; ii) monitoring software, such as board independence or gender diversity calibrated to the firm's ownership structure; and iii) ownership contexts that either disperse control sufficiently to empower independent oversight or concentrate it in ways disciplined by diversity. Where any element is missing, purpose remains rhetoric discourse. The enactment gap closes not through moral exhortation but through constitutive alignment: the precise matching of governance design to organizational context. Our findings reveal that purpose enactment is fundamentally a governance design problem, requiring alignment between the formal apparatus of control and the underlying distribution of power within the firm.

Our configurational analysis has identified three distinct paths to duty-based purpose, each reflecting a different resolution of the governance trilemma. The *Independent Monitoring* path demonstrates that dispersed ownership can sustain purpose when boards possess genuine independence and firms institutionalize dedicated sustainability governance. The *Diverse Stewardship* path reveals that concentrated ownership enables purpose only when disciplined by cognitive diversity, particularly gender diversity, which introduces stakeholder perspectives capable of challenging owner closedness. The *Pluralistic Consensus* path shows that large boards can overcome their coordination challenges when diversity and structural safeguards create space for stakeholder deliberation. Across all three paths, CSR Sustainability Committees and ESG-linked pay consistently appear as non-negotiable elements in our sample: the constitutive 'hardware' without which, in large European firms, purpose does not appear to be credibly enacted.

Ultimately, this research speaks to a broader transformation in corporate capitalism. The question is no longer whether corporations should embrace purpose, but whether they can design governance systems capable of sustaining it. The findings of this study suggest that the answer depends on the willingness of firms to move beyond symbolic gestures and construct the constitutive architecture that purpose demands. In the absence of such architecture, purpose is likely to remain what critics have long alleged: cheap talk, facade, a rhetorical ornament adorning an unchanged structure of power. But where firms succeed in aligning governance hardware with organizational context, purpose can become what its advocates envisioned: a binding fiduciary commitment capable of redirecting corporate power toward the creation of real shared value.

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Greenhushing under Institutional Contestation: Evidence from U.S. Listed Firms

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Abstract

Frame of the research. *Recent evidence suggests that some firms deliberately under-communicate their sustainability achievements ("greenhushing") while continuing to invest in sustainability, particularly in politicised, controversy-prone environments.*

Purpose of the paper. *This study explains how ESG controversies reshape firms' ESG disclosure strategies by inducing greenhushing and examines how firm size conditions the feasibility and persistence of strategic under-disclosure in a contested institutional environment.*

Methodology. *The study analyses a panel of 76 NYSE- and NASDAQ-listed firms through 2020-2024. Greenhushing is operationalised as a negative ESG disclosure-performance gap, employing fixed-effects regressions with lagged ESG controversies and interactions with market capitalisation.*

Results. *Results show that higher levels of past ESG controversies deepen greenhushing. This tendency intensifies over time. Firm size moderates this relationship, with controversies reinforcing under-disclosure among less visible large firms, while the effect weakens for the largest and most visible firms.*

Research limitations. *The analysis is limited to U.S. listed firms, a specific time window, and a single data provider, which may affect generalisability.*

Managerial implications. *The findings highlight that disclosure strategies should consider controversy exposure, firm visibility, and stakeholder configuration, rather than ESG performance alone.*

Originality of the paper. *This paper provides evidence on greenhushing as an ESG disclosure strategy, operationalising it as a negative disclosure-performance gap, showing that ESG controversies can influence it and firm size conditions this response. The study highlights the role of visibility and stakeholder salience in shaping ESG disclosure for companies that decide to respond to ESG shocks with silence rather than disclosure.*

Keywords: *corporate governance; esg disclosure; greenhushing; esg controversies; market capitalization*

1. Introduction

"*Record ESG, but in secret*." This expression captures a growing tension in corporate sustainability strategy. In 2026, journalists used these words to describe Deutsche Bank's strongest year in sustainable finance and ESG investment volumes since 2021, noting that these achievements received limited visibility in earnings communications compared with traditional financial results (Eticanews, 2026). Rather than amplifying ESG success, firms appear increasingly inclined to keep it in the background.

This tendency extends beyond the financial sector. At the World Economic Forum in January 2026, the CEO of TotalEnergies publicly suggested that European Union sustainability mandates would be diluted, warning that current rules risk generating unnecessary costs as elements of the Green Deal are softened (Reuters, 2026). Advisory reports indicate that, in line with this perspective, many firms continue to achieve relatively strong ESG outcomes while deliberately reducing the prominence of ESG narratives in earnings calls, regulatory filings and external communications (The Economist, 2025; Bloomberg Law, 2025). All these new developments show that there is a growing difference between how well companies are performing in terms of ESG and how they are talking about it (Palea et al., 2025).

This emerging pattern challenges core assumptions in the disclosure literature. Voluntary disclosure has traditionally been understood as a strategic practice shaped by firm characteristics (Uyar and Karamahmutoğlu., 2012) and governance structures (Lagasio and Cucari, 2019; Cucari et al., 2018; Paolone et al., 2023), primarily aimed at enhancing legitimacy and reducing information asymmetry (Adams, 2002; García-Meca & Sánchez-Ballesta, 2010).

As sustainability has become economically and regulatorily material, environmental and ESG

reporting have turned into a widespread and increasingly expected feature of corporate practice, particularly among large firms (Fifka, 2013; Durand et al., 2019). From this perspective, stronger ESG performance should be associated with more extensive and visible disclosure. However, the literature suggests that this alignment cannot be taken for granted. Previous research has documented systematic discrepancies between ESG performance and ESG disclosure (ESGD), revealing that firms may exaggerate or downplay their achievements depending on contextual incentives and perceived risks (Kim & Lyon, 2015; Montgomery et al., 2024). Under-communication is particularly puzzling when it characterises relatively strong performers, as it implies a deliberate decision to forego potential legitimacy gains and weaken ESG signals directed at investors and other stakeholders (Falchi et al., 2022).

Recent research has conceptualised this behaviour as *greenhushing*, understood as the intentional under disclosure of genuine environmental or ESG performance (Font et al., 2017; Falchi et al., 2022). Positioned at the low visibility end of the sustainability communication spectrum, greenhushing reflects a strategic choice to limit exposure rather than to signal virtue.

While the concept has gained traction, empirical knowledge of the conditions that foster greenhushing remains limited, particularly in environments marked by regulatory uncertainty and political contestation. Such environments have become increasingly salient in recent years (Esposito De Falco and Cucari, 2025; Li et al., 2025). Regulatory pressure for sustainability disclosure has intensified, as exemplified by the EU Corporate Sustainability Reporting Directive and related initiatives aimed at standardising climate related information (Bloomberg Intelligence, 2024). At the same time, ESG has become politically contested, especially in the United States, where legislative initiatives and public discourse have raised the reputational and legal risks associated with visible ESG positioning (TD Securities, 2024). In Europe, the apparent softening of key Green Deal elements has raised doubts about the durability of earlier climate commitments (Reuters, 2025). Under these conditions, the strategic calculus of ESG communication is likely to change, potentially altering the relationship between performance and disclosure.

Within this context, ESG controversies represent a particularly relevant yet underexplored factor. Controversies constitute high salience events that affect firm value, stakeholder perceptions, and legitimacy (Aouadi & Marsat, 2018; Bang et al., 2023). According to legitimacy theory, negative events of this kind should trigger legitimacy repair strategies, typically expressed through more extensive disclosure aimed at restoring trust and social approval (Patten, 1992; Suchman, 1995; Cho & Patten, 2007). Emerging insights from the greenhushing literature challenge this expectation, suggesting that ESG controversies can instead raise the perceived costs of public visibility and prompt firms to strategically scale back ESG communication while continuing their underlying sustainability practices (Kim and Lyon, 2015).

Which of these responses firms adopt is unlikely to be uniform and may vary systematically across firms. Firm size plays a central role in shaping both exposure to scrutiny and the capacity to manage communication strategically. Larger firms typically face stronger legitimacy pressures and more intense media attention, yet they also possess greater resources to calibrate disclosure and to absorb reputational shocks (Gray et al., 1995; Hahn & Kühnen, 2013; Baldini et al., 2018). It therefore remains unclear whether ESG controversies tend to narrow the gap between ESG performance and disclosure through increased transparency, or whether they widen this gap by reinforcing greenhushing, and how these dynamics differ across firms of varying size.

Addressing this unresolved issue is essential for understanding contemporary corporate sustainability strategies. Therefore, this study addresses the following research question: *How do ESG controversies and firm size influence the dynamics of greenhushing among under-disclosing U.S. firms between 2020 and 2024?*

To answer this question, we examine how ESG controversies and firm size shape greenhushing behaviour among 76 U.S. listed firms over the period 2020 to 2024. The US is chosen as the setting for this study following Barroso Del Toro, Crissol and Tort-Martorell (2022), who focus on American listed firms because the country's regulatory and economic environment shapes how controversies

affect ESG decisions. The narrative shift around sustainability since the first Trump administration in 2017, together with the complex evolution of ESG described by Sulkowski and Jebe (2022), makes the US a particularly suitable context to examine how disclosure behaviour changes over time. The results show that ESG controversies are associated with reinforced greenhushing among relatively large firms, while for the largest firms, controversies are associated with a smaller disclosure-performance gap, indicating stronger constraints on persistent under disclosure.

This study contributes to the literature on ESGD and greenhushing by clarifying how firms adjust their disclosure strategies following ESG controversies and how these responses vary with firm size. It extends the decoupling literature beyond greenwashing and shows how legitimacy pressures shape ESG communication.

2. Theoretical Background

Greenhushing refers to the deliberate under-disclosure of firms' environmental or ESG performance, whereby companies strategically limit the visibility of sustainability-related information despite maintaining substantive ESG activities. The expression *greenhushing* was coined in 2008 by brand strategist Jerry Stifelman and subsequently introduced into the academic debate to capture this form of strategic silence in sustainability communication. While greenwashing relies on selective over-disclosure, greenhushing operates through selective under-disclosure, with both strategies reflecting deliberate choices about the visibility of ESG information rather than the absence of sustainability engagement (Baldassarre & Campo, 2016; Kutzschbach et al., 2021). Consistent with the greenwashing literature (Bernini & La Rosa, 2024), research suggests that disclosure-based strategies are shaped by external conditions, incentives, and pressures that characterise the institutional context in which firms operate, including regulatory scrutiny, stakeholder expectations, and reputational risk (Hilton, 2025a). This underscores the central role of the institutional setting in determining not only firms' incentives to communicate ESG information, but also the perceived risks associated with increased disclosure visibility. Understanding greenhushing therefore requires situating ESGD within a broader theoretical framework that treats reporting as a strategic response to information asymmetry, stakeholder scrutiny, and institutional pressures rather than as a neutral reflection of underlying performance. Because ESGD involves discretion over what to disclose, how to disclose it, and with what degree of prominence, prior research has consistently argued that no single theoretical framework can fully explain ESG reporting practices, which unfold at the intersection of societal norms, stakeholder demands, governance structures, and reputational considerations (Baldini et al., 2018; Hammami & Zadeh, 2020; Seow, 2024).

Within this theoretical landscape, legitimacy theory and stakeholder theory have emerged as the dominant lenses for explaining voluntary non-financial reporting and CSR disclosure under an implicit social contract between firms and society (Guthrie et al., 2006; Spence et al., 2010; Deegan, 2019). Recent systematic literature reviews confirm the continued centrality of these frameworks, showing that legitimacy- and stakeholder-based explanations account for more than 70% of theoretical applications in the ESGD literature (Del Gesso & Lodhi, 2024). Moreover, legitimacy theory and stakeholder theory are commonly treated as complementary, particularly in ESG contexts, as both focus on how firms respond to external evaluation and scrutiny (Jasni et al., 2020).

Legitimacy theory provides a macro-level explanation by conceptualising disclosure as a mechanism through which organisations seek to maintain or restore societal approval by aligning observable behaviour and communication with prevailing norms and values (Suchman, 1995; Deegan, 2019). In the context of ESG, this implies that disclosure serves not only to inform stakeholders, but also to signal conformity with socially valued standards. Stakeholder theory complements this view by offering a micro-level foundation for disclosure decisions, emphasising firms' accountability to multiple stakeholder groups involved in or affected by corporate operations and value creation, including investors, employees, communities, and public authorities (Guthrie et

al., 2006; Lozano et al., 2015; Rezaee, 2016). This perspective is particularly useful for understanding greenhushing because firms may privilege some audiences over others, and reduce ESG visibility when they expect public communication to trigger scepticism, criticism, or political backlash.

These perspectives frame disclosure as a relational and context-dependent practice through which firms manage heterogeneous and sometimes conflicting external expectations (Kim and Lyon, 2015). Within this framework, greenhushing can be conceptualised as a deliberate form of strategic silence, whereby firms under-disclose ESG information when maintaining visibility is perceived as costly or risky. In particular, under-communication is more likely to emerge when salient stakeholders reward substantive ESG performance while penalising overt ESG communication, especially in politicised or highly scrutinised environments (Font et al., 2017; Ginder et al., 2021). This interpretation positions greenhushing as a rational disclosure response to institutional pressures and stakeholder configurations, rather than as an anomaly or withdrawal from sustainability engagement.

2.1 Literature Review and Hypothesis development

ESG controversies are commonly defined as events or ongoing situations, reported in the media, in which firms are alleged to have generated harmful environmental, social, or governance impacts, including environmental accidents, product-related scandals, social misconduct, and governance failures that attract broad public and investor attention (Aouadi & Marsat, 2018). A growing body of empirical research documents that such controversies have material consequences for firms, affecting financial performance (Aouadi & Marsat, 2018), operational efficiency (Dipierro et al., 2024), credit risk (Petkevich et al., 2024), firm value (Anita et al., 2023), and stock prices (Cui and Docherty, 2020). Investors appear to require compensation for bearing ESG-related controversy risk, consistent with evidence that controversies increase firms' cost of capital and risk premia (Bang et al., 2023).

From a disclosure perspective, legitimacy theory predicts that such negative events constitute legitimacy-threatening shocks that prompt firms to engage in legitimacy-repair behaviour through increased transparency and communication (Patten, 1992; Suchman, 1995). Following environmental incidents or reputational scandals, firms are therefore expected to expand environmental and social reporting in order to signal responsiveness and regain stakeholder trust, particularly among salient audiences (Ashforth & Gibbs, 1990; Cho & Patten, 2007). Research supports this logic by showing that environmentally underperforming firms often disclose more environmental information than stronger performers, using disclosure strategically to manage heightened scrutiny and reputational pressure (Bansal & Clelland, 2004; Alrazi et al., 2015). This stream of research has contributed to the view that ESGD can function as a vehicle for ESG-washing, allowing firms to signal commitment without fully matching it in practice (Alexander & Buchholz, 1978; Barnea & Rubin, 2010).

Recent literature, however, questions that controversies systematically lead to greater disclosure. Research on greenhushing suggests that under conditions of scepticism, high litigation risk, and politicised ESG debates, firms may respond to controversies by reducing the visibility or explicitness of ESG communication rather than increasing it (Font et al., 2017; Ginder et al., 2021; Falchi et al., 2022; Tao, 2024). In such contexts, disclosure itself becomes risky, as additional ESG communication may be interpreted as opportunistic, hypocritical, or politically charged. Evidence from tourism and hospitality, shows that firms often communicate only a subset of their sustainability initiatives to avoid accusations of inconsistency, a practice described as "structural greenhushing" and interpreted as a form of moral muteness adopted under high ethical expectations (Font et al., 2017; Ettinger et al., 2021). These studies portray greenwashing and greenhushing as alternative strategic responses located along a disclosure continuum, rather than as random or idiosyncratic errors, with firms selecting the configuration perceived as less risky given prevailing institutional conditions (Lublóy et al., 2025).

The literature examining ESG controversies and disclosure further reinforces this ambiguity. On the one hand, some studies find that enhanced ESG transparency can mitigate the negative consequences of controversies, for example by improving analysts' forecast accuracy or strengthening organisational resilience following environmental incidents (Schiemann & Tietmeyer,

2022; Marsat et al., 2022). On the other hand, evidence suggests that post-controversy disclosure is often symbolic rather than substantive, indicating that additional communication may be driven by impression management rather than genuine behavioural change (Li et al., 2019).
Building on this we hypothese:
H1: *Higher levels of past ESG controversies are associated with more intense greenhushing.*

Prior research shows that ESGD is strongly shaped by contextual and institutional forces operating at both country and firm level (Ogundajo et al., 2022). Literature shows that variations in ESGD are driven by changes in regulatory frameworks, political systems, investor regimes, and broader socio-cultural conditions, which jointly influence firms' incentives, constraints, and exposure to scrutiny (Baldini et al., 2018; Seow, 2024). From an institutional and legitimacy perspective, ESGD reflects firms' adaptive responses to shifting expectations about acceptable corporate behaviour rather than a stable or purely performance-driven reporting practice.

Within this context, Europe and the United States represent two interconnected but institutionally distinct trajectories of ESG development (Esposito De Falco and Cucari, 2025; Bax et al., 2023). In Europe, ESGD has progressively moved toward formalisation and standardisation, driven by supranational regulation and coordinated policy initiatives (CSRD e CSDDD), aimed at embedding sustainability within corporate governance and capital markets. The expansion of mandatory reporting requirements and harmonised disclosure frameworks has reinforced the perception of ESG transparency as a normative obligation, reducing managerial discretion over whether and how sustainability information should be communicated.

By contrast, ESGD in the US has evolved through a more volatile and contested process (Sulkowski and Jebe, 2022). In the early 2020s, federal climate initiatives, including the US re-entry into the Paris Agreement and the SEC's 2022 proposal on climate-risk disclosure, signalled that expanded ESG reporting was becoming a normative expectation for listed firms (US SEC, 2022). This regulatory momentum was reinforced by growth in investor demand for ESG information, reflected in significant inflows into ESG-labelled funds and the increasing integration of ESG data into investment decision-making (Harvard Law School Program on Corporate Governance, 2022). Consistent with prior evidence, this phase aligned with the view that ESGD can reduce information asymmetry, improve capital-market outcomes, and support long-term value creation (Dhaliwal et al., 2011; Cheng et al., 2014). From 2021 onwards, however, this trajectory became unstable. ESG entered a phase of political contestation at the sub-national level, as conservative politicians, advocacy groups, and think tanks reframed ESG investing and corporate sustainability initiatives as ideologically driven and incompatible with shareholder primacy (Capital Monitor, 2022; Heritage, 2024). This discursive shift translated into an unprecedented wave of state-level legislation restricting the use of ESG criteria in public investment and procurement, and in some cases explicitly penalising firms perceived as "anti-fossil" (American Legislative Exchange Council, 2022; Garrett and Ivanov, 2022). Notable examples include Texas's legislation that penalises companies for divesting from fossil fuels, and Florida's prohibition on considering ESG factors when making state investment decisions (Reuters, 2023). This landscape of conflicting state-level rules creates an environment that is potentially hostile to sustainability communication. The result has been a fragmented institutional environment in which firms face conflicting and geographically uneven expectations regarding ESG communication, reflecting increasing institutional complexity and partial de-institutionalisation of ESG narratives (Wang et al., 2025).

While global investors and federal regulators continue to endorse sustainability-oriented disclosure, powerful domestic actors contest the legitimacy of visible ESG communication, reasserting a shareholder-value logic (Oliver, 1991; Greenwood et al., 2011; Hilton, 2025). Under such conditions, legitimacy cannot be secured through uniform disclosure strategies. Organisational theory suggests that firms respond through selective coupling and institutional repair, maintaining substantive ESG practices internally while recalibrating external communication to minimise legitimacy threats in hostile environments (Pache and Santos, 2013; Micelotta and Washington,

2012).

Greenhushing emerges precisely within this temporal and institutional configuration. When public ESG communication is perceived as increasing political, legal, or reputational risk, firms may rationally reduce the visibility of ESG information, even as underlying practices remain unchanged (Kim and Lyon, 2015; Hilton, 2025b). Survey evidence and practitioner reports indicate that many firms continue ESG integration while deliberately lowering the prominence, explicitness, or labelling of sustainability disclosures (The Economist, 2025; Esposito De Falco, 2025). Importantly, this shift is not instantaneous but unfolds over time as institutional signals become more ambiguous.

The temporal dimension is therefore central. Examining whether and how the greenhushing evolves over time allows us to capture this gradual adjustment process and to assess whether it becomes more pronounced as institutional conflict intensifies.

Building on this we hypothese:

H2: *Through 2020-2024, greenhushing has increased among under-disclosing firms, reflecting increased reliance on under-disclosure strategies.*

In this context, firm size is important in shaping firms' ESGD strategies. Larger firms are typically more visible and subject to stronger societal, media, and stakeholder scrutiny, possessing greater organisational resources to develop sophisticated reporting and sustainability management infrastructures (Gray et al., 1995; Adams et al., 1998; Hahn & Kühnen, 2013). Research shows that large companies make more extensive use of tools to organise, analyse, and communicate ethical and sustainable practices, and that both the scope of CSR reporting and related expenditures tend to increase with firm size (Graafland et al., 2003). Evidence further indicates that larger firms are more familiar with sustainability management tools and that this familiarity is associated with more formalised and standardised reporting structures (Hörisch et al., 2015). Similarly, ESG data availability in commercial databases is positively correlated with firm size and market value, reflecting higher visibility and reporting capacity (Baldini et al., 2018). A review by Hahn and Kühnen (2013) concludes that firm size is the only determinant that consistently and positively affects sustainability reporting across studies. At the same time, greater visibility and reporting capacity do not necessarily translate into closer alignment between disclosure and practices. Organisational theory suggests that highly visible firms may be more prone to decoupling between formal structures and substantive activities, using reporting to manage legitimacy and conform to external expectations without proportionate changes in core operations (Meyer & Rowan, 1977; Gallo & Christensen, 2011). Sustainability reports and advanced communication capabilities allow large firms not only to provide richer information, but also to strategically shape narratives and manage impressions in response to external pressures (Baumann-Pauly et al., 2013; Baldini et al., 2018). In this sense, size and visibility simultaneously increase the capacity to disclose and the incentives to strategically manage disclosure, creating fertile ground for both greenwashing and greenhushing. However, larger firms attract greater attention from analysts, media, regulators, and activists, which magnifies both the reputational benefits of credible ESGD and the potential costs of communicative missteps (Cahan et al., 2016; Yu et al., 2020). Therefore, ESG controversies are unlikely to exert a uniform effect on disclosure behaviour across firms of different sizes. For relatively less visible large firms, the concern following a controversy may be to avoid further attention, leading to deeper under-disclosure as a defensive strategy. For large firms, however, the combination of intense scrutiny, litigation exposure, and political salience may render sustained greenhushing after a controversy increasingly risky. Therefore, controversies may prompt greater alignment between ESG performance and communication..

Building on these considerations, market capitalisation is treated as a moderating variable capturing cross-sectional heterogeneity in visibility and stakeholder pressure among large listed firms. Accordingly, the following hypothesis is proposed.

H3. *Firm size moderates the relationship between past ESG controversies and the ESG disclosure-performance gap.*

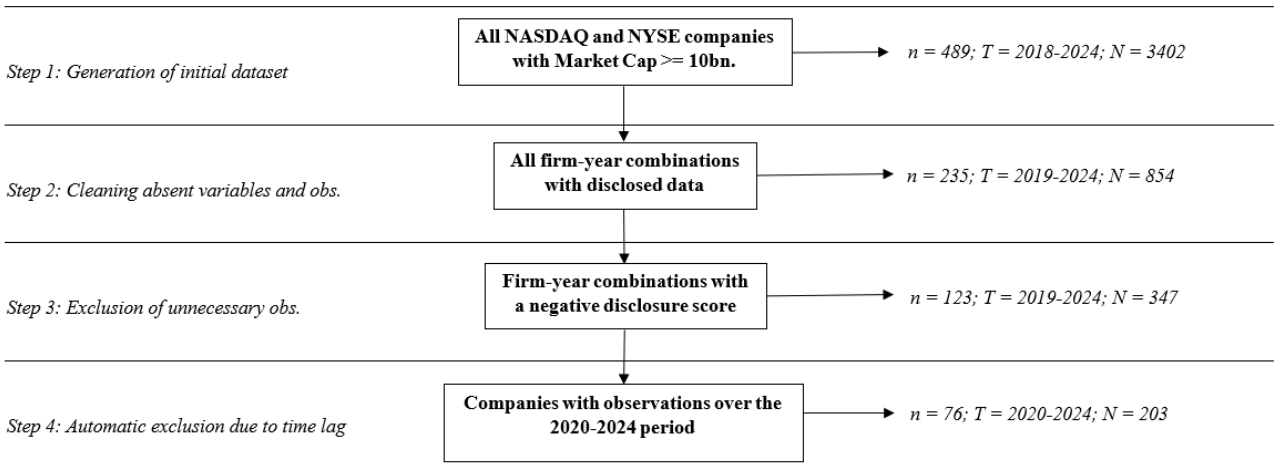
3. Methodology

3.1 Sample description

The empirical analysis is based on a panel dataset of US listed firms obtained from Refinitiv, drawing on the NYSE and NASDAQ Capital Market indexes over the 2018-2024 period, which were regarded as the two most comprehensive ones. Firms were selected by applying standard filters for primary issues, quoted issues, and active status, in order to ensure consistency in listing characteristics and data comparability over time. The timeframe was chosen following the rise of greenhushing-related literature from the publication of Font et al. (2018) onward. In particular, the shift in the narrative related to sustainability since the advent of the first Trump administration in 2017 has put companies in a tough spot. This, along with the convoluted history of ESG laid out by Sulkowski and Jebe (2022), singles out the US as a uniquely optimal context to understand the temporal evolution of disclosure-related behavior. Moreover, the selection of American firms lines up significantly with companies with a larger than 10 billion USD market capitalization.

Once the temporal and spatial scope of the dataset was specified, it had to be refined to address data availability constraints and to ensure the completeness of all variables required for the analysis. After removing firm-year combinations due to missing information, the sample was reduced and observations for the year 2018 were omitted following a general lack of availability, which further exemplifies the lack of harmonization on ESGD in the US. Given the specific focus of this paper, all companies that were not found employing greenhushing behavior were also subsequently omitted from the dataset. Finally, to account for the temporal relationship between ESG controversies score[1] and subsequent disclosure decisions, the empirical model had to be built based on lagged explanatory variables. Therefore, the first year of observation for each firm cannot be used in the estimation. This leads to the exclusion of 2019 data and results in a final estimation sample of 76 firms observed over five years (2020–2024), for a total of 203 firm-year observations. The resulting panel is unbalanced, which is addressed through fixed-effects estimation techniques. The overall data collection process is summarized in Fig.1.

Figure 1: Data collection



Source: own elaboration

[1] The ESG controversies score, provided by LSEG Workspace (formerly Thomson Reuters' Refinitiv Database), is a recent metric that offers a comprehensive evaluation of a company's sustainability impact and conduct over time. It measures a company's exposure to ESG controversies, capturing adverse events reflected in global media (LSEG Data and Analytics 2023). The score is calculated based on 23 specific controversy areas, such as business ethics, tax fraud, human rights, and environmental issues. Companies with fewer controversies receive higher scores, with 100 representing no controversies. When controversies arise, the score is penalized, and ongoing legal disputes or fines can continue to affect the score over multiple years.

3.2 Variables description

3.2.1 Dependent variable

As the summary of the research variables (Tab. 1) shows, the dependent variable of the analysis is an ESGD score. This was constructed following the methodology proposed by Yu et al. (2020). The objective of this measure is to capture the extent of firms' ESGD relative to their ESG performance, thereby allowing for the identification of greenhushing behavior. The construction of the disclosure score proceeds in several steps. First, a set of Refinitiv variables related to ESGD is extracted separately for each of the three ESG pillars: Environmental (E), Social (S), and Governance (G). These variables include both quantitative indicators and binary disclosure indicators that capture whether specific ESG-related information is publicly reported by the firm. In the second step, all disclosure-related variables within each ESG pillar are normalized using a min–max transformation. For a generic disclosure variable x, the normalized value is computed as:

$$x = \frac{x - min(x)}{max\,(x) - min(x)}$$

Binary variables are transformed into numerical form, with True = 1 and False = 0, and are then included in the normalization procedure. Within each pillar, the normalized disclosure variables are summed to obtain a raw disclosure index. This raw index is subsequently normalized again using a min–max transformation to ensure comparability across firms and years. The result of this procedure is a normalized disclosure score for each ESG pillar, denoted as E_{dis} , S_{dis} , and G_{dis}.

In the third step, the pillar-specific disclosure scores are compared to the corresponding ESG performance scores provided directly by Refinitiv. These scores were subsequently subtracted from the corresponding parts of the ESG score, extracted from REFINITIV, and renamed E_{score}, S_{score}, and G_{score}, which were also normalized using the min-max ratio. For each pillar, the difference between disclosure and performance is computed as:

$$\begin{aligned} \Delta E &= E_{score} - E_{dis} \\ \Delta S &= S_{score} - S_{dis} \\ \Delta G &= G_{score} - G_{dis} \end{aligned}$$

These differences are interpreted as the gap between disclosure intensity and underlying ESG performance. Therefore, they are not meant to provide any information on the quality of disclosure itself. In the fourth step, the overall disclosure score is constructed by aggregating the pillar-level differences:

$$\Delta(ESG\ Disclosure\ Score) = \Delta E + \Delta S + \Delta G$$

This composite measure captures the extent to which a firm's ESGD exceeds or falls short of what would be expected given its ESG performance. Finally, in the fifth step, only observations with negative values of the disclosure score are retained for our analysis. Negative values indicate that a firm's ESGD is lower than its ESG performance, consistent with greenhushing as defined in the related literature, shown in the equation below. Observations with non-negative values are excluded, as they reflect greenwashing-oriented behavior.

$$\begin{cases} \Delta ESG\ Disclosure\ Score > 0 \rightarrow Greenwashing \\ \Delta ESG\ Disclosure\ Score < 0 \rightarrow Greenhushing \end{cases}$$

3.2.2 Other variables

The main independent variable is ESG controversies, which measures the occurrence and intensity of negative ESG-related events involving the firm. ESG controversies capture reputational shocks arising from environmental incidents, social misconduct, or governance failures. They have been

found to impact firm performances (Aouadi and Marsat, 2018) and reputation (Minutiello and Tettamanzi, 2025). As a result, it is estimated that firms will tend to safeguard themselves from further controversies by underdisclosing sustainability information. Therefore, ESG controversies are put in the model in lagged form, to measure how they shape the reaction process over time. In addition, year fixed effects are included in all specifications to control for common time trends, regulatory developments, and changes in ESG reporting standards, as done in previous ESGD-related studies (Gavana et al., 2024).

The second independent variable is the function of time. By measuring variations in the greenhushing score from 2021 to 2024, it is possible to understand how exogenous changes may have impacted on firm behavior. This is done by inserting year dummies and transforming the model in a two-way fixed effects model. Without this function, the explanatory power of year-on-year changes could be absorbed by other variables, or be registered as "background noise" and negatively influence the overall R-squared. However, given the theoretical background and the importance of political shifts in the contemporary American context, variations over time will be taken into account as an integral part of the model. The key assumption is that - as time progresses - greenhushing will become both more intense and more widespread, and consequently easier to predict.

Firm size is introduced as a moderating variable through the natural logarithm of market capitalization, as done previously in ESG literature, by using either market cap, total assets, or a combination of both (Ahmad et al., 2021; Hamdouni, 2025). In particular, market capitalization was chosen as it reflects firms' visibility, access to capital markets, and exposure to external scrutiny. An interaction term between lagged ESG controversies and market capitalization is included to examine whether the disclosure response to controversies varies systematically with firm size.

Finally, the model includes a set of control variables commonly used in the ESGD literature. Consequently, they were implemented to isolate their effects and prevent omitted variable biases. Gender diversity is measured as the proportion of female directors on the board of directors. Board independence - which has been found to impact sustainability metrics (Ciasullo et al., 2020) - is captured through the percentage of independent directors. Firm size from an accounting perspective is controlled for using the natural logarithm of total assets. ESG performance is computed through proxy by using Refinitiv's ESG score and is included to isolate disclosure behavior from performance and check the impact of the latter on the former.

Tab.1: Variables selection

	Dependent Variable	**Source**
greenhushing_score	Composite ESGD Score (< 0 only)	Yu et al. (2020)
	Independent Variables	**Source**
esg_contr	ESG Controversies	Aouadi and Marsat (2018)
function(year)	Year-on-year variation of the DV	Gavana et al. (2024)
	Control Variables	**Source**
esg_score	ESG Score	Lopez-de-Silanes et al. (2020)
gender_div	% of Women in the BoD	Gavana et al. (2024)
ind_board _members	N. of Independent Board Members	Arif et al. (2021)
log_tot_assets	Total Assets	Gavana et al. (2024)

	Moderating Variable	Source
log_mkt_cap	Market Capitalization	Ahmad et al. (2021)

Source: own elaboration

3.3 Model specification and estimation method

The relationship between ESG controversies and ESGD is examined using a firm fixed-effects panel regression model which controls for unobserved, time-invariant firm characteristics that may simultaneously affect disclosure and the explanatory variables. The choice of a fixed-effects model is supported by a Hausman test rejecting the random-effects specification (p-value < 0.005), and is consistent with prior studies on ESGD and corporate governance. The resulting model follows the equation:

$$greenhushing_score_{it} = \beta_1 \times esg_contr_{i,t-1} + \beta_2 \times \log(mkt_cap)_{it} + \beta_3\left[esg_contr_{i,t-1} \times \log\left(mkt_cap_{it}\right)\right] + \beta_4 \times esg_score_{it} + \beta_5 \times gender_div_{it} + \beta_6 \times ind_board_members_{it} + \beta_7 \times \log(tot_assets)_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

The baseline specification includes lagged ESG controversies, market capitalization, their interaction term, the set of control variables, firm fixed effects (α), and year fixed effects (γ). The disclosure score is taken at its absolute value, as companies with an underdisclosure gap exclusively were included in the final dataset. Therefore, variables with a positive impact on the score will actually show an increase in greenhushing practices.

3.4 Robustness checks

Several robustness checks were performed to assess the stability of the results. First, alternative lag structures for ESG controversies are employed to verify the persistence of the estimated relationship over time. Second, all models are re-estimated using firm-clustered standard errors to account for serial correlation and heteroskedasticity within firms. Third, multicollinearity is assessed through variance inflation factors, which do not indicate problematic levels of collinearity. Finally, a mechanical endogeneity test is conducted by reversing the direction of causality and replacing lagged ESG controversies with future controversies. The absence of significant effects in these placebo regressions supports the interpretation that ESGD responds to past controversies rather than anticipating future events.

4. Results

4.1 Model selection

The choice of the fixed-effects estimator is supported by the Hausman test, which strongly rejects the null hypothesis of random effects (p-value < 0.05). Multicollinearity concerns were addressed through a variance inflation factor (VIF) test. All VIF values turned up well below conventional thresholds (<< 5), excluding the threat of multicollinearity. Reverse causality issues were also taken into account and accounted for with a placebo test that replaced lagged ESG controversies with future ones. This turned out to be non-significative, as to be expected.

4.2 Baseline fixed-effects results

After selecting the model, multiple regressions were run with all the available variables. Model 1 presents the baseline specification using a one-year lag of ESG controversies. The coefficient on lagged ESG controversies is positive and statistically significant, indicating that, within firms, an increase in ESG-related controversies is followed by an increase in greenhushing levels in the following year. This result suggests that firms respond to reputational shocks by adjusting their disclosure practices, while also keeping their actual sustainability performances unchanged.

Multiple robustness checks were carried out, to test the computational limits of the base model. Attempt n.2 replaces the one-year lag with a two-year lag of ESG controversies in order to assess the

persistence of disclosure responses over time. The coefficient on the two-year lag remains positive and statistically significant, confirming that the disclosure response to ESG controversies extends beyond the immediate aftermath of the shock, and even becoming more significant. The consistency of the results across lag structures indicates that the relationship is not sensitive to the specific timing assumption. The results (Table 2) are consistent with our hypotheses.

Tab.2: Results

	FE Model 1	**FE Model 2**	**Cluster-Robust Test**
lag(esg_contr, 1)	0.01 * (0.00)		0.01 * (0.00)
lag(esg_contr, 2)		0.02 * (0.01)	
log_mkt_cap	0.12 (0.06)	0.17 . (0.10)	0.12 . (0.06)
lag(esg_contr, 1): log_mkt_cap	-0.00 * (0.00)		-0.00 * (0.00)
lag(esg_contr, 2): log_mkt_cap		-0.00 * (0.00)	
esg_score	0.01 *** (0.00)	0.01 *** (0.00)	0.01 *** (0.00)
log_tot_assets	-0.03 (0.04)	-0.00 (0.00)	-0.03 (0.04)
gender_div	0.00 ** (0.00)	0.00 * (0.00)	0.00 * (0.00)
ind_board_members	0.00 (0.00)	0.01 ** (0.00)	0.00 (0.00)
factor(year)2021	0.01 (0.02)		0.01 (0.02)
factor(year)2022	0.06 * (0.02)	0.04 (0.03)	0.06 . (0.02)
factor(year)2023	0.07 * (0.03)	0.05 (0.03)	0.07 (0.05)
factor(year)2024	0.19 *** (0.04)	0.19 *** (0.05)	0.19 *** (0.06)
R2	0.49	0.61	
Adj. R2	0.11	0.24	
Num. obs.	203	136	

Source: own elaboration

4.2.1 Control variables and time effects

Among the control variables, ESG performance exhibits a positive and highly statistically significant association with ESGD across all specifications, indicating that disclosure remains positively related to underlying ESG performance, even after controlling for firm fixed effects and time trends. Board gender diversity is also positively associated with greenhushing levels and is statistically significant in most specifications. Although this seems to suggest that changes in board composition toward greater gender diversity are linked to higher disclosure levels, this might also be a byproduct of increasing ESG-related performances, which are strongly associated with gender diversity (i.e: Manita et al., 2018; Martinez et al., 2024). Therefore, as our greenhushing score is computed by subtracting performance levels from disclosure ones, this increase in sustainability might be wrongly read by the model as an increase in greenhushing.

Moreover, the proportion of independent board members shows a weaker and less stable association with ESGD, while total assets do not display a statistically significant effect once market capitalization is included. Year fixed effects also reveal a strong upward trend in greenhushing tendencies over the 2021-2024 period, with particularly pronounced increases in the most recent years. This pattern confirms *H2* and the negative impact of the recent political and economic trends on disclosure levels in American firms. Importantly, the main results remain robust after controlling for these common time trends.

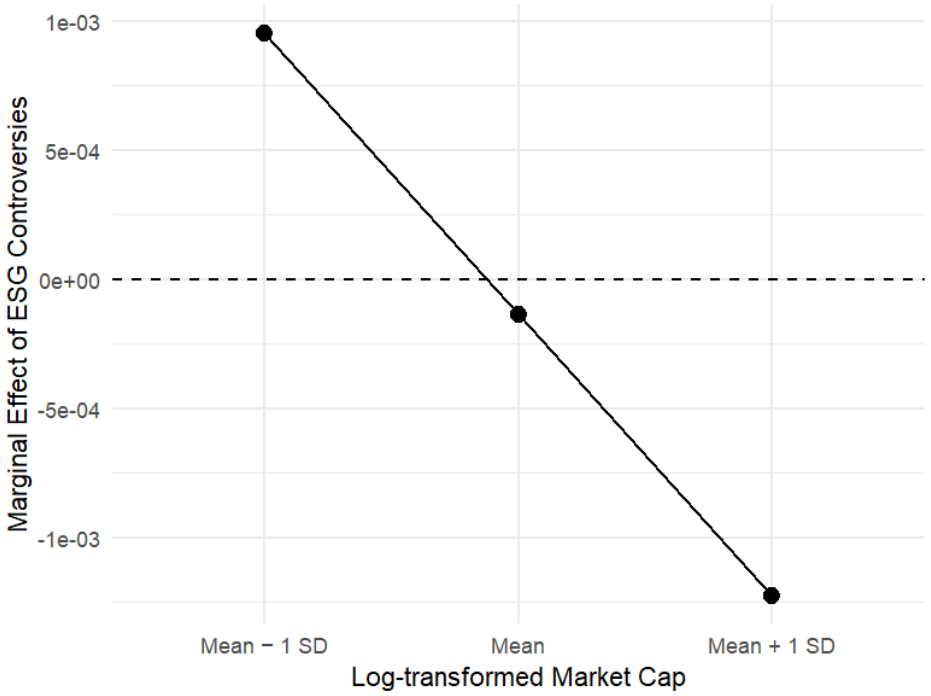
4.2.2. Robustness to clustered standard errors

To account for potential serial correlation and heteroskedasticity within firms, the baseline model is re-estimated using firm-clustered standard errors (Table 2). The results confirm that the key findings remain unchanged. In particular, the coefficients on lagged ESG controversies and on the interaction with market capitalization retain their sign and statistical significance. This indicates that the baseline inference is not driven by underestimated standard errors.

4.3 The moderating role of market capitalization

A central contribution of the analysis concerns the interaction between ESG controversies and firm size. In both Model 1 and Model 2, the interaction term between lagged ESG controversies and market capitalization is negative and statistically significant, although the impact (-0.00) is minimal. This finding indicates that the positive relationship between ESG controversies and subsequent ESGD becomes weaker for larger firms. The negative interaction implies that firm size moderates the disclosure response to ESG controversies. While relatively smaller firms increase ESGD following reputational shocks, larger firms exhibit a substantially weaker response. This pattern is robust across alternative lag specifications and suggests that firm size plays an important role in shaping disclosure strategies. To get a better understanding of this interaction between ESG controversies and market capitalization, Figure 3 was created to show the marginal effect of ESG controversies on ESGD at different levels of firm size. Marginal effects are computed using the estimated coefficients from the baseline model and are evaluated at the mean and at plus and minus one standard deviation of market capitalization. Ninety-five percent confidence intervals are constructed using the delta method.

Fig. 3: Marginal effects of ESG Controversies on greenhushing, evaluated at mean of market cap



Source: Own elaboration

The marginal effects analysis reveals a linear downward pattern. For firms with relatively low market capitalization, the marginal effect of ESG controversies on ESGD is positive and statistically significant, indicating a strong increase in greenhushing practices following reputational shocks. As firm size increases, the marginal effect declines steadily and becomes statistically indistinguishable from zero at the mean level of market capitalization. For firms with high market capitalization, the marginal effect turns negative, thus changing the sign of the interaction. These results provide two clear insights on the model. The first one is that market capitalization plays a crucial moderating role in the relationship. Indeed, the changes it causes is not simply quantitative, but qualitative too. Consequently, the use of the moderating variable is justified from a statistical point of view, as well as a theoretical one. Second, it shows that larger firms appear less responsive in their disclosure behavior following ESG-related controversies, which shows a lower impact of negative public opinion compared to relatively smaller firms. This is consistent with previous studies (Cahan et al., 2016; Yu et al., 2020) on the impact that firm size and overall "power" can have on disclosure processes, thus confirming the expected results of *H3*.

5. Discussion

This study advances understanding of ESGD by examining how firms characterised by greenhushing adjust their communication strategies following ESG-related controversies and how these adjustments vary with firm size. The findings indicate that greenhushing is neither a residual reporting outcome nor a purely firm-specific anomaly, but a systematic and context-dependent response to external shocks and evolving institutional conditions. Thus, ESGD emerges as a strategically managed activity rather than a neutral reflection of underlying sustainability performance (Suchman, 1995; Deegan, 2019; Guthrie et al., 2006).

A central implication of the results concerns how firms engaging in greenhushing reassess disclosure risk following ESG-related controversies. The analysis shows that higher levels of past

ESG controversies are associated with a subsequent increase in the ESG disclosure-performance gap, supporting H1. Traditional legitimacy-based arguments would predict the opposite pattern, namely an expansion of disclosure following legitimacy-threatening events in order to restore social approval (Patten, 1992; Suchman, 1995). Research grounded in this logic has documented cases in which firms increase environmental or social reporting after accidents or scandals to signal responsiveness and regain stakeholder trust (Ashforth and Gibbs, 1990; Cho and Patten, 2007). The evidence of our study, however, aligns more closely with the emerging greenhushing literature, which suggests that controversies can raise the perceived costs of ESG communication and induce firms to limit disclosure visibility rather than expand it (Font et al., 2017; Ginder et al., 2021; Falchi et al., 2022; Tao, 2024). In politicised or sceptical environments, additional ESGD may heighten scrutiny or invite accusations of hypocrisy, thereby undermining rather than restoring legitimacy. From this perspective, ESG controversies do not merely threaten legitimacy, they also reshape firms' disclosure calculus by increasing the risks associated with visible ESG talk (Kim and Lyon, 2015).

This reassessment of disclosure risk does not occur in isolation, but unfolds over time as institutional conditions surrounding ESG continue to evolve. The year fixed effects indicate a clear increase in under-disclosure over the period examined, thus supporting H2. Our results suggest that greenhushing has intensified over time, consistent with broader changes in the institutional environment surrounding ESG. As ESGD becomes more contested and partially de-institutionalised, firms may respond through selective coupling, maintaining substantive practices internally while recalibrating external communication to preserve legitimacy across heterogeneous audiences (Pache and Santos, 2013). Relatedly, institutional repair work highlights how organisations adjust symbols and narratives under pressure without abandoning underlying practices (Micelotta and Washington, 2012). The observed temporal increase in under-disclosure is consistent with these mechanisms, particularly in contexts characterised by political polarisation and regulatory uncertainty (Oliver, 1991).

Finally, the feasibility of strategic silence depends on firm visibility and scale. The results show that market capitalisation significantly moderates the relationship between ESG controversies and the disclosure gap, directly addressing H3. This finding is consistent with prior evidence that larger firms are more visible and subject to stronger stakeholder scrutiny, while also possessing greater resources to manage disclosure strategically (Gray et al., 1995; Hahn and Kühnen, 2013; Baldini et al., 2016). Among less visible firms within the under-disclosing segment, controversies are associated with a stronger widening of the disclosure gap, consistent with a defensive turn toward reduced visibility to contain attention. For the largest and most visible firms, however, the effect of controversies weakens and may become negligible, indicating that persistent greenhushing becomes increasingly difficult to sustain under conditions of continuous scrutiny. Importantly, this does not imply that large firms are less dependent on stakeholders. Rather, it suggests that the configuration of salient stakeholders and the constraints they impose differ systematically with scale and visibility, altering the strategic feasibility of sustained silence following ESG controversies.

6. Conclusions

These findings of this paper recast ESG reporting as an adaptive equilibrium at the intersection of legitimacy pressures, stakeholder configurations, and political contestation, where firms adjust the level of sustainability practices to manage controversy risk and stakeholder expectations.

6.1 Contribution to the literature

The paper has three main literature contributions. First, it refines ESGD theory by operationalising greenhushing as a negative disclosure-performance gap and documenting, on a large sample, that firms may respond to ESG shocks not through exaggeration but through silence. This complements the dominant focus on greenwashing and reframes disclosure strategy as spanning both over- and under-communication. Moreover, it suggests a refinement of legitimacy theory, which has already

been heavily suggested by Deagan (2019). In particular, we find that under conditions of institutional conflict, firms may instead pursue legitimacy through reduced visibility, thus indicating that silence can function as a strategic legitimacy mechanism. This is not accounted for by seminal works that define legitimacy theory, therefore implying the need for further debate.

Second, by integrating legitimacy and stakeholder perspectives within a politically polarised U.S. context, the study shows that controversies do not uniformly prompt transparency as a form of legitimacy repair. When salient stakeholders penalise explicit ESG communication, visibility itself becomes costly. This has significant implications that are heavily rooted in stakeholder theory, and in particular on the criteria for stakeholder selection, a branch of this approach exemplified by Bridoux and Stoelhorst's (2014) seminal work. In particular, it is worth noting that when certain stakeholder groups penalise ESG visibility, firms may prioritise selective stakeholder alignment, leading to under-disclosure strategies.

Third, the findings enrich institutional and governance research by identifying firm size as a key moderator: relatively less scrutinised large firms deepen under-disclosure following controversies, whereas the largest and most exposed firms exhibit limited capacity to sustain silence. This will be especially important for future quantitative research on greenhushing practices, which will have to consider size and influence in a way that is seldom done by past studies.

6.2 Managerial implications

For managers, ESG communication must be jointly controlled with ESG controversy history (at least last 3 years), visibility in terms of market capitalization, and salient stakeholders in terms of their material sensitivity, to avoid both exaggerated claims and over-silence. External auditors also should define a minimum, assured disclosure baseline. For investors, sparse disclosure should not be always taken as weak performance, and engagement should target both inflated claims and unusual silence. For regulators, formal mandates should be complemented with enforcement, assurance, and prominence requirements for core ESG indicators, especially for large or controversy-prone firms, to curb greenhushing without stifling discretion.

Moreover, there is a significant number of external stakeholders that are directly impacted by disclosure practices. Indeed, civil society actors, including NGOs and the media, may also face increasing challenges in monitoring corporate sustainability behaviour, as greenhushing reduces the availability and salience of information necessary for public scrutiny. Finally, for standard-setters and assurance providers, the findings underscore the importance of developing frameworks capable of detecting not only over-disclosure greenwashing but also systematic under-disclosure, thereby supporting more reliable and comparable ESG reporting ecosystems. We argue that rising lack of trust by external stakeholders will provide an even further challenge for managers in an already chaotic environment.

6.3 Limitations and future research

Despite the advancements made by this paper, the focus on U.S. listed firms from 2020 to 2024 and reliance on a single dataset may embed contextual and provider-specific biases. Restricting the sample to under-disclosers sharpens identification of greenhushing but limits direct comparison with greenwashing and may overlook dynamics near the disclosure threshold. The quantitative design cannot fully capture qualitative dimensions of ESG communication, such as tone or framing. Moreover, despite lags, fixed effects, and robustness checks, the observational approach constrains strong causal inference. Therefore, cross-country analyses could assess whether controversy-driven greenhushing generalises to different regulatory and political regimes. Mixed-method designs combining disclosure-performance gaps with textual analysis could uncover subtler forms of narrative softening or depoliticisation. Extending the time horizon and modelling major regulatory inflection points would clarify whether greenhushing is a temporary adaptation to institutional turbulence or an enduring feature of contemporary ESG capitalism.

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When Corporate Governance becomes Necessary: Board Mechanisms and Innovation Efficiency

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Abstract

Frame of the research. *Research on corporate governance and innovation has predominantly relied on sufficiency-based models that estimate average effects of board mechanisms, offering limited insight into whether certain governance mechanisms are indispensable for innovation outcomes. This limitation is particularly salient in knowledge-intensive and highly regulated contexts such as the healthcare industry, where innovation efficiency is critical.*

Purpose of the paper. *This study investigates whether board-level corporate governance mechanisms constitute necessary conditions for achieving innovation efficiency, understood as the effective transformation of R&D investments into patented innovation outputs.*

Methodology. *The paper employs Necessary Condition Analysis (NCA) to examine whether board size, board independence, board gender diversity, board tenure, and CEO duality represent necessary consitions for innovation efficiency. Ceiling line estimation, permutation tests, and bottleneck analysis are employed.*

Results. *The findings identify board independence as the only necessary condition for high innovation efficiency. Firms with insufficient board independence are unable to achieve high efficiency levels, regardless of R&D intensity. Other board mechanisms display weaker or non-significant necessity patterns.*

Research limitations. *The study is constrained by a limited sample size, a short observation period, and a focus on the healthcare sector, which may affect generalisability.*

Managerial implications. *The results suggest that board independence represents a non-negotiable governance foundation for innovation efficiency, while other board attributes should be adapted to firm-specific contexts.*

Originality of the paper. *The study advances governance and innovation research by introducing necessity logic, reconceptualising innovation efficiency as a governance-relevant outcome, and demonstrating the non-compensatory role of board independence.*

Keywords: *corporate governance; board of directors; innovation efficiency; nca; healthcare*

1. Introduction

Innovation, defined as the development of new products, services, processes, or organisational models (Kahn, 2018; Annesi *et al.*, 2020), is a fundamental determinant of firm competitiveness and long-term survival in complex and uncertain environments (Almrshed *et al*., 2023; Becheikh *et al*., 2006; Johannessen *et al*., 2001). Its strategic importance became particularly evident in the aftermath of the COVID-19 pandemic, which profoundly reshaped global economic structures and forced organisations to reconfigure business models (Seetharaman, 2020), supply chains (Raj *et al*., 2022), and innovation processes (Amankwah-Amoah, 2021; Akay *et al.*, 2022).

Within this landscape, the healthcare sector occupies a distinctive position. The need for rapid and effective innovation intensified, positioning innovation capability as a central lever for resilience and competitive advantage (Chesbrough, 2020). During the pandemic, major U.S. healthcare and pharmaceutical firms sustained record levels of R&D investment, such as Merck & Co. (USD 13.56 bn), Johnson & Johnson (USD 12.15 bn), and Pfizer (USD 9.41 bn), underscoring the sector's central role in sustaining global innovation (FDI Intelligence, 2021). Yet healthcare innovation remains characterised by unusually high risk, substantial resource requirements, and uncertain market success (Jalonen, 2012; Stern, 2017; Nawrocki & Jonek-Kowalska, 2022). These challenges have intensified in the post-pandemic years, when healthcare firms must simultaneously ensure financial resilience, improve operational robustness, and respond to demographic trends such as ageing populations and rising chronic disease prevalence (Flessa and Huebner, 2021; Oderanti *et al*., 2021; Nawrocki and Jonek-Kowalska, 2022). So the growing societal expectations for an improved quality of life and increased life expectancy further amplify the demand for innovation (Segarra-Oña *et al*., 2020; Saheb

and Izadi, 2019), which is supported by ongoing digital transformation and rising R&D costs.

However corporate governance has emerged as a key determinant of firms' innovative behavior (Sapra *et al*., 2014; Asensio-López *et al*., 2019). Over the past two decades, research has progressively moved beyond the governance-performance link and has examined the role of governance structures in shaping innovation outcomes (Barker and Mueller, 2002; Lin *et al*., 2011; Belloc, 2012). Recent contributions highlight that innovation should not be viewed only as a technological or operational process, but as an evolving dynamic process shaped by the quality of corporate governance (Bobillo *et al*., 2018; Liu *et al*., 2025). Several governance mechanisms have been shown to influence innovation strategies, including board size (Blibech and Berraies, 2018), board independence (Berezinets *et al*., 2018), gender diversity (Harjoto *et al*., 2018), board tenure (Chen, 2013), and CEO duality (Goodstein and Boeker, 1991; Sierra-Morán *et al*., 2024; Kor, 2006).

Despite these contributions, two major research gaps remain. First, existing research is fundamentally limited in how it conceptualises and measures innovation. Most prior studies (e.g. Bravo and Reguera-Alvarado, 2017; Chen, 2014; Cumming and Leung, 2021) use innovation inputs (e.g. R&D expenditure) or outputs (e.g. patents) as standalone indicators. However, these indicators only capture the volume of innovation efforts, not their productivity (Hagedoorn and Cloodt, 2003). As Cruz-Cázares et al. (2013) have highlighted, examining innovation inputs and outputs in isolation provides an incomplete and often misleading picture of innovation performance because it fails to reflect the efficiency with which firms convert R&D efforts into tangible innovation outcomes. Innovation inputs represent sunk costs unless they generate successful innovations, and innovation outputs alone say little about the effort required to obtain them (Tidd and Bessant, 2009; Koellinger, 2008). Consequently, only a limited number of studies examine innovation efficiency — the ability of firms to transform R&D inputs into meaningful innovation outputs — leaving a limited understanding of how governance mechanisms influence this productivity dimension.

A second limitation relates to the theoretical and empirical approaches that have traditionally been used to study governance and innovation. Existing research relies on linear, additive models (typically regressions), which assume that governance mechanisms operate independently and have equal marginal effects. However, as scholars have argued, corporate governance does not operate through isolated mechanisms, but rather as a "governance bundle" (Rediker and Seth, 1995, p. 87) or a "system of interdependent elements" (Aguilera et al., 2008, p. 482). Subsequent contributions (Dalton *et al*., 2003; Aguilera *et al*., 2012; Misangyi and Acharya, 2014; Greckhamer et al., 2018; Cucari, 2019; Furnari *et al*., 2021) have further reinforced the view that governance systems are configurational, meaning that mechanisms interact with, reinforce or even substitute each other. These contributions have emphasised that the effectiveness of governance depends not on the attributes of individual mechanisms, but on their configuration.

This perspective challenges the assumptions underlying regression-based approaches. Organisational processes, and innovation in particular, often exhibit "necessary but not sufficient" dynamics. This means that certain conditions must exceed a minimum threshold for innovation to occur, even though they are not sufficient to guarantee high performance. This logic is similar to the concept of bottlenecks, threshold constraints and non-compensatory mechanisms, whereby the absence of a single critical governance attribute can prevent innovation, despite the presence of other favourable conditions. For example, substantial investment in R&D may be ineffective if board independence is insufficient to ensure adequate oversight, whereas strong oversight alone cannot produce innovation without complementary organisational capabilities. However, traditional regression models cannot detect such asymmetric and non-compensatory patterns, as they estimate average additive effects and cannot test whether a predictor serves as a necessary condition.

To address these gaps, we address the following research question: *Which corporate governance mechanisms function as necessary conditions for innovation efficiency in healthcare firms?*

This study applies Necessary Condition Analysis (NCA) (Dul, 2016; Dul, 2024), a methodology specifically developed to identify factors that act as non-compensatory constraints: if the condition is absent or too low, the outcome cannot occur, regardless of the presence of other favourable factors.

Rather than modelling sufficiency *"does X increase Y?"*, NCA tests necessity "*if X is absent, Y is always absent"*.

This approach is particularly suited to studying innovation efficiency in healthcare, where regulatory compliance, organisational capabilities, and financial resources often operate as hard constraints that limit firms' ability to transform R&D input into innovation output.

We analyse 315 firm-year observations from 63 NASDAQ-listed U.S. healthcare firms over 2020–2024, applying NCA to assess whether specific board mechanisms impose ceiling constraints on firms' innovation efficiency. This time window captures a unique phase in which innovation pressures and governance practices were profoundly reshaped by pandemic-related disruptions. Our findings reveal a highly asymmetric relationship between governance and innovation. Of the board mechanisms examined, board independence is the most important factor in achieving high innovation efficiency. Firms with insufficient independent oversight are unable to reach higher levels of innovation efficiency, regardless of their R&D investment levels. Other board attributes, such as board size, gender diversity and tenure, display weaker necessity patterns that do not withstand permutation testing. Meanwhile, CEO duality does not impose any binding constraints on innovation efficiency.

The study makes three contributions. First, it provides one of the few empirical analyses that link governance mechanisms to innovation efficiency rather than innovation intensity in the healthcare sector. Second, it introduces Necessary Condition Analysis to this field of research, demonstrating the value of identifying governance-related constraints on innovation. Third, it provides practical guidance for managers and policymakers. By identifying the minimum governance thresholds required for efficient innovation, the findings offer actionable insights for configuring boards to avoid innovation bottlenecks.

2. Governance Mechanisms as Necessary Conditions for Innovation Efficiency

In corporate governance systems, the board of directors provides the formal link between shareholders and those responsible for the firm's day-to-day management, and constitutes the primary locus of control within the organisation (Fama and Jensen, 1983; Adams *et al*., 2008). From this perspective, the board's core function is to monitor managerial behaviour and safeguard shareholders' interests. However, an increasing amount of research on governance and strategy suggests that the role of the board extends beyond control and oversight. This research positions governance mechanisms as strategic resources that influence a firm's capacity to develop and implement complex strategies (Zahra and Pearce, 1989; Baysinger and Hoskisson, 1990; Zattoni and Pugliese, 2012). The composition and structure of the board have a significant influence on the approval of strategic initiatives, as well as on the possession by organisations of the cognitive capacity, expertise, and evaluative capabilities required to execute them effectively, particularly in innovation-intensive contexts (Forbes and Milliken, 1999; Hillman and Dalziel, 2003). Through its monitoring and advisory roles, the board therefore shapes strategic priorities, constrains managerial discretion, and defines the organisational conditions under which long-term investments, including R&D, are evaluated and governed.

Early studies on corporate governance and innovation already recognised that board mechanisms influence firms' innovation-related decisions (Baysinger *et al.*, 1991; Lacetera, 2001; Hoskisson *et al.*, 2002), yet subsequent research has largely examined these relationships through average effects on innovation inputs or outputs (Balsmeier *et al*., 2014), rather than asking whether certain governance mechanisms constitute necessary conditions for innovation. In R&D-intensive and highly regulated contexts such as the healthcare industry, this distinction is particularly salient. Innovation efficiency depends on whether firms possess a minimum set of governance mechanisms that make the disciplined transformation of R&D investments into valuable innovation outputs organisationally feasible. Among these, board size represents a fundamental structural constraint shaping the board's

ability to coordinate monitoring and advisory functions. While larger boards may increase access to expertise and information, the associated coordination frictions, slower deliberation, and diffusion of responsibility undermine accountability and weaken the board's capacity to evaluate complex R&D portfolios in a timely manner (Nguyen and Huynh, 2023; Li *et al*., 2024). In innovation environments characterised by high uncertainty and irreversible investment decisions, even modest reductions in the effectiveness of monitoring can prevent firms from discontinuing low-quality projects and reallocating resources efficiently. This makes achieving high innovation efficiency impossible, regardless of R&D intensity (Messai and Jouini, 2025; Shabbir *et al*., 2024). Board independence is a second critical governance prerequisite. Independent directors improve the quality of monitoring, curb managerial opportunism and ensure more rigorous project selection, thereby reducing the tendency to escalate commitment in uncertain research trajectories (Rosenstein and Wyatt, 1990; Almulhim, 2023). Evidence that increased independence reduces R&D spending while simultaneously improving patent output suggests that independence does not stimulate innovation volume, but rather enables firms to extract more value from existing R&D investments (Balsmeier *et al*., 2017; Chou and Johennesse, 2021). Without a minimum level of independence, boards lack the authority and informational distance required to correct decisions that allocate resources inefficiently. This makes it structurally infeasible to innovate efficiently, even when technological capabilities are present.

Board gender diversity further operates as a necessary organisational condition by expanding cognitive variety (Müller-Horn *et al.*, 2024), improving deliberation quality (Nielsen and Huse, 2010), and enhancing strategic evaluation in innovation governance (Memon *et al*., 2025). Empirical evidence shows that gender-diverse boards are associated with higher innovation productivity rather than merely higher output volumes, reflecting superior conversion of R&D inputs into impactful outcomes (Griffin *et al*., 2021). Importantly, this relationship is best understood through the lens of critical mass theory. Prior research suggests that when women represent only a small minority on the board, their ability to influence strategic discussions is constrained by tokenism, limited voice, and conformity pressures. Only once a critical mass is reached do female directors acquire sufficient legitimacy, interaction intensity, and decision-making influence to shape board processes and strategic outcomes meaningfully (Torchia *et al*., 2011; Schwartz-Ziv, 2017; Slomka-Golebiowska *et al*., 2023; Al-Shaer *et al*., 2026).

Board tenure introduces a temporal constraint that further shapes the feasibility of innovation efficiency. A minimum level of tenure is required for directors to accumulate firm-specific and technological knowledge necessary to understand complex R&D processes (Kor, 2006), yet prolonged tenure fosters entrenchment, conformity, and reduced monitoring vigilance, impairing boards' willingness to challenge legacy projects and adapt research portfolios to emerging opportunities (Vafeas, 2003).

Finally, CEO duality defines a critical boundary condition for innovation governance by restructuring authority and information flows at the apex of the firm. Unified leadership can streamline decision-making, reduce information frictions, and enhance strategic coherence in innovation-intensive settings, thereby improving the productivity of R&D investments (Li and Yang, 2019; Yu, 2023; Hsieh *et al.*, 2024). However, duality can also weaken formal monitoring and increase exposure to discretionary biases, potentially undermining innovation efficiency in the absence of sufficient transparency and reporting structures (Krause *et al*., 2014; Nuanpradit, 2024).

3. Methodology

3.1 Research design and sample

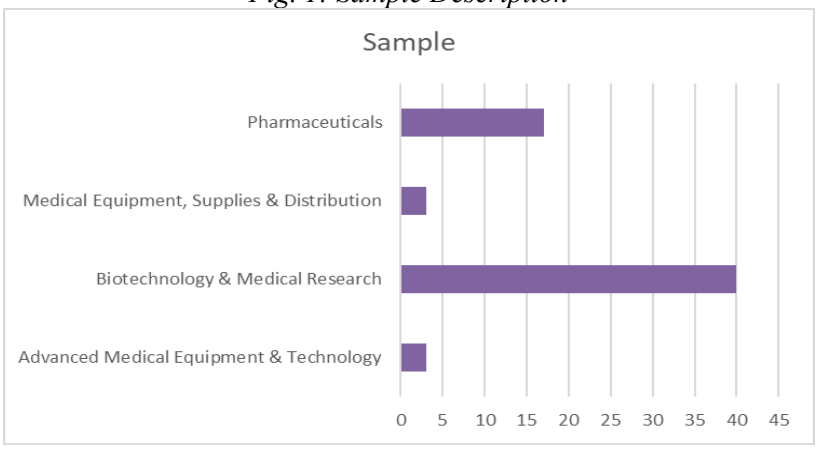
The empirical analysis adopts a panel data research design, in line with previous studies on corporate governance and innovation (e.g. Lacetera, 2001; Abu Alia *et al*., 2024), in order to capture cross-sectional heterogeneity and the temporal evolution of firms' innovation efficiency. The dataset

covers the period from 2020 to 2024. This timeframe was deliberately chosen to exclude the most acute phase of the pandemic, in order to avoid any distortions associated with extraordinary crisis conditions. At the same time, it captures the post-pandemic phase of strategic recovery, organisational restructuring and renewed innovation efforts in the healthcare sector. During this period, healthcare firms substantially increased their R&D investments in order to rebuild technological capabilities and enhance operational resilience (Shukla *et al*., 2020; Robinson, 2021; Marques *et al*., 2021; Sharma *et al*., 2021).

The sampling procedure followed a transparent and systematic process. First, the full population of healthcare companies listed on the NASDAQ stock exchange was retrieved from the LSEG Data & Analytics database, resulting in an initial universe of 743 firms. This comprehensive starting point ensured that the study did not rely on any ex ante selection criteria that could bias the sample. Second, all firms were screened for the availability of complete financial, governance, and innovation-related data over the entire 2020–2024 period. Because the analysis requires consistent time-series observations for all variables, firms with missing data were excluded to preserve comparability and internal validity. After applying these data-quality filters, 63 firms met the full inclusion criteria, yielding a fully balanced panel of 315 firm-year observations (Figure 1).

Importantly, firms were excluded solely due to incomplete disclosure rather than firm-specific characteristics, thereby reducing concerns regarding systematic selection bias. The final sample comprises U.S. healthcare firms operating across heterogeneous but innovation-intensive subsectors, including biotechnology and medical research, pharmaceuticals, and medical equipment and technology. These firms exhibit substantial variation in size, governance structures, and innovation profiles, ranging from small R&D-intensive biotechnology companies to larger, more established pharmaceutical and medical technology firms. Consistent with the characteristics of innovation-driven healthcare industries, a large share of sample firms report negative profitability during the observation period, reflecting long development cycles, high R&D intensity, and delayed commercialisation of innovation outputs. This heterogeneity enhances the suitability of the sample for examining innovation efficiency, as it captures firms operating under markedly different organisational and economic conditions while facing similar innovation-related challenges. The use of a high-quality balanced panel is particularly important for reliably identifying both average relationships and necessity-based constraints.

Fig. 1: Sample Description



Source: our elaboration

3.2 NCA Technique

To investigate whether specific board-related governance mechanisms operate as prerequisites for innovation efficiency, the study employs NCA, a method specifically designed to detect non-compensatory, constraint-like relationships (Dul, 2016; Dul *et al.*, 2020; Dul, 2024). A necessary condition is a factor whose absence systematically prevents the outcome: "*if X is absent, Y is always*

absent." Unlike sufficient conditions—which may be compensated for by other favourable factors—necessary conditions are indispensable thresholds that cannot be substituted. This logic aligns with bottlenecks and non-compensatory mechanisms widely discussed in organisational research (Goertz *et al.*, 2013; Karwowski *et al*., 2016) but seldom tested empirically in the governance–innovation domain.

NCA identifies these constraints by examining the boundary of the XY scatterplot rather than its centre, as done in regression-based models. If the upper-left region of the plot is empty, high levels of the outcome never occur when the predictor is low, indicating the presence of a necessary condition (Richter *et al*., 2020). The boundary separating the populated area from this empty "ceiling zone" is the ceiling line, which marks the maximum attainable level of the outcome for any given value of the predictor.

Ceiling lines are estimated using two techniques. The CE-FDH estimator constructs a non-parametric, stepwise frontier and is considered the most conservative, while the CR-FDH estimator provides a linear approximation that offers smoother and more interpretable results (Dul, 2016). For CR-FDH, ceiling accuracy values of 95% or higher indicate a reliable necessity relationship. The importance of a necessary condition is captured by the effect size (d), defined as the proportion of the empirical outcome space restricted by the ceiling. Following Dul (2016) and Van der Valk *et al.* (2016), effect sizes are interpreted as small ($0 < d < 0.10$), medium ($0.10 \leq d < 0.30$), large ($0.30 \leq d < 0.50$), or very large ($d \geq 0.50$). Statistical significance is evaluated using permutation tests, which assess whether the observed ceiling zone could arise by chance (Dul *et al*., 2020).

Because NCA is suited to cross-sectional data, applying it directly to panel structures may distort ceiling shapes by multiplying observations for each firm (Dul, 2021). To avoid this, the balanced panel was transformed into a cross-sectional dataset by computing firm-level means for all variables, following established methodological recommendations. All analyses were conducted in R using the nca package 4.0.4.

3.3 Outcome, conditions and measurements

3.3.1 Outcome variable: Innovation efficiency

This study measures innovation efficiency through a composite indicator that captures both the inputs and outputs of the firm's innovation process. Specifically, the dependent variable is defined as the ratio of the number of patents to R&D expenditures, thereby quantifying the firm's ability to convert research investments into codified technological outcomes. This approach extends beyond the limitations of single dimensional innovation indicators. While R&D expenditure is widely used as a proxy for a firm's innovative efforts, representing deliberate investments aimed at generating new scientific or technical knowledge and bringing substantially improved products or processes to market (Jermias, 2008), it captures only inputs and not whether these investments result in successful innovation.

Prior studies consistently rely on R&D intensity as an indicator of innovative effort (Bublitz and Ettredge, 1989; Coff, 2003; O'Brien, 2003), recognizing that R&D spending reflects a firm's intention to build technological capabilities and sustain competitive advantage. Conversely, patent counts represent realized innovative output by capturing the novelty and codification of technological inventions; however, there are not single metrics that alone fully capture all the aspects of innovation (Hagedoorn and Cloodt, 2003).

By combining these two components into a patent-to-R&D ratio, this study adopts a productivity-oriented measure of innovation efficiency, consistent with prior research emphasizing the complementarity of input- and output-based indicators (Artz et al., 2010; Chircop et al., 2020; Hsieh et al., 2024). This composite indicator aligns with the broader innovation-measurement literature, which underscores the need for multifaceted indicators capable of capturing the complexity of innovation processes and the interplay of resources, technological capabilities, and realized outcomes (Patel and Pavitt, 1995; Grupp and Schubert, 2010; Dziallas and Blind, 2019).

Given the inherent difficulty of measuring innovation, particularly in contexts where companies

are reluctant to disclose sensitive innovation data (Chesnais, 1992) and where no single "catch-all" indicator exists (OECD, 2005), composite measures provide a more robust assessment of innovation performance.

The measure adopted here is especially appropriate for the healthcare sector, where R&D activities are highly resource-intensive, characterized by long development cycles, regulatory uncertainty, and substantial technological risk (Katila, 2000). In these industries, patents serve not only as formal protection mechanisms but also as strategic signals of technological capability, partnership potential, and market value. Thus, innovation efficiency, operationalized as the firm's effectiveness in transforming R&D inputs into patented outputs, offers a conceptually grounded and empirically validated proxy for capturing the innovation performance most relevant to this study's context.

3.3.2 Condition variables: Governance Mechanisms

To examine whether corporate governance mechanisms act as necessary conditions for innovation efficiency, the study focuses on five board-related mechanisms: Board Size, Board Independence, Board Gender Diversity, Average Board Tenure, and CEO Duality (Table 1). These conditions, sourced from LSEG Data & Analytics, capture structural and compositional dimensions of the board that may impose threshold constraints on firms' innovative efficiency.

Tab. 1: Variables Description, Source: LSEG Data & Analytics

	Name	**Type**	**Definition**	**Source**
Condition variables	Board Size	Continuous	The total number of board members at the end of the fiscal year	LSEG
	Independent Board Members Score	Continuous (%)	Percentage of independent board members as reported by the company	LSEG
	Board Gender Diversity Score	Continuous (%)	Percentage of females on the board	LSEG
	Average Board Tenure	Continuous	Average number of years each board member has been on the board	LSEG
	CEO Duality	Binary (0/1)	Binary value: 1 is True and 0 is False	LSEG
Outcome variable	Innovation Efficiency	Continuous	Number of patents / R&D Expenditures	LSEG

Source: our elaboration

4. Results

Table 2 reports the results of the NCA analysis for the five board-related governance mechanisms. For each mechanism we estimated two ceiling lines, the conservative non-parametric CE-FDH and the linear CR-FDH. The ceiling plots (Figures 2–6) graphically display the empirical upper frontier and the empty ceiling zone above it; these plots are the core diagnostic of NCA because they show whether high values of the outcome (innovation efficiency) ever occur when the predictor is low.

Across the board mechanisms, the most striking finding is the necessity of board independence.

The ceiling plot for independent directors (Figure 2) exhibits a pronounced empty area in the upper-left part of the scatter, and the effect sizes are very large for both estimators (CE-FDH: d = 0.839; CR-FDH: d = 0.747). In substantive terms, the observed distribution implies that firms with low shares of independent directors do not achieve the higher levels of innovation efficiency observed in this sample.

Other board mechanisms display moderate necessity patterns. Board Size (Figure 3), Board Gender Diversity (Figure 4), and Average Board Tenure (Figure 5) all display visible ceiling zones, although less pronounced than for board independence. These patterns indicate that firms must meet minimum thresholds of board capacity, gender diversity, and accumulated board experience to avoid structural constraints on innovation efficiency. The trajectory of the ceiling lines suggests that insufficient levels of these conditions prevent firms from reaching higher innovation outcomes.

In contrast, CEO Duality (Figure 6) shows no evidence of necessity. The scatterplot lacks a discernible upper-boundary constraint, the ceiling line is flat, and the effect size is zero (d = 0). The scatter lacks an upper-left empty zone and the ceiling is effectively flat, which implies that whether the CEO also serves as board chair does not constrain firms' ability to achieve higher innovation efficiency in our data.

Across all variables, ceiling accuracies exceed 93%, and visual inspection confirms that the estimated ceiling lines appropriately trace the upper frontier of the data. This provides strong support for the robustness and reliability of the necessity patterns identified.

4.1 Permutation Test

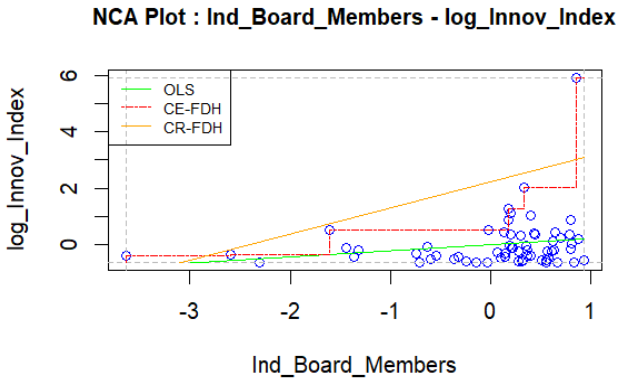
In line with the recommendations of Dul (2020) and Dul et al. (2023), we performed permutation tests to determine whether the observed effects differed significantly from those expected by chance. The p-values are reported in Table 2. The results show that only independent board members yield statistically significant necessity effects (p = 0.05 and 0.012). Board size, gender diversity, and board tenure yielded non-significant p-values, and CEO duality was not statistically significant (p = 1.00). Thus, permutation testing confirms that, in our sample, board independence is the only robust necessary condition for innovation efficiency.

Tab. 2: NCA Results

Conditions	Method	c-accuracy	Ceiling Zone	Scope	Effect size	Fit	p-value (Permutation Test)
Board Size	CE-FDH	100%	11.455	30.013	0.382	100%	0.123
	CR-FDH	93.7%	8.571	30.013	0.286	74.8%	0.135
Independent Board Members	CE-FDH	100%	25.282	30.130	0.839	100%	0.012
	CR-FDH	96.8%	22.495	30.130	0.747	89.0%	0.005
Board Gender Diversity	CE-FDH	100%	9.912	25.857	0.383	100%	0.408
	CR-FDH	95.2%	7.998	25.857	0.309	80.7%	0.439
Average Board Tenure	CE-FDH	100%	10.464	28.702	0.365	100%	0.178
	CR-FDH	93.7%	7.876	28.702	0.274	75.3%	0.176
Ceo Duality	CE-FDH	100%	0.000	6.601	0.000	100%	1.000
	CR-FDH	100%	0.000	6.601	0.000	NA	1.000

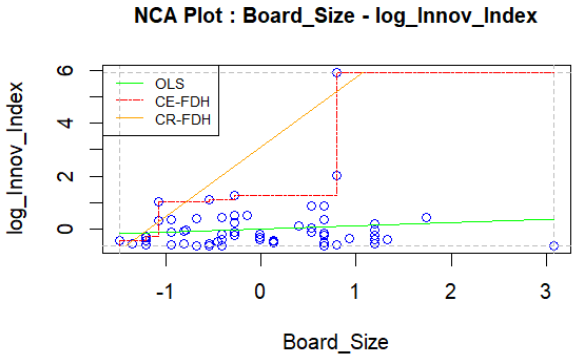
Source: our elaboration

Fig. 2: NCA Scatter Plot, Independent Board Member



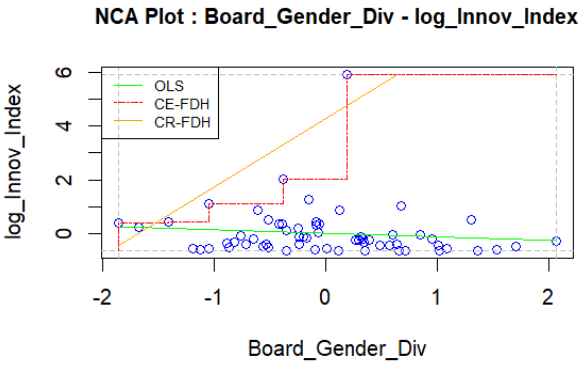
Source: our elaboration

Fig. 3: NCA Scatter Plot, Board Size



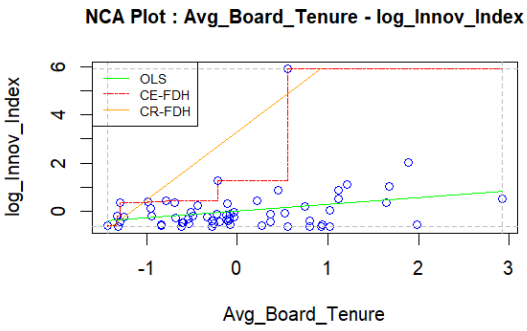
Source: our elaboration

Fig. 4: NCA Scatter Plot, Board Gender Diversity



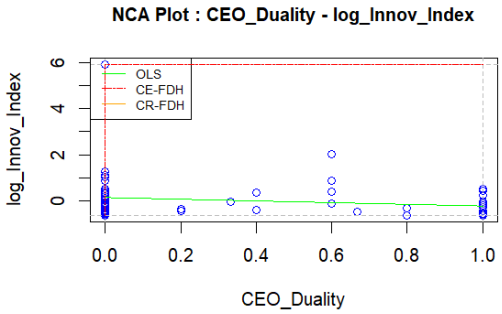
Source: our elaboration

Fig. 5: NCA Scatter Plot, Average Board Tenure



Source: our elaboration

Fig. 6: NCA Scatter Plot, CEO Duality



Source: our elaboration

4.1 Bottleneck Table

In line with Dul's (2016) recommendations, we present the bottleneck table based on the CR-FDH ceiling (Table 3). The CR-FDH method produces a linear ceiling that yields smooth, interpretable thresholds, expressed as a percentage of the observed range. At the 10% outcome level, only modest thresholds are required: a limited presence of board size (6.7%), independent directors (26.7%), gender diversity (4.5%), and board tenure (6.1%). These lower requirements indicate that initial innovation performance can be supported by relatively minimal governance mechanisms. As innovation output increases, however, the minimum necessary levels rise sharply. For instance, at outcome levels of 30–50%, firms are required to have substantially higher board size (17.6%–28.6%), greater independence (57.9%–89%), increased gender diversity (17.7%–30.9%), and more substantial board tenure (16.8%–27.4%). At innovation levels of 60% and above, Independent Board Members' condition become ‘not acceptable’ (NA), indicating that no feasible threshold could be computed due to data sparsity in the upper-right corner of the distribution, an expected behaviour of the linear CR–FDH estimator when observations are limited at high outcome levels.

Tab. 3: Bottleneck Table (CR-FDH)

Y	Board Size	Independent Board Member	Board Gender Diversity	Average Board Tenure
0	1.2	11.2	NA	0.8
10	6.7	26.7	4.5	6.1
20	12.1	42.3	11.1	11.4
30	17.6	57.9	17.7	16.8
40	23.1	73.5	24.3	22.1
50	28.6	89.0	30.9	27.4
60	34.0	NA	37.5	32.8
70	39.5	NA	44.1	38.1
80	45.0	NA	50.7	43.4
90	50.4	NA	57.3	48.8
100	55.9	NA	63.9	54.1

Source: our elaboration

5. Discussion

This study examined whether board-level corporate governance mechanisms are necessary organisational conditions for achieving high levels of innovation efficiency in healthcare firms. Moving beyond the dominant regression-based approaches that focus on average effects, we adopted a logic of necessity to determine whether specific governance structures must be present to an extent sufficient for innovation efficiency to be attainable.

This perspective is particularly relevant in research and development (R&D)-intensive and highly regulated industries, where the successful implementation of innovation-oriented strategies depends not only on investment in resources, but also on governance structures that enable disciplined strategic execution, timely project evaluation and effective reallocation of resources across competing innovation trajectories.

The most notable finding relates to board independence. Large effect sizes and statistically significant permutation tests suggest that firms with a low proportion of independent directors do not achieve the higher levels of innovation efficiency observed in the sample. From a strategy implementation perspective, this finding suggests that independent directors play a critical role in ensuring that not only are innovation strategies formulated, but they are also executed efficiently. By enhancing monitoring quality and constraining managerial discretion, independent boards reduce escalation of commitment in uncertain R&D trajectories and facilitate the timely termination or redirection of projects that no longer align with strategic priorities (Almulhim, 2023). A point that had been unclear in earlier literature is clarified by the necessity logic. Board independence does not just improve the outcomes of innovation on average. Instead, it is a minimum governance condition. Without this condition, it is not possible to implement innovation strategies in an effective way. This is because the strategies need efficient allocation and reallocation of R&D resources. This interpretation reconciles previous findings that independent boards often reduce R&D spending while increasing patent output (Balsmeier et al., 2017), suggesting that independence primarily affects the productivity, rather than the scale, of innovation investments.

The bottleneck analysis further reinforces this interpretation by showing steep threshold requirements for independence as innovation efficiency increases. At moderate and high outcome levels, firms must appoint a very high proportion of independent directors to avoid constraints on innovation efficiency. In highly regulated healthcare environments, where project termination decisions are politically and economically costly, independent directors are essential for enabling disciplined strategy implementation. Specifically, they help to ensure that innovation portfolios remain aligned with strategic objectives over time, thereby preventing the persistent misallocation of resources to projects that no longer contribute to the firm's competitive positioning.

Although other board characteristics (board size, gender diversity and board tenure) display visible ceiling patterns, they do not qualify as statistically robust necessary conditions. These results suggest that, while these mechanisms may facilitate efficient innovation, they are not strict prerequisites. With regard to board size, the observed ceiling zone is consistent with previous arguments that boards that are too small may lack the cognitive and informational capacity required to govern complex R&D portfolios effectively (Lacetera, 2001). Similarly, although there is a moderate necessity pattern for board gender diversity, it fails to reach statistical significance.

However, this result does not contradict the growing body of evidence linking gender-diverse boards to higher innovation productivity (Griffin et al., 2021). Rather, it suggests that gender diversity improves the quality of deliberation and problem-solving during strategy execution, acting as a strategic enhancer rather than a binding condition without which innovation efficiency cannot be achieved.

The pattern of board tenure is similar. While insufficient tenure may limit directors' understanding of complex technological processes, the results suggest that a minimum tenure level is not strictly necessary for innovation efficiency to be achieved. This finding reflects the dual nature of tenure, as highlighted in previous research: the informational benefits coexist with the risks of entrenchment

and conformity (Vafeas, 2003; Kor, 2006).

Finally, there is no necessary relationship between CEO duality and innovation efficiency. This finding supports the notion that leadership structure is a contingent governance choice rather than a structural prerequisite. Although unified leadership can improve strategic coherence in certain innovation contexts (Hsieh et al., 2024), NCA findings suggest that firms can attain high innovation efficiency regardless of whether the CEO also serves as board chair. This finding is consistent with mixed prior evidence and highlights the importance of considering CEO duality as a context-dependent governance configuration rather than a universal enabler or constraint.

5.1 Theoretical Implications

This study makes three primary theoretical contributions to the literature on corporate governance and innovation.

First, it advances the corporate governance and innovation literature by introducing necessity logic through the application of NCA. Prior research has predominantly relied on additive models that estimate average effects of board characteristics on innovation outcomes, implicitly assuming symmetry and compensability among governance mechanisms. As highlighted by Belloc (2012), this tradition has struggled to explain why firms with similar size, market power, and R&D investment often display markedly different innovation performance, largely because governance has been treated as a "black box" or as a set of isolated, exogenous attributes. By contrast, our findings demonstrate that governance mechanisms operate asymmetrically: some conditions, such as board independence, function as non-compensatory prerequisites rather than incremental drivers. This necessity-based view reframes corporate governance not only as a system of control, but as an enabling architecture for strategy implementation, by delineating the minimum governance conditions under which innovation strategies can be effectively executed through efficient R&D allocation. In doing so, the study helps reconcile prior mixed evidence and clarifies why similar innovation investments can yield vastly different efficiency outcomes.

Second, the study contributes to the growing configurational perspective on corporate governance by showing that innovation efficiency depends on governance bottlenecks rather than isolated mechanisms. The results suggest that governance systems should be understood as bundles in which certain elements define feasibility boundaries. Board independence, in particular, emerges as a structural condition that enables other governance mechanisms to operate effectively, supporting the view that boards play a strategic and coordinating role, rather than serving solely as control. This insight resonates with recent calls to reconnect board research with stewardship oriented perspectives, which emphasise the board's role in enabling long-term value creation and strategic action rather than focusing exclusively on control (Belkacemi et al., 2025).

Third, the study contributes to innovation research by conceptually and empirically distinguishing innovation efficiency from innovation intensity. By operationalising innovation efficiency as the conversion of R&D inputs into patented outputs and analysing it through a necessity lens, the study demonstrates that efficiency captures governance-relevant aspects of innovation performance that are obscured by traditional input- or output-based measures. This reconceptualisation aligns innovation measurement more closely with the strategic oversight role of boards and opens new avenues for governance research focused on productivity rather than scale. By operationalising innovation efficiency as the conversion of R&D inputs into patented outputs, this study responds to calls for more integrative innovation constructs that capture both effort and outcome (e.g., Zahra, 1996; Wincent et al., 2013; Zona et al., 2013). Analysing this construct through a necessity lens further demonstrates that efficiency captures strategically salient aspects of innovation performance that are directly aligned with the board's oversight and implementation role, opening new avenues for governance research focused on productivity and strategic feasibility rather than innovation scale alone.

5.2 Managerial Implications

The findings offer several actionable implications for managers and policymakers.

First, the results highlight board independence as a non-negotiable governance foundation for innovation efficiency. Firms seeking to improve the productivity of their R&D investments should prioritise achieving and maintaining sufficiently high levels of board independence. Independence is not merely a compliance or legitimacy concern, but a structural condition that enables the effective implementation of innovation strategies by supporting disciplined monitoring, strategic project evaluation, and the timely termination or redirection of underperforming research initiatives. Without such governance capacity, innovation strategies risk remaining symbolic rather than operationally executable.

Second, the absence of robust necessity effects for board size, gender diversity, and tenure suggests that there is no one-size-fits-all governance template for innovation efficiency. Managers should view these mechanisms as levers that can enhance innovation governance but are not substitutes for independence. This flexibility is particularly relevant for smaller or younger firms that may face constraints in board composition but can still achieve high innovation efficiency by strengthening independent oversight.

Third, the findings caution against overemphasising leadership structure reforms, such as separating or unifying CEO and chair roles, as primary drivers of innovation efficiency. Since CEO duality does not constitute a binding constraint, firms should base such decisions on contextual considerations rather than assuming universal innovation benefits.

Conclusion

This study set out to investigate whether board-level corporate governance mechanisms act as necessary organisational conditions for innovation efficiency in healthcare firms. Departing from traditional sufficiency-based approaches, the analysis adopted a necessity perspective to identify governance structures that must be present at minimum levels for firms to effectively transform R&D investments into valuable innovation outputs.

The central finding is that board independence constitutes a robust and statistically significant necessary condition for innovation efficiency. Firms lacking sufficient independent oversight are structurally constrained from achieving high innovation efficiency, regardless of their innovation inputs. Other board mechanisms (board size, board gender diversity, and board tenure) exhibit supportive but non-binding roles, while CEO duality does not constrain innovation efficiency.

Some limitations should be acknowledged. First, the sample size is relatively small, which may limit the generalisability of the findings and reduce statistical power for detecting weaker necessity effects. Second, the temporal horizon is short, restricting the ability to capture long-term governance dynamics and delayed innovation outcomes. Future research should extend the analysis to larger samples, longer time spans, and firms operating in industries beyond healthcare to assess the external validity of the necessity patterns identified. Additionally, future studies could integrate complementary configurational approaches, such as fuzzy-set qualitative comparative analysis (fsQCA), to explore how combinations of governance mechanisms jointly enable high innovation efficiency.

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Long papers

Track:
Supply Chain Management, Logistics & Operations



An Agent-Based Modeling Approach to Multilevel Emergent Dynamics in OSCM

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Abstract

Frame of the research. Organizations and supply chains are multilevel systems in which micro-level interactions among heterogeneous actors give rise to higher-order operational outcomes. Yet OSCM research remains dominated by single-level, variance-based designs that are poorly suited to capture emergence as an unfolding cross-level process.

Purpose of the paper. This paper advances a process-based, multilevel approach to theorizing and analyzing emergent dynamics in OSCM by integrating multilevel theory with agent-based modeling, with the aim of specifying, interrogating, and refining generative mechanisms that link micro behaviors to macro-level unit properties.

Methodology. We develop a conceptual framework that positions ABM as a computational instantiation of multilevel process theorizing, capable of representing heterogeneity, local interaction rules, and top-down contextual constraints. We then demonstrate the approach through an agent-based model of the Sales and Operations Planning executive meeting, in which strategic consensus conditions information disclosure, integration, and the accumulation of shared team knowledge over time.

Results. The paper shows how ABM can render cross-level mechanisms explicit and testable by simulating how localized interaction patterns, under varying contextual constraints, generate emergent properties at the collective level. In the S&OP setting, the model illustrates how consensus operates as a higher-level constraint shaping disclosure and integration processes that, in turn, drive the emergence of team knowledge.

Research limitations. The demonstration is grounded in a stylized representation of the S&OP meeting and is intended to establish generative plausibility rather than provide direct empirical validation, which should be pursued in subsequent work through calibration and triangulation.

Managerial implications. The framework supports managers in diagnosing which meeting conditions and interaction structures foster knowledge integration, offering a basis for designing S&OP routines that promote productive information exchange and collective learning.

Originality of the paper. The paper contributes a theory-building template for OSCM research that couples multilevel process theorizing with ABM, enabling disciplined explanation of emergent operational phenomena beyond variance-based inference.

Keywords: *Computational process theory, layers of theoretical explanation, agent-based simulation, multilevel emergence, sales and operations planning.*

1. Introduction

Organizations and supply chain networks are inherently complex and multilayered entities where activities and interactions occur across multiple levels (Carter et al., 2015; Pavlov & Micheli, 2023), spanning across individuals, teams, organizations, and interorganizational networks. The operations and supply chain management (OSCM) literature has increasingly recognized this multilevel and processual nature of its core phenomena, as reflected in research on purchasing and supply (Meschnig et al., 2018), delivery delays (Awaysheh et al., 2021), new product development (Swink & Song, 2007; Yan & Dooley, 2013), and operational improvement (Stefanini et al., 2020). Despite this growing recognition, a misalignment persists between the research strategies used in the OSCM literature and the multilayered nature of its core phenomena.

In their review of OSCM publications, Carter et al. (2015) examined studies published between 2002 and 2014 showing that, although sophisticated methodological tools (e.g., statistical modeling via Hierarchical Linear Modeling, HLM, or Structural Equation Modeling, SEM) are increasingly available, explicit multilevel designs remain underutilized. Compared to other management disciplines (e.g., marketing or organizational behavior), most OSCM research still theorizes and tests

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hypotheses at a single level of analysis, leaving cross-level relationships and interactions underexplored. This misalignment is also consequential for theory building. As noted by Bendoly and Oliva (2025), meaningful contributions can take different forms, ranging from identifying regularities among empirical observations to focusing on phenomena that contradict existing knowledge. Those two different perspectives shift the motivation for the research question from "*what do we expect to see*" to "*how can we explain what we are seeing*" (Bendoly & Oliva, 2025). Therefore, a multilevel, process-oriented approach becomes necessary because it is designed to connect observed regularities to their lower-level generative mechanisms (Bendoly & Oliva, 2025; Kozlowski & Klein, 2000; Kozlowski et al., 2026).

In this paper, building on the call for methodological refinement in OSCM research (Bendoly & Oliva, 2025; Cornelissen et al., 2024), we advance a theoretical and methodological approach to study emergent phenomena in OSCM. After a literature review on multilevel research in OSCM, we propose the multilevel theory (MLT) of Kozlowski and Klein (2000) as a meta-theoretical framework to account for the different emergence patterns that organizational phenomena follow. We advocate for an epistemological shift from variance-based to process-based theorizing, enabling researchers to develop appropriate theories for uncovering emergent processes (Mohr, 1982; Kozlowski et al., 2026). As a research tool, we contend that Agent-Based Simulation (ABS) is among the most suitable tools to conduct research on multilevel emergent phenomena (Grand et al., 2025; Kuljanin et al., 2024).

We also provide an example of how to conceptualize and compute an ABS to study a multilevel bottom-up phenomenon. Specifically, we investigate the role of management cognitive alignment, conceptualized as Strategic Consensus (SC, Tarakci et al., 2013), on the emergence of team knowledge during executive meetings of the Sales and Operations Planning (S&OP) process. To do so, we adopt a bottom-up multilevel perspective and investigate how micro-level determinants (i.e., generative mechanisms) at the individual level (i.e., communication skills, information processing skills, and speaking rate), and a team-level factor (i.e., Strategic Consensus), influence the process of team knowledge emergence. We conclude by providing a roadmap for designing and implementing ABS in multilevel research and outlining validation logics suitable for OSCM.

2. Literature review

2.1 Methodology

To contextualize our proposal within the existing OSCM literature, we conduct a Systematic Literature Review (SLR) to accomplish two main objectives. First, to evaluate whether the results presented by Carter et al. (2015) on the substantial lack of multilevel inquiry within the OSCM literature still hold a decade later. Consistent with established SLR practice in the OSCM literature (Carter et al., 2015; Zupic & Čater, 2015), we searched Elsevier's Scopus using a structured query applied to titles, abstracts, and keywords. The query was developed in three steps. First, we included emergence terms to capture bottom-up pattern formation, then we added multilevel terms to capture nested structures and cross-level mechanisms, and finally, we restricted our search for journals to leading OSCM outlets (Carter et al., 2015). We limited the publication window from 2015 to 2025 to evaluate developments since Carter et al. (2015). Each retained study was coded by focal phenomenon and methodological approach to support descriptive and thematic synthesis (Zupic & Čater, 2015). In Section 1 of the Online Appendix, we provide a detailed explanation of the methodology and a comprehensive analysis of the sample papers.

2.2 SLR results and literature gap

The final sample comprises 43 articles, approximately 4.3 per year, closely mirroring Carter et al. (2015) results. This indicates that, despite sustained calls for multilevel process research, the volume of explicit multilevel inquiry in OSCM remains limited. Based on the methodology employed, we divided the papers into three methodologically homogeneous clusters.

Cluster 1, *multilevel econometrics methods*, includes hierarchical modeling, HLM, multilevel SEM, and related variance partitioning designs used to test cross-level associations. These studies are analytically suited for separating within-unit from between-unit variance and estimating cross-level effects, but they typically operationalize emergence as a measurable outcome or relational pattern, rather than modeling the interaction dynamics through which it unfolds. Accordingly, they are best aligned with post-emergence inference, where the emergent construct is already stabilized and measurable.

Cluster 2, *qualitative designs*, includes interviews, comparative cases, and longitudinal case studies that trace how micro actions and interpretations accumulate into evolving system outcomes. Papers in this cluster articulate generative mechanisms and temporal sequencing, and develop constructs and boundary conditions when emergence is inherently processual. The main limitation is context dependence and interpretive findings, which can constrain generalization without complementary analytic generalization.

Cluster 3, *complex systems approaches*, includes simulation and network analytic work that represents local interaction rules and examines macro-level pattern formation, disruption propagation, and structural evolution. Interestingly, the sole paper in our sample using an Agent-Based Model (ABM) in emergent multilevel research is Clement and Puranam (2018), which examines how contextual, top-down organizational design can shape the bottom-up evolution of intraorganizational social networks over time. The phenomenon of interest is the emergence of stable interaction patterns from decentralized microlevel agents' choices, where agents repeatedly decide with whom to interact, learn from prior outcomes, and adapt their ties under limited information and enforcement. ABM fits this multilevel emergent research because it lets socialization arise from individual interactions, where agents use the quality of those interactions, such as performance feedback, to judge whether engaging with a given individual is worth repeating. It shows how individual interaction rules and local learning generate macro network structure and performance, and it isolates the conditions under which even imperfect formal structures function as coordination "scaffolds" that help agents discover, sustain, and regenerate productive relationships as the system evolves.

To conclude, the results of our SLR corroborate Carter et al.'s (2015) evidence on the relative scarcity of multilevel research in OSCM, identifying only a limited number of contributions over the past decade. Beyond this quantitative gap, our review also suggests that existing studies approach multilevel emergence through a variety of conceptual lenses and methodological strategies. Although these contributions provide valuable insights into specific aspects of multilevel phenomena, the literature remains somewhat fragmented, with limited integration between how emergence is theorized and how it is empirically investigated across levels of analysis. As a result, opportunities remain to further clarify the conceptual foundations of multilevel emergence and to strengthen the alignment between theoretical argumentation and the methodology employed to test it. Building on these observations, the next section introduces our proposal for theorizing and studying multilevel emergent phenomena in OSCM.

3. Multilevel Theory

To address the methodological gap in emergent multilevel research, we propose the MLT conceptualized by Kozlowski and Klein (2000) as a meta-theoretical framework. MLT can serve as an ontological framework for OSCM that largely follows a variance-based, cross-sectional logic, emphasizing statistical relationships among variables to infer causality (Ketokivi, 2019; Carter et al., 2015). As is well known, variance-based approaches are ill-equipped to capture the temporal and recursive dynamics that characterize emergent processes (Mohr, 1982; Kozlowski et al., 2026; Grand et al., 2025). MLT conceptualizes organizations as hierarchical systems composed of interacting entities at the micro, meso, and macro levels that are dynamically connected through top-down and bottom-up processes (Kozlowski & Klein, 2000). Within this framework, higher-level phenomena

are not simply aggregations of lower-level components, but emergent outcomes of interdependent lower-level constituents and interactions that unfold across time and levels of analysis. As specified by Kozlowski et al. (2013), emergent phenomena are:

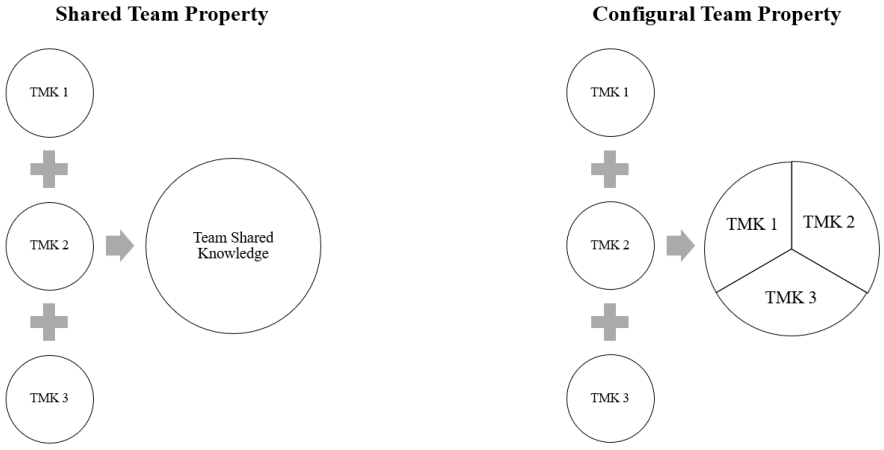
- *Multilevel* because they originate at the lower level and manifest as collective outcomes at higher levels, thus linking micro-, meso-, and macro-level dynamics.
- *Time-dependent* because they develop, stabilize, or transform over cycles of interaction, adaptation, and feedback, which may occur rapidly or over extended periods depending on their nature.
- *Process-oriented* because their main focus lies in the dynamic interaction mechanisms among entities, such as social coordination and feedback, that generate higher-level properties.
- *Context-sensitive* because higher-level contextual factors (e.g., structure, culture, or environment) shape and constrain the dynamic process of emergence, influencing how and under what conditions collective properties unfold.

Kozlowski and Klein (2000) emphasize that bottom-up phenomena can unfold following different patterns of emergence, ranging from convergent (compositional) to divergent (compilational). In compositional emergence, individual contributions are homogeneous and isomorphic, yielding a shared unit property that maintains functional and structural equivalence across levels. This form of emergence reflects uniformity and stability, where the higher-level constructs mirror their lower-level constituents in both form and meaning (Kozlowski & Chao, 2012). Compositional emergence gives rise to shared constructs, unit-level properties grounded in within-unit consensus or homogeneity. By contrast, compilational emergence captures heterogeneity and asymmetry in individual contributions, where the collective phenomenon arises through complex patterns of differentiation and interdependence (Stewart et al., 2005; Kozlowski & Klein, 2000). In such cases, the collective property is functionally equivalent but structurally distinct across levels, emerging from specific configurations of individual states and behaviors rather than uniform aggregation. Thus, compilational emergence unfolds into configural constructs, which capture unit-level phenomena that depend on patterned heterogeneity, such as the distribution or variability of within-unit attributes of its lower-level constituents. Consequently, the operationalization of configural constructs must be tailored to the type of emergence process, reflecting the system's interactional logic (Kozlowski & Chao, 2012). Finally, emergence is not a one-time event but a dynamic process that can evolve, shifting from divergent, compilational states to convergent, compositional ones as they unfold (Kozlowski et al., 2013; Kozlowski & Chao, 2012).

As an example of the differences between shared and configural proprieties, we can think of two different conceptualizations of team knowledge in inventory management (Figure 1). If team knowledge is conceptualized as shared unit propriety, the emergent construct reflects the extent to which relevant information is commonly held across members involved in inventory decisions (e.g., current on-hand inventories, open orders, and promotion calendars). Shared team knowledge can be operationalized as the percentage of information shared among team members.

On the other hand, if team knowledge is conceptualized as configural propriety, it will consist of the complementary knowledge that unit members possess. A configural perspective of team knowledge corresponds to the configuration of team members' non-overlapping information sets whose joint pattern will represent the team's knowledge. In a configural conceptualization, what matters is team members' knowledge configurations, given that this perspective highlights the complementary array of unique knowledge. Adopting this lens, team knowledge outcomes (e.g., bullwhip attenuation, lower backorders, and better service-level) are the result of the complementary structure of heterogeneous information sets rather than from the sharedness of the same dataset.

Figure 1: Representation of team knowledge as a shared and configural team property.



Note: TMK = Team Member's unique Knowledge

From this perspective, multilevel process theorizing integrates the temporal focus of process theory with the structural layering of MLT. This dynamic view of multilevel emergence directly addresses the OSCM call for more informed multilevel research within the field (Carter et al., 2015).

4. Why is multilevel bottom-up emergent research needed in OSCM

Among the multilevel studies in OSCM, a top-down approach prevails, which tends to overlook how lower-level dynamics generate emergent constructs (Carter et al., 2015; Ketokivi, 2019). Top-down processes refer to the way higher-level systems shape the actions and configurations of lower-level units; e.g., how the configuration of the supply chain structurally affects its organizations, shaping coordination mechanisms, decision rights, and the locus of innovation (Dyer & Singh, 1998; Flynn et al., 2010; Gereffi et al., 2005; Sturgeon, 2002).

In contrast, bottom-up processes describe how lower-level constituents coalesce over time to produce higher-level manifestations, such as organizational capabilities (Roscoe et al., 2019). Moreover, bottom-up research can aid in exploring how teams and organizations accumulate knowledge (Grand et al., 2016; Kozlowski & Bell, 2020), support/hinder individuals' proactive effort (Twemlow et al., 2023; Carraro et al., 2024), manage relationships with buyers/suppliers (Shamsollahi et al., 2021), and inquire into how individual decision heuristics shape systemic efficiency (Croson & Donohue, 2006).

Understanding the interplay between these distinct but interdependent perspectives is essential for explaining how organizations both shape and adapt to these primary driving forces in complex systems. As Kozlowski and Klein (2000) argue, understanding organizational systems requires tracing how micro-level interactions among individuals give rise to higher-order properties by simultaneously accounting for the influence that higher-order contextual factors exert over the micro dynamics. The lack of a coherent theoretical and methodological framework for examining bottom-up emergence is particularly striking, given that organizational performance, and generally most organizational outcomes, emerge from the dynamic interactions of individuals within teams (Bendoly et al., 2006; Marks et al., 2001; Mathieu et al., 2008).

4.1 Variance-based and process-based perspectives

Understanding bottom-up organizational processes and inferring causality with respect to emergent dynamics requires an epistemological shift, distinguishing between variance-based and process-based theorizing. As Mohr (1982), Maxwell (2004), and Bendoly and Oliva (2025) argue, the theoretical difference between variance and process-based explanations lies not in whether they seek causality but in how they conceptualize and test it.

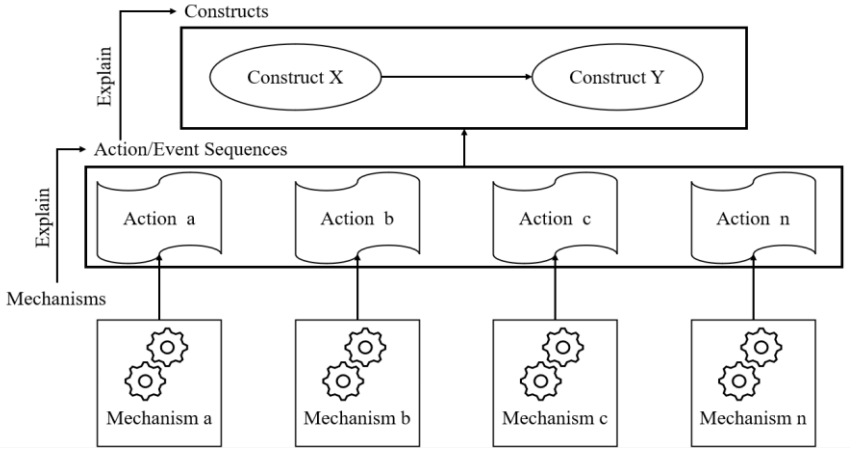
Building on this distinction, Kozlowski et al. (2026) propose a typology, the Layers of Theoretical Explanation, that distinguishes three levels of analysis that differ in causal explanatory depth (Figure 2). At Layer 1, theorizing focuses on constructs and their empirical associations. Layer 2 lowers the focus of explanation by describing the sequence of actions and events through which outcomes unfold over time. Layer 3 deepens the explanation by specifying the generative mechanisms that produce those sequences, which ultimately give rise to observed outcomes.

Within this typology, variance-based explanations operate at Layer 1 by identifying systematic covariations among variables. They operate under the logic that differences in the values of independent variables account for differences in dependent outcomes, usually assuming temporal stability, measurable constructs, and generalizable relationships. The typical research design of variance-based research is "construct X is correlated with construct Y, and this relationship is moderated or mediated by constructs A, B, or C." Such studies rely on what can be termed construct-centered causal reasoning (Kuljanin et al., 2024), which assumes that, once alternative explanations are ruled out or statistically controlled (Mohr, 1982; Antonakis et al., 2010), the presence of X accounts for the presence of Y. In other words, in the absence of any other explanation, Y would not occur without X. Although this logic allows researchers to infer associations among variables, it does not shed light on the underlying drivers through which a particular configuration of X brings about specific manifestations of Y. Causality here is treated as a "black box," where the mechanisms linking variables are not directly observed, but rather inferred from regularities across cases (Kozlowski et al., 2026).

On the other hand, process-based theories focus on events, time-sensitive sequences, and the underlying mechanisms that generate outcomes (Mohr, 1982; Kozlowski et al., 2013; Kuljanin et al., 2024). As Mohr (1982) contends, process theorizing seeks to uncover the causal processes that connect events, observing how specific conditions and interactions lead to a specific phenomenon. Process theorizing mainly focuses on explicating organizational phenomena as action/event sequences that unfold over time (Mohr, 1982; Kuljanin et al., 2024; Kozlowski et al., 2026), emphasizing the situated context, the actors involved, and the temporal ordering through which outcomes emerge. In doing that, causal explanation is refined by focusing on "*what happened*" and "*in what order.*"

We acknowledge that process-based research is not new within OSCM, much of which has been conducted qualitatively (e.g., Oliva & Watson, 2011; Kaipia et al., 2017). Qualitative research is typically case-based and draws on techniques such as narratives, interviews, ethnography, and participant observation to develop a rich, interpretive, and holistic understanding of an emergent phenomenon, making it especially useful for theory building (Kozlowski & Chao, 2012). In addition, those studies present the advantage of lowering the explanation focus by one layer (from Layer 1 to Layer 2 in Figure 2), offering a closer examination of actions and the sequences of events through which processes unfold. However, this approach provides limited insight into *why* particular actions are enacted or specific events unfold in a given sequence. Moreover, given their interpretive nature (Kozlowski & Chao, 2012), direct observation of actions and event sequences introduces a potential measurement problem (Kuljanin et al., 2024), as interpretations are inevitably filtered through the observer's understanding, reinterpretation, and cognition (Kozlowski & Chao, 2012; Kozlowski et al., 2013). Even when process data are complemented with interviews or other ethnographic techniques, there is also the risk of overgeneralizing idiosyncratic findings derived from specific cases without testing their generalizability (Eisenhardt, 1989). Nonetheless, qualitative process and variance-based studies represent valuable starting points for identifying relevant variable correlations (Kozlowski et al., 2013) as epiphenomena, which need to be complemented by the study of underlying generative mechanisms.

Figure 2 Layers of Explanation Offered by Process Theories.



Note: Adapted with permission from Kuljanin, G., Braun, M. T., Grand, J. A., Olenick, J. D., Chao, G. T., & Kozlowski, S. W. (2024). Advancing organizational science with computational process theories. The Leadership Quarterly, 35(4), 101797. https://doi.org/10.1016/j.leaqua.2024.101797

To this end, computational-process theorizing (CPTs) takes a foundational theoretical focus on the generative mechanisms or drivers producing a determined pattern of actions and event sequences. Specifically, CPTs aim to disaggregate the variables of interest to their lowest layer of explanation, uncovering the mechanisms responsible for actions and events (Layer 3 in Figure 2). This distinction is described by Pentland (1999, p.722), who noted that "to describe a process, one needs event sequences. But to explain a process, one needs to identify the generative structures that enable and constrain it." In other words, CPT lowers the layer of explanation to the causal mechanisms generating certain patterns of action or events responsible for the correlation of two constructs X and Y. CPT theories rely on mechanistic, temporal, and configurational forms of explanation (Grand et al., 2016; Grand et al., 2025), better suited to domains where causation is emergent, non-linear, and context dependent. Focusing on the generative mechanisms consists of focusing on the *drivers* leading to specific actions or sequences of events underpinning construct relationships.

In sum, CPTs complement narrative process explanations with formal specifications expressed through mathematical equations, logical statements, and computer simulations (Davis et al., 2007). These computational formulations overcome limitations of variance-based and narrative process-based theory, such as relying on natural language, suffering from ambiguity, a lack of standardization, and interpretive variability, which hinder consistent evaluation of theoretical plausibility and causal adequacy (Frankenhuis et al., 2023; Smaldino, 2017). Moreover, by explicitly stating theoretical intentions, empowering simulation and internal validation, referred to as generative sufficiency (Epstein, 1999), allows researchers to clearly determine driving mechanisms of how processes evolve and interact across multiple levels and contexts. This refinement moves inquiry beyond answering *what* questions, toward explaining *how* and *why* phenomena occur.

The distinction between variance and process-based perspectives can be illustrated through the example of a clinical trial for a new drug. In a randomized controlled trial, participants are randomly assigned to treatment or control groups (Hariton & Locascio, 2018; Moher et al., 2010). By manipulating the independent variable, the drug to be tested, researchers observe its effects on patients. Outcomes may be different, as the drug could be 100% effective or cause adverse effects in certain subgroups (Sun et al., 2014). In the latter and more common case, knowing that for subgroup Z the drug causes adverse effects identifies a correlation but not provide insights about its cause (Rubin, 2005; Bradford Hill, 1965). To uncover this, researchers adopt a mechanistic perspective, examining how the compound interacts with biological processes, such as whether it inhibits or overstimulates enzymes, produces reactive metabolites, or alters biomarkers indicating organ stress (Danhof et al., 2008; Edwards & Aronson, 2000; Lin et al., 2019; Lavertu et al., 2021). Tracing these mechanisms reveals how molecular interactions lead to clinical outcomes and informs clinicians

about reformulation or dosage adjustments (Lavertu et al., 2021). Applying a similar logic to OSCM means moving beyond correlations between constructs, such as between supply chain integration and firm performance, to uncover the causal drivers and temporal dynamics through which these relationships emerge and evolve within organizations (Antonakis et al., 2010; Ketokivi & McIntosh, 2017; Ho et al., 2017).

4.2 OSCM limitations addressed by MLT

An overemphasis on variance-based and equilibrium-oriented modeling has often treated organizations as predictable rather than adaptive systems (Pavlov & Micheli, 2023), generating a multitude of correlational findings linking constructs at the aggregate level while overlooking the generative mechanisms and interactive processes through which such relationships develop or dissipate over time. Even with panel data, causality posited between variables is still inferred, because panel data provide repeated snapshots of the variables of interest, observed at multiple points in time (Kozlowski et al., 2026). These limitations are a relevant constraint in OSCM research since, as Sterman et al. (2015) emphasize, operations contexts are feedback-rich and time-dependent, rendering static, correlational models insufficient to explain temporal dynamics. Empirical meta-analytic evidence further shows that the effects of supply chain complexity on performance are contingent and divergent, contradicting the notion of simple, linear, and time-invariant causal relationships (Akın Ateş et al., 2022).

A direct consequence of variance-based theorizing is that organizational research frequently aggregates phenomena or processes data to higher levels (e.g., team averages or firm aggregates) without clearly theorizing the mechanisms of aggregation or emergence (Kozlowski & Klein, 2000; Carter et al., 2015). This exposes empirical analysis to the ecological fallacy (Klein et al., 1994; Bliese, 2000; Bliese et al., 2007), in which inferences about lower-level dynamics are drawn from higher-level assessments, leading to invalid generalizations across levels (Ketokivi, 2019). This simplification neglects the inherently multilevel nature of organizational systems, spanning across different levels. Consequently, the field has limited insight into how lower-level entities and their interactions contribute to and affect higher-level outcomes. Misplacing the generative mechanism at the wrong level might lead to inaccurate inference of a specific relationship or, even worse, to wrong inference (Klein et al., 1994; Hitt et al., 2007).

Empirical research suggests that this type of oversimplification obscures the underlying drivers of OSCM phenomena. In a multiplant study, Ketokivi and Schroeder (2004) show that the same manufacturing practices can yield different results depending on whether they align with a plant's strategic priorities. As a result, operational performance improves when practices fit the plant's competitive features rather than when a generic best practice bundle is applied uniformly. In addition, Turkulainen and Ketokivi (2012) reinforce this point by demonstrating that the apparent benefits of cross-functional integration are not invariant across levels of analysis. Cross-level integration relates differently to distinct performance outcomes when they are clearly specified and targeted at the right level.

A process-oriented, multilevel perspective explicitly distinguishes between within-level processes and cross-level relationships, revealing how micro-level variation contributes to collective patterns and, conversely, how macro-level contexts constrain or enable local action (Kozlowski & Klein, 2000). Process-based bottom-up MLT provides a framework to overcome the limits of variance-based, top-down explanations and level-of-analysis confusion in OSCM. In fact, MLT requires explicit observation of each construct at its focal level, specifying how higher-level phenomena emerge (composition vs. compilation), and specifying the cross-level mechanisms in place (e.g., top-down constraints, bottom-up interactions, and feedback loops) that unfold over time (Kozlowski & Klein, 2000). In sum, MLT converts the call to encompass more levels of analysis (Mathieu & Chen, 2011; Hitt et al., 2007) into a research design suited for explaining emergence, aligning measurement, and identifying cross-level effects, strengthening causal claims (Kozlowski et al., 2026), and yielding actionable interventions (Braun et al., 2022).

5. MLT methodological proposal: Agent-Based Simulations

ABSs represent a valid tool to conduct emergent multilevel inquiry (Kozlowski et al., 2013; Kozlowski, 2015; Kuljanin et al., 2024; Grand et al., 2016; Grand et al., 2025). In general, computational modeling serves as a rigorous methodological framework for articulating, testing, and refining the logical and causal structure of theories by translating their components into formal, executable representations (Borsboom et al., 2021; Eronen & Bringmann, 2021; Guest & Martin, 2021; Kozlowski et al., 2013). In short, computational modeling can be thought of as a technique for specifying and testing the proposed logic and rationale of a theory, as it requires that the computer to serve as an input-output calculator that executes predefined instructions (code) following prescribed rules (formal logic and mathematics), to be capable of reproducing the theory's mechanisms in a fully operational form (Grand et al., 2025).

ABSs are computational tools that represent a system as a collection of autonomous, decision-making agents that interact according to defined rules (Epstein, 1999; Kozlowski et al., 2013; Grand et al., 2025). Each agent evaluates its environment and acts based on these rules, producing system-level patterns that can reveal complex, emergent phenomena. By encoding decision-making and interaction rules as executable algorithms, ABS provides a means of examining how individual-level mechanisms generate collective outcomes. By simulating interactions among agents and their relationships, ABS enables the exploration of adaptive and evolving processes that are often unobservable through purely analytical methods (Bonabeau, 2002). By explicating micro-level generative mechanisms, ABS enables scholars to explore how entities coevolve, revealing the emergent pathways that underlie operational and supply chain phenomena. In doing so, ABS embeds the principles of contextual constraints, temporality, and multilevel interdependence central to organizational science, offering OSCM a rigorous methodological foundation for studying emergence as a dynamic, evolving process rather than a static correlation.

Because computational models must be expressed in precise logical or mathematical terms that computers can interpret and execute, this approach demands the complete and precise specification of a theory's core concepts, processes, generative mechanisms, and contextual assumptions, provided by CPTs. As Vancouver and Weinhardt (2012) emphasize, a working computational model assures that a theory is internally consistent, accounts for the phenomena it claims to represent, is sufficiently specified, and remains unambiguous in the dynamics it portrays. Furthermore, computational modeling enables systematic exploration of theoretical assumptions and implications through simulation, allowing researchers to examine how variations in parameters and conditions influence predicted outcomes, uncover emergent phenomena from complex interactions, and generate empirically testable predictions (Grand et al., 2025; Kuljanin et al., 2024; Kozlowski et al., 2013; Vancouver et al., 2020). Thus, computational approaches enhance theoretical precision and internal validity, simultaneously expanding the capacity to interrogate and evolve theories through dynamic, emergent inquiry. This logic aligns closely with the structure of CPT, which formalizes how activities, events, and mechanisms interrelate to produce emergent phenomena.

Appendix A provides two ancillary arguments that are relevant, but not central to the point of the paper. First, an analysis of how ABSs mitigate endogeneity issues, and second, a comparison between ABS and another computational model typically used in OSCM, i.e., System Dynamics. Table 1 provides a synthesis of multilevel theory, process-based theorizing, and ABSs, highlighting their interconnections.

	MLT	Process theorizing	ABS
Purpose	Meta-theoretical framework for nested systems, linking micro, meso, and macro levels through bottom-up emergence and top-down constraints, clarifies construct locus and cross-level linkages.	Explains emergent phenomena through ordered sequences, mechanisms, and feedback over time.	Implements mechanisms as executable rules, enabling simulation and falsifiable implications.
Causality focus	Pinpoint causal drivers at the appropriate level, specifies within level processes and cross-level relationships, guide aggregation logic and measurement alignment, mitigates ecological and atomistic fallacies.	Moves beyond construct covariation and specifies how and why phenomena unfold.	Evaluates generative sufficiency, mechanisms must reproduce target macro regularities.
Emergence focus	Differentiates different forms of emergence, among which are compositional and compilational emergence. Categorizing global, shared, and configural unit properties allows shifts from divergence to convergence over time and acknowledges equifinality in emergent pathways.	Treats emergence as dynamic, recursive, context sensitive, not a one-time aggregation.	Captures heterogeneity and network structure, avoids perfect mixing assumptions. Tests whether the theorized emergence form (e.g., composition, or compilation) and cross-level constraints are sufficiently described by the computed generative mechanisms to generate the intended unit property under heterogeneity, network structure, and feedback conditions.
How do the three dimensions integrate?	MLT specifies levels and emergence form, process theorizing specifies temporal mechanisms and event sequences, and ABS formalizes the generative mechanisms to evaluate generative sufficiency and boundary conditions.		

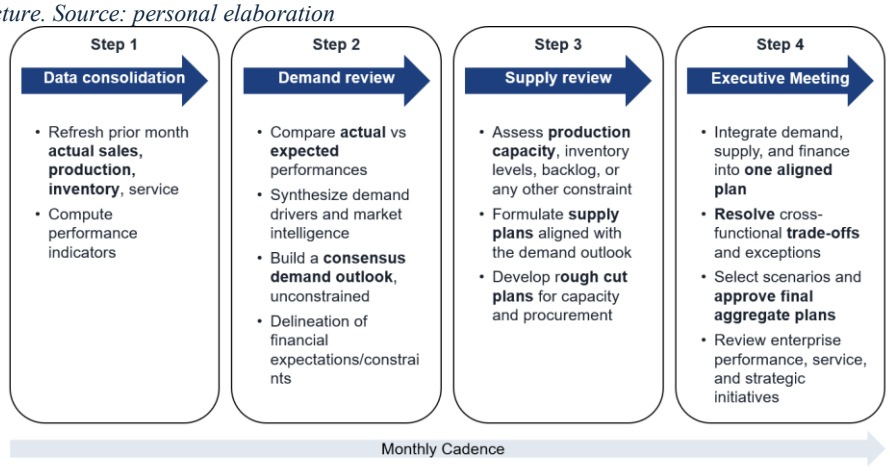
6. Unpacking S&OP effectiveness: an ABS approach

In this section, we provide an example of how to build an ABS to investigate multilevel phenomena in OSCM. In particular, we aim to study the effect of strategic consensus (i.e., the extent to which executives share the same strategic priorities) on the information sharing process leading to team knowledge emergence during the S&OP executive meetings. This phenomenon is particularly suitable to be analyzed through an ABS since it requires identifying the microlevel determinants and dynamics shaping the process of information sharing, leading to team knowledge emergence. To provide an actionable framework on how to conduct multilevel emergent research using ABSs, we articulate the discussion and conceptualization of our model into a seven-step roadmap.

6.1 First step - Team knowledge of the executive team in S&OP

S&OP represents a managerial control and coordination tool through which organizations periodically, usually monthly (Grimson & Pyke, 2007), aggregate and reconcile different functional plans into a coherent set of medium- to long-term plans with a forecasting horizon of 3-18 months, balancing forecasted demand, supply, and production, as well as meeting financial objectives (Figure 3).

Figure 3 S&OP structure. Source: personal elaboration



S&OP can be thought of as an integrative process that entails information acquisition, validation, and interpretation across functions whose differentiated incentives and priorities require managing a set of trade-offs in resource allocation (Shapiro, 1977; Oliva & Watson, 2011; Kristensen & Jonsson, 2018). Its scope is simultaneously operational and strategic, including upstream preparation activities (e.g., the generation of function specific analyses, forecasts, and performance indicators), and a structured sequence of cross-functional meetings that progressively aggregate, evaluate, and agree on these inputs, condensing them into a restricted number of feasible scenarios and plans (Grimson & Pyke, 2007; Thomé et al., 2012; Danese et al., 2018).

The executive meeting is the last step of the monthly S&OP process, where functional forecasts and proposals are reconciled, inconsistencies are resolved, and competing plans are synthesized into a limited set of aggregated plans that can be agreed and communicated as a stable commitment (Thomé et al., 2012; Tuomikangas & Kaipia, 2014; Wu et al., 2025). The reconciliation stage is crucial because S&OP must consolidate demand forecasts and functional plans that often conflict with cross-functional priorities. Integrating information originating in different parts of the organization involves overcoming functional specialization, which is known to generate tensions and conflicts over divergent preferences and priorities (Oliva & Watson, 2011; March & Simon, 1958).

Prior research shows that the quality of S&OP outcomes is also dependent on the extent to which executives share the same strategic priorities, since alignment affects what information is disclosed, when it is disclosed, and which inferences are deemed legitimate in converting heterogeneous functional views into integrated decisions (Oliva & Watson, 2011; Goh & Eldridge, 2019; Kristensen & Jonsson, 2018).

As noted by Thomé et al. (2012), much of S&OP literature remains descriptive and focused on how to implement this managerial tool, rather than shedding light on the characteristics and drivers of its effectiveness (e.g., stage of the maturity model, Grymson & Pyke, 2007). An underexplored aspect of this gap is how SC influences the information sharing process, which ultimately determines the amount of shared knowledge that is held by the team (Kozlowski & Chao, 2012). Unpacking the microdynamics of information sharing is relevant for deepening our understanding of S&OP performance determinants, since the amount of shared information reduces forecasting error (Cui et al., 2015), mitigates supply chain disruptions (Lee et al., 2000), and generally improves S&OP effectiveness (Oliva & Watson, 2011; Tuomikangas & Kaipia, 2014).

Our study examines whether higher levels of SC (Tarakci et al., 2013) among executives during the S&OP executive meeting enhance information sharing and, in turn, increase the team's shared knowledge. Drawing on OSCM evidence that richer, more transparent information sharing improves forecast accuracy and planning quality (Lee et al., 2000; Cui et al., 2015; Oliva & Watson, 2011; Tuomikangas & Kaipia, 2014; Abolghasemi et al., 2025), we argue that SC provides a common mental frame that aligns priorities, reduces defensiveness, increases prosocial behaviors, and encourages executives to share their unique, privately held insights (Becker et al., 2025). Consistent with research on emergent team cognition, such disclosure enables individually held knowledge to be shared at the team level, transforming idiosyncratic functional expertise into collectively available knowledge (Kozlowski & Chao, 2012).

Based on this rationale, we assert this proposition, which we evaluate by means of an ABS:

"Higher strategic consensus will enhance the information sharing process within the executive team, thus increasing the amount of shared team knowledge."

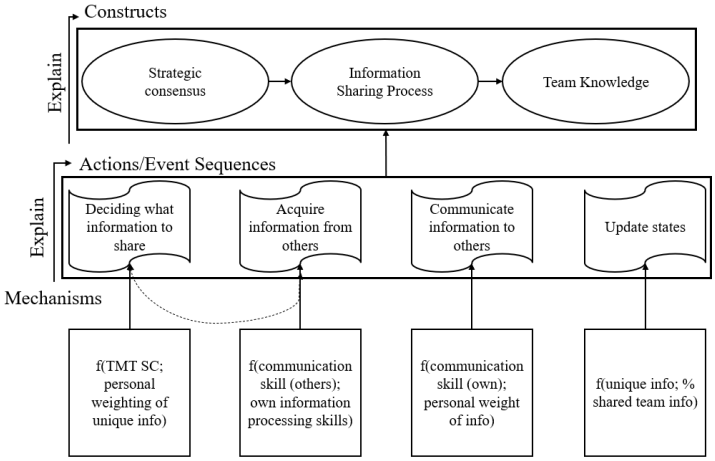
From a methodological standpoint, ABS is particularly well-suited to investigate this emergent phenomenon because it can capture heterogeneity across executives. For example, it can model differences in executives' cognitive abilities or in the amount of function-specific information that executives receive between successive S&OP meetings, thereby linking individual cognition and interaction to the emergence of team-level knowledge. Recent OSCM studies reinforce this internal perspective on S&OP effectiveness, showing that performance depends on how information is acquired, processed, and disclosed within the firm, and that well-designed alignment mechanisms can

unlock the benefits of information sharing by making cross-functional coordination timely and actionable (Kaipia et al., 2017, Goh & Eldridge, 2019, Oliva & Watson, 2011).

6.2 *Second step – A process theory of knowledge team emergence in S&OP executive meetings*

In this section, we seek to identify the mechanisms behind the multilevel nature of the relationship between SC and team knowledge. We first present the core variables and summarize findings from prior literature. Subsequently, we articulate our CPT, depicted in Figure 4, as a determinant sequence of actions and events and their generative mechanisms.

Figure 4 Process-based model of our ABS



We represent the executive team of the S&OP as composed of three executives (Oliva & Watson, 2011), namely the Chief Marketing Officer (CMO), Chief Operations Officer (COO), and Chief Financial Officer (CFO). Executives enter the meeting possessing a distinct private information vector that reflects the informational domain of their respective function:

- CMO contributes demand-related signals such as promotions and market trends;
- COO provides production and capacity constraints;
- CFO introduces financial parameters such as margin targets, cash constraints, and working-capital limits.

Collectively, these distributed information sets constitute the information configuration of the firm's mid- to long-term planning horizon. Having described the primary agents comprising our model, we next define the variables involved in our models, i.e., strategic consensus, team knowledge, agent parameters, and the process governing information sharing.

6.2.1 Variables and Agent Parameters

Strategic Consensus is defined as "*the shared understanding of strategic priorities among managers at the top, middle, and/or operating levels of the organization*" (Kellermanns et al., 2005, p. 721). In our CPT, SC functions as a contextual variable shaping information exchange. High levels of consensus align the mental frameworks through which executives interpret and prioritize information, thus fostering mutual trust and shared interpretive schemas that encourage full information disclosure (Kellermans et al., 2008; Xiang et al., 2013; Turner et al., 2014; DeChurch & Mesmer-Magnus, 2010).

Recent work on managerial mental representations (MMRs) indicates that within stable teams, SC tends to endure because the MMRs on which it relies display cognitive permanence and consistency over time (Becker et al., 2025). Permanence refers to shared representations that are easily reactivated and remain decision-relevant, lowering the cognitive cost of transparent exchange across cycles (Becker et al., 2025). When team composition remains constant, these shared cognitive structures consolidate into stable mental schemas that guide perception and decision making, maintaining consensus even under moderate environmental change (Becker et al., 2025). The stability and permanence of such representations, understood as their sustained relevance and reactivation

potential, support ongoing alignment of strategic understanding within teams (Becker et al., 2025). Moreover, even when cognitive structures evolve, those that are widely shared tend to exhibit change inertia, becoming embedded in organizational norms and decision processes that reproduce collective understanding (Benner & Ranganathan, 2017).

Team Knowledge is defined as the shared knowledge integrating individual team members' knowledge and expertise, and arising from collaborative interactions and exchanges (Kozlowski & Chao, 2012). Therefore, team knowledge is the result of team members' mutual learning, which is a multilevel emergent phenomenon (Kozlowski & Bell, 2020), particularly relevant in teams with distributed expertise in which team members must learn from one another to integrate complementary insights (Kozlowski & Bell, 2020). In our model, team knowledge is specified as a compositional construct capturing the overlapping amount of information held in common by executive members stemming from the information-sharing process. Conceptually, this aligns with composition emergence, where convergent interaction processes yield isomorphic contributions across levels, so that when information is shared, it becomes commonly held at the collective level (Kozlowski & Chao, 2012).

Internalized knowledge is the task-relevant knowledge that individuals learn and integrate and remains privately held within members as they acquire and retain it through individual learning processes (Grand et al., 2016). *Externalized (encoded) knowledge* is knowledge that is articulated and shared with others, becoming collectively held and mutually acknowledged through team sharing and agreement, and therefore available as public, actionable team knowledge (Grand et al., 2016). *Share rate* is the ratio of information shared by each agent relative to the total unique information available for that agent.

Following Johnson and Hollenbeck (2007) and Grand et al. (2016), we conceptualize team knowledge emergence as an interpersonal process, whereby team members build shared information through interaction, communication, and mutual adjustment. Accordingly, following Grand et al. (2016) we describe the amount of externalized (encoded) knowledge as the result of two agents' characteristics: information processing skills (receiving agents) and communication skills (speaking agent).

Information Processing Skills refer to the individual capacity to select task-relevant information, internalize and encode it into durable mental representations, decode information received from others, and integrate new inputs with prior knowledge so that an increasingly coherent schema guides judgment and action. In team cognition, this set of microprocesses is typically formalized as data selection, encoding, decoding, and integration (Grand et al., 2016; Kozlowski & Bell, 2020).

Communication Skills refer to the individual capacity to transform internalized knowledge into collectively held knowledge through high-quality message externalization (Grand et al., 2016). *Unique functional information* refers to the set of novel function-specific information that each executive holds when entering S&OP executive meetings, whereas *Speaking Rate* is the probability that a given member will elect to speak first in the team meeting (Grand et al., 2016). A higher level of speaking rate is correlated with the tendency to speak first in the team meeting.

Information weights (*information saliency* and *prosocial orientation*) refer to the importance attached to each piece (bit) of private information held by each executive. Building on the motivated information processing model (De Dreu et al., 2008), we conceptualize the weight associated with each information bit as a combination of two components: epistemic motivation and social motivation. Importantly, in our model both components are attributes of each bit of information in a given context, rather than stable traits of the manager.

Epistemic motivation is defined as "the willingness to expend effort to achieve a thorough, rich, and accurate understanding of the world, including the group task or decision problem at hand" (De Dreu et al., 2008, p. 23). In our setting, epistemic motivation is operationalized through *information saliency*, which captures how temporally proximate and decision-relevant the consequences of a specific information bit are. Thus, information whose effects will materialize in 18 months has lower

saliency than information whose effects will manifest within the next three months. For example, a sales director may enter the executive S&OP meeting with evidence that the largest customer has pulled forward a promotion by six weeks, shifting a substantial demand spike into the next two months. If the plan is not adjusted promptly, service levels will collapse and expedited deliveries will be required. This information bit has high saliency because its consequences materialize within the immediate planning window; directly constrain near-term capacity, inventory, and cash; and alter the optimal aggregate plan in the short forecasting horizon.

Social motivation constitutes the second component of the information weight and captures the orientation embedded in the handling of a specific information bit, i.e. whether it is framed and disclosed in a proself or prosocial manner. Consistent with De Dreu et al. (2008), a *proself orientation* reflects a focus on individual or functional outcomes, whereas a *prosocial orientation* reflects a concern for collective, firm-level outcomes. In our framework, a proself versus prosocial orientation is not modeled as a stable individual disposition, but as an information-specific attitude that may vary depending on the type of information and the incentives attached to it.

This distinction is particularly relevant in the S&OP context, where participants must reconcile potentially conflicting functional objectives. A higher prosocial orientation associated with a given information bit increases its transparency and the willingness to share it openly, thereby helping resolve tensions between local and firm-wide goals (De Dreu et al., 2008; Kellermanns et al., 2005). For instance, a COO may possess information that a critical production line will undergo preventive maintenance next month, reducing capacity and threatening on-time delivery. If handled in a proself manner, this information may be withheld or downplayed to avoid blame or protect local performance metrics, allowing the constraint to surface later when mitigation options are costly. Conversely, if handled prosocially, the same information bit would be disclosed early with explicit quantification of the expected capacity loss and proposed cross-functional mitigation actions (e.g., pre-building inventory, reallocating production, or substituting components). Even if such disclosure worsens short-term functional KPIs, it improves overall firm performance and reduces total system costs. Accordingly, we compute the weight of each information bit as the joint product of its *saliency* (epistemic component) and its *prosocial orientation* (social component). In this way, the information weight emerges from the interaction between the decision-relevance of the information and its collectively oriented handling within the executive team.

During S&OP meetings, managers continuously recalibrate the weight attached to their own privately held information in response to what others disclose. We name this process *information weight recalibration*. We conceptualize the situation as one in which a manager enters the meeting endowed with a set of private information bits, each associated with an initial weight (reflecting its saliency and prosocial orientation). Upon receiving others' inputs, the manager updates the weight assigned to each information bit. The extent of this adjustment depends on perceived information complementarity, relevance, and the level of uncertainty implied by the task environment (Bonaccio & Dalal, 2006; Harvey & Fischer, 1997; Yaniv, 2004). As the discussion unfolds, disclosed information may alter the perceived contribution of one's own information bits. A given piece of information may become more critical, for example, because it resolves residual uncertainty or complements others' disclosures, or less consequential, for instance, if it is inconsistent with the emerging shared interpretation of the situation (Gigone & Hastie, 1993). Through this iterative process, the relative influence of each information bit evolves dynamically over the course of the meeting.

Finally, to reflect the evolving nature of the planning environment across S&OP cycles, the simulation embeds an information updating cycle to allow executives' information sets to change over time. Specifically, after each S&OP executive meeting, participants may receive different quantities of new information, and each information bit may differ in both saliency and prosocial orientation. As a result, the model captures a dynamic environment in which functional areas are exposed to heterogeneous between-cycle updates that vary not only in volume but also in relevance and collective orientation.

6.2.2 Process description

The process underlying team knowledge emergence in S&OP executives' meetings occurs across a series of meetings within a stable TMT and unfolds as a set of interacting executives exchanging their unique function-specific knowledge. We simulate 60 executive meetings over a period of 5 years (one meeting per month). Each executive begins with a unique information set and a subjective weighting scheme that captures both salience and prosocial dimensions, together with heterogeneous communication and information processing abilities. Rolling S&OP meetings represent the point at which interaction and information sharing occur. The logic we compute is that the privately held set of information for each executive has an attached weight, such that a lower weight means a lower disposition to share a particular bit of information. In each meeting, each participant must choose between sharing or withholding every unique information bit they possess in their information set, comparing their subjective information weight to a cognitive threshold that decreases with a higher level of SC. If the weight of the information bit is higher than this threshold, the executive will share the information bit. In other words, a higher level of SC should facilitate the sharing of unfavorable information, as the TMT is aligned toward the strategic priorities of the firm. Conversely, when consensus is low, divergent strategic priorities amplify the perceived risk of misalignment and opportunistic interpretation, leading executives to withhold or strategically filter information in defense of functional interests.

Every time an information bit is shared, the amount of information internalized by each participant depends jointly on the speaker's communication skill and the receiver's information processing skill, following a cognitive ability-based team knowledge emergence model (Grand et al., 2016). Because information disclosed during the S&OP meetings is interconnected across functions, listening and internalizing information from other participants may trigger a recalibration of each manager's privately held information. Therefore, executives may revise the weights they assign to their own information bits in light of newly internalized information, and this revision can trigger additional disclosure in subsequent meetings as perceived complementarities and reduced uncertainty change what becomes worth sharing. Or, it might have the opposite effect of decreasing the willingness to share a particular information bit by decreasing the relative weight attached to it. Between meetings, executives also update their unique information as a result of the new functional information emerging from each function's data analysis (Grimson and Pyke, 2007), representing the process and team knowledge dynamic emergence.

These dynamics are described by four linked generative mechanisms explaining how shared knowledge emerges and how SC affects this dynamic (Figure 4). First, SC and personal weighting of private information will determine the initial amount of information that each executive is willing to share during the executive meeting. The second and third generative mechanisms occur simultaneously, since whenever a speaking agent is disclosing its own private information, the amount of information conveyed will depend on its own communication skills and its personal information weight. Contextually, all information shared by a speaking agent will be encoded by the receiving agents based on their information processing skills and the speaking agent's communication skills. This encoding process can also induce agents to revise the weight they assign to their own information when complementarities emerge (dotted line in Figure 4). Fourth, after all agents have disclosed their unique information, team knowledge is calculated as the proportion of information that becomes commonly shared across agents relative to the total information available. Between meetings, agents update their information sets to incorporate new information emerging from their respective functions.

6.3 Third step – From process theory to CPT. Define agents and model rules/constraints

Pseudocode is a central step in CPT development, being a representational layer connecting the narratively articulated process description to an executable computational model. Kuljanin et al. (2024) define pseudocode as "a higher-level representation of a computational process theory, which may include a listing of computational steps, diagrams, equations, etc., with varying specificity"

(Kuljanin et al., 2024, p. 10). This representation is also framed as a simple, plain language description of the sequence of actions and events that a computer program should perform, whose primary purpose is to clarify the steps, requirements, and logical structure of an algorithm, while remaining independent from any particular programming language (Grand et al., 2025). This use of pseudocode is presented as a means to sharpen causal inference by forcing precise specification of actors and the dynamics involved in a process, where and when phenomena unfold, why the process operates as proposed, and how its actions and events are linked, rendering process theories both conceptually transparent and subject to rigorous computational evaluation (Kozlowski et al., 2026). In our case, Tables 2 and 3 present the operationalization of the variables and our pseudocode as step-by-step high-level code to clarify the generative mechanisms and the hypothesized process of information sharing and team knowledge emergence.

Table 2: Variables Operationalization

Variable	Operationalization	Rationale
Strategic Consensus	Range between 0 and 1. Drawn randomly	Tarakci et al. (2013) measure ranges from 0 to 1.
Cognitive Threshold to Share Information	Range between 0 and 1. Threshold=(1-Strategic Consensus)	With this operationalization, a higher level of Strategic Consensus will lower the cognitive threshold of agents to share information, increasing the information shared.
Team Knowledge	Ratio between the total commonly held information and the total information available. Range between 0.1 and 1 $\sum \frac{Total\ Internalized\ Information}{Total\ Info\ Available}$	A compositional representation of team knowledge reflecting the amount of commonly held knowledge among S&OP participants (Kozlowski & Chao, 2012; Kozlowski & Klein, 2000). To represent the minimum amount of shared information within the TMT on a firm's specific information, we put a lower threshold of 10% to Team Knowledge.
Internalized (Encoded) Information	$Encoded\ Information = Shared\ Information * CommunicationSkill[Speaking\ Agent] * InformationProcessingSkill[Receiving\ Agent]$	The amount of information internalized by the receiving agents, function of the agents' cognitive abilities
Shared Rate	Ratio between each agent's total externalized information and the total information available	The amount of information each agent shared.
Information Processing Skill	Drawn randomly from a normal distribution with a floor at the 70th percentile	Adams et al. (2018) find that large company CEOs have cognitive ability above 82 percent of the population, while Wai and Rindermann (2015) show extreme right tail overrepresentation among Fortune 500 CEOs, consistent with many being in top percentiles, including around the top 1 percent. Accordingly, representing C-level managers' cognitive ability by drawing from the top percentiles of a normal distribution better matches observed selection than sampling on the whole distribution.
Communication Skill	Drawn randomly from a normal distribution with a floor at the 70th percentile	
Speaking Rate	Range between 0 and 1. Drawn randomly	Agents' parameters representing the proclivity to speak first during a meeting.
Recalibration of information Weights	While listening to others' information, if the information is particularly relevant (assigned weight over 0.5), each agent can recalibrate their information weight, ranging between ±10%	Representing a dynamic of information weight recalibration similar to the one reported by Yaniv (2004) and Bonaccio & Dalal (2006).
Unique Information	Vector of information	A vector containing each agent's set of unique functional information.
Saliency	Range between 0 and 1. Drawn randomly	Weight component representing Epistemic Motivation
Prosocial	Range between 0 and 1. Drawn randomly	Weight component representing Social Motivation
Information weight	Function of saliency and prosocial. Ranging from 0.25 and 1 $\frac{(1+prosocial)^2 + (1+saliency)^2}{8}$	This operationalization reflects that if one of the two components is high, the overall weight will be higher than a simple linear combination. It represents one of the two components taking over the other in computing the cognitive weight attached to a particular information bit.
Updates Matrix	Matrix containing all the possible update combinations between cycles. N. of new information (1;3;5) Saliency (0.1;0.5;0.9) Prosocial (0.1;0.5;0.9)	Since the timestep has been bound to 60, to ensure heterogeneity in the update condition, we predefine a 27-condition matrix, whose combinations allow us to represent a dynamic and evolving environment in each simulation.

Table 3 Pseudocode for Computational Simulation of Team Knowledge Emergence during SOP Meetings

Model/theory component	Step	Actions/ Sequence
Setting of Initial Conditions	1	Initialize each agent's parameters: - Start a vector of unique information, - Weight each information bit, depending on information saliency and "prosocial" value of a particular information - Information processing skills - Communication skills - Speaking rate
	2	Set the Strategic Consensus level drawing from a normal distribution Set the cognitive threshold to decide whether to share information or not
	3	Set counter m of the model to 0 Set counter of total-meetings = 60 (Repeat until 60 cycles have been computed)
	4	Set all different possible combinations of emergent new information bundles (saliency/prosocial/ number of new bits of information per new cycle) a) Update the number of new pieces of information acquired before the next meeting b) Update new information saliency and prosocial
Model algorithm specification	5	WHILE current held monthly meetings < total monthly meetings in the forecasted horizon:
	6	FOR each agent of the team, select the speaking order based on their speaking rate (extraversion).
		FOR each unique information bit, decide whether to share it or not, based on the comparison between the information weight and the threshold for sharing.
	7	Based on communication skills, the selected agent shares unique information with the rest of the team.
		FOR each not speaking agent:
	8	Receiving agents internalize the information shared by other agents based on their information processing skills (received information is internalized by the receivers based on their information processing ability)
	9	Based on information weight (proxy of complementarity), if the information shared by other agents is strongly relevant, it might alter the relative weight that a receiving agent assigns to its own information; update the receiving agent's information weights accordingly.
	10	Compare the amount of information internalized by each agent and compute the amount of shared info (% of shared information with respect to the total information available)
	11	Update the amount of unique information for each agent (new information + withheld information) → New bits of information are drawn randomly from the pool of predetermined combinations of new info bits/saliency. Store all the agents' parameters and team knowledge into a database to compute further statistical analysis.
	12	Iterate m = m + 1
	13	If m = 60, end simulation.

6.4 Fourth step - Model Coding

After specifying the CPT and presenting the pseudocode, we operationalized the model as an ABS computed in RStudio. In line with recommended practice, the code maps each pseudocode element onto concrete functions, logical conditions, and iterative control structures, improving transparency and reproducibility of the theorized dynamics (Grand et al., 2025; Kuljanin et al., 2024). The ABS simulated 3000 distinct teams to characterize the distribution of emergent outcomes across heterogeneous team compositions and contextual conditions. Repeated simulation across many independent teams is appropriate for evaluating the implications of CPTs, because it reveals how outcomes vary as a function of initial states and process parameters, not only whether a single run produces a plausible trajectory (Grand et al., 2025). Our code is available in the online Appendix. For clarity, we present it in three parts, (a) agent parameters, (b) model function, and (c) general model.

Agent parameters specify the model's initial conditions (Grand et al., 2025) with respect to the actors, their attributes, and the relevant contextual parameters that define the starting state of each simulated team. These initialization choices are crucial because they establish boundary conditions that shape what the model can generate (Grand et al., 2025; Kuljanin et al., 2024). In practice, initialization encodes the distribution of starting states across the 3000 teams, ensuring that cross-team variation in outcomes can be attributed to the intended differences in inputs and process parameters.

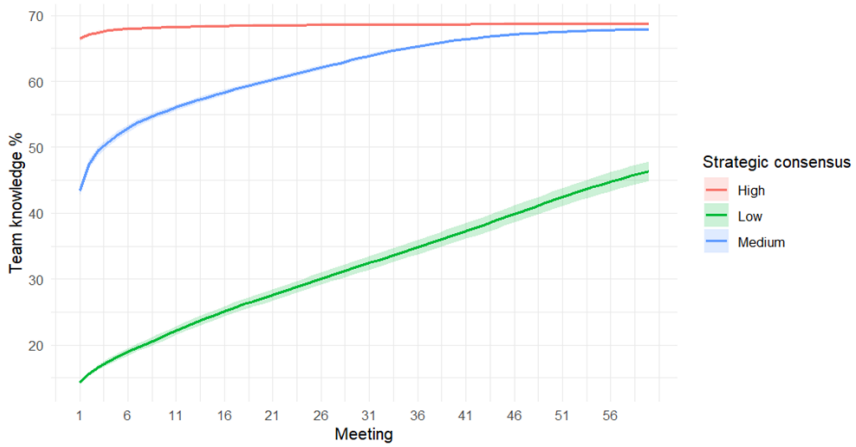
In the function and general model files, we computed the sequence of actions and events that enact the emergent dynamic, specifying their order, their decision rules, and the intensity with which they recur through time. A central requirement in computational process modeling is to make the

temporal structure explicit, including the sequencing of activities and the state transition logic that connects one step to the next (Grand et al., 2025). Accordingly, the main simulation code advances the model timesteps, triggers actions in the prescribed order, updates agent and system states, and stores outcomes for analysis. This structure supports the interpretation of emergent outcomes as consequences of the theorized mechanisms operating through time, rather than underspecified variables or dynamics with imprecise execution.

6.5 Fifth step - Simulate Emergence

The simulation unfolded over 60 discrete time steps, with each time step representing one S&OP meeting, thereby allowing us to trace how repeated cycles of interaction progressively accumulate into commonly held knowledge. We chose 60 cycles to represent a TMT tenure of five years, which is the average executive tenure (Messersmith et al., 2014; Carpenter, 2002; Zhang, 2019). To ease interpretation through visualization, we grouped teams according to their level of SC, defining Low consensus teams as those with values between 0 and 0.33, Medium consensus teams as those between 0.33 and 0.66, and High consensus teams as those between 0.66 and 1. This grouping enables the plotted trajectories (Figure 5) to be read as average emergent paths under systematically different consensus conditions, highlighting how differences in initial alignment translate into distinct rates of knowledge accumulation and distinct saturation levels across the 60 meetings. Finally, to assess the representativeness of our code, we conducted a series of sensitivity analyses, ensuring that the results are not driven by the model's parameter initialization, but by the within-team dynamics. All the sensitivity analyses are available in Section 2 of the online Appendix.

Figure 5 Output of ABS. 3000 simulated teams. Source: output from R code



6.6 Sixth step - Establish Generative Sufficiency and Model Validation

To assess the model's generative sufficiency (Epstein, 1999), we have to evaluate the ability of the ABS to reproduce the theoretically expected qualitative pattern across conditions. Because our simulation is grounded in a compositional conceptualization, we compute the variables for statistical analysis (i.e., team knowledge, share rate) as a group average across cycles. In our ABS, we expect a between-group difference in team knowledge across High, Medium, and Low SC, to an extent that is unlikely to be attributable to noise alone (Epstein, 1999; Kuljanin et al., 2024; Grand et al., 2016; Grand et al., 2025). To test ABS's generative sufficiency, we first computed an ANOVA to assess whether there was a statistical difference between these three subgroups. In addition, we also performed a pairwise group comparison with Tukey's method to further evaluate whether the differences between groups in their amount of team knowledge are statistically significant and with the predicted sign. The results of these analyses are provided in Tables 4 and 5. The one-way ANOVA provided strong evidence that the consensus manipulation was generatively relevant in the simulated data, $F(2, 2997) = 9905.47$, $p < .001$, with R-squared = .8686, indicating that most of the variance in team knowledge is explained by the grouping variable. The Tukey post-hoc tests reinforce this

conclusion by showing that all pairwise contrasts were significant and correctly ordered, Medium is lower than High by 12.53 %, Low is lower than High by 46.74%, and Low is lower than Medium by 34.21%, all $p < .001$, which yields the expected finding that a higher level of SC leads to a higher level of team knowledge. To strengthen the empirical grounding of the ABS, we calibrated agents' parameters so that they reflect executives' characteristics as closely as possible (see Table 2). Combined with the theoretical plausibility of the generative mechanisms, this strengthens confidence in the model's ability to explain the outcomes of interest.

Table 4: ANOVA output. Source: output from Stata 18

Source	Partial SS	df	MS	F	P > F
Model	1164174.8	2	582087.39	9905.47	0.0000
Group	1164174.8	2	582087.39	9905.47	0.0000
Residual	273348.79	2997	58.764211		
Total	176116.34	2999	446.91268		
Observation n.	3000				
R-squared	0.8686				
Root MSE	7.66578				

Table 5: Tukey test output. Source: output from Stata 18

Groups	Contrast	Std. err.	t	P > |t|
Medium vs High	-12.5322	.3416307	-36.68	0.000
Low vs High	-46.74792	.3433605	-136.15	0.000
Low vs Medium	-34.21572	.3435292	-99.60	0.000

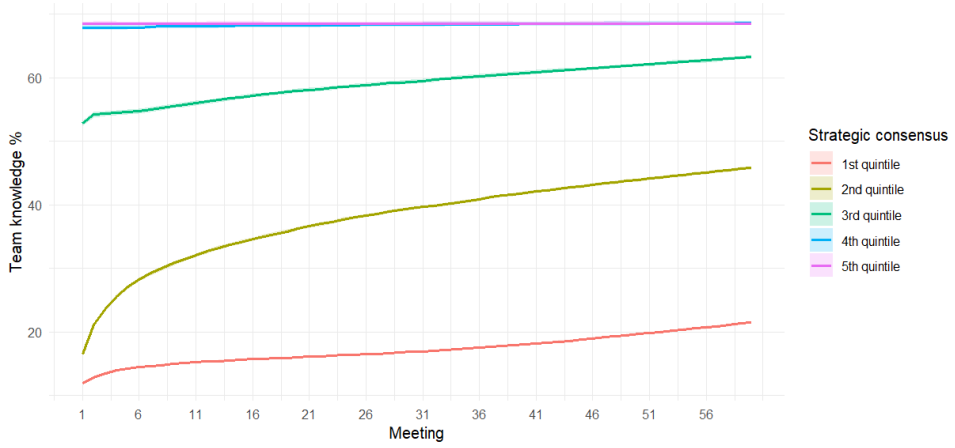
6.7 Seventh step - Analyze process and outcome patterns over time

6.7.1 Simulation Analysis

The simulation result presented in Section 6.5 depicts the dynamic emergence of team-shared knowledge within a TMT across S&OP meetings. Although Figure 5 presents a visualization of the dynamic emergence of Team Knowledge, it is not highly informative *per se*. What we can grasp from Figure 5 is that team knowledge increases over time, but it does so at significantly different rates and toward different saturation levels depending on SC. In particular, the trajectories depicted suggest that teams characterized by Medium and High levels of SC tend to stabilize, with the highest consensus conditions approaching a clear plateau and exhibiting only marginal increase thereafter. Thus, the figure implies a pattern of diminishing marginal returns at the Medium to High level of SC, where additional increases in consensus translate into relatively small improvements in team knowledge, whereas the difference between low and moderate consensus remains relevant across the entire time horizon.

To further unpack the results shown in Figure 5, we reran the simulation, this time not drawing SC values randomly between 0 and 1, but manually assigning them to better isolate the effect of SC. Specifically, we divided the distribution into quintiles and assigned the median values to each quintile (i.e., 0.1, 0.3, 0.5, 0.7, 0.9), generating a set of simulations depicting the effect of increasing the level of SC on team knowledge building. In this analysis, we simulated 2500 teams, 500 teams in each quintile. The results, shown in Figure 6, disaggregates the effect of different levels of SC, such that the lowest quintile starts with the smallest knowledge base and improves gradually, the second quintile exhibits faster early growth but remains well below the mid and high conditions, the median quintile continues to accumulate knowledge more steadily across meetings, and the fourth and fifth quintiles begin at substantially higher levels and rapidly reach a ceiling point, with the top two trajectories nearly overlapping for most of the simulation. Considering the findings portrayed in Figures 5 and 6 together, the pattern suggests that SC shapes both the early stages of team knowledge accumulation and the speed with which teams convert interaction over time into commonly held shared knowledge. It is worth noting that the graph suggests a team knowledge convergence over a longer time horizon; for longer periods of time, it would be unlikely that the TMT would remain constant. Consequently, changing team composition would have consequences for SC and would, therefore, affect within-team dynamics and subsequent team knowledge emergence.

Figure 6: Output of ABS's sensitivity analysis. 2500 simulated teams, 500 for each category. Source: output from R code



Results of the quintiles analysis, paired with the scatter plot and fitted values in Figure 7, reinforce the idea that the association between strategic consensus and team knowledge is nonlinear. Greater gains appear when moving from low to moderate consensus, where an increase in team knowledge flattens, and may even begin to decrease as consensus becomes very high. A similar nonlinear pattern emerges in the relationship between information sharing and team knowledge. As shown in Figure 8, increments in share rate (i.e., the team average of the ratio between each agent's externalized information and their total unique information over the simulated period), are associated with a steep increase in team knowledge at low levels of share rate, but the slope progressively flattens as share rate rises, with the curve reaching a saturation point.

Figure 7: Scatter Plot and Fitted Value of Team Knowledge and Strategic Consensus. Source: personal elaboration with Stata 18

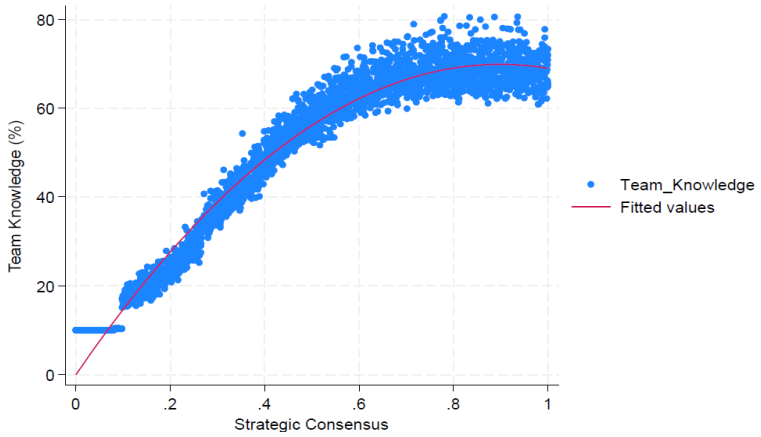
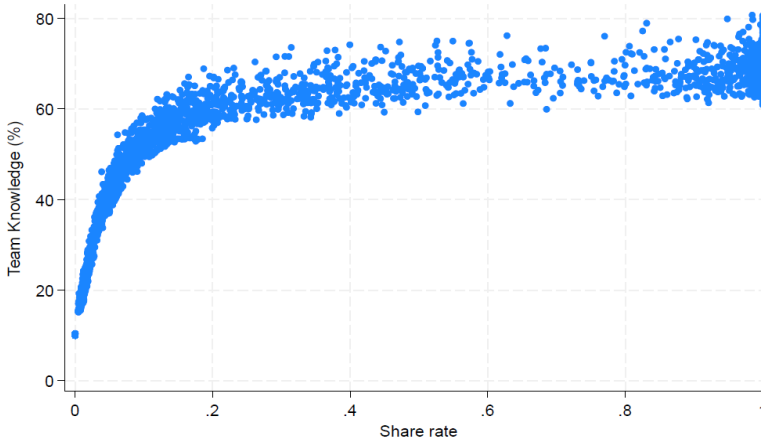


Figure 8: Scatter Plot of Team Knowledge and Share Rate. Source: personal elaboration with Stata 18



To address our proposition that a higher level of SC will increase the amount of information sharing within the TMT, thus increasing team knowledge, we ran a path analysis to examine whether the effect of SC on team knowledge is mediated by the share rate. Because Figure 7 suggested a curvilinear association, we also included a quadratic term for SC, allowing us to test whether its effect is monotonically positive even at higher levels. The concave relationship between share rate and team knowledge suggests that a linear operationalization of share rate is not the most appropriate (Box & Cox, 1964). Therefore, in our analysis, we model the share rate using a logarithmic transformation, which provides a good representation of the relationship depicted in Figure 7. Results of the path analysis are reported in Table 6.

Table 6: Results of path analysis for the SC mediation effect on Team Knowledge. SE calculated with the Satorra-Bentler estimator. N- of teams: 3000

	Coefficients	**SE**	**P>|z|**
ln(Share Rate)			
Strategic Consensus	15.241	.441	0.000
Strategic Consensus^2	-7.930	.346	0.000
Constant	7.275	.124	0.000
Team Knowledge			
ln(Share Rate)	.244	.098	0.013
Strategic Consensus	171.715	1.795	0.000
Strategic Consensus^2	-100.840	1.080	0.000
Information Processing Skills	55.333	1.366	0.000
Communication Skills	54.483	1.363	0.000
Constant	-87.576	1.957	0.000

As we can see from the results, SC has a strong positive correlation with team knowledge, β = 171.72, $p < 0.001$, consistent with the proposition, but the squared term revealed a significant nonlinear dynamic. Specifically, SC squared had a negative direct effect on team knowledge, β = -100.84, signaling diminishing returns and a negative effect at very high levels of consensus. In addition, SC squared also had a mediated negative indirect effect on team knowledge via share rate, as its effect on share rate is β = -7.93, $p < 0.001$, and share rate increased team knowledge, $\beta = 0.244$, $p < 0.05$, yielding an indirect effect of approximately $-7.93 \times 0.244 = -1.94$. Because the share rate is operationalized in logarithmic form, the coefficient represents a proportional change in team knowledge. Specifically, a one-unit increase in *ln(share rate)*, equivalent to an *e-fold* increase in share rate, is associated with a 0.244 percentage point increase in team knowledge. Thus, the total effect of the squared term on team knowledge is negative through both paths, with the indirect, mediated component complementing the negative direct component. Together, they confirm the curvilinear pattern in the scatterplot, whereby team knowledge increases with strategic consensus but stabilizes and slightly declines at the highest levels of consensus. To conclude, path analysis shows an excellent model fit, with RMSEA = 0.023, a very high p-close of 0.956, CFI and TLI both equal to 1.000, and SRMR = 0.003, indicating that the specified nonlinear relationships align closely with the data.

6.7.2 Simulation Discussion

Across the ABS runs and the complementary statistical tests, the results support a central intuition: SC helps top teams integrate privately held information into team knowledge, but its effects are not strictly linear. In the simulation, teams in higher consensus conditions achieve higher team knowledge than medium and low consensus teams. The ANOVA and post hoc comparison indicate that these differences are large and systematically ordered, consistent with the idea that consensus strengthens the social and cognitive conditions for alignment. This finding aligns with core S&OP research that treats the process as an integrative planning mechanism, where cross-functional alignment, structured meetings, and shared targets help synchronize demand and supply decisions, and thereby improve collective understanding of the plan and its assumptions (Grimson & Pyke, 2007; Thomé et al., 2012; Tuomikangas & Kaipia, 2014).

At the same time, the time series trajectories and the quintile reruns show that the strongest gains occur when moving from low to moderate consensus, where gains flatten at high levels, with the top quintiles rapidly approaching a ceiling and becoming difficult to distinguish. In other words, consensus appears to shape the speed of knowledge accumulation, yet it also introduces saturation, which is consistent with a curvilinear relationship implied by the fitted scatterplot.

The path analysis clarifies the effects and sharpens the boundary conditions. The linear component of SC positively predicts share rate, and share rate positively predicts team knowledge, which is the mediation logic embedded in our proposition. Higher strategic consensus increases information sharing within the TMT, which in turn increases team shared knowledge. This is consistent with team information processing research showing that information sharing and elaboration are foundational for building shared mental models and common understanding (Mesmer Magnús & DeChurch, 2009; Mohammed et al., 2010).

Accounting for the curvilinear pattern by including SC squared helps explain why the benefits of consensus taper off at higher levels. In the model, SC is specified to have a linear positive effect on the propensity to share information, because higher consensus lowers the cognitive threshold that determines whether an information bit is disclosed. However, ABS dynamics depict a saturation effect. In fact, for high values of SC, additional increments in SC have diminishing marginal returns to the accumulation of team knowledge, because lowering the cognitive threshold over a certain point will not increase the portion of the information being exchanged (reflected by the team share rate), as it is already known. The squared term, therefore, captures this diminishing return, exerting a negative direct effect on team knowledge and an additional negative indirect effect through share rate. When combined with heterogeneity in agents' communication and information processing abilities, this saturation dynamic can even produce conditions in which very high levels of consensus yield smaller, and even negative, marginal contributions to team knowledge.

Conceptually, this suggests that excessive consensus may limit the informational gains generated through interaction. When teams become highly aligned, the incremental value of additional exchanges declines, and the integration of diverse perspectives becomes less pronounced. This interpretation is consistent with evidence that groups often fail to pool unique information, particularly when agreement is socially rewarded and dissent is costly (Stasser & Titus, 1985). It also aligns with the groupthink literature, which argues that concurrence seeking suppresses critical evaluation and the generation of alternatives, leading to high consensus but low informational richness (Janis, 1972). Similarly, Knudsen and Srikanth (2014) show that strong alignment in specialists' mental models can induce "joint myopia," narrowing collective search and increasing the likelihood of suboptimal performance.

Viewed through an S&OP lens, the nonlinear relation between SC and team knowledge has important implications, because S&OP performance depends upon sustained integration of new information into the aggregate plan. Extremely high SC may generate fast and stable emergence of team knowledge, yet simultaneously inhibit the critical recombination of discrepant demand, supply, and market information that protects forecast accuracy and plan quality over time. In this sense, the same consensus that reduces coordination costs can raise the risk of overconfidence, insufficient scenario exploration, and weaker information integration, which would be expected to manifest downstream as diminishing improvements in plan accuracy even as perceived alignment remains high.

The first managerial recommendation appears to be almost self-evident, as it suggests composing the TMT with managers with above-average relational skills (i.e., communication and information processing skills) as they directly improve the amount of information encoded at the team level. Second, and a bit counterintuitive, is not to pursue maximal consensus, but to prefer a consensus high enough to enable coordination and shared understanding, while preserving structured techniques for dissent and evidence-based challenge. Such techniques include explicit scenario comparisons, rotating devil's advocate roles, pre-meeting reviews that surface exceptions, and decision rules that require revisiting assumptions when new information conflicts with the current plan.

As shown by the intervention described by Tarakci et al. (2013), it is possible to increase SC of a TMT with an exogenous intervention. Our ABS findings reframe SC as a lever that must be balanced with effective information integration, and it provides a process-based explanation for why teams can underperform on accuracy when they become too cognitively aligned (Janis, 1972; Mesmer Magnús & DeChurch, 2009; Knudsen & Srikanth, 2014).

7. How to compute an ABS: a "To-do" list

To conclude, we provide a step-by-step guide (see Table 7) on how to conduct multilevel emergent CPT research, detailing the steps we used to outline our research on team knowledge emergence in S&OP executive meetings.

Table 7: Stepwise guide on how to compute an ABS. Acknowledge that this is an "idealized" way to build a CPT and ABS

Step	Description
1. Observe an emergent multilevel phenomenon	Identify a phenomenon and determine if the generative mechanisms driving this posited relationship are known. ABSs and process theory can be used to deepen the understanding of an already established correlation, an observation of a given phenomenon, or a processual causal relationship that seems plausible to explain an organizational phenomenon.
2. Build a process theory	If generative mechanisms are yet to be uncovered, identify the actions/event sequence determining the observed relationship in type (negative/positive) and intensity (relative magnitude of the correlation). If some prior literature exist, use the correlations and nomological networks to guide the identification of the underlying process.
3. Translate the process theory into a CPT. Define Agents and model rules/constraints	Starting from the pattern of actions/events sequence, compute a CPT based on logical statements and mathematical functions to eliminate any kind of uncertainty and ambiguity on driving mechanisms and model rationale. Design agents and encode their decision rules, goal functions, and contextual constraints. Translate the narrative process theory into agent action and sequences Write a complete pseudocode.
4. Model Coding	Operationalize the pseudocode into an ABS using code (e.g., Python or R). Model operational logics: - Initial Conditions; - Specify order, nature, and intensity of actions/events.
5. Simulate Emergence	Run ABS to observe how agents' characteristics and interactions lead to higher phenomena emergence over time. Manipulate context variables and external factors
6. Validate Generative Sufficiency	Assess if micro rules reproduce the observed macro regularities. If necessary, iteratively refine the narrative theory, CPT and then the pseudocode and code. This step tests the plausibility and representativeness of our model's generative mechanisms.
7. Analyze both process and outcome patterns over time	Track trajectories, feedback loops, and tipping points, not just end-state performance. Plot the data into clear graphs and store the generated data in a database. Enhance the theory around an emergent phenomenon by uncovering and theorizing at the mechanism level, clearly identifying the cause of a given phenomenon without the need for inference.

7.1 Observe an emergent multilevel phenomenon

The starting point of emergent multilevel research is a detailed specification of a focal phenomenon that plausibly reflects the generative mechanisms of its emergence over time (Epstein, 1999). In organizational science, including OSCM, this first step is not just a descriptive phase. Rather, it is a bounding exercise that clarifies context, the relevant actors and levels, and the temporal

window over which the phenomenon unfolds, because process explanations depend on specifying *what* happens, *where*, *when*, *how,* and for *whom* (Kozlowski et al., 2026). In this phase, researchers should not fall into what Bendoly and Oliva (2025) call the "fallacy of cited references;" namely, the mistaken belief that theoretical arguments must be legitimized primarily through the explicit citation of established theories. Bendoly and Oliva (2025) caution that while positioning with prior work matters, the logic of an explanation should remain defensible even if citations are stripped away. This is because references can reinforce an argument, but cannot substitute for warranted mechanisms and boundary conditions. The initial phase of conceptualization in multilevel emergence research should therefore draw on observation, intuition, and/or abductive reasoning, and need not be overly grounded in prior literature (Bendoly & Oliva, 2025; Kozlowski & Klein, 2000).

7.2 Build a process theory

Process theory development requires moving from covariance statements toward an explicit action and event sequence that can plausibly generate the observed phenomenon. This involves progressing downward across the Layers of Theoretical Explanation (Kozlowski et al., 2026) from construct relations to the process sequence layer, and ultimately to the mechanism or deep structure layer that enables and constrains the process action sequence (Kuljanin et al., 2024; Kozlowski et al., 2026). The core goal is a narrative explanation that identifies the actors involved in the sequence, the ordering and timing of events, and the conditional dependencies that render the process intelligible as something other than a retrospective story. Moreover, identifying an action or event sequence is insufficient unless the underlying generative mechanisms are specified as drivers of agents' actions, guiding how and with whom they interact. These mechanisms also shape the direction and strength of relationships and the stochastic processes through which multilevel phenomena unfold (Kozlowski et al., 2026).

7.3 Translate the process theory into a CPT. Define agents, model rules, and constraints

Translating narrative process theory into a CPT entails transforming qualitative process accounts into unambiguous, executable statements about how system states update from one-time point to the next (Kuljanin et al., 2024; Grand et al., 2016, 2025). This step is crucial as it forces researchers to clearly specify what the features of the model are (e.g., the initial conditions), how many actors to represent, what characteristics they possess and their parameter values, what they can do, and which environmental structures enable or constrain action (Grand et al., 2025). In agent-based terms, these model features constitute the microspecification, namely the initial agent environment and behavioral specifications that govern local interactions (Epstein, 1999). Pseudocode is an intermediate representation between a narrative process theory and an operationalized computational model, because it maps the process narrative into a stepwise representation of actions and events with sufficient granularity to be translated into code, while still being readable as theory (Kozlowski et al., 2026). In this step, the focal point is to clarify every ambiguity source over the computed model, as it is a direct threat to interpretability. In fact, two implementations of the same process can diverge dramatically in code and results if core actions and event ordering are underspecified (Grand et al., 2025).

7.4 Model Coding

Coding operationalizes the pseudocode into an executable simulation, thus turning the theory into an algorithmic object whose implications can be examined under controlled conditions (Kozlowski et al., 2026). The primary methodological feature is correspondence or fusion between the ABS coding and the theory, specifically the generative mechanisms. This careful mirroring requires clarity and attention to specifying initial conditions; state variables; and the order, nature, and intensity of actions and events as they occur within each iteration of the model (Rand & Rust, 2011). Initial conditions can be thought of as theoretical boundary conditions that shape what the

ABS can and cannot explain, thus determining what the ABS's "computational world" contains and how the mechanisms operate (Grand et al., 2025).

Similarly, coding requires fully specified operational definitions for each action and event, including how actions are initiated, how they update the states of actors and their environment, and how stochastic elements influence the model when probabilistic processes are represented (Grand et al., 2025). Thus, building an ABS entails defining agents as "purposive" actors embedded in contexts, encoding decision rules or goal functions that operationalize the underlying generative mechanisms, and specifying relevant constraints (e.g., resource limitations, role structures, or network interdependencies).

7.5 Simulate Emergence

Simulation is the phase in which the ABS is run, enabling observation of whether local interactions among agents, under specified constraints and contexts, yield the expected higher-level phenomenon over time. This is the distinctive value proposition of ABSs for emergence-based research questions, as it renders the unfolding process itself observable, rather than inferred from cross-sectional accounts (Kozlowski et al., 2016). In practice, simulation should be treated as systematic experimentation over theoretically meaningful parameter ranges and contextual conditions, not as a single illustrative run.

Agent representativeness can be progressively refined through empirical inputs, after which the simulation can be used as a platform for virtual experiments that explore contextual manipulations (Kozlowski et al., 2016). This logic also enables the manipulation of exogenous shocks, institutional constraints, or network structures to assess robustness and identify boundary conditions (Grand et al., 2025).

The appropriate timeframe is idiosyncratic to the phenomenon under study, as it depends on the frequency and magnitude of interactions (Kozlowski et al., 2013; Kozlowski, 2015; Kozlowski et al., 2026). Importantly, the relevant output is the joint pattern of trajectories and process dynamics: how micro-level interactions aggregate, interact, and feed back into the evolving environment (Kozlowski et al., 2026).

7.6 Establish Generative Sufficiency and Model Validation

Establishing generative sufficiency and model validation must be understood as two different requirements. To establish generative sufficiency, researchers must determine whether the model specification is sufficient to generate macro patterns of interest. Following Epstein's (1999) criterion on generative sufficiency, if the macro pattern does not emerge from the ABS, the proposed explanation mechanism is disqualified. However, assessing generative sufficiency does not imply that a single successful reproduction is sufficient. Rather, it supports generative plausibility while motivating comparative evaluation against alternative microspecifications and sensitivity analyses. More precisely, generative sufficiency constitutes an internal plausibility check, namely, whether the specified mechanisms can reproduce the target pattern under the ABS's boundaries and assumptions (Kozlowski et al., 2026).

Validating an ABS involves comparing synthetically generated data and patterns with available empirical evidence. In other words, validation serves as an external plausibility check, assessing whether the specified mechanisms can reproduce observed phenomena under the proposed constraints and boundary conditions. Accordingly, validation is an empirical endeavor, achieved through systematic confrontation with observed evidence rather than reliance on a single test.

However, because many empirical observations take the form of aggregate differences or correlations derived from cross-sectional data, validating the micro-to-macro dynamics implied by ABSs may be challenging. For this reason, empirical validation should be treated as a cumulative and revisable process, in which confidence in the model is progressively strengthened through triangulation across multiple patterns, datasets, and levels of aggregation, where possible. When data

are unavailable, model parameters and dynamics should be calibrated to align as closely as possible with known features of the real-world.

Depending on whether an ABS is used for theory building or for explaining empirical phenomena, the required type of analysis differs. When ABS aims at theory building, its value lies in operationalizing CPTs, whose implications for a phenomenon's generative mechanisms can be simulated over time to assess the plausibility of the proposed process account (Kozlowski et al., 2026).

Given its exploratory and novel nature, appropriate data tracing underlying action–event sequences (e.g., fine-grained process data) may not exist, as the purpose of theory building is precisely to develop and refine a novel, coherent causal account of how and why the phenomenon unfolds (Kozlowski et al., 2026). Accordingly, theory building with ABS does not require empirical data as input or as a benchmark, provided that the model's dynamics are theoretically credible, explicitly specified, and internally coherent with the proposed causal explanation (Kozlowski et al., 2026). This position aligns with the broader view that theorizing progresses along a continuum, from early-stage propositions to increasingly detailed accounts of causal mechanisms (Bendoly & Oliva, 2025).

When the ABS is used normatively or to explain an empirically observed phenomenon, researchers should validate the model against available empirical evidence. In this normative use, validation becomes necessary, even if the empirical evidence is scant or indirect. In this case, ABS requires both verification and validation as distinct processes: test the generative sufficiency to ensure the ABS reflects the conceptual model, and validation to assess correspondence with real-world patterns and evidence (Rand & Rust, 2011). Thus, whereas generative sufficiency asks whether the model "works" as a coherent generator of the theorized dynamics, ABS validation offers a stronger, externally anchored test of whether the same mechanisms can reproduce independent empirical findings (Kozlowski et al., 2026), when such evidence is available and commensurate with the model's claims. When empirical data exist, scholars can strengthen model evaluation by estimating or calibrating parameters and quantifying the correspondence between simulated predictions and observed patterns. In doing so, it is useful to distinguish between qualitative sufficiency (i.e., whether an effect emerges and in the expected direction), and quantitative sufficiency (i.e., whether the magnitude and temporal dynamics of the effect align with empirical observations; Ballard et al., 2021). At the same time, the feasibility of quantitative validation depends on the availability of sufficiently granular, longitudinal, or process-tracing data.

7.7 Analyze both process and outcome patterns over time

ABS allows not just the analysis of the end state phenomenon, but the evaluation of dynamic signatures by which the phenomenon emerges, stabilizes, oscillates, or collapses. This entails tracking trajectories with different agent parameters and contextual constraints, identifying feedback loops, and locating tipping points where small micro-level changes produce discontinuous macro effects, which are the kinds of implications that narrative dynamic theories often leave unspecified (Vancouver & Weinhardt, 2012). Consistent with CPTs, analysis should treat constructs as summaries of action streams, but the focus of the analysis must remain anchored in the underlying process rules that generated those summaries (Kozlowski et al., 2026). Accordingly, researchers should store rich time-indexed outputs, including micro determinants of interactions, meso-level coordination patterns, and macro outcomes, enabling both descriptive visualization and formal analytical analyses.

Step 7 also closes the theory-building loop, because discrepancies between predicted and observed process outcomes can be used as a stepping-stone to refine the narrative explanation. Ideally, a well-crafted ABS can elucidate how and why the phenomenon occurs by pointing to the mechanism-level responsible for generating macro phenomena, thereby reducing reliance on inference from static covariances and improving the design logic for interventions tested through virtual experimentation and refining the aim and scope for possible subsequent empirical study (Braun et al., 2022; Kozlowski et al., 2016; Epstein, 1999).

8. Conclusion

This manuscript addresses an evident gap in OSCM research. Many of the phenomena theorized are multilevel, dynamic, and time-dependent, yet research strategies largely prefer single-level and variance-based methodologies, producing construct associations that often leave the generative "how" and "why" under-specified.

Building on multilevel theory and computational process theory, we propose a complementary path for theory building in such settings, shifting the explanatory target from covariation to generative mechanisms, specifying the sequences of actions and state transitions that can generate a focal macro regularity, and then evaluating those mechanism explanations through executable computational models. In this approach, ABS is a tool that forces unambiguous operationalization, makes temporality explicit, and supports systematic experimentation over boundary conditions, while evaluating internal credibility through generative sufficiency and robustness checks.

Our S&OP ABS example clarifies both the value and the limits of strategic consensus as an alignment mechanism in executive planning. Across 3,000 simulated teams observed over 60 S&OP cycles, higher SC increases team shared knowledge primarily by increasing information sharing, consistent with the logic embedded in our proposition. At the same time, the emergent trajectories and the curvilinear findings show that the benefits are not monotonic. At very high levels, SC begins to reduce the share rate and exerts an additional negative component on team knowledge, yielding diminishing returns and, at the extreme, slight inhibition of team knowledge emergence. This pattern is consistent with groupthink and hidden profile mechanisms, where strong concurrence seeking narrows search, suppresses unique information pooling, and yields agreement that is socially smooth but informationally thin.

This result is a particularly consequential risk in S&OP, where planning quality depends on integrating discrepant demand, supply, and financial signals over repeated cycles. The central implication is therefore not that consensus is undesirable, but that its effectiveness is bound to a threshold, beyond which more consensus can undermine the information integration it initially facilitated. By making this nonlinear tradeoff mechanistically explicit, and by showing how it can emerge from micro-level disclosure and integration dynamics under repeated interaction, the manuscript overcomes some limitations in the extant literature, offers a coherent roadmap for multilevel bottom-up theorizing in OSCM, and provides an actionable framework for future research on emergent phenomena.

APPENDIX A:
ABS and Endogeneity

Traditional econometric approaches seek to mitigate endogeneity biases through identification strategies, such as instrumental variables, lag structures, or fixed effects, focusing on strengthening the assumptions of variable exogeneity. Ketokivi and McIntosh (2017) contend that these problems in OSCM research arise from the complex and interdependent nature of organisations and supply chains, so we should accept, up to a certain point, a certain degree of endogeneity. Moreover, they argue that "the conclusion about endogeneity is based not on statistical theory but on substantive, theoretical considerations" (Ketokivi and McIntosh, 2017, p. 5). Building on this view, the question is not only how to remove endogeneity, but how to design dependence in ways that make causal inference testable in its generative mechanisms.

Ho et al. (2017, pp. 511-512) identified three primary sources of endogeneity in OSCM research. These are:

1. Omitted variables occur when one ignores the possibility of some unobserved variable affecting both the outcome and key explanatory variables in the estimation models.
2. Simultaneity or reverse causality occurs when there are multiple dependent variables, each influencing at least one other dependent variable.
3. Measurement and selection biases, resulting from imperfect data, non-random sampling, and the endogenous nature of variables of interest.

Rather than attempting to isolate exogenous variation, ABSs can simulate the endogenous interdependencies among agents, allowing simultaneity and feedback to emerge as intrinsic system properties (Kuljanin et al., 2024). Underlying causes of omitted variables bias can be explicitly modelled as agent attributes or environmental parameters rather than absorbed into a regression error term. Similarly, measurement error and selection bias become matters of model specification and validation, where researchers define the generating process and can simulate different samples

or test several measurement conditions. Thus, instead of attempting to rule out endogeneity through instruments or controls, ABSs address it by explicitly embedding the causal mechanisms that generate dependence among variables at the "co-variance layer" (Figure 2).

Nonetheless, it is worth specifying that ABSs do not eliminate endogeneity problems. The question becomes whether those mechanisms are credible and plausible representations of the real processes that generate the outcome of interest, and whether alternative mechanisms could yield the same results, indicating that we are overlooking some determinant mechanisms. In this sense, ABSs do not "solve" endogeneity through identification strategies but reframe it as a theory-level problem focused on the adequacy of the proposed causality. In other words, addressing endogeneity becomes a matter of ensuring that in the "world" the model is intended to represent, the mechanisms are theoretically plausible as generators of the observed phenomena.

In a generative model, explanation is incomplete unless a micro-specification is sufficient to produce the phenomenon to be explained (Epstein, 1999). If the proposed mechanisms are plausible, simulated outcomes should reproduce key empirical patterns at the aggregate level (Epstein, 1999). If they are meaningful in real phenomena, the model must represent them, or the model's generative sufficiency requirement would not be satisfied. Yet, because the same aggregate regularities can sometimes be reproduced by different micro-level specifications and interactions (i.e., generative equifinality), generative sufficiency alone cannot prove which mechanism is causally correct. In a case of generative equifinality (i.e., different micro-level specifications generate similar macro-level patterns), the choice of the most appropriate model should be based on the plausibility and representativeness of generative mechanisms and, where possible, backed up by empirical evidence (Epstein, 1999). Accordingly, model validation becomes a relevant test, as it evaluates whether the proposed mechanisms can reproduce empirical regularities beyond those implied by the model's own assumptions. In those cases, we argue that the model should be the one whose agent rules are better supported by extant theory and empirical evidence (Epstein, 1999), ideally supplemented by validation using observed data.

Empirical anchoring strengthens this approach, as parameters can be estimated from empirical data and models' outputs can be compared to observed time series patterns (Ballard et al., 2021). Finally, rigour guidelines for ABSs recommend verification, validation, calibration, and sensitivity analyses, so that models and their results do not depend on researcher assumptions but are both theoretically grounded and empirically sound (Rand & Rust, 2011).

Computational models in OSCM: System Dynamics and ABS

In response to the growing recognition that modern operations are inherently dynamic, nonlinear, and cross-functional, the OSCM field has increasingly advocated for the adoption of system dynamics (SD) modelling to complement traditional static and variance-based approaches. As Sterman et al. (2015) note, many operational challenges emerge from feedback processes, information delays, bounded rationality, and behavioural responses that generate variability, coordination failures, and policy resistance. SD provides a formal means to represent these feedback-rich systems and to test how structural and behavioural factors jointly drive performance over time. For example, recent studies have employed SD models to examine supply chain risk management and readiness (Stumpf et al., 2023), the propagation of financial risk under alternative payment-term policies (Esenduran et al., 2022), the coordination of humanitarian search-and-rescue operations (Kosmas et al., 2022), and the mitigation of medical supply disruptions during crises (Falagara Sigala et al., 2022). These studies demonstrate SD's value in representing aggregate feedback loops and policy-level decision structures, helping to explain the dynamic variation of the observed. However, SD and other Differential Equation (DE) based approaches typically rest on aggregation and perfect-mixing assumptions (Rahmandad & Sterman, 2008), treating agents as homogeneous and their interactions as averaged over the system.

As Rahmandad and Sterman (2008, p. 998) argue, "Nonlinear DE models can easily encompass a wide range of feedback effects, but typically aggregate agents into a relatively small number of states (compartments)." To examine the implications of these assumptions, they developed a series of simulations comparing a traditional differential equation diffusion model with an equivalent Agent-Based Models across multiple network topologies (i.e., fully connected, random, Watts-Strogatz small world, scale-free, and lattice) and under different levels of heterogeneity in agents' contact rates. Their simulations revealed that the two modelling approaches produce nearly identical average dynamics under perfect mixing and homogeneous conditions. However, once network structure or agent heterogeneity is introduced, diffusion in the ABS becomes slower, more variable, and granular, while DE models continue to predict smooth, deterministic trajectories that miss early burnout or localised saturation effects.

In the OSCM literature, ABSs have been used to represent heterogeneous agents (firms, orders, or facilities), each with distinct attributes and interaction rules within explicit network structures, thus depicting granular effects or heavy-tailed performance (e.g., Swaminathan et al., 1998). More recently, in their study on ripple effects and the effect of blockchain in enhancing supply chain resiliency, Lohmer et al. (2020) used a model to compute heterogeneous and interconnected firms to evaluate how specific and digitally enabled collaboration of firms along the supply chain can mitigate disruption propagation. By employing ABS, the authors were able to represent a tiered network composed of suppliers, producers, wholesalers, and retailers. Under high process efficiency, the ABS reveals localised effects in the baseline and shows that collaboration reduces disruption costs by up to ≈$13M, shortens recovery by up to ≈90 days, and limits propagation of a disruption to a smaller subgroup of tied organisations (effects that depend nonlinearly on disruption duration and process times). Since these outcomes depend on *who* is facing disruption, *where* a specific firm is placed along the network, and *how fast* partners can enact smart-contract exchanges, the mechanism is inherently agent- and topology-specific. An SD stock-and-flow representation would have mainly captured only smoothed averages of

inventory, backlog, and cash static states, obscuring the subnetwork improvements and contextual conditions (e.g., under low collaboration efficiency) that the ABS can make explicit.

In sum, because SD can effectively shed light on macro-level dynamics and feedback complexity, such models are well-suited for analysing aggregate feedback and policy. However, their ability to reproduce emergent phenomena arising from heterogeneity, lower-level interactions, or network structure is limited (Rahmandad & Sterman, 2008). In contexts where agents are heterogeneous, there are non-linear connections, or uneven agents' contributions, and nuanced dynamics shape agents' behaviour, SD provides only an approximation of the process. In contrast, because ABS captures the generative dynamics through which micro-level interactions scale into system-wide outcomes, it provides more nuanced insight into how heterogeneous phenomena unfold over time. Consequently, although SD can offer a representation of dynamic complexity, it is not fully capable of capturing the generative, bottom-up processes through which collective patterns emerge in complex adaptive systems. To advance computational methodologies, OSCM scholars should complement SD with bottom-up ABSs to enable process-oriented inquiry that represents how interaction structure and heterogeneity jointly shape system evolution within operational settings.

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Società Italiana di MANAGEMENT

Long papers

Track: Sustainability



A Comparative Cross-European Investigation into Social Sustainability Disclosure among Leading Football Clubs

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Abstract

***Purpose of the paper**. This study is intended to investigate how leading European football clubs approach the disclosure of social sustainability initiatives. Given the "culture of silence" and social challenges traditionally affecting the industry, this research aims to identify the primary themes and practices communicated by clubs to meet the rising demand for stakeholder accountability and compliance with evolving European regulations.*

***Methodology.** The study has been conducted by implementing an inductive qualitative thematic analysis to examine official documents issued by the main football clubs active in three of the main European leagues (Serie A, La Liga, and Bundesliga). The analysis followed a six-step iterative process to identify recurrent patterns of meaning and was cross-validated through a data triangulation process involving multiple researchers to ensure internal validity.*

***Results.** Results revealed five overarching themes recurring in European clubs' disclosure (Social Value, Environmental Protection, Talent Legacy, Governance & Ethics, and Operations & Mobility), but also a significant geographic divide that characterized this industry. Thus, if German clubs tend to adopt a systemic, compliance-based approach, Spanish and Italian ones tend to prioritize values-driven, community-oriented social practices. Furthermore, a maturity gap has emerged between major and smaller clubs regarding the adoption of high-level reporting standards.*

***Originality of the paper.** This study contributes to the managerial literature by offering a holistic, cross-European comparison of social sustainability disclosure in the football industry. It provides a novel thematic map that bridges the gap between theoretical frameworks like Legitimacy Theory and the practical managerial shifts required by the Corporate Sustainability Reporting Directive (CSRD).*

Keywords: *Social Sustainability, Football Industry, Sustainability Disclosure, Thematic Analysis.*

1. Introduction

Since the beginning of the XXI century, the public concern about organizations' environmental and social impacts has globally risen (Hoerber, 2025). More recently, this concern has also interested the sports industry, sparking debate about whether and how sustainability and sustainable development are addressed. This debate has been inspired by the seminal pillars of the Brundtland Report (1987), and its well-recognized aim to meet the needs of the present generation without compromising the ability of future generations to do the same. This opens to the dynamism that inherently characterizes sustainable development, inspired by the lessons learnt over time in terms of sustainability operationalization (Azapagic and Perdan, 2011). Despite the long debate around sustainability, it remains a complex and multi-dimensional concept, which scholars (Ben-Eli, 2018; Greenland et al., 2022) tend to approach considering five different foundational elements: 1) social/socio-cultural, 2) economic, 3) environmental, 4) political, and 5) technological. The first three elements, or the constitutive pillars of the Triple Bottom Line (TBL) (Elkingthon, 1997), are well established among institutions and organisations, mainly thanks to the publication and the promotion of the United Nations "2030 Agenda for Sustainable Development", and the definition of the Environmental, Social, and Governance (ESG) principles. ESGs were first conceptualized in the 2004 UN report "Who Cares Wins" (Senadheera et al., 2022), inspired by well-established sustainability frameworks and initiatives, such as the Global Reporting Initiative (GRI) and the UN Global Compact, and considered as an evolution or the operationalization purpose of the traditional paradigm of Corporate Social Responsibility (CSR) (Tarczynska-Luniewska et al., 2024). The rise of ESGs marked the concrete evolution from the voluntary and often ambiguous nature of CSR to a more standardized and measurable evaluation framework (Chutiphongdech et al., 2026). At the operational level, this supported organizations in better managing sustainable initiatives, also thanks to a set of specific evaluation criteria.

Over the last few decades, efforts towards sustainability have also grown in the sports industry, which is globally recognized as one of the most economically and culturally prominent industries (Woratschek et al., 2014). Even though the public pressure to prevent social and environmental misconduct (McCullough and Bramley, 2025), the guidelines of the UN's 2030 Agenda for Sustainable Development Goals (SDGs) and the ESG (Hugaerts et al., 2021) have contributed to expanding research on sport sustainability, it still lags behind other domains, such as operations, finance, or manufacturing (Gregori-Faus et al., 2025). The starting point of the managerial debate on this topic is the 2012 London Olympics, the first international sports event ISO-certified (ISO 20121 based on the British standard BS 8901) because organized around specific sustainability criteria (Söderman, 2023). Nevertheless, sport sustainability remains a blurred concept that scholars (Johnson Morgan and Summers, 2012) have differently approached, focusing on one or another sustainability dimension according to different and often siloed interpretative frameworks. The most common ones are the Social Exchange Theory (Cook et al., 2013), which analyses the social aspects (e.g., people participation) of sustainability initiatives related to sporting events (Liang et al., 2026), the Stakeholder Theory (Freeman, 1998), which offers a better understanding of the decision-making processes aimed at balancing the interests of the stakeholders involved in the initiatives defined above (Daddi et al., 2025). The analysis of the environmental dimension of sustainability is often conducted according to the Value-Belief-Norm (VBN) framework (Stern et al., 1999), which supports the analysis of how environmental initiatives of sport organizations influence fans' pro-environmental behaviors (Pelcher et al., 2023). These frameworks usually complement the holistic approach of the seminal ones, such as the UNSDGs and the TBL.

In sport management research on sustainability has mainly focused on economic and environmental issues, neglecting the social ones (McCullough and Kellison, 2020). In this domain, economic sustainability has been based on multi-stakeholder value-based collaborative processes, intended to create value from different financial sources (Paredes et al., 2019). Compared with the previous concept, environmental sustainability is an expanding topic, characterized by studies mainly focused on the assessment of the environmental impact of sports events, often neglecting the importance of environmentally responsible business practices (Cury et al., 2023). Finally, the research on sports' social sustainability is still nascent, even though this industry has a positive influence on it through its principles of discipline, culture of wellbeing, and teamwork orientation (Barbu et al., 2022), and a negative one due to several social challenges, such as crises, misconduct, and even scandals, which have negatively affected athletes' and supporters' well-being (Breitbarth et al., 2023).

In the sports industry, research on social sustainability cannot ignore some complex phenomena, such as the social stigma (Tyler and Slater, 2018) and the culture of silence (Wilcox, 1987). The first one is related to the myth and rhetoric of success, which pressure athletes to hyper-perform physically (Petersen et al., 2024), sometimes negatively affecting athletes' mental health and strength (Ryan, 2013). The second further affects the social sphere of sports' sustainability, being linked to one of the most critical paradoxes of the current society. Thus, it deals with the silence that pervades the sports industry's social issues such as bullying, harassment, alimentary and psychological disorders (Sartore-Baldwin et al., 2017).

To counteract this situation, research on sports' social sustainability should also put more effort into connecting the theory and practice; for example, promoting disclosure practices pointing to enact a more transparent and reliable communication of social sustainability initiatives (Rith and Spinelli, 2024; Stokowski and Carter, 2025). Thus, this paper aims to contribute to bridging this gap by investigating if and how one of the most prominent sports worldwide, football, approaches social sustainability and its disclosure, also identifying the main initiatives and topics that characterize their social sustainability efforts. In doing so, the analysis will also contribute to advancing and better framing the existing definitions of and approaches to sport social sustainability. Three main research questions inspired the study:

RQ1: Do the European major football clubs disclose information about social sustainability?
RQ2: How do they approach social sustainability disclosure?

RQ3: Which are the social sustainability themes that these clubs mostly disclose?

To address these questions, an inductive thematic analysis (Terry et al., 2017) has been conducted on the official documents published by the major European football clubs to identify the main themes at the core of their approach to social sustainability disclosure. The analysis of the achieved results will support policymakers and sports managers in strategically approaching social sustainability and its disclosure, challenging misconduct and segregation, and promoting a culture of inclusion and equity. The paper is organized as follows. The first section is dedicated to the critical description of the sustainable approach to sport management, and of the way football clubs deal with social sustainability disclosure. Follows the presentation of the implemented methodology and of the achieved findings, which have been subsequently discussed. Closed, the presentation of theoretical, managerial, and policy implications, together with study limitations and future research paths.

2. Theoretical background

2.1 A sustainable approach to Sport Management: A Focus on the football industry

As in many other sports, sustainability is gaining prominence also in professional football due to the institutional and social pressure (Daddi et al., 2025). However, the literature on the sustainable approach to football management is still nascent and characterized by the need for further investigation for a better understanding of its determinants.

Approaching sustainability in this industry is as complex as in many other domains, due to the intertwined interactions between its social, environmental, and economic dimensions and the actors involved in the related processes and activities (Lozano and Barreiro-Gen, 2023). To better understand football sustainability, the growing pressure and expectations that affect this industry cannot be ignored due to its high visibility, public scrutiny, and expanding regulatory and societal demands. This has led international institutions to develop sustainability-oriented strategies, standards, and agendas intended to encourage more responsible practices (Konstantopoulos and Manoli 2024). One of the most prominent sustainability-oriented strategies has been launched by the UEFA (*Union of European Football Associations*) to pressure its 55 member associations to take action towards specific environmental and social goals. This strategy (*Strength through Unity: Football Sustainability Strategy*) "sets out 11 key policies and 66 indicators, effectively introducing sustainability reporting as a compliance and governance instrument in the sector" (Agostino and Thomasson, 2025, p.381). This and other top-down initiatives reflect the institutional growing awareness about the fact that long-term sustainability legitimacy mainly depends on football clubs "to align commercial success with environmental stewardship and social responsibility" (L'Abate et al., 2026, p.3).

Some studies, focused on the pressure of stakeholders and governance dynamics on clubs' sustainability, pointed out the enduring difficulties in integrating this paradigm in the environmentally and socially-oriented processes of a highly commercialized and multi-actor industry such as football (Trendafilova and McCullough 2018). Thus, most of the studies focus on the economic dimension of sustainability, while the environmental and social dimensions remain under-investigated (Pellegrino and Stasi, 2025). Despite the growing research on football's environmentally sustainable practices, often linked to event organization (Tettamanzi et al. 2024), the literature still calls for a better understanding of its commitment to social sustainability and its integration within the culture and strategies of clubs. This research need is because most of the existing studies demonstrated that often "sustainability issues are pursued more coincidentally than with a clear strategy" (Baumgartner & Ebner, 2010, p. 76). It follows that social sustainability remains conceptually elusive, empirically fragmented, and normatively contested (Agostino and Thomasson, 2025), because often associated with other constructs such as "social responsibility" or "community engagement". Despite this conceptual ambiguity, this study approaches social sustainability as "a life-enhancing condition within communities, and a process within communities" (McKenzie, 2004, p.4). This definition

aligns with the inherent nature of football clubs, which are, on the one hand, strongly connected to the local communities they represent and, on the other, highly influenced by the social context in which they have been created (Hyndman and Liguori, 2024). Thus, the clubs have traditionally assumed a social role, acting not only as sports organizations but also as social organizations (Agostino and Thomasson, 2025) by promoting local culture, heritage, and identity, engaging people in the revitalising of urban/local areas (Yiapanas, 2025).

More recently, financial and social scandals have put the football industry under public scrutiny, calling for concrete changes in managerial practices based on the enactment of responsible programs aimed to promote ethics, inclusion, and transparency (Robertson et al., 2025). This calls for further investigations on the football clubs' impact and contribution to societal grand challenges

To respond to this call, especially in managerial studies, should be more focused on the promotion of societal accountability and on the engagement of stakeholders (e.g., staff, suppliers, fans, athletes, etc.) in specific sustainability-oriented strategies and actions. To achieve this goal, organizations must necessarily better manage and communicate their "responsibility and awareness of the impacts that sport events have on societal issues" (Chutiphongdech et al., 2025, p.3), and on the overall community well-being. Thus, a better disclosure will also contribute to counteract the so-called "culture of silence", which traditionally affects sport and above all football organizations, characterized by a passive tolerance of domination that prevent some social groups from speak up and speak out about misconduct and abuses, making them reluctant to expressing their opinion, feelings, and desires (Mitchel, 2012; Sartore-Baldwin et al., 2017).

2.2 The disclosure of social sustainability in the football industry

Over the last few decades, public pressure towards sustainability has stimulated growing interest in sustainability reporting and disclosure (Troshani and Rowbottom, 2024).

Even though the concept of sustainability disclosure is gaining international attention as central to managerial research and practice, a comprehensive approach to its main determinants still lacks (Wahyuningrum et al., 2023). This is mainly due to the enduring prejudice that sustainability performance and its disclosure are not among the sport organizations' and, especially, football clubs' primary objectives, remaining something used to instrumentally enhance corporate reputation when it is under criticism (Liu and Wu, 2023). Even though the growing stakeholder pressure led scholars and practitioners to focus on environmental and economic sustainability reporting and disclosure, the social dimension remains fragmented and elusive (Abhayawansa et al., 2022). Thus, little research investigates how social sustainability is operationalized, reported, and disclosed within football clubs. This is mainly due to the high fragmentation and the lack of standardized approaches to reporting and communicating social sustainability initiatives. To contribute to bridging this gap, the disclosure of social sustainability of European football clubs has been investigated, highlighting how the major European clubs contextualize and approach social sustainability disclosure. In doing so, the guidelines set by the specific sustainability disclosure regulations have been considered, such as the Non-Financial Reporting Directive[1] (NFRD) (European Parliament and Council of the European Union, 2014), and the most recent Corporate Sustainability Reporting Directive (CSRD) (European Parliament and Council of the European Union, 2022).

Football clubs tend to disclose mostly on financial and environmental matters, rather than on social ones, which remain conceptually and empirically fragmented (Agostino and Thomasson, 2025). This happens even though international bodies (e.g., the UN Global Compact, the Climate Disclosure Standards Board, UEFA, and Global Reporting Initiative or GRI) have offered some general guidelines (Adegbie et al., 2020). In particular, the EU issued "more comprehensive and detailed reporting requirements, such as the principle of double materiality, the integration of sustainability information into management reports, mandatory external assurance, digital tagging of reported data,

[1] This Directive, enacted in 2017, states that EU public interest entities characterized by a specific size and financial criteria must disclose non-financial information, including diversity data.

and, crucially, the obligation to report in line with the European Sustainability Reporting Standards (ESRS)" (Raimo et al., 2025, p.5). However, this activity remains highly voluntary and presented in the annual report of football clubs following a generic spirit of integration (Raimo et al., 2021). This is often inspired by some institutional initiative, such as European Union and global reporting guidelines issued by the International Sustainability Standards Board (ISSB) and the Global Reporting Initiative (GRI) (Raimo et al., 2025). Together with these, clubs also use some specific "tools" (e.g., sustainability reports, corporate websites, or social media) to communicate sustainable initiatives, integrating them in the traditional reports (e.g., Corporate Sustainability Reporting Directive, Corporate Sustainability Due Diligence Directive, GRI standards, and ESGs). This depicts clubs' tendency to narratively approach social sustainability disclosure, rather than in a normative and strategic way (Milne and Gray, 2013).

The nascent but growing effort of football clubs in disclosing social sustainability practices (e.g., gender diversity, assaults and scandals, equity, inclusion, bullying, etc.) is also due to the need for gaining reputational advantages by counteracting the negative influence of misconduct, scandals, and the culture of silence that negatively affect sports (Caccialanza et al., 2024; Clarkson and Philippou, 2024). Thus, according to Agostino and Thomasson (2025), social sustainability disclosure is not a "neutral act of transparency but a political and selective construction of organisational legitimacy" (p.381). This led to approaching social sustainability disclosure in the football industry not only as a mere communication act, but rather as a relational act merging the stakeholder theory and the legitimacy theory approach **(**Deegan, 2014). Thus, the disclosure of clubs' social commitment not only responds to stakeholders' information (supporters, institutions, local community, etc.) needs, but also contributes to activating a legitimation process that better commits clubs to their local context, thanks to the social work they do for the community. This is in line with the extant literature, which considers sustainability disclosure a key mechanism for achieving or improving corporate accountability (Sarfaty, 2015; Teplitz, 2025) or organizations' responsibility for something that explains and justifies the acts and omissions for which they are responsible to people with a legitimate interest (ISEA, 1999). Freeman (1984) incorporated accountability to a wide range of stakeholders, considering it as inherently related to whether stakeholders have sufficient, accurate, understandable, and timely information for starting decision-making processes.

3. Methodology

3.1 Research Method

This study investigates and compares the disclosure of social sustainability initiatives of the clubs active in the main European leagues (*Serie A, La Liga,* and the *Bundesliga*), identifying the themes or practices they mainly communicate. In doing so, an inductive thematic analysis (Joffe, 2011; Terry et al., 2017) has been conducted to identify and analyse the most recurrent patterns of meaning related to the topic under investigation. This method examines narrative materials, fragmented into small units of analysis to be described and qualified. Thematic analysis supports researchers in dealing with individuals' and/or organizations' attitudes, concerns, or feelings about a specific phenomenon (Vaismoradi et al., 2013). The flexibility of this method offers a qualitative interpretation of the collected data and information, identifying and comparing common elements across an entire set of textual resources. According to Braun and Clarke (2006), this methodological approach is suitable "for identifying, analysing and reporting patterns (themes) within data" (p. 79). This method is mainly implemented when researchers want to use a relatively low level of interpretation, in contrast to grounded theory or hermeneutic phenomenology, in which a higher interpretive complexity is needed.

3.2 Research Design

The thematic analysis has been conducted on a sample of primary European football clubs, collecting and screening their sustainability reports to identify, classify, and compare, according to

the thematic analysis protocol, the social sustainability initiatives, issues, and actions they mostly disclose. The analysis of the textual resources (sustainability reports) was organized around the following open-ended iterative process (Finfgeld-Connett and Johnson 2013): 1) searching, 2) sorting, 3) selecting, 4) acquiring, 5) reading, 6) identifying, and 7) refining.

The searching process was conducted by analysing titles and eventual keywords to understand if the selected documents align with the topic at the core of the study. This led to sorting and selecting the final sample to be analysed. In doing so, some inclusion criteria were set. The publication timeline, which spans from January 2021 to January 2026. January 2021 has been selected as the starting period because of the enactment of some sustainability-oriented regulations (e.g., the SFDR). Other inclusion criteria were the publishing language (English) and the authorship (Serie A, La Liga, and Bundesliga clubs). The Serie A, La Liga, and Bundesliga were selected according to a convenience sampling strategy (Etikan et al., 2016), justified by 1) the prominence of these leagues within the European football industry, 2) data availability and accessibility, and 3) their representativeness of three different organizational, economic, and cultural models. This ensures high data quality, transparency, and accessibility (Bryman, 2016), as well as a comparative analysis of different contexts and managerial approaches implemented in highly professional and competitive contexts; thus, the Bundesliga is organized in an 18-team format and 34 matches, while the Serie A and La Liga are organized in a 20-team format and 38 matches (Etikan et al., 2016). After the application of the inclusion criteria to the initial sample of 48 clubs, the final sample was made up of 23 clubs, because these 1) are committed to sustainability practices, 2) publish sustainability reports regularly, and 3) an English version of these reports is freely available online.
The thematic analysis was conducted following the guidelines defined by Braun and Clarke (2006): 1) data familiarization, 2) code generation, 3) themes' construction, 4) themes' reviewing, 5) themes' defining and naming, and 6) report production.

Two researchers worked independently on the selected sample to familiarize themselves with it and generate the initial codes. Then, a list of preliminary themes and subthemes based on similarities across texts was defined. Researchers also re-assessed each text, changing and/or adding codes if necessary. This led to reconciling discrepancies and re-coding data for gaining consensus on the defined thematic categorizations. When no agreement was achieved, the thematic map was modified until all texts were represented by a final list of themes and subthemes. When thematic grouping was comprehensively agreed upon, the themes were named, and representative quotes were selected and described.

Data triangulation process ensured the internal validity of the analysis; thus, a data triangulation strategy was implemented, based on cross-referencing sample reports with external regulatory frameworks (European and national), official press release, professional articles, and interviews, etc. This led to the cross-validation of findings, comparing and corroborating them through multiple data sources (Denzin and Lincoln 2011). Thus, the robustness of the analysis was ensured not only by cross-referencing sustainability reports with external sources but also by maintaining inter-coder consistency to mitigate subjective bias during the thematic labeling process (Flick, 2018; Patton, 2014). This made it possible for two different researchers to categorize the emerging themes in the same way.

3.3 Thematic Analysis structure

To start the thematic analysis, some content units (or "observation" in inferential statistics) were defined, and the sentence was set as the unit of analysis. Two researchers worked independently, checking the texts to correct any eventual coding errors. As stated, the internal validity of the analysis was ensured through the data triangulation process (Houghton et al. 2013), which allows the test of the thematic analysis observations and the minimization of researchers' subjective influence.

The thematic analysis has been conducted following Braun and Clarke's (2006) approach, which points to inductively defining some primary themes, specified by some related sub-themes, essential to provide more granular detail to the analysis. The software Atlas.it was used to analyse the selected

reports, while two researchers reviewed the achieved results. Some codes (or key concepts) were defined to describe the content of the paragraphs of the selected reports, grouped according to the reported topic. These codes were then grouped and used to define the final themes and sub-themes, presented in the following paragraph.

4. Findings

As stated, the inductive thematic analysis was conducted following Braun and Clarke's (2006) iterative process, which led to the definition of the main semantic themes that characterize the analyzed sample of sustainability reports issued by some of the main European football clubs. In doing so, the identification of some codes led to the clustering of five primary themes and some sub-themes extracted from the analyzed texts (Tab.1).

Tab. 1: Comparative Thematic Table and Key Components.

Codes (Key Components)	**Primary Themes**	**Sub-themes**	**Unit Analysis Findings (sample)**
Foundations, Solidarity, Inclusion, Dialogue	*Social Value*	Social Accounting (Spanish/German clubs) Sport for Change (Italian clubs)	Maximizing social influence through "Sport for Development"
Net Zero, Circular Economy, Photovoltaics, Water	*Environmental Protection*	Technocratic Data (German clubs) Natural Resource Defense (Spanish/Italian clubs).	Focus on "Scope 1, 2, 3 emissions" and "resource conservation".
Youth, Wellbeing, Education, Development, Growth.	*Talent Legacy*	Youth education (All clubs) Social inclusion (All clubs)	Maximizing social influence through "Sport for Personal Development and Wellbeing"
Transparency, Governance, Stakeholders, Materiality, Compliance.	*Governance & Ethics*	Governance used to maintain fan trust (All clubs) Materiality reporting (German/Italian clubs)	"Double materiality" and reporting for specific stakeholder groups.
ResearchLab, Green, Circular, vehicles, supply chain, innovation.	*Operations & Mobility*	Insfrastructures' green innovation (Spanish/German clubs)	Viewing sustainability as a challenge to change and innovate infrastructures (e.g., the sustainable arena).

Source: authors' elaboration.

The primary themes are: 1) Social Value, 2) Environmental Protection, 3) Talent Legacy, 4) Governance & Ethics, and 5) Operations & Mobility. These themes have been derived after having counted the occurrences of the defined codes (key concepts), which have been grouped, according to their meaning and number of occurrences, into 5 primary themes. This has led to the recognition of the "dominating" themes that mutually characterize the analyzed reports. The frequency is defined as "high" when the primary themes have a recurrence frequency higher than the average of the dataset, "medium" when the patterns are recurrent but less than the average, and "low" when the themes are interesting but characterized by a lower frequency (Tab.2).

Tab. 2: Primary themes recurrency frequence

Primary Themes	**Recurrence (High/Med/Low)**	**Avg. Sentence Count**
Social Value	High	146
Environmental Protection	High	94
Talent Legacy	Medium	74
Governance & Ethics	Medium	55
Operations & Mobility	Low	44

Source: authors' elaboration.

Two of the five themes have a clear environmental orientation (*environmental protection* and *operations & mobility*). Even though this study is focused on the social dimension of sustainability, the environmental-based themes have been considered because they support the integrity of the analysis and data coherence. In doing so, it is also possible to avoid the so-called social washing, which distorts the representation of the investigated phenomenon, isolating the social dimension of sustainability and the related communication. Moreover, the occurrence and the analysis of the main environmental themes highlight the intertwined and holistic nature of sustainability as well as the clubs' integrated approach to sustainability and its disclosure. Dealing with these themes, the first is *Environmental Protection,* which groups issues/activities related to environmentally friendly practices (e.g., climate neutrality, waste management, and resource preservation). This theme occurred 94 times in the analyzed reports, and those with the most occurrences were published by two German clubs (FC Augsburg and Wolfsburg), while those with fewer occurrences were the reports of two Spanish clubs (Athletic Bilbao and Valencia CF). The other environmentally friendly theme was *Operation & Mobility,* which groups issues/activities related to the sustainable management of operations and mobility infrastructures (e.g., green stadium infrastructure, EV charging, and supply chain). This theme occurred only 44 times, and the reports in which it recurred mostly were issued by a Spanish and a German club (Real Madrid and FC Augsburg), while the reports with fewer occurrences were issued by a German and an Italian club (Bayer Leverkusen and AC Milan).

Focusing on the social sustainability-oriented themes, the most recurrent theme is *Social Value*, which occurred 146 times in the analyzed reports and is characterized by practices intended to create and share social value among stakeholders (e.g., Philanthropy, social inclusion, human rights, and community equity). The reports in which this theme mainly occurred were issued by Athletic Bilbao and AC Milan, while Wolfsburg and Hoffenheim issued those with fewer occurrences. Follows the theme *Talent Legacy* with 74 occurrences, which is characterized by issues/activities related to youth education and support (e.g., youth academy education, safeguarding, and "dual-career" support). The reports in which this theme mostly occurred were published by Bayer Leverkusen and FC Augsburg, while those in which it has fewer occurrences were published by Juventus and Bayern Munich.

The last theme recognized during the analysis was *Governance & Ethics,* with 55 occurrences and characterized by issues/activities related to business ethics (e.g., ESG committees, risk management, and legal compliance). Atlético Madrid and Juventus published the reports in which this theme mostly occurred, while Valencia CF and Athletic Bilbao published those with fewer occurrences. The following table depicts the themes' recurrence and distribution across the sample (Tab.3).

Tab.3: Comparative Thematic Table and Recurrence

Final Theme	Description	Most Recurrent	Least Recurrent
Social Value	Philanthropy, social inclusion, human rights, and community equity.	Athletic Bilbao, AC Milan	Wolfsburg, Hoffenheim
Environmental Protection	Climate neutrality, waste management, and resource preservation.	FC Augsburg, Wolfsburg	Athletic Bilbao, Valencia CF
Talent Legacy	Youth academy education, safeguarding, and "dual-career" support.	Bayer Leverkusen, FC Augsburg	Juventus, Bayern Munich
Governance & Ethics	ESG committees, risk management, and legal compliance.	Atlético Madrid, Juventus	Valencia CF, Athletic Bilbao
Operations & Mobility	Green stadium infrastructure, EV charging, and supply chain.	Real Madrid, FC Augsburg	Bayer Leverkusen, AC Milan

Source: authors' elaboration.

The five primary themes were also further investigated to better specify them by recognizing the practices that each of the analyzed clubs has disclosed to communicate the effort they are putting into each of the retrieved sustainability areas. Themes and subthemes are described in Table 4.

Tab. 4: Thematic Map.

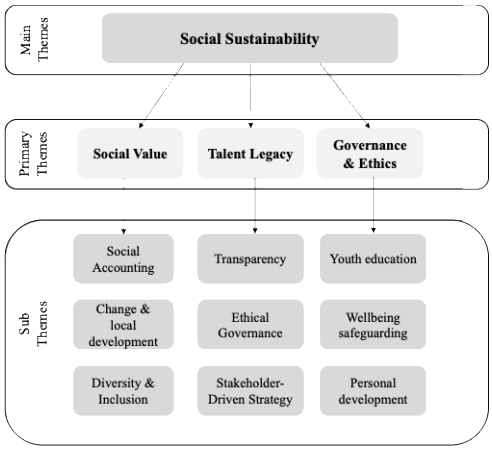
Thematic Map		
Primary Theme	**Sub-theme**	**Action/s**
Social Value	Social Accounting	Athletic Bilbao effort to monetizing intangible social impact.
	Change & local development	Valencia's response to the 2024 floods, AC Milan: Using the jersey as a tool for bridge-building
	Diversity & Inclusion	FC Bayern promotion of equity in the workplace and stands through the "*mitnand*" philosophy.
Environmental Protection	Technocratic Data	German clubs focus on ISO 14001 and technical Psi.
	Climate Action	The effort toward carbon neutrality, and the BVB's Scope 1/2 goals by 2040.
	Natural Resource Defense	Spanish and Italian clubs' actions intended to water-saving/drought-prevention.
Talent Legacy	Youth education	Almost all clubs' efforts to use football as a "tool" for the personal growth.
	Wellbeing safeguarding	The promotion of mental health programs, as in the case of Bayer Leverkusen.
	Personal development	The development of a "dual-career" promoted by German clubs.
Governance & Ethics	Transparency	Almost all clubs consider governance as a tool to maintain stakeholders' trust.
	Ethical Governance	Almost all clubs are involved in compliance, transparency, and anti-corruption actions.
	Stakeholder-Driven Strategy	Almost all clubs are involved into a materiality analysis to align their goals with stakeholders' expectations.
Operations & Mobility	Circular resources	Waste management and energy efficiency, as for Wolfsburg's "Zero Waste" vision.
	Sustainable Infrastructures	The modernization of physical assets to reflect "Green" values, as for Real Madrid's innovation in infrastructures.
	Resource saving	Efforts toward carbon neutrality, as for German clubs.

Source: authors' elaboration.

The primary themes were organized into two main categories: 1) *sub-themes* or the content and topics covered by the reports, and 2) *action/s* or the investigated clubs' approach to the identified contents related to social sustainability.

Drawing on Brown and Clark (2006), a graphical thematic map has been proposed to better depict the themes inductively retrieved and the hierarchical relationships between them (main themes, primary themes, and sub-themes) (Fig.1). This led to addressing the first research question at the core of this analysis (*Which are the sustainability-related themes that these clubs mostly disclose?*).

Fig. 1: Graphical representation of the thematic map based on socially-oriented themes.



Source: authors' elaboration.

To better support the retrieved sub-themes, some relevant example quotes have also been identified. In terms of Diversity & Inclusion, AC Milan reported "Fondazione Milan (…) uses sport as a lever for inclusion and participation to trigger social change", while on Climate Actions, Bayern Munich reported "We have achieved a 35% total emissions reduction compared to our 2019 baseline and received SBTi verification". Dealing with Youth Education, Bayern Leverkusen affirmed, "Bayer 04 Leverkusen promotes the dual career of its young talents, linking sporting development with vocational and school education". Finally, reporting on Sustainable Infrastructures, Real Madrid affirmed, "Real Madrid has increased the number of charging points for electric vehicles by four, installing 70 additional points".

5. Discussion

The debate around the football industry's disclosure of social sustainability practices is increasingly attracting societal and managerial interest globally (Trail and McCullough, 2020). As the results demonstrated, this has pushed major European clubs to integrate social sustainability practices into sports strategic management and corporate communication. All the analyzed clubs recognize the importance of social sustainability disclosure in inspiring, engaging, and communicating with local communities. Thus, "sport and sustainability are increasingly being linked together in efforts to promote environmental stewardship and social responsibility" (Safarpour et al., 2025, p.3). This led to addressing the first research question (*Do the European major football clubs disclose information about social sustainability?*). Drawing on these considerations, this paper has investigated the approach of some of the major European football clubs to social sustainability disclosure, offering a holistic picture of the practices they are implementing and communicating.

First, the analysis pointed out the existence of a clear geographic divide among the three analyzed leagues (Bundesliga, La Liga, and Serie A), which is mainly due to the influence of national/local context. However, Serie A and La Liga demonstrated some similarity, if compared with the Bundesliga. This is in line with Hydman et al. (2024), who underlined that football clubs historically act as a guide for local communities, influencing their social development and being influenced by the related societal context. Therefore, the geographic divide that emerged from the analysis is not merely a spatial difference, but rather a structural difference in social contracts (Chen and Choi, 2005), and in the way they mediate between the interests of the stakeholders involved in the social initiatives (Daddi et al., 2025). Therefore, this divide among the three analysed leagues is mainly due to the existence of different local exchange norms, inspired by the related specific socio-cultural context. Thus, assuming the Social Exchange Theory perspective (Cook et al., 2013), at the national level, the investigated clubs demonstrated a certain level of social reciprocity, based on the fact that when a club effectively intervenes in a community's social development, create a commitment based on a common social identity, a strong sense of belonging, and community cohesion. This pushes the local community to provide clubs with social capital, legitimacy, and loyalty.

Tab. 5: Geographical divide in social sustainability disclosure.

League	Local Context	Examples
Bundesliga	High emphasis on fan ownership (50+1 rule) and community accessibility.	The "cost" (ticket prices) is kept low to maximize the "reward" (fan inclusion), ensuring a high volume of social exchange.
Serie A **La Liga**	Historical ties to regional identity and local political patronage.	The exchange is often centred on regional prestige; the club acts as a vessel for local pride against central authorities, a high-value intangible reward.

Source: authors' elaboration.

Drawing on these considerations, clubs have evolved into multifaceted institutions able to inspire and holistically contribute to local sustainable development, encompassing its economic, environmental, and social dimensions (Risaliti and Verona, 2013). It follows that sustainability reporting, and the activity of social sustainability disclosure, are more than a mere communicative exercise, but it is rather a situated act of contextualization (Røvik, 2016), where socially related concepts can be reported and legitimized by a specific organizational, regulatory, and sociocultural context (Agostino and Thompson, 2025). This justifies the different approaches demonstrated by the clubs of three European Leagues. In particular, the Bundesliga demonstrated a systemic and compliance-based approach to sustainability and social sustainability, often leading the way, especially in the implementation of environmentally friendly practices and in their strategic integration. This integrated and systemic approach to sustainability lays its foundations on the Deutsch Strategy for Sustainability (*Deutsche Nachhaltigkeitsstrategie*), defined in 2002 and constantly updated to UN goals. This highlights that social sustainability disclosure acts as a proxy for legitimation, because clubs tend not to just report facts, but rather align social sustainability to their specific organizational, regulatory, and sociocultural context (Archel et al., 2009). Thus, by legitimizing socially related activities and projects through disclosure, clubs make a situated act of contextualization (Ferraro et al., 2026). This led to addressing the second research question (*How do they approach social sustainability disclosure*?).

Football clubs, like all profit and non-profit organizations, must comply with clear and strict legal requirements, as the results demonstrate, highlighting the emphasis on technical certifications and the need for reaching specific quantitative goals (e.g., climate neutrality by 2040, and the maintenance of the EMAS certification for the Allianz Arena since 2006). This emerges from the German approach to social sustainability, which clubs consider a real asset to be used to strengthen local identity and to stakeholders' engagement, supported by a well-established materiality analysis (Adam et al., 2025).

La Liga (Spain) and Serie A (Italy) clubs demonstrated quite a different approach to social sustainability; thus, their reports are more focused on social, societal, and community-oriented practices than on environmentally friendly ones. This is also testified by the clubs' foundations' direct and primary involvement in sustainability disclosure. In particular, Spanish clubs tend to adopt a global, values-driven approach, leveraging their international influence to promote universal sustainability goals (e.g., Real Madrid was the first club to join the UN Global Compact) and sustainable innovation (e.g., the restyling of the Santiago Bernabéu, which features innovative water recycling and energy-efficient LED technology). This aligns with the extant research, which focuses on the importance of sport organizations' disposition to approach sustainability efforts and disclosure according to a value-driven perspective (Yiapanas, 2025). This emerges from football clubs' disclosure of their disposition to ground their business and athletic activities in ethical values, rather than merely in financial performances (Fernández-Villarino, 2021; Jones, 2023).

Finally, the approach of Italian football clubs is characterized by institutional rigor and sophisticated reporting, because they often treat sustainability and social sustainability with the same level of accountability as financial performance. This emerges from these clubs' disposition to disclose the implemented governance, transparency, and anti-corruption measures, embedded in the general sustainability strategy. This finding is justified by the past scandals that affected Italian clubs, which are currently deeply committed to properly communicating their institutional integrity, as in the case of Juventus, which, in doing so, is also advancing in the application of the main formal accounting standards like CSRD (Corporate Sustainability Reporting Directive) and Social Monetary Accounting. This finding aligns with the research stream that considers sustainability as a system-based paradigm, in which economic viability, social equity, and environmental integrity are embedded within corporate governance strategies (Yadav and Yadav, 2024). Drawing on these results, the approach to social sustainability disclosure of the three leagues can be described as follows. The Bundesliga's approach can be defined as "systemic and compliance-oriented" because inspired by a substantive approach to legitimacy. This is due to clubs' adherence to the *Deutsche Nachhaltigkeitsstrategie*, the rigorous certifications (e.g., EMAS, etc.), and the alignment with

national systemic goals. La Liga's approach can be described as "global and value-driven" because inspired by a normative approach to legitimacy, due to the mission and the values that inspire clubs towards social sustainability. Thus, La Liga clubs tend to act as moral leaders in the international football community. Finally, Serie A's approach to social sustainability disclosure can be defined as "institutional rigor and accountability" because it relates to a restorative approach to legitimacy. This is justified by the need and desire to restore accountability after some scandals, and restore, through sophisticated reporting, the social contract, and prove to stakeholders that the clubs are now transparent and accountable.

Tab. 6: Geographical divide in social sustainability disclosure

League	Core Approach	Focus	Examples
Bundesliga (compliance)	Systemic & Compliance-oriented	Regulatory Legitimacy: Focus on strict legal requirements, technical certifications, and quantitative environmental goals. Sustainability is treated as a strategic asset for local identity.	EMAS certification (Allianz Arena), Climate neutrality by 2040, Deutsche Nachhaltigkeitsstrategie, Materiality analysis.
La Liga (values)	Global & Value-Driven	*Moral/Ethical Legitimacy:* Prioritizes social and community-oriented practices over environmental ones. Leverages international influence to promote universal values and ethical business.	UN Global Compact (Real Madrid), Club foundations' involvement, Santiago Bernabéu restyling (water/energy innovation).
Serie A (accountability)	Institutional Rigor & Accountability	*Governance Legitimacy:* Focus on transparency, anti-corruption, and institutional integrity to rebuild trust following past scandals. Sustainability is treated with the same rigor as financial reporting.	CSRD application, Social Monetary Accounting, Governance and anti-corruption measures (e.g., Juventus).

Source: authors' elaboration.

Going through the differences between the analysed clubs, it is worth noting that some differences in the way they approach social sustainability disclosure also emerge when comparing small and big clubs. This implies a clear dualism between local versus global identity, because smaller clubs (e.g., TSG Hoffenheim) tend to emphasize their local roots as a unique challenge in competing with the "global giants" (e.g., Real Madrid, Barcelona, Juventus, Bayern Munich, etc.), focusing on their role as inspirational examples for the UN SDGs. This opens to another interesting finding, clubs' maturity level in sustainability reporting and disclosure. Thus, also in this case, the major clubs (Juventus, AC Milan, Real Madrid, Barcelona, Dortmund, Bayern Munich, etc.) have demonstrated the ability to deeply align with high-level reporting standards (e.g., ESRS or Social Accounting, etc.), treating social impact with the same rigor as financial accounting. This led to some reflections on the maturity level of European football clubs in disclosing social sustainability. As for many other sectors, football clubs that approach sustainability strategically, considering it a guiding principle for each organizational process and for maintaining an integral legitimacy, tend to demonstrate a higher level of disclosure maturity (Bonrath et al., 2022; Anis and Avrilia, 2024). This also implies a clear shift from an unstructured to a more strategic and systemic approach to sustainability management and communication, with a focus on the interdependencies among economy, society, and environment, and on related resource management (Setyawan, 2025).

6. Implications, limitations, and final remarks

Analysing how the major European football clubs approach the disclosure of social sustainability efforts and initiatives, this study offers multifaceted, interesting theoretical and practical implications for supporting and inspiring clubs towards a more rigorous, strategic, and shared approach.

The first theoretical implication emerging from the analysis delves into the contribution to sustainability disclosure research and focuses on the contribution of the Legitimacy Theory (Deegan, 2014), by reframing social sustainability disclosure from a passive transparency tool to a proactive, and strategically organized situated act of contextualization (Røvik, 2016; Agostino and Thompson, 2025). This suggests that legitimacy is not a static "license to operate" but a dynamic construct negotiated within specific regulatory and sociocultural boundaries. Consequently, for football clubs, disclosure should serve as a mechanism to "translate" sustainability imperatives into local social capital, thereby validating the organization's existence according to the specific local expectations (e.g., the German compliance model vs. the Spanish value-driven model).

The second theoretical implication concerns the need and the efforts that clubs must dedicate to accountability, moving beyond traditional financial reporting and disclosure to incorporate societal matters that represent a wider range of stakeholders' (e.g., fans, athletes, local communities, etc.) needs and issues. This also supports and extends the application of the Stakeholder Theory (Freeman 1984) to the sport domain, by demonstrating that the "social contract" of a football club has expanded beyond traditional boundaries. Thus, accountability is no longer limited to the financial stewardship of shareholders but must now address a multidimensional ecosystem of fans, athletes, and local communities. The findings suggest that in the sports industry, "social utility" is a core performance metric. This necessitates a shift in stakeholder management where societal issues are not peripheral "externalities" but central to the club's strategic survival.

Finally, a third contribution to the theory emerged from this analysis, which is the identification of five semantic themes (Social Value, Environmental Protection, Talent Legacy, Governance & Ethics, and Operations & Mobility). This contributes to the conceptualization of sustainability as a system-based paradigm, validating the shift from an unstructured approach to a more strategic, systemic model where economic viability and social equity are deeply embedded within corporate governance strategies (Dilling, 2010).

In terms of managerial and policy implications, this study suggests the need for a paradigm shift from a narrative-based to a strategic and systemic approach to sustainability disclosure. In this sense, football managers should no longer approach this activity instrumentally, considering it a tool for reputation repairing, but they should rather integrate it into core decision-making processes (Chopra et al., 2024). This implies a systemic approach to sustainability and social sustainability, and in doing so, managers should manage social impact data with the same rigor applied to financial accounting, and use specific frameworks (e.g., Social Monetary Accounting, ESRS, etc.) to meet increasing stakeholder expectations for accountability. This will also support clubs in holistically exploiting the potential of sustainability to promote innovation, also at the social and societal level (Yiapanas, 2025).

From a policy perspective, this research highlights a significant geographic divide, where national strategies influence the general level of disclosure maturity of European clubs (Anis and Avrilia, 2024). In this sense, policymakers should leverage the main sustainability directives and standards to harmonize the enduring fragmentation existing at the local and national level, ensuring that social sustainability becomes a normative requirement rather than a voluntary and random activity. This will support the mitigation of the culture of silence mentioned before and the promotion of a more transparent, equitable, and inclusive football industry.

Despite its insights, this study is limited by its qualitative nature and the small sample of analysed reports. The reliance on official documents may also reflect a selective construction of organisational legitimacy, rather than actual performance. Future research should employ longitudinal quantitative methods to track the progress of football clubs in social sustainability disclosure and in the quality of communication and reporting. Additionally, investigating the perspective of diverse stakeholder groups (e.g., fans, athletes, and local communities) through primary data collection would provide a more holistic understanding of whether disclosed initiatives translate into tangible social and environmental improvements.

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Assessing the Financial Impact of Climate-Related Risks in the Automotive Industry

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Abstract

Frame of the research. *The automotive industry is facing increasing exposure to climate-related risks that threaten its financial stability and competitiveness.*

Purpose of the paper. *This study examines how the severity of these risks interacts with risk types and a firm's value chain position to influence its performance.*

Methodology. *Using climate risk data and economic indicators from major automotive manufacturers between 2018 and 2021, we apply a quantitative framework that links risk classifications with severity scores and the value chain.*

Results. *Findings indicate that financial impacts are strongly dependent on the type and magnitude of risk. Physical and regulatory risks exert the most significant economic toll, particularly when severity is high. Market and technological risks tend to have minor or context-dependent effects, with certain firm positions, such as upstream suppliers under market risk, experiencing relative insulation.*

Research limitations. *This research has some limitations. First, it relies on self-reported CDP disclosures, which may vary in accuracy or reflect strategic bias. Second, the analysis is confined to the automotive sector.*

Managerial implications. *From a managerial perspective, the heterogeneity of climate risk impacts demands differentiated strategies across the value chain.*

Originality of the paper. *This research advances the understanding of climate-related financial exposure in the automotive industry and provides a practical framework for assessing risks in carbon-intensive sectors.*

Keywords: *Climate-related risks, financial impact, automotive industry, risk severity, value chain*

1. Introduction

The unfolding reality of climate change has emerged as one of the most profound economic disruptors of the 21st century, reshaping the competitive landscape across virtually every sector (Dietz et al., 2016). For industries with extensive global footprints, the challenge is not merely about complying with environmental norms but about safeguarding operational continuity, protecting asset value, and sustaining profitability in the face of escalating climate-related risks. Climate change manifests through two broad and interconnected dimensions of risk: physical and transition (Carney, 2017). Physical risks encompass both acute events, such as extreme storms, floods, droughts, and heatwaves, as well as chronic environmental shifts, including progressive temperature increases and rising sea levels. These phenomena can directly damage infrastructure, interrupt production processes, disrupt supply chains, and impose unplanned repair and maintenance costs, all of which translate into revenue loss and operational inefficiencies. Transition risks, on the other hand, stem from the global pivot toward a low-carbon economy, encompassing the tightening of regulatory requirements such as emissions standards and carbon pricing (regulatory risk), shifts in consumer preferences toward cleaner products (market risk), and technological disruptions that render existing processes and assets obsolete (technology risk) (Gasbarro et al., 2017; Krueger et al., 2020). For instance, the introduction of aggressive carbon pricing mechanisms can sharply increase manufacturing costs and depress the market valuation of carbon-intensive assets, particularly when firms lack proactive adaptation strategies (Matsumura et al., 2014).

The automotive sector is uniquely and acutely exposed to this evolving risk landscape. As one of the most carbon-intensive manufacturing industries, it is simultaneously grappling with unprecedented regulatory scrutiny, market realignment toward electric mobility, and the operational

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challenges of globalized and complex supply networks. Automakers and their suppliers are facing not only the imperative to decarbonize production processes but also the financial volatility brought by shifting demand patterns, raw material price fluctuations, and rapid technological innovation cycles (IEA, 2021). The shift toward vehicle electrification, combined with stricter emissions regulations in major markets, has accelerated the need for operational and technological transformation (Sierzchula et al., 2014). Despite its vulnerability, the automotive sector remains underrepresented in the empirical literature on climate-finance linkages. Previous studies increasingly highlight the financial consequences of climate risk exposures: evidence suggests that heightened exposure to climate-related hazards tends to weaken corporate returns (Zhang et al., 2023), while firms that adopt robust carbon-management practices often demonstrate enhanced profitability and resilience (Busch et al., 2016; Matsumura et al., 2014). This dynamic implies that unmanaged climate risks are not only an environmental liability but also a material financial hazard.

However, the current state of academic inquiry reveals essential gaps. Much of the literature on the financial impacts of climate-related risks has concentrated on sectors such as finance, energy (Dietz et al., 2016; Ilhan et al., 2021), and utilities, leaving the manufacturing sector, particularly the automotive industry, relatively underexplored. Even when manufacturing is examined, the analytical scope is often confined to firm-level exposures without sufficient consideration of the broader supply-chain context. This omission is critical because climate-related risks rarely occur in isolation; instead, they propagate along value chains. A flood or typhoon affecting a raw materials supplier can create cascading production delays for upstream manufacturers, while sudden shifts in downstream demand, such as a surge in electric vehicle adoption, can reverberate upstream, altering production schedules, procurement strategies, and investment decisions (Ghadge et al., 2020). Furthermore, the financial consequences are influenced not only by the type of risk but also by its severity, defined as the likelihood and magnitude of the anticipated climate event (Chakraborty et al., 2019). However, no empirical studies have systematically integrated the interplay between risk type, supply chain position, and risk severity into a unified analytical framework.

This study addresses these gaps by conducting a multi-dimensional analysis of climate-related risks in the automotive sector, linking physical, regulatory, market, and technological risk categories to firms' reported financial impacts while explicitly accounting for supply-chain positioning and risk severity. Drawing on firm-level climate disclosures from the Carbon Disclosure Project (CDP) between 2018 and 2021, this research applies a combination of analysis of covariance (ANCOVA) and robust regression techniques to quantify these relationships. The novelty of this approach lies in its integration of risk typology, value-chain location, and risk severity into a single empirical model, allowing for a more granular and operationally relevant understanding of how climate change is reshaping the financial dynamics of one of the world's most strategically significant manufacturing sectors. By doing so, the study not only advances theoretical perspectives on climate-finance interactions but also offers practical insights for managers, investors, and policymakers seeking to mitigate financial vulnerability and strengthen resilience within the global automotive value chain. The remainder of the paper is structured as follows: Section 2 reviews the relevant literature and develops the hypotheses; Section 3 details the data sources and analytical approach; Section 4 presents the empirical results, focusing on statistically significant effects and coefficient interpretations; and Section 5 discusses the findings in light of existing empirical evidence and outlines implications for practitioners and policymakers.

2. Literature review and hypothesis development

2.1 Financial impact of climate-related risks

Climate-related risks, both physical and transitional, can materially affect revenues, asset values, and long-term business viability. Physical hazards, such as floods, droughts, and hurricanes, directly damage assets, disrupt supply chains, and reduce productivity, leading to revenue loss, higher

insurance costs, and asset impairments (Krueger et al., 2020; Linnenluecke et al., 2013). Chronic risks, including temperature shifts and sea-level rise, impose long-term pressure on operations and resource availability (Bolton et al., 2020).

Transitional risks, on the other hand, arise from the global low-carbon transition and are especially critical in the automotive industry (Kim et al., 2024). These include regulatory risks stemming from emission standards and carbon pricing, market risks arising from shifting consumer preferences, and technological risks associated with disruptive innovations such as electric mobility. Regulatory changes often increase compliance costs, impair the performance of carbon-intensive assets, and create legal or reputational exposure (Engau & Hoffmann, 2011). Evidence suggests that carbon pricing and emission trading schemes can negatively impact stock performance when firms are unable to adapt (Er Kara et al., 2021; Palea & Santhià, 2022).

Most prior research on climate-related financial impacts has concentrated on the financial sector, particularly banks (Chalabi-Jabado & Ziane, 2024; S. Li & Pan, 2022), with some coverage of the energy (Palea & Santhià, 2022) and health sectors (Toumi, 2025). Within these contexts, evidence consistently shows that physical risks tend to depress financial performance, while the effect of transition risks is more nuanced. For example, Chalabi-Jabado & Ziane (2024), using a 10-year CDP dataset of 147 banks across 37 countries, found that physical risks reduced returns on assets, equity, and capital. In contrast, proactive integration of transition risks into strategy often yielded positive effects. Other related studies, including Pagliari (2021), Li and Pan (2022), and Huang et al. (2022), confirm that physical climate risks present a systemic threat to financial stability, particularly for banks with exposure to climate-vulnerable sectors.

However, the impact of transition risks on financial performance is less consistent. Chalabi-Jabado & Ziane (2024) and Sun et al. (2020) found a positive effect, which they attributed to firm proactiveness in incorporating transition risk into their risk framework, hence, reversing the potential challenges of regulatory changes (regulatory risks), changes in consumer demand (market risks), and technology dynamics (technological risks). Roncoroni et al. (2021) and Cortes and Straham (2017) found negative impacts, which Li and Pan (2022) explained by linking it to the failure or not of banks to fully incorporate transition risk, of any form, into their strategic and operational decision-making processes.

Palea & Santhià (2022) demonstrate that transition risks linked to policy uncertainty and regulatory tightening exert downward pressure on firm profitability and asset values in the automotive sector. Similarly, Toumi (2025) employed a Bloomberg dataset of firms from 51 countries, comprising 169 financial and non-financial sectors, and found a significant positive effect of climate physical risk on all three financial performance indicators: Tobin's Q, return on assets, and return on equity. Song et al. (2025) confirmed the significant differences in the financial impact of various climate-related risks across 47 sectors in China, revealing both negative and positive effects. The literature indicates that climate-related risk types — physical, regulatory, market, and technological — exert distinct financial pressures. In the automotive sector, these risks influence cash flows, asset valuations, and revenue stability. We therefore hypothesize:

H1. The financial impact of climate-related risks differs significantly across risk types (physical, regulatory, market, and technological).

2.2 Risk value chain

Climate-related risks extend across the entire value chain, propagating both upstream and downstream rather than remaining within a firm's direct operations. Research highlights how disruptions from physical dangers, such as natural hazards or resource shortages, can threaten suppliers and buyers alike (Dasaklis & Pappis, 2013; Furlan et al., 2017), hence underscoring the importance of considering climate-related risks along the value chain. In direct operations, capital outlays for technology and infrastructure remain central (Jin et al., 2025). Empirical studies confirm that cost structures vary depending on where the risk originates along the supply chain (Li et al., 2024; Mao et al., 2017).

The interdependencies across the chain create reciprocal challenges. Poor environmental practices by suppliers can raise indirect emissions and damage reputations downstream (Cousins et al., 2004; Delmas & Montiel, 2009). In addition, Carbon-intensive supply chains may also heighten financial risks if suppliers pass down rising costs from carbon pricing (Lash & Wellington, 2007). Non-compliance may even trigger regulatory shutdowns, pushing firms to prefer suppliers with more substantial climate commitments. Consequently, many companies now demand carbon transparency and embed climate-related criteria into their procurement processes (Jira & Toffel, 2013). Taken together, while risk exposure varies along the chain, the financial implications of climate-related risks remain broadly significant, leading us to propose the following hypothesis:

H2. The financial impact of climate-related risks differs significantly across risk value chains.

Prior studies suggest that the financial materiality of climate risks may depend on the interaction between risk typology and value chain position. For example, regulatory risks such as emission limits may exert greater financial pressure on downstream firms with high consumer visibility and stringent compliance demands, whereas upstream suppliers may internalize hidden costs due to raw material volatility or relocation efforts (Khan & Khan, 2025; Qing et al., 2024). Physical risks, on the other hand, may disproportionately affect firms that rely on climate-vulnerable infrastructure, regardless of their position in the supply chain (Jin et al., 2025; X. Li et al., 2024). Subsequently, we follow from H1 and H2, and hypothesis that:

H3. The interaction between risk type and value chain position has a significantly different effect on financial performance.

2.3 Severity of climate risks

A growing body of empirical research demonstrates that firms with severe climate face valuation penalties, as investors price in future liabilities (Chalabi-Jabado & Ziane, 2024). In contrast, proactive firms with climate strategies tend to receive valuation premiums (Jin et al., 2025).

The risk score of firms is measured by components of risk perception, including risk impact, which encompasses a combination of the relative likelihood of occurrence, time priority, and the relative impact magnitude. Previous studies refer to this composition as risk exposure (X. Li et al., 2024) or risk exposure score (Sakhel, 2017). While studies have examined the effect of climate change exposure on firm value (Almaghrabi, 2023; Jin et al., 2025; Ongsakul et al., 2023), few studies have analyzed the financial impact of climate-related risk severity, while empirical studies on the effect of climate risk score or risk severity on financial implications are lacking. Several empirical studies support the notion that higher climate-related risk scores, whether physical, regulatory, market, or technological, are associated with adverse financial outcomes for firms.

For instance, Jin et al. (2025) found a 4.14% reduction in firm value with a one-standard-deviation increase in climate change exposure in a study of non-financial firms in the Asia-Pacific region. This justifies empirical findings by prior studies on the effect of increased climate risk on firm's vulnerability with resulting increase in cost of capital (Lemma et al., 2019), effect on capital structure (Ahmad et al., 2023; Huang et al., 2022), and reduction in stock market reactions (Hossain & Masum, 2022; Matsumura et al., 2014). Huang et al. (2022) found an adverse effect of climate risk exposure of companies on corporate finance. Similarly, Almaghrabi (2023) found a negative impact on firm cash flow volatility and profitability, while Ongsakul et al. (2023) found erosion of company value among US firms due to firm-specific climate change exposure. These findings support the expectation that climate risk scores have a statistically significant adverse effect on financial performance. Hence, the hypotheses:

H4. There is a direct, negative, and significant financial impact of risk severity (as measured by the risk score) on firms.

Following hypothesis H4, it is essential to consider how the severity of climate risks affects firms differently depending on the type of risk involved. Different risk types, such as physical risks like

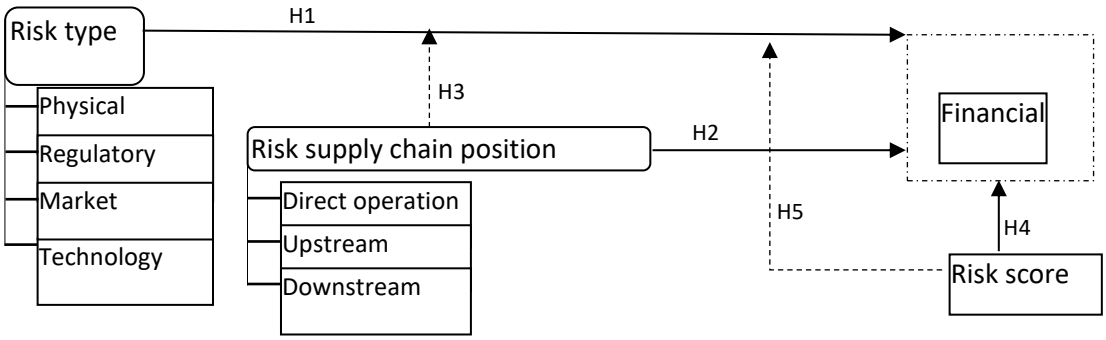
flooding or regulatory risks like stricter emissions rules, lead to other costs and financial effects. For example, severe physical risks often require substantial investments in infrastructure, resulting in long-term cash outflows, while severe regulatory risks may lead to immediate compliance costs and penalties. Research indicates that physical risks can sometimes signal future resilience and be viewed positively by markets, whereas severe regulatory risks typically lower a firm's value (Lash & Wellington, 2007; X. Li et al., 2024). In the automotive sector, where supply chains face multiple climate risks, the financial consequences of severe risks vary based on their type. Physical risks may prompt firms to undertake costly supply chain adjustments, while market or technological risks may drive innovation with varying cost and revenue implications. Moreover, enterprise risk management studies highlight that the same severity level can have very different financial impacts depending on whether the risk affects supply continuity, regulatory compliance, or reputation (Delmas & Montiel, 2009; Mao et al., 2017). Thus, the impact of climate risk severity on financial performance depends strongly on the interaction between risk type and severity (Khan & Khan, 2025). Based on the argument regarding the economic impact of risk types and risk severity, we propose the following hypothesis.

H5. The financial impact of climate-related risks varies significantly depending on the interaction between risk type and risk severity (risk score).

In the automotive sector, climate-related risks affect financial performance through interconnected pathways. Physical, regulatory, market, and technological risks vary in their impact depending on a firm's value chain position: upstream, OEM, or downstream. These effects are further shaped by the severity of risks, as measured by their likelihood, timing, and magnitude of impact.

The hypotheses (H1–H5) reflect these relationships, positing both direct effects (H1, H2, H4) and interaction effects (H3, H5) between risk type, value chain position, and risk severity. As shown in Figure 1, the framework illustrates how these dimensions collectively influence financial impacts.

Fig. 1 Conceptual framework: climate-related risks and financial impacts in the automotive value chain



Source: our elaboration

3. Methodology

3.1 Research design and context

This study uses a quantitative, archival approach. We analyze self-reported climate-risk disclosures by automotive-sector firms to examine how risk characteristics relate to financial outcomes. The sample comprises global automotive companies that responded to the Carbon Disclosure Project (CDP) climate questionnaire between 2018 and 2021. The automotive industry is an ideal setting for this investigation because it is highly carbon-intensive and subject to both stringent regulations and rapid technological advancements.

The analysis focuses on one dependent variable, which is the log of the reported financial impact

of a climate-related risk (lnFI). Using a single-outcome design (ANCOVA and robust regression) lets us model risk-type and supply-chain effects while adjusting for continuous covariates. Methodologically, the approach extends Sakhel's (2017) framework on the cost of response by integrating a covariate in a model that captures both direct effects and interactions between risk types, value chain positions, and risk score, offering a more detailed picture of sectoral vulnerabilities and firm-level financial impacts. Our design also enables us to assess how the economic impact of climate-related risks varies by risk type and risk value chain, with subsequent depth, the directional effects, and the magnitude of the risk characteristics on the company's finances.

3.2 Data sources and sample

We used data from the CDP's climate change disclosure database, which collects self-reported information on climate-related risks and opportunities from firms worldwide. We select observations in which the firm's primary activity is in the automobile manufacturing and transportation equipment industries. The selection of the automotive sector ensures consistency with the sector's emission profile, technological transition pressures, and supply chain complexity. The final dataset is an unbalanced panel of firm-year-risk type observations, as firms reported multiple climate-related risk types (e.g., physical, regulatory, market, or technology) for each year, identified as having the potential to have a substantive financial or strategic impact on their business. This repeated and nested structure reflects the reality of how firms experience and report distinct climate risks over time, making the data suitable for interaction-based modeling. We excluded observations missing key variables (financial impact and risk scores). Differences in CDP question formats between 2018–2019 and 2020–2021 data were harmonized during data cleaning.

3.3 Study variables and construction

The key variables in this study capture the types of climate-related risks firms face, their position in the value chain, the estimated financial impact, and the risk characteristics, including the time horizon, likelihood, and magnitude of effects, as determined by questions C2.3a_C2, C2.3a_C3, C2.3a_C7, and C2.3a_C9 (see Appendices A1 and A2). Although the structure of some questions varied slightly across years, the data were harmonized to ensure consistency, using the 2021 format as the reference.

Financial Impact (lnFI)

This is the firm's potential or monetary loss if the risk materializes. CDP responses include either a point estimate (C2.3a_C11) or a reported range (C2.3a_C12 and C2.3a_C13). We take the midpoint of any range. We log transform this to lnFI. This transformation helps normalize the skewed distribution of monetary values. A higher lnFI indicates a larger potential loss (a worse outcome).

Risk type (RiskT)

This is a categorical variable with four levels: physical, regulatory, market, and technological risk. This categorization is based on how risk types are captured in the latest CDP database (2020 and 2021). In our study, acute physical and chronic physical risks are combined into "physical risk"; current regulations, emerging regulations, and legal issues into "regulatory risk"; market risks and reputation into "market risk"; and technology-related issues remain . This categorization reflects recent updates in climate risk reporting frameworks and is consistent with the emerging academic consensus on multidimensional climate risk typologies (e.g., Li et al., 2024; Busch et al., 2022). The risk data for 2018 and 2019 are physical and transition risk. However, we used the data on the primary climate-related risk drivers (C2.3a_C4) in recategorizing the risk types to align with the 2020-2021 format.

Risk value chain position (rvchain)

This variable identifies a firm's position in the value chain as upstream (e.g., suppliers), in direct

operation (including the midstream or OEM segment), and downstream. To ensure consistency across years, the 2018 and 2019 data were reclassified to align with the 2020–2021 structure, grouping "supply chain" and "investment" under upstream, and "customer" under downstream.

Climate risk score

The risk score (riskE) is a composite metric derived using three dimensions reported by firms: time horizon (rT), likelihood of occurrence (rL), and magnitude of financial impact (rM), based on responses to CDP questions C2.3a_C7 to C2.3a_C9. In the survey, each parameter is assessed using predefined Likert-type scales, although the number of scale points varies by parameter. For instance, the likelihood of occurrence is rated on an 8-point scale ranging from "exceptionally unlikely" to "virtually certain." At the same time, the magnitude of impact is evaluated on a 5-point scale, ranging from "low" to "high", and the time frame is evaluated on a 4-point scale, ranging from "unknown" to "long-term" . Following a normalized scoring approach, each component is expressed as a fraction of its maximum possible value on the corresponding Likert scale, as shown in Equation (1). For example, a magnitude score of 3 on a 5-point scale is computed as 3/5 = 0.6, resulting in a normalized score between 0 and 1.

$$T_{(k,t,i)}=(〖rT〗_{(k,t,i)}/N_{rT}) ; L_{(k,t,i)}=(〖rL〗_{(k,t,i)}/N_{rL}) ; \text{and } M_{(k,t,i)}=(〖rM〗_{(k,t,i)}/N_{rM}), \quad (1)$$

where T_(k,t,i) refer to the normalized risk time horizon (rT) of risk type k in year t for company i, and N denote the maximum possible value on the corresponding Likert scale.

Because our study considers the risk value chain in its analysis, we deviate from computing a single score for each risk type, as in Sakhel (2017) and Li et al. (2024), to computing risk scores for each risk type within each risk value chain. Our data structure assumes a many-to-many form, where a particular company can have multiple entries of a specific kind of risk, as this may relate to different value chains; hence, the impacts on finance may vary for the same risk type across various value chains. We compute a composite risk score for each identified risk type, defined as the product of the normalized time, likelihood, and magnitude scores, as depicted in Equation (2).

$$〖RiskS〗_{(k,t,i)}=T_{(k,t,i,)}*L_{(k,t,i)}*M_{(k,t,i)}, \quad (2)$$

where 〖riskS〗_(k,t,i) is the composite risk score for risk type k in year t for firm i, hereafter referred to as the risk score for simplicity. This enables cross-risk comparability of severity levels and provides a continuous measure of climate vulnerability, which serves as a covariate in the empirical model.

3.4 Analytical strategy and model selection

Our primary analysis employs analysis of covariance (ANCOVA) based on our study variables and the objective of examining whether different risk types significantly impact a company's finances differently, while controlling for risk severity (measured by risk score), a continuous variable. Interaction terms between risk type and chain position are included to test H3, and between risk type and risk severity to allow severity to have differential effects by risk. ANCOVA adjusts for the impact of Risk Score (risk severity) while comparing mean lnFI across groups. This yields tests of our main hypotheses: for example, a significant main effect of Risk Type would support H1.

We first checked ANCOVA assumptions. Univariate normality of lnFI was acceptable. Homogeneity of variances across groups was confirmed (Levene's test $p>0.10$) after log transformation. However, a Breusch-Pagan test indicated mild heteroskedasticity ($p\approx0.03$). To ensure robust inference, we supplemented ANCOVA with robust regression models using the same predictors (risk type, value chain, severity, and interactions). Robust regression downweighs outliers

and relaxes normality assumptions, providing a robustness check on significance and coefficient estimates.

The adopted regression model is expressed in equations (3) and (4). We added the interaction term between RiskT and riskS in (4) to test whether the effect of risk scores differed by type of risk.

$$\ln〖FI〗_{itk}=ß_0+ß_1\ 〖RiskT〗_k+ß_2\ 〖rvchain〗_{it}+ß_3\ (〖RiskT〗_{ik}*〖rvchain〗_{ik})+ß_4\ 〖RiskS〗_{itk}+ε_{itk} \quad (3)$$

$$\ln〖FI〗_{itk}=ß_0+ß_1\ 〖RiskT〗_k+ß_2\ 〖rvchain〗_{it}+ß_3\ (〖RiskT〗_{ik}*〖rvchain〗_{ik})+ß_4\ 〖RiskS〗_{itk}+\ ß_5\ (〖RiskT〗_{ik}*〖RiskS〗_{ik})+ε_{itk} \quad (4)$$

where y_itk is the outcome variable y (i.e., lnFI) of firm i in year t for risk type k; ß_0 is the intercept and ß_i (i=1, 2, …, 5) is the effect of the respective predictor on the outcome variables (lnFI); 〖RiskS〗_itk is a standardized risk score, and ε_itk is the error term.

All analyses were performed in Stata 15. We report both ANCOVA F-tests (Table 3) and the robust regression coefficients (Table 4), focusing on statistically significant findings ($p<0.05$). In interpreting coefficients, recall that lnFI is log loss: a positive coefficient means the factor increases the logged financial impact (larger losses), whereas a negative coefficient means it reduces lnFI (i.e., lower losses, relatively better outcome).

4. Empirical results

4.1 Descriptive statistics

The descriptive results in Tables 1 and 2 reveal that both financial impact and risk severity vary by risk type and value chain segment. Technology-related risks have the highest average financial impact and severity, particularly in direct operations and downstream. Physical and Regulatory risks are more prevalent in direct operations, while Market risks are concentrated downstream. Financial impact and risk severity are moderately positively correlated (r = 0.30, see Table 3A), suggesting that more severe risks tend to have higher financial consequences. Most risk cases are reported in direct operations, highlighting this segment as a key vulnerability point in the value chain.

Tab. 1 Descriptive statistics of lnFI by risk type and risk value chain

RiskT	Direct operation	Upstream	Downstream	Total
Physical	19.697	20.212	22.070	19.907
	4.210	4.169	2.621	4.165
	87	39	3	129
Regulation	19.379	18.762	21.119	19.572
	4.278	4.180	3.444	4.198
	131	7	20	158
Market	19.731	18.524	20.970	20.445
	4.489	2.690	3.769	3.880
	17	9	56	82
Technology	21.099	20.897	19.061	20.503
	6.688	1.929	3.343	5.066
	20	10	11	41
Total	19.646	19.927	20.807	19.945
	4.493	3.743	3.632	4.221
	255	65	90	410

In rows, the outputs show means and standard deviations of lnFI, and frequencies of crosstab between RiskT and rvchain

Source: our elaboration

Tab. 2 Descriptive statistics of RiskS by risk type and risk value chain

Table 1: Descriptive statistics of RiskS by risk type and risk value chain				
RiskT	Direct operation	Upstream	Downstream	Total
Physical	0.3416	0.263	0.194	0.316
	0.219	0.165	0.111	0.207
	131	50	5	186
Regulation	0.383	0.341	0.275	0.366
	0.182	0.166	0.160	0.181
	173	13	27	213
Market	0.387	0.423	0.393	0.394
	0.222	0.299	0.158	0.197
	39	14	73	126
Technology	0.423	0.476	0.532	0.458
	0.217	0.290	0.331	0.260
	38	12	15	65
Total	0.373	0.328	0.375	0.367
	0.204	0.222	0.203	0.207
	381	89	120	590
In rows, the outputs show means and standard deviations of RiskS, and frequencies of crosstab between RiskS and rvchain				

Source: our elaboration

4.2 Analysis of covariance results

From Table 3, we find significant main effects of RiskT [$F(3, 394) = 2.63$, $p = 0.049$]. This supports H1, that different risk categories yield different financial impacts. The covariate RiskS is highly significant [$F(1, 394)=35.86$, $p<0.001$], indicating that, across the board, firms projecting more severe risk report larger losses. In contrast, the main effect of value chain position is not significant, contrary to H2's position that chain position alone does not change impact.

Of the interactions, the RiskT × RiskS interaction is significant [$F(3,394)=3.36$, $p=0.019$]. This means the effect of risk severity on lnFI differs by risk category, suggesting severity amplifies impacts more strongly for some risks than others. The RiskT × rvchain interaction is marginal [$F(6,394) = 2.09$, $p = 0.053$], suggesting some variation in how certain risks affect different segments, but this is at the threshold of conventional significance. The ANCOVA confirms that risk type and severity are key drivers of financial impact, while simple chain-position differences are weak.

4.3 Robust Regression results

To probe these relationships in detail, the findings from Table 3 and Table 4 provide nuanced insights into how climate-related risks, risk value chain, and risk severity affect financial impact. Risk severity emerged as the strongest predictor of financial impact across all models, with a highly significant and positive effect. This underscores that, irrespective of risk category or supply chain position, more severe risks are associated with greater financial costs.

Table 4 offers more granular insights into how different types of risks affect financial outcomes, both independently and in combination with the risk value chain and severity. M4 and M5 are the results for (3) and (4). M1 to M3 are the base models, which include the interaction between RiskT and the rvchain in M3. In M4, the physical and regulatory risk types are consistently associated with higher financial impact relative to climate-related technology risk (the baseline category). For instance, physical risks exhibit a statistically significant coefficient of 5.280 ($p < 0.05$), suggesting that physical climate-related risks can have disproportionately large financial consequences relative to technology risks.

The rvchain is not significant and aligns with the ANOVA outcome. In M4, however, companies in direct operations (Coefficient = 3.090, $p < 0.05$) face higher financial impacts compared to those

in downstream positions. The closer a firm is to the point of climate exposure (e.g., production or resource extraction), the greater the potential financial burden.

The RiskT x rvchain terms indicate that a value chain position strongly influences the financial impact of different risks. Across models M4–M5, all interaction coefficients are negative, suggesting that being upstream or in direct operations reduces the marginal impact of non-technology risks compared to downstream firms. This effect is especially pronounced and significant for Regulation × Direct operation (M4: -3.199*, M5: -4.118**) and Market × Upstream (M4: -4.246*, M5: -5.171**), indicating that OEMs are more exposed to regulatory shocks. At the same time, upstream suppliers are relatively shielded from market shocks. Physical risk interactions are consistently negative but less robust, implying weaker moderating effects. Overall, the results indicate that not all risks are transmitted evenly across the value chain, and the combination of risk type and chain position is crucial in explaining financial vulnerability.

The RiskT x RiskS interactions reveal that regulatory risks become particularly financially burdensome as severity increases. Specifically, Regulatory × RiskS was 10.123 ($p<0.01$), highlighting a multiplicative effect between regulation and severity. This suggests that firms exposed to regulatory uncertainty or stringent climate policy may face compounding financial effects when those risks are also severe.

Tab. 3 ANCOVA results for significant differences in lnFI

Source	F	df	*p*-value	interpretation
RiskT	3	2.63	0.049	sig. main effect
rvchain	2	1.36	0.256	not sig.
RiskT X rvchain	6	2.09	0.053	marginally sig. interaction
RiskS	1	35.86	0.000	strong covariate effect
RiskT X RiskS	3	3.36	0.019	sig. interaction with covariate

Source: our elaboration

Tab. 4 Robust regression results with lnFI as dependent variable

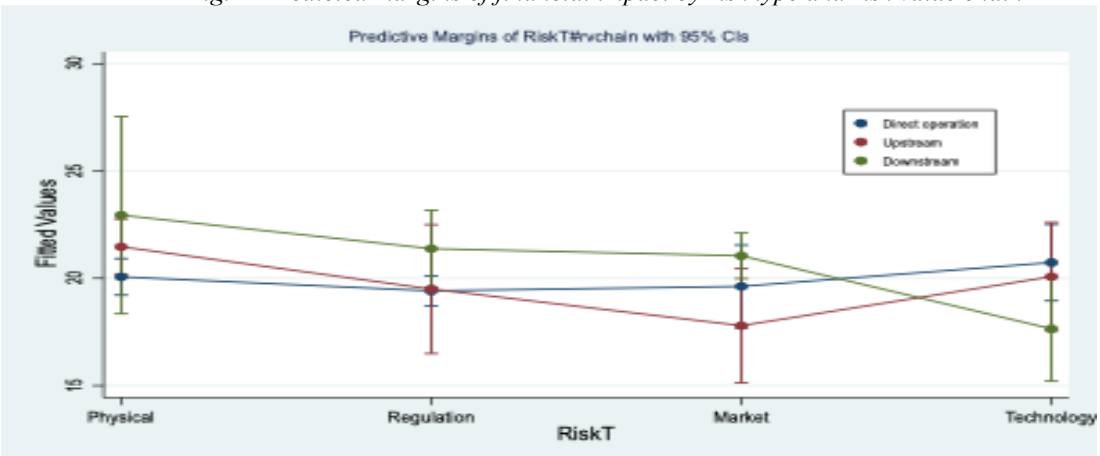
Table 2: Robust regression results with lnFI as dependent variable					
Varaibles	M1	M2	M3	M4	M5
RiskT:					
Physical	0.391	1.636**	2.923	5.280**	2.929
Regulatory	-0.256	0.794	1.853	3.735**	-0.911
Market	-0.087	0.602	1.931	3.405**	0.703
rvchain:					
Direct operation	-1.250*	-1.539**	1.633	3.090**	1.924
Upstream	-0.910	-0.874	1.793	2.431	1.961
RiskT & rvchain interaction					
Physical X direct operation			-3.740	-5.965**	-4.493
Physical X upstream			-3.244	-3.906	-3.397
Regulation X direct operation			-3.199*	-5.057***	-4.118**
Regulation X upstream			-3.697	-4.312*	-3.873
Market X direct operation			-2.975	-4.517**	-3.361*
Market X upstream			-4.246*	-5.687**	-5.171**
RiskS		6.614***		7.195**	2.229
RiskT & RiskS interaction					
Physical X RiskS					2.837
Regulatory X RiskS					10.123***
Market X RiskS					4.435
Constant	20.905***	17.624***	19.099***	14.874***	17.787***
Obs.	410	410	410	410	410
R-sq	0.016	0.107	0.027	0.129	0.160
Robust SE	yes	yes	yes	yes	yes
Adj R-sq.	0.00357	0.094	8.80e-05	0.103	0.128
F-stats	1.293	8.079	1.003	4.903	4.993
**** p<0.01, ** p<0.05, * p<0.1; Base categories for categorical variable: RiskT (technology risk), rvchain (downstream), RiskT & rvchain interaction (technology x downstream), and RiskT & RiskS interaction (technology)*					

Source: our elaboration

Figure 2 displays the predictive margins of financial impact (lnFI) by risk type and value chain position, based on the interaction effects from the regression model. The analysis reveals important distinctions in financial exposure across different segments of the value chain. Specifically, downstream firms report the highest predicted financial losses in relation to physical risks, while upstream firms appear more sensitive to technology-related risks. Direct operations, by contrast, exhibit more stable financial impacts across all risk types.

Notably, the non-parallel trend lines confirm the presence of an interaction effect between risk type and value chain position, echoing the marginally significant ANCOVA interaction result. This finding highlights that the impact of climate-related risks on financial performance is not uniform, but varies substantially depending on a firm's position along the value chain and the nature of the risk it faces. These insights underscore the importance of developing targeted risk management strategies that are tailored to both risk typology and operational context.

Fig. 2 Predicted margins of financial impact by risk type and risk value chain



Source: our elaboration

5. Discussion

The findings of this study provide new empirical evidence on how climate-related risks differentially influence financial impact in the automotive industry, and how both risk value chain and risk severity shape these effects. Consistent with H1, the ANCOVA results reveal that risk type has a significant effect on financial impact, even after controlling for severity. This aligns with prior research suggesting that physical and regulatory climate-related risks tend to exert disproportionate financial pressure on firms (Dietz et al., 2016; Krueger et al., 2020). The consistently significant impacts from physical risks align with industry observations that manufacturers are vulnerable to extreme events. When floods, storms, or other hazards strike, they can halt assembly lines and damage expensive machinery, resulting in significant revenue losses and costly repairs. This is well-documented: severe weather disruptions have repeatedly forced automakers to suspend production, supporting our result that physical risks entail large financial losses. Regulatory risks also impose significant burdens. A tightening of emission standards or the introduction of new carbon taxes can strand existing assets and increase compliance costs, which our results confirm through the strong positive effects on regulatory risk (especially at high severity). This echoes the notion that climate policy uncertainty escalates financial risks. For instance, Engau & Hoffmann (2011) argue that unpredictable environmental regulations deter investment; our finding that regulatory risk interacted with severity to magnify losses is consistent with that view. In essence, when firms judge a regulation to be highly probable and impactful, the compounded effect on their balance sheets is severe.

The absence of a significant main effect for value chain contradicts H2 and aligns with earlier studies (Li et al., 2024; Mao et al., 2017), echoing findings from the supply chain literature that risk

impact depends on the interaction between value chain position and risk type rather than chain position alone (see also M5 of Table 4). For M4, the results on the value chain are rather illuminating. Only Direct-operation firms (OEMs) consistently report relatively higher financial impact, reflecting their capital-intensive plants in potentially hazard-prone locations, tight production schedules, and limited flexibility to climate shocks. For example, a flooded factory halts output but incurs fixed costs.

The results also support H3. In contrast, the negative Market x Upstream effect suggests suppliers are more resilient to pure market shocks. With multiple customers, lower fixed costs, and diversified sales, suppliers can adjust more easily to changing market conditions. This supports the findings of Khan & Khan (2025), Qing et al. (2024), Jin et al. (2025), and Li et al. (2024) on physical risks and RVChain. These findings highlight that shocks affect tiers differently, underscoring the need for targeted risk management.

The strong and positive covariate effect of risk severity corroborates the fourth hypothesis (H4) and is consistent with earlier studies, which demonstrate that the magnitude of losses escalates as risks intensify (Bolton et al., 2020; Bolton & Kacperczyk, 2021; Gölgeci et al., 2019). Our results also underscore the overriding importance of risk severity. Across all models, a higher composite risk score dramatically increased lnFI. These findings corroborate those of Huang et al. (2022) on the negative financial implications of risk severity. This confirms that firms' own assessments of risk magnitude and likelihood are meaningful predictors of economic outcomes. It suggests that companies' internal risk evaluations carry weight: when a risk is rated as high-severity, the expected financial impact is substantially larger. This aligns with the broader finance literature, which suggests that firms facing extreme, likely hazards suffer greater valuation penalties (Linnenluecke et al., 2013). In practical terms, it highlights that detailed climate risk assessments (as recommended by frameworks like TCFD) are vital. Firms need granular, quantitative estimates of the potential severity of each risk.

The interaction patterns deepen this understanding. The significant RiskT × RiskS effect suggests that severity amplifies financial losses more sharply for some risk categories, particularly regulatory risks, than for others. This is in line with evidence that regulatory shocks, such as sudden compliance costs or stringent emissions caps, can disproportionately strain financial performance when severity is high.

The marginally significant RiskT × rvchain interaction, supported by robust regression results, further indicates that certain combinations of risk type and value chain stage result in either heightened or reduced financial impacts relative to the baseline (technology risk × downstream). Negative coefficients for interactions such as regulatory × direct operations or market × upstream imply that, compared to downstream firms facing technology risks, these groups experience relatively lower financial costs. Theoretically, this suggests that specific operational contexts may afford structural or strategic buffers against specific risk categories, possibly due to upstream flexibility in sourcing or more direct operational control over mitigation measures. Empirically, this partially supports H3 by confirming that the financial burden of climate risks depends on the intersection of risk type and chain position. However, the direction of impact may sometimes run counter to expectations based on generalized vulnerability models. In the context of existing research, our findings contribute several insights. They extend findings like those of Zhang et al. (2023), who report that general climate risk tends to reduce returns. We show that this effect is concentrated in specific risk categories (physical and regulatory) and contingent on firm attributes. They also complement literature (Er Kara et al., 2021; Palea & Santhià, 2022) showing that proactive climate management correlates with better financial performance. In this sense, our evidence suggests that firms experiencing the most significant economic impacts may be those that have not effectively hedged or adapted to their climate-related risks. In contrast, those with lower (or even negative) coefficients may be managing risk effectively. For example, the supplier firms showing a negative impact under market risk might have already taken measures (like flexible contracts) to buffer those effects.

Taken together, these findings bridge and extend the literature by demonstrating that climate-

related financial impacts in the automotive sector are not only risk- and severity-dependent but also contingent upon operational positioning. While prior work has established the differentiated nature of climate risk exposure across sectors, our results highlight that within a single industry, these differences are further shaped by the nuanced interactions between the typology of climate risks, risk severity, and the location within the value chain where the firm operates. This highlights the importance of developing targeted, context-specific adaptation and mitigation strategies, rather than adopting one-size-fits-all approaches.

6. Conclusion and Implications

6.1 Conclusion

This study aimed to investigate how different types of climate-related risks —physical, regulatory, market, and technological—impact the financial performance of firms in the automotive sector, and how these effects are influenced by value-chain position and the perceived severity of risks. Using firm-level disclosures from CDP (2018–2021) and applying ANCOVA and robust regression models, we provide systematic evidence that bridges risk typology, value chain dynamics, and severity assessments within a single analytical framework.

This study provides robust empirical evidence on how climate-related risks —physical, regulatory, market, and technological —interact with value-chain position and perceived severity to shape the financial impacts faced by firms in the automotive sector. The findings reveal that physical and regulatory risks exert the greatest financial toll, particularly when severity is high, underscoring the disruptive potential of extreme weather events and stringent policy shifts. In contrast, market and technological risks tend to have more minor or context-dependent effects, with certain firm positions, such as upstream suppliers under market risk, experiencing relative insulation.

Notably, risk severity emerged as the most consistent and powerful predictor of financial impact, confirming that firms' own assessments of a risk's likelihood, magnitude, and time horizon taken together are meaningful indicators of potential losses. These results extend beyond generalized sectoral vulnerability models by demonstrating that the materiality of climate risks is contingent not only on risk type and severity but also on the operational role a firm plays in the value chain.

Compared to earlier studies, which have predominantly focused on financial and energy firms or examined climate risks in isolation, this research contributes a sector-specific and value-chain-sensitive analysis of the automotive industry, an industry central to global decarbonization efforts. By jointly modeling risk type, value-chain position, and risk severity, we move beyond generalized sectoral vulnerability models to offer more granular and empirically grounded evidence of financial materiality. This extends prior findings, including those of Dasaklis & Pappis (2013), Li et al. (2024), and Jin et al. (2025), by demonstrating that climate risk impacts are heterogeneous, contingent, and shaped by firms' operational roles in the supply chain.

By integrating these dimensions, this study advances the literature on cleaner production and climate finance, offering a more granular understanding of where and how climate risks become financially material. The evidence underscores that one-size-fits-all approaches to climate risk management are insufficient. Instead, industry actors must adopt targeted, position-specific strategies to strengthen resilience and protect long-term financial performance.

6.2 Managerial and Policy Implications

From a managerial perspective, the heterogeneity of climate risk impacts demands differentiated strategies across the value chain. For original equipment manufacturers (OEMs) operating at the point of production, investments in physical resilience such as flood defenses, asset hardening, and production flexibility are critical. Firms with high exposure to regulatory risk should strengthen compliance readiness, engage proactively with policymakers, and integrate adaptive planning into capital investment decisions. Upstream suppliers, particularly those relatively shielded from certain

market risks, may prioritize supply diversification, contractual flexibility, and customer portfolio management to buffer demand shocks.

For policymakers and investors, these results underscore the need for targeted and nuanced intervention. Large OEMs may benefit from targeted incentives for resilience upgrades and decarbonization efforts, while smaller suppliers could require financial support to manage market volatility. Climate disclosure frameworks, including the CDP and the EU's Corporate Sustainability Reporting Directive, should encourage firms to report not only emissions and aggregate risks but also the interaction between value-chain position and risk type. This information is material for capital allocation, risk pricing, and designing policies that maximize sectoral stability during the climate transition.

6.3 Limitations and Directions for Future Research

This research has some limitations. First, it relies on self-reported CDP disclosures, which may vary in accuracy or reflect strategic bias. Future work could triangulate these with independent datasets on actual financial losses from specific climate events or market shifts. Second, the analysis is confined to the automotive sector; extending the framework to other industries could reveal whether similar interaction patterns hold in sectors with different asset structures or supply-chain dynamics. Comparative, multi-industry studies could thus broaden the external validity of these findings.

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The Corruption Configuration Cube (CCC): A Configurational Governance Framework for Corruption Analysis

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1. Introduction

Corruption is increasingly recognized not only as a legal or ethical deviation, but as a structural threat to economic sustainability, organizational legitimacy, and governance resilience. Across both public and private sectors, corruption distorts resource allocation, undermines institutional trust, inflates transaction costs, and weakens long-term value creation processes (Bahoo et al., 2020; OECD, 2023). Within management and governance research, corruption has traditionally been analysed through compliance-oriented and institutional perspectives, primarily focusing on monitoring systems, regulatory enforcement, and incentive misalignment (Klitgaard, 1988; Johnston, 2005). While these approaches have generated important insights, they often conceptualize corruption as a discrete governance failure rather than as a multidimensional organizational phenomenon embedded within decision-making structures, strategic adaptation processes, and evolving systems of moral agency.

Recent transformations in the global governance environment further amplify these limitations. Organizations increasingly operate within fragmented institutional settings characterized by geopolitical instability, regulatory asymmetries, stakeholder pressure, and overlapping governance regimes. Simultaneously, the growing diffusion of artificial intelligence, algorithmic management systems, and digitally mediated decision architectures is reshaping how organizational decisions are produced, delegated, and controlled. Emerging research on digital governance and AI-mediated organizational systems suggests that these transformations generate new integrity vulnerabilities, including opacity in decision-making, diffusion of accountability, and forms of moral distancing within technologically mediated governance environments (Martin, 2019; Kellogg et al., 2020; Raisch & Krakowski, 2021). In such contexts, corruption can no longer be interpreted exclusively as intentional misconduct by isolated individuals but increasingly appears as a systemic governance pathology emerging from the interaction between organizational incentives, institutional pressures, technological mediation, and weakened ethical oversight.

At the same time, existing corruption models remain only partially equipped to capture these evolving dynamics. Classical analytical frameworks, such as the Fraud Triangle (Cressey, 1953), the Corruption Triangle, the Corruption Diamond (Johnston, 2005), and institutional opportunity-structure models (Klitgaard, 1988; Mungiu-Pippidi, 2015), have contributed significantly to explaining corruption through opportunity architectures, incentive systems, rationalization mechanisms, and governance weaknesses. More recent streams of research in behavioural ethics and organizational misconduct have also demonstrated how unethical practices may become normalized through moral disengagement, bounded ethicality, and organizational cultures that prioritize performance over ethical reflexivity (Bandura, 1999; Ashforth & Anand, 2003; Treviño et al., 2006). However, despite their explanatory relevance, these approaches tend to under-theorize coercive corruption dynamics, fear-based compliance, blackmail mechanisms, and the progressive erosion of moral agency within complex governance environments.

This limitation becomes particularly relevant in contexts where corruption is not driven primarily by voluntary exchange or opportunistic calculation, but by asymmetrical power relations, coercive pressures, reputational vulnerability, and governance-induced fear. Existing management literature has only marginally explored how corruption may emerge through mechanisms of domination, forced compliance, or strategic adaptation under conditions of organizational insecurity. As a result,

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corruption is frequently treated as a transactional or behavioural anomaly rather than as a multidimensional governance configuration involving agency structures, legitimacy of instruments, and power asymmetries within organizational systems.

To address this gap, the present paper introduces the Corruption Configuration Cube (CCC), a multidimensional conceptual governance framework designed to analyse corruption as a configurational governance phenomenon rather than as an isolated act or compliance deviation. The framework integrates three analytical dimensions: (1) agency structure, ranging from coercion to voluntariness; (2) legitimacy of instruments, ranging from formally legitimate to intrinsically illegitimate means; and (3) transactional directionality, ranging from offer-based to request-based corruption. By combining these dimensions within a unified configurational architecture, the CCC enables corruption to be conceptualized as a heterogeneous strategic and governance phenomenon characterized by different organizational dynamics, sustainability risks, and integrity failures.

The paper contributes to the literature in three principal ways.

First, it extends existing corruption research by integrating coercion, fear dynamics, and moral agency governance into corruption analysis, dimensions that remain comparatively underdeveloped within management studies.

Second, it contributes to governance and sustainability research by reframing corruption as a systemic sustainability failure linked to organizational design, strategic incentives, and decision architectures rather than solely to compliance deficiencies.

Third, the paper advances emerging debates on governance complexity and the agentic economy by exploring how digitally mediated decision systems and distributed organizational agency may reshape corruption vulnerabilities in contemporary organizations.

The remainder of the paper is structured as follows. The next section reviews the principal corruption models within management and governance literature and identifies the main conceptual limitations of existing approaches. The paper then introduces the methodological positioning of the study and develops the Corruption Configuration Cube (CCC) framework. Subsequently, the analysis discusses the governance and sustainability implications of the model, including its managerial relevance and potential empirical operationalization. The final section concludes by outlining the theoretical contributions, limitations, and future research directions of the study.

2. Literature Review and Theoretical Gap

2.1 Corruption in Management and Governance Research

Corruption has traditionally been examined across economics, political science, criminology, and public administration as a phenomenon associated with institutional inefficiency, abuse of power, and regulatory failure. Within management and governance research, however, corruption has progressively evolved from being considered a peripheral compliance issue to being recognized as a strategic and organizational challenge capable of undermining long-term value creation, stakeholder trust, and sustainability performance (Bahoo et al., 2020; OECD, 2023).

Early management approaches largely interpreted corruption through agency and control perspectives, emphasizing opportunistic managerial behaviour, information asymmetries, and failures in monitoring systems (Klitgaard, 1988). In this view, corruption emerges when organizational actors exploit discretionary power under conditions of weak accountability and insufficient oversight. Consequently, anti-corruption efforts have historically focused on compliance architectures, internal controls, auditing systems, and regulatory enforcement mechanisms.

Although these approaches remain highly relevant, contemporary governance environments have exposed their limitations. Organizations increasingly operate across fragmented institutional settings characterized by regulatory asymmetries, geopolitical instability, stakeholder activism, and complex transnational supply chains. At the same time, the expansion of ESG governance and sustainability-oriented management has broadened the understanding of corruption beyond legal misconduct,

reframing it as a systemic threat to organizational legitimacy and sustainable development (Bahoo et al., 2020; Shaheer et al., 2019).

Recent research in behavioural ethics and organizational misconduct has further demonstrated that corruption cannot be fully explained through formal control deficiencies alone. Studies on moral disengagement, ethical fading, and normalization processes show how organizational cultures, performance pressures, and cognitive framing mechanisms may progressively legitimize unethical conduct within otherwise formally compliant systems (Bandura, 1999; Tenbrunsel & Messick, 2004; Ashforth & Anand, 2003). Corruption increasingly appears not as an isolated deviation, but as a phenomenon deeply embedded within organizational routines, strategic incentives, and governance architectures.

This shift becomes particularly relevant within emerging digitally mediated governance environments. The diffusion of artificial intelligence, algorithmic management systems, and data-driven organizational decision-making introduces new forms of opacity, distributed accountability, and moral distancing within corporate governance structures (Martin, 2019; Raisch & Krakowski, 2021). In such contexts, corruption risks may emerge not only from intentional misconduct, but from systemic vulnerabilities embedded within technologically mediated decision architectures that prioritize efficiency, optimization, or competitive survival over ethical reflexivity.

Despite the growing sophistication of corruption research, much of the management literature still conceptualizes corruption primarily through voluntary exchange logics, opportunistic incentives, or institutional weakness. Comparatively limited attention has been devoted to coercive corruption dynamics, fear-based compliance, blackmail mechanisms, and the erosion of moral agency under conditions of organizational pressure and asymmetrical power relations. This omission becomes increasingly problematic in governance environments where corruption operates not only through incentives and opportunity, but also through domination, retaliation, and coercive adaptation processes. Contemporary ESG and sustainability debates have further expanded the scope of corruption research by emphasizing the relationship between integrity failures, stakeholder legitimacy, and long-term organizational resilience. Corruption increasingly appears not only as a legal or reputational issue, but also as a sustainability risk capable of undermining environmental governance, social trust, and responsible value creation processes. This perspective reinforces the need for governance frameworks capable of analysing corruption as a multidimensional organizational phenomenon linked to systemic governance quality, rather than merely to compliance deficiencies, or isolated individual behaviour.

2.2 Classical Corruption Models

The international literature has produced several influential analytical models aimed at explaining the emergence and persistence of corruption across individual, organizational, and institutional contexts. Although these frameworks differ in scope and level of analysis, they collectively contributed to establishing corruption as a structured governance phenomenon rather than merely an individual ethical failure. One of the foundational models is the Fraud Triangle[2] developed by Cressey (1953), which explains fraudulent behaviour through the interaction of three conditions: pressure, opportunity, and rationalization. According to this framework, corruption becomes possible when individuals experience situational pressures, encounter organizational opportunities for misconduct, and cognitively justify unethical behaviour through rationalization mechanisms. The model has had

[2] The Fraud Triangle *(Cressey, 1953)* is individual-centred, approaching fraud from a criminological micro-level of analysis It explains unethical behaviour as a product of individual moral reasoning under constraint. Widely used in auditing, compliance, internal control, it's suited to analysing non-systemic or episodic corruption and financial fraud.
. It identifies three necessary conditions for fraudulent or corrupt behaviour:
- Pressure / Motivation: Economic needs, professional pressure, personal ambitions, or organizational stressors that lead individuals to consider illicit behaviour as a viable option.
- Opportunity: Weak internal controls, lack of segregation of duties, opacity of procedures, or technical possibilities that enable misconduct without immediate detection.
- Rationalization: Moral or cognitive justifications that allow individuals to neutralize ethical dissonance.

a major influence on auditing, compliance, and corporate governance research because of its simplicity and operational applicability. Subsequent developments adapted this logic to broader corruption contexts. The Corruption Triangle[3] shifted attention from moral rationalization toward strategic calculation by emphasizing opportunity, perceived risk, and expected benefit. This perspective conceptualizes corruption as a decision-making process shaped by cost-benefit evaluations under conditions of imperfect accountability and enforcement. The model proved particularly influential in public administration and procurement studies, where corruption is often analysed as an adaptive response to incentive structures and regulatory weaknesses.

More systemic approaches emerged through the Corruption Diamond[4]proposed by Johnston (2005), which conceptualizes corruption as the outcome of interacting structural conditions involving opportunities, incentives, control systems, and social norms. Unlike individual-centered approaches, the Diamond highlights how corruption may become institutionally embedded within political systems, organizational networks, and informal governance structures. This perspective contributed significantly to comparative corruption research by showing how different "corruption regimes" emerge from distinct institutional and cultural configurations.

Similarly, institutional opportunity-structure models, particularly those associated with Klitgaard[5] (1988) and later developed by Mungiu-Pippidi (2015), explain corruption through the interaction of monopoly power, discretionary authority, and weak accountability systems. These approaches conceptualize corruption as a structural governance pathology generated by institutional configurations that systematically enable misconduct. Their relevance lies in shifting anti-corruption analysis from moral exhortation toward governance design and institutional reform.

Collectively, these models have generated major theoretical and practical advances. They demonstrate that corruption is shaped by incentives, organizational structures, social norms, governance architectures, and cognitive rationalization processes. Moreover, they have informed anti-corruption strategies focused on transparency, compliance, accountability, and institutional strengthening.

However, despite their explanatory power, classical corruption models share several limitations. First, they predominantly conceptualize corruption as a voluntary or incentive-driven phenomenon, implicitly assuming relatively symmetrical agency relations between actors. Second, they tend to focus on opportunity structures and strategic calculation while underexploring how fear, coercion, retaliation, and domination shape corrupt behaviour. Third, they frequently treat governance failures

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[3] *The Corruption Triangle* adapts Cressey's framework to administrative and political corruption, shifting the analytical focus from moral justification to strategic calculation, from an individual and organizational point of view, as a decision-oriented model. The model foregrounds power, incentives, and strategic behaviour over moral rationalization. It is particularly effective in analysing public-sector corruption and procurement, and identifies actionable intervention points: reducing opportunities, increasing perceived risk, and limiting benefits. The core elements of the triangle are:

- Opportunity: The practical ability to influence decisions or extract favours due to discretionary power, procedural opacity, or control deficiencies.
- Perceived Risk: The subjective assessment of the likelihood of detection and sanction (not the actual risk).
- Expected Benefit: Economic, political, personal, or organizational gains resulting from corrupt actions.

[4] The Corruption Diamond *(Johnston, 2005)* conceptualizes corruption as a property of interacting structural factors rather than individual deviance. It focuses on four dimensions of systemic, political-institutional drivers and enablers:

- Opportunities: Vulnerable public resources, regulatory assets, privileged access, and institutional weaknesses.
- Incentives Pressures: Economic interests, distorted political competition, clientelist networks, and elite collusion.
- Control + Accountability: Enforcement institution's effectiveness, independence of judiciary, media, civil society.
- Norms + Culture: Social tolerance of favoritism, gift-giving, nepotism, informal practices. This enables cross- country comparisons to identify distinct corruption regimes and inform long-term institutional reform strategies.

[5] The Corruption Opportunity Structure framework *(Klitgaard; Mungiu-Pippidi; Heywood)* approaches corruption from an institutional viewpoint, explaining corruption as a function of configurations that generate opportunities for misconduct. Identifying high-risk sectors and processes, this model serves as a diagnostic tool for institutional assessment and forms the basis of prevention policies focused on structural reform and it builds upon Klitgaard's corruption formula: ***Corruption = Monopoly of Power + Discretion - Accountability***

- Monopoly: Concentration of decision-making authority and lack of competition or alternatives.
- Discretion: Wide margins of interpretation, opaque procedures, and personalized decision-making.
- Accountability: Effectiveness of audits, transparency mechanisms, judicial enforcement, media oversight, and whistleblowing systems.

as problems of insufficient monitoring or institutional weakness rather than as failures in the governance of moral agency and decision architectures.

As governance systems become increasingly complex, technologically mediated, and politically fragmented, these limitations suggest the need for conceptual frameworks capable of integrating structural, cognitive, relational, and coercive dimensions within a unified analytical perspective.

Table 1. Comparative Positioning of Classical Corruption Models and the CCC

Model	Level of Analysis	Core Dimensions	Main Strengths
Fraud Triangle	Individual	Pressure - Opportunity - Rationalization	Simplicity; useful for audits and compliance
Corruption Triangle	Individual / Organizational	Opportunity - Risk - Benefit	Effective for public decision-making and procurement
Corruption Diamond	Systemic	Opportunity - Incentives - Control - Norms	Strong for comparative and macro-level analysis
Opportunity Structure	Institutional	Monopoly - Discretion - Accountability	Ideal for risk mapping and policy design

CCC Positioning vs existing literature (Author's elaboration)

2.3 The Overlooked Dimension: Coercion, Fear, and Moral Agency Collapse

A major limitation of existing corruption research concerns the under-theorization of coercive and fear-based corruption dynamics. Most classical corruption models implicitly assume that corrupt exchanges are fundamentally voluntary, incentive-driven, or strategically opportunistic. Even when pressure is acknowledged, it is typically interpreted as economic stress, performance pressure, or institutional incentive distortion rather than as coercive domination or forced compliance. This approach endures despite the extensive criminological literature and judicial evidence establishing corruption as the primary instrument and strategic *modus operandi* through which criminal organizations and organized crime cartels operate, infiltrating legitimate markets and subverting competitive integrity.

Both empirical evidence and emerging governance research suggest that corruption frequently operates through mechanisms of intimidation, retaliation, reputational blackmail, extortion, and asymmetrical power dependence. In such contexts, organizational actors may engage in corrupt conduct not because they actively seek illicit advantage, but because they perceive compliance as necessary for professional survival, organizational belonging, or protection against retaliation.

Research on moral disengagement and ethical fading partially addresses these dynamics by showing how individuals cognitively neutralize ethical responsibility under organizational pressure (Bandura, 1999; Tenbrunsel & Messick, 2004). Similarly, Ashforth and Anand (2003) demonstrated how corruption may become normalized through institutional routines and collective rationalization processes. Nevertheless, these approaches still focus predominantly on normalization and rationalization rather than on coercive governance structures themselves.

This omission becomes increasingly problematic in contemporary governance environments characterized by heightened uncertainty, organizational insecurity, and concentrated power asymmetries. Under such conditions, corruption may emerge as a defensive adaptation mechanism rather than as a purely opportunistic choice. Fear of exclusion, career retaliation, reputational destruction, or economic marginalization can progressively erode moral agency, encouraging individuals to prioritize short-term survival over long-term ethical commitments (Valentini, 2026).

The issue is particularly relevant in relation to whistleblowing systems and organizational silence. Studies on organizational misconduct (Kish-Gephart et al., 2024) increasingly show that when governance systems fail to protect dissent, fear itself becomes a governance mechanism capable of sustaining corrupt practices through implicit coercion and collective conformity (Molds, 2023). Corruption operates not only through rewards and incentives, but also through vulnerability, dependency, and domination (Schmid et al., 2022).

Furthermore, emerging forms of digitally mediated governance may intensify these dynamics. Algorithmic management systems, opaque decision infrastructures, and AI-assisted performance

evaluation processes can contribute to the diffusion of accountability and moral distancing, making it more difficult for organizational actors to identify responsibility, resist unethical directives, or challenge corrupt practices. In such contexts, corruption increasingly appears as a systemic governance pathology embedded within organizational decision architectures rather than solely as intentional individual misconduct.

These developments reveal a significant theoretical gap within existing corruption literature. While current models explain how corruption becomes possible, they insufficiently explain how governance systems progressively weaken moral agency, normalize coercive adaptation, and generate corruption through fear-based organizational dynamics.

Recent research on organizational moral agency further supports the relevance of governance structures in shaping ethical conduct. Vriens et al. (2024) demonstrate that organizational architectures characterized by excessive fragmentation, formalization, and functional separation may weaken individuals' capacity for moral deliberation and ethical responsibility. Their findings suggest that governance systems themselves can either support or undermine moral agency within organizations. This perspective is particularly relevant for corruption analysis because it shifts attention from isolated unethical actors toward organizational configurations capable of progressively normalizing ethical disengagement and compliance under pressure.

2.4 Research Gap and Conceptual Need for the Corruption Configuration Cube (CCC)

The preceding discussion highlights an important limitation within contemporary corruption research. Existing analytical models have significantly advanced the understanding of corruption by identifying key drivers such as opportunity structures, institutional weakness, rationalization mechanisms, incentive systems, and governance failures. Nevertheless, these approaches remain only partially capable of capturing corruption as a multidimensional governance phenomenon emerging from the interaction of agency structures, coercive dynamics, legitimacy of instruments, and transactional power asymmetries.

More specifically, current corruption frameworks tend to analyse corruption either as an individual behavioural outcome or as a structural institutional pathology, while rarely integrating cognitive, relational, coercive, and governance dimensions within a unified conceptual architecture. As a result, forms of corruption rooted in fear, blackmail, retaliation, domination, and forced compliance remain comparatively under-theorized within management and governance studies.

This gap becomes increasingly relevant in contemporary organizational environments characterized by governance fragmentation, technological mediation, distributed decision-making, and intensified competitive pressure. In such settings, corruption cannot be fully understood solely through compliance failures or opportunistic calculation. Instead, it increasingly reflects failures in the governance of moral agency and in the design of organizational decision architectures capable of protecting ethical autonomy under conditions of uncertainty and power asymmetry.

Moreover, institutional complexity increasingly exposes organizations to overlapping regulatory expectations, conflicting stakeholder demands, and hybrid governance pressures that blur traditional boundaries between legitimate influence, strategic adaptation, and corrupt conduct. Under such conditions, corruption risks may emerge not only through direct illegality, but through ambiguous governance environments characterized by opacity, asymmetrical dependence, and accountability diffusion.

Recent governance scholarship increasingly frames organizational misconduct as the outcome of systemic governance failures rather than isolated ethical deviations. In particular, Paruchuri et al. (2024) argue that governance breakdowns often emerge through the interaction of board structures, accountability failures, and organizational responses to misconduct crises. This perspective aligns with the present study's configurational approach by suggesting that corruption should be analysed as an emergent property of governance systems rather than solely as individual opportunism.

To address these limitations, this paper introduces the Corruption Configuration Cube (CCC) as a multidimensional conceptual framework aimed at reconceptualizing corruption as a configurational governance phenomenon.

Rather than explaining corruption through linear causal relationships, the CCC conceptualizes corruption as the interaction of three analytical dimensions: (1) agency structure, ranging from coercion to voluntariness; (2) legitimacy of instruments, ranging from formally legitimate to intrinsically illegitimate means; and (3) transactional directionality, ranging from offer-based to request-based corruption.

The framework extends existing corruption models in three principal ways. First, it explicitly incorporates coercion and fear-based dynamics into corruption analysis, treating them not as marginal anomalies but as structurally relevant governance configurations. Second, it integrates governance, sustainability, and behavioural ethics perspectives within a unified multidimensional architecture. Third, it shifts corruption analysis from static behavioural explanations toward configurational and systems-oriented governance approaches capable of capturing the complexity of contemporary organizational environments.

The CCC should be understood not as a replacement for existing corruption models, but as an integrative analytical framework designed to connect and extend them within a broader governance and sustainability perspective.

Recent developments in AI governance and algorithmic management further complicate traditional corruption analysis. Emerging research demonstrates that algorithmic decision-making systems may generate new governance vulnerabilities linked to opacity, distributed accountability, and weakened human oversight (Martin & Waldman, 2023; Stark & Vanden Broeck, 2024). In increasingly automated organizational environments, decision authority is progressively embedded within data-driven infrastructures and algorithmic management systems, potentially reducing transparency and diluting individual responsibility. Studies on algorithmic governance further suggest that technologically mediated decision systems may intensify moral distancing, reinforce asymmetrical power relations, and constrain employees' capacity for ethical dissent or autonomous judgment (Adams-Prassl et al., 2023; Rinta-Kahila et al., 2023). These developments reinforce the need to conceptualize corruption not only as intentional misconduct, but also as a systemic governance pathology emerging from complex organizational decision architectures.

Table 2. Emerging Governance Drivers Reinforcing the Need for the CCC

Governance Trend	Limitation of Classical Models	CCC Contribution
Algorithmic management	Accountability diffusion	Agency structure dimension
ESG governance complexity	Ambiguous legitimacy	Legitimacy of instruments
Institutional fragmentation	Overlapping incentives	Configurational approach
Organizational coercion	Under-theorized fear dynamics	Coercion-voluntariness axis
Distributed decision systems	Moral distancing	Moral agency integration

CCC's Contemporary Governance Relevance (Author's elaboration)

3. Methodology

3.1 Research Design

This study adopts a conceptual and theory-building research design aimed at developing an integrative analytical framework for the interpretation of corruption as a multidimensional governance phenomenon. Rather than testing predefined hypotheses through empirical observation, the paper seeks to advance theoretical understanding by synthesizing and reconfiguring existing streams of literature into a unified conceptual architecture. The study follows the tradition of conceptual research in management and organization studies, where theory development emerges

through analytical integration, reinterpretation of existing constructs, and identification of overlooked relationships among phenomena (Jaakkola, 2020).

The conceptual orientation of the paper is particularly appropriate given the fragmented nature of contemporary corruption research. Existing studies on corruption are often distributed across distinct disciplinary domains - including economics, public governance, criminology, behavioural ethics, sustainability, and strategic management - with limited integration among organizational, cognitive, institutional, and coercive dimensions. As a result, current models frequently explain isolated aspects of corruption while lacking an overarching framework capable of capturing the configurational complexity of corruption within contemporary governance systems.

The purpose of the present study is not to replace existing corruption models, but to integrate and extend them through the development of the Corruption Configuration Cube (CCC), a multidimensional framework designed to analyse corruption through the interaction of agency structures, legitimacy of instruments, and transactional directionality. Thus the CC framework can support analytical interpretability across heterogeneous corruption contexts.

3.2 Literature Selection and Analytical Approach

The development of the CCC framework is grounded in an integrative review of interdisciplinary literature on corruption, governance, organizational misconduct, behavioural ethics, and sustainability management. The review combines foundational theoretical contributions with more recent research addressing emerging governance dynamics associated with digitalization, algorithmic decision-making, ESG governance, and institutional complexity.

The literature selection process followed three complementary criteria. First, the analysis included seminal corruption models that have historically shaped governance and organizational research, such as the Fraud Triangle (Cressey, 1953), institutional corruption approaches (Klitgaard, 1988), the Corruption Diamond (Johnston, 2005), and opportunity-structure perspectives. These models were selected because of their foundational role in explaining corruption through incentives, rationalization, institutional weakness, and governance asymmetries.

Second, the review incorporated literature from behavioural ethics and organizational misconduct studies, particularly research examining moral disengagement, ethical fading, normalization of deviance, and organizational corruption processes (Bandura, 1999; Ashforth & Anand, 2003; Tenbrunsel & Messick, 2004). This stream was included to better understand how corruption may become embedded within organizational routines, decision-making systems, and governance cultures (Molds, 2023).

Third, the analysis integrated recent contributions from management and governance scholarship addressing contemporary transformations in organizational environments, including AI governance, algorithmic management, ESG accountability, and institutional fragmentation (Martin & Waldman, 2023; Raisch & Krakowski, 2021; Stark & Vanden Broeck, 2024). These studies were considered particularly relevant because they highlight emerging governance vulnerabilities associated with distributed accountability, technologically mediated decision architectures, and the erosion of moral agency in increasingly complex organizational systems.

The analytical process adopted an abductive and configurational logic. Rather than deriving the framework deductively from a single theory or inductively from empirical data, the study progressively identified recurring analytical dimensions across different research streams and reorganized them into a coherent multidimensional structure. This approach is consistent with conceptual theory-building methodologies aimed at generating integrative frameworks capable of explaining complex organizational phenomena through the interaction of multiple dimensions rather than through linear causal relationships.

3.3 Framework Development Process

The development of the Corruption Configuration Cube (CCC) occurred through a three-stage analytical process.

In the first stage, the study systematically analysed the explanatory assumptions underlying the principal corruption models discussed in the literature. Attention was devoted to identifying the dominant explanatory variables used to conceptualize corruption, including opportunity structures, rationalization mechanisms, institutional weakness, incentive systems, and governance failures. This phase revealed that most existing approaches predominantly conceptualize corruption as either an opportunistic behavioural choice or an institutional pathology generated by insufficient accountability structures.

In the second stage, the analysis focused on identifying dimensions that remained comparatively underdeveloped within existing corruption frameworks. Through comparison across governance, behavioural ethics, and organizational misconduct literature, three recurrent analytical gaps emerged. The first concerned the limited treatment of coercion and fear-based corruption dynamics. The second involved the insufficient distinction between formally legitimate and intrinsically illegitimate instruments used within corrupt exchanges. The third related to the directional structure of corruption transactions, particularly the distinction between offer-driven and request-driven corruption mechanisms.

In the third stage, these dimensions were reorganized into a unified configurational framework through the construction of three orthogonal analytical axes: (1) agency structure, ranging from voluntariness to coercion; (2) legitimacy of instruments, ranging from formally legitimate to illegitimate means; and (3) transactional directionality, ranging from offer-based to request-based corruption. The interaction among these dimensions generated the conceptual architecture of the Corruption Configuration Cube (CCC).

The configurational structure of the framework reflects the assumption that corruption cannot always be adequately explained through isolated variables or linear models. Instead, corruption configurations emerge from the interaction between governance pressures, power asymmetries, organizational incentives, and moral agency conditions. Consequently, different combinations of the three dimensions may produce qualitatively distinct forms of corruption characterized by different governance implications, sustainability risks, and organizational dynamics.

3.4 Methodological Positioning and Scope

The present study should be interpreted as an exploratory conceptual contribution rather than as an empirically validated predictive model. The purpose of the CCC is primarily analytical and heuristic: to provide a multidimensional interpretive framework capable of supporting future empirical investigation, governance analysis, and organizational diagnosis.

Consistent with conceptual theory-building research, the framework aims to generate analytical categories and relationships that may subsequently be operationalized through qualitative, comparative, or quantitative methodologies. In particular, the CCC may support future studies focused on corruption mapping, governance risk assessment, organizational misconduct analysis, whistleblowing systems, and AI-mediated governance environments.

At the same time, the conceptual nature of the study necessarily entails limitations. The framework has not yet been empirically tested across organizational contexts, and the boundaries between different corruption configurations may vary depending on institutional, cultural, and sectoral conditions. Moreover, some dimensions may interact dynamically rather than remaining fully independent in practice. Nevertheless, the configurational approach adopted in this paper offers a foundation for future refinement and empirical validation.

By explicitly integrating coercion, legitimacy structures, and transactional directionality within a unified governance framework, the methodology adopted in this study seeks to advance corruption research beyond purely compliance-oriented or incentive-based interpretations, contributing instead to a broader understanding of corruption as a multidimensional governance and sustainability phenomenon.

4. The Corruption Configuration Cube (CCC): Analytical Framework

4.1 Conceptual Logic of the Framework

The Corruption Configuration Cube (CCC) is proposed as a multidimensional analytical framework designed to conceptualize corruption as a configurational governance phenomenon rather than as a singular behavioural deviation or isolated compliance failure. Unlike traditional corruption models, which typically explain corruption through linear causal variables such as opportunity, incentive, rationalization, or institutional weakness, the CCC adopts a configurational perspective in which corruption emerges through the interaction of multiple organizational, relational, and governance dimensions.

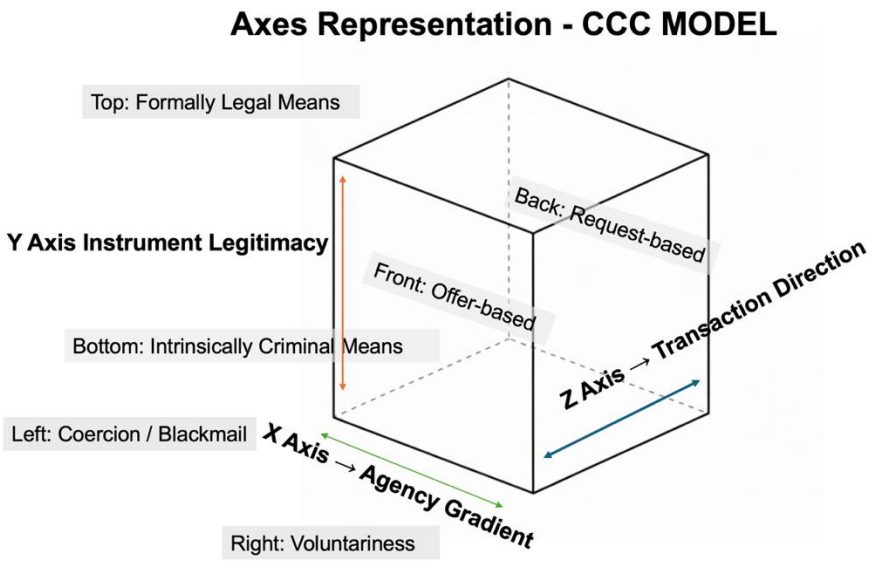
The framework is grounded in the assumption that contemporary corruption cannot always be adequately interpreted through binary distinctions such as legal/illegal or ethical/unethical behaviour. In increasingly complex governance environments characterized by institutional fragmentation, algorithmic mediation, ESG pressures, asymmetrical power relations, and distributed decision systems, corruption often develops through hybrid and dynamic configurations involving coercion, strategic adaptation, moral distancing, and governance-induced (Misangyi et al., The Role of Power in Organizational Corruption).

The CCC conceptualizes corruption as a multidimensional governance configuration generated by the interaction of three analytical dimensions:

1. Agency structure;
2. Legitimacy of instruments;
3. Transactional directionality.

These dimensions are represented as orthogonal analytical axes within a three-dimensional conceptual cube. Their interaction generates different corruption configurations characterized by distinct governance logics, organizational dynamics, ethical implications, and sustainability risks.

Figure 1. The Corruption Configuration Cube (CCC)



Core Dimensions

- X-Axis | Agency Structure: Evaluates the degree of autonomy and volitional capacity of the actors, mapping the spectrum from external coercion to proactive engagement.
- Y-Axis | Legitimacy of Instruments: Assesses the normative standing of the methods employed, distinguishing between formally regulated legal mechanisms and illicit or extra-legal means.
- Z-Axis | Transactional Directionality: Identifies the point of origin and the flow of the interaction, differentiating between offer-based initiatives and request-driven responses.

Research Utility

By replacing qualitative abstractions with defined structural vectors, the model enables a systematic diagnostic of transaction integrity. This framework allows researchers and managers to visualize complex power dynamics and compliance risks within a standardized geometric space, facilitating comparative analysis across diverse institutional contexts.

The configurational structure of the framework reflects two core assumptions.

First, corruption is not homogeneous. Different corruption phenomena may emerge through substantially different combinations of coercion, legitimacy, and transactional asymmetry. Consequently, anti-corruption governance mechanisms cannot be uniformly designed, since different corruption configurations require different forms of organizational intervention, accountability structures, and governance responses.

Second, corruption must be understood not only as an issue of individual misconduct, but also as a governance pathology embedded within organizational systems, power structures, and decision architectures. In this sense, the CCC shifts the analytical focus from isolated corrupt actors toward the broader governance conditions that enable, normalize, or impose corrupt conduct.

The framework should be interpreted primarily as an analytical and diagnostic tool rather than as a predictive model. Its purpose is to support a more nuanced interpretation of corruption dynamics within contemporary organizations by integrating structural, relational, cognitive, and coercive dimensions within a unified governance perspective.

4.2 The Three Dimensions of the CCC

4.2.1 Agency Structure: Voluntariness and Coercion

The first dimension concerns the structure of agency underlying corrupt conduct. Existing corruption literature has traditionally interpreted corruption as a predominantly voluntary and opportunistic behaviour driven by incentives, rationalization, or strategic gain. However, contemporary governance environments increasingly reveal forms of corruption characterized by coercion, fear, dependency, intimidation, and asymmetrical power relations.

The agency axis ranges from voluntary corruption to coercive corruption. At the voluntary end of the spectrum, actors actively engage in corrupt practices in pursuit of economic advantage, strategic benefit, reputational gain, or organizational competitiveness. These forms typically correspond to classical bribery, collusive agreements, preferential treatment, or strategic influence exchanges. At the coercive end, corruption emerges through domination, blackmail, retaliation threats, organizational intimidation, or forced compliance. In such contexts, actors may participate in corrupt conduct not because they seek illicit benefit, but because they perceive non-compliance as threatening to professional survival, organizational belonging, personal security, or economic stability.

This distinction is particularly relevant within contemporary organizations characterized by strong performance pressures, precarious governance systems, concentrated authority structures, and weak whistleblower protections. Under these conditions, corruption may progressively become a defensive adaptation mechanism rather than a purely opportunistic choice.

The agency dimension introduces moral agency conditions into corruption analysis. It highlights how governance systems themselves may weaken ethical autonomy by generating fear, dependency, moral distancing, or constrained capacity for dissent.

4.2.2 Legitimacy of Instruments

The second dimension concerns the legitimacy of the instruments through which corruption is enacted. Traditional corruption models frequently treat corruption as inherently illegal or explicitly criminal. However, contemporary governance environments increasingly reveal ambiguous situations in which formally legitimate instruments may be strategically manipulated to generate unethical or corrupt outcomes without necessarily violating explicit legal boundaries.

The legitimacy axis ranges from formally legitimate instruments to intrinsically illegitimate instruments. At the illegitimate extreme, corruption relies on explicitly unlawful or fraudulent

mechanisms such as bribery, extortion, falsification, embezzlement, coercive payments, or criminal collusion. At the formally legitimate end, corruption may operate through legal but ethically problematic instruments including lobbying abuse, revolving-door dynamics, selective information asymmetries, strategic consulting arrangements, political influence networks, or governance structures designed to privilege specific actors while preserving formal legal compliance.

This dimension reflects an important transformation in contemporary governance systems. Increasing regulatory sophistication and institutional complexity often encourage the migration of corruption from overt illegality toward legally ambiguous forms of influence embedded within organizational routines, governance structures, and institutional arrangements.

The legitimacy dimension expands corruption analysis beyond purely criminal perspectives by emphasizing the distinction between legal validity and ethical legitimacy. This distinction becomes particularly important within ESG governance environments, where formally compliant organizational practices may nevertheless undermine transparency, accountability, stakeholder trust, or sustainability objectives.

4.2.3 Transactional Directionality

The third dimension concerns the directional structure of corruption transactions.

Most corruption models implicitly assume symmetrical exchange relationships in which corrupt transactions emerge through mutually beneficial arrangements between actors. However, corruption dynamics often differ substantially depending on whether corrupt conduct originates primarily from the offering side or from the requesting side of the transaction.

The transactional directionality axis ranges from offer-based corruption to request-based corruption. Offer-based corruption occurs when the initiating actor proactively proposes corrupt exchanges in pursuit of strategic advantage, preferential treatment, competitive gain, or accelerated access to resources. These forms typically correspond to proactive bribery, influence purchasing, strategic collusion, or opportunistic corruption. Request-based corruption, by contrast, emerges when actors are pressured or required to provide benefits, payments, favours, or concessions in response to explicit or implicit demands imposed by individuals or institutions controlling access to resources, approvals, protection, or organizational opportunities.

This distinction is analytically significant because offer-based and request-based corruption generate different governance implications.

Offer-based corruption tends to reflect strategic opportunism and competitive advantage-seeking behaviour, whereas request-based corruption more frequently reflects asymmetrical power structures, institutional vulnerability, dependency relations, and coercive governance conditions.

Expanding upon this framework, the transactional directionality axis corresponds to the disparate power endowments and strategic objectives of the participants. Offer-based dynamics frequently reflect the proactive deployment of capital by high-resource non-state actors, such as Multinational Enterprises (MNEs), seeking to secure institutional capture or favourable regulatory shifts within asymmetrical economic environments; in these instances, corruption functions as an informal extension of strategic lobbying. Conversely, request-based corruption is fundamentally rooted in the extractive agency of public officials, where the solicitation of rents is facilitated by institutional gatekeeping. This latter modality manifests either as systemic petty corruption or as grand-scale political extortion, whereby the locus of initiation shifts from the private pursuit of advantage to the institutional exploitation of authority.

The transactional directionality dimension enables corruption analysis to move beyond static exchange models by incorporating power asymmetries, initiation structures, and relational dependency into the interpretation of corrupt behaviour.

4.3 Corruption Configurations and Interaction Effects

The analytical value of the CCC emerges not from the isolated dimensions themselves, but from their interaction. Different combinations of agency structure, legitimacy of instruments, and

transactional directionality generate qualitatively distinct corruption configurations characterized by different organizational dynamics, governance failures, sustainability implications, and ethical risks.

For example, a corruption configuration characterized by voluntary agency, illegitimate instruments, and offer-based directionality may correspond to classical competitive bribery, where actors proactively engage in illegal transactions to secure strategic advantage.

By contrast, a configuration characterized by coercive agency, illegitimate instruments, and request-based directionality may correspond to extortionary corruption regimes in which actors comply with corrupt demands due to fear, retaliation risk, or asymmetrical dependence.

Similarly, configurations involving voluntary agency, formally legitimate instruments, and offer-based dynamics may correspond to ethically ambiguous influence systems operating through legal but strategically distortive governance arrangements, such as lobbying capture or revolving-door influence structures.

The configurational perspective allows corruption phenomena that appear superficially similar to be analytically differentiated according to their governance logic and organizational implications.

Importantly, the framework also recognizes that the three dimensions may interact dynamically rather than remaining fully independent in practice. For instance, coercive conditions may progressively alter the perceived legitimacy of instruments, while request-based corruption may generate normalization processes that transform defensive adaptation into routine organizational behaviour. The CCC conceptualizes corruption configurations as dynamic governance patterns rather than static categories.

4.4 Illustrative Corruption Configurations

To clarify the analytical applicability of the framework, Table 3 presents illustrative examples of corruption configurations generated through different combinations of the three dimensions.

Table 3. Illustrative Corruption Configurations within the CCC

Agency Structure	Legitimacy of Instruments	Transactional Directionality	Illustrative Configuration	Governance Logic
Voluntary	Illegitimate	Offer-based	Competitive bribery	Strategic advantage seeking
Voluntary	Legitimate/formally compliant	Offer-based	Lobbying capture	Institutional influence distortion
Coercive	Illegitimate	Request-based	Extortionary corruption	Domination and forced compliance
Coercive	Legitimate/formally compliant	Request-based	Organizational intimidation	Governance-induced fear
Voluntary	Legitimate/formally compliant	Request-based	Network dependency corruption	Relational asymmetry
Coercive	Illegitimate	Offer-based	Survival corruption	Defensive organizational adaptation

The examples of *possible corruption configurations* presented in Table 3 are illustrative rather than exhaustive. Their purpose is not to rigidly classify all corruption phenomena, but to demonstrate how the CCC can support a more differentiated analysis of corruption dynamics across organizational and institutional contexts.

The framework enables corruption to be interpreted not simply according to legal status, but according to governance structure, agency conditions, relational asymmetry, and ethical configuration.

4.5 Governance and Sustainability Implications of the CCC

The CCC framework carries important implications for governance design and sustainability management because it reframes corruption as a multidimensional organizational and sustainability challenge rather than merely as a problem of legal compliance or individual misconduct. By integrating coercion, legitimacy structures, and transactional asymmetries within a unified analytical

architecture, the framework suggests that corruption risks are deeply connected to the design of organizational decision systems, accountability mechanisms, and governance environments.

A first implication concerns the limitations of compliance-centered governance approaches. Traditional anti-corruption systems have historically emphasized compliance monitoring, auditing, formal controls, legal and regulatory enforcement. While these mechanisms remain essential, the CCC suggests that they may be insufficient in organizational environments where corruption emerges through coercion, fear, governance-induced pressures and moral distancing, or normalized dependency relations rather than through explicit opportunistic intent alone.

In such contexts, organizations ought to move beyond traditional reactive compliance architectures, towards mechanisms capable of protecting and encouraging autonomous moral agency. This requires governance systems that reduce asymmetrical dependence, encourage ethical dissent, and strengthen individuals' capacity to resist coercive or ethically ambiguous pressures. Protected whistleblowing channels, independent reporting structures, anti-retaliation safeguards, and distributed accountability systems thus become central governance tools rather than peripheral compliance instruments.

Second, the CCC framework highlights the importance of governance transparency within digitally mediated organizational systems with important implications for board governance and organizational oversight. As algorithmic management and AI-assisted decision-making increasingly influence organizational processes, corruption risks may become embedded within opaque decision architectures characterized by distributed accountability and reduced human oversight. Emerging governance research suggests that technologically mediated systems may unintentionally intensify accountability diffusion, moral distancing, and opacity in organizational decision processes. Under such conditions, corruption risks may become embedded not only in individual actions, but also within the architecture of automated or semi-automated governance systems themselves.

Consequently, organizations adopting AI-supported governance mechanisms should complement technological efficiency with ethical oversight structures capable of preserving transparency, traceability, and human accountability. Governance safeguards may include explainability mechanisms, ethical escalation procedures, algorithmic audit systems, and human review structures designed to reduce the risk of ethically opaque or coercively normalized decision processes.

Corruption risks should not be evaluated exclusively through legal exposure or financial misconduct indicators, but through broader governance configurations involving power concentration, decision opacity, dependency structures, and accountability fragmentation. Boards and senior governance actors should assess corruption risk not only by asking whether illegal conduct exists, but also whether organizational conditions may progressively normalize coercion, silence, strategic ambiguity, or ethical disengagement.

From this perspective, governance quality depends not only on control intensity, but also on the capacity of organizational systems to preserve ethical reflexivity and moral agency under conditions of strategic pressure. This issue becomes particularly relevant in highly competitive sectors, politically exposed industries, and transnational organizational environments characterized by institutional fragmentation and regulatory asymmetries.

A further implication concerns the relationship between corruption and sustainability governance. The framework supports a broader interpretation of ESG governance in which integrity, accountability, transparency, and ethical decision architectures become central dimensions of sustainable organizational performance. In this sense, corruption risks should not be confined to legal compliance departments alone, but integrated into enterprise governance, sustainability oversight, and strategic risk management systems.

The CCC reinforces the idea that corruption should be interpreted as a sustainability failure capable of undermining long-term organizational resilience, stakeholder trust, institutional legitimacy and ESG credibility even in the absence of overt illegality. Configurations involving formally legitimate but ethically distortive practices - such as influence capture, governance opacity, selective information control, or structurally asymmetrical access to decision-making processes - may remain

formally compliant while nevertheless eroding institutional trust and sustainable governance outcomes.

Finally, the framework supports the development of more differentiated anti-corruption strategies. For example:

- voluntary and offer-based corruption configurations may require stronger monitoring systems, transparency measures, and incentive realignment mechanisms;
- coercive and request-based corruption configurations may instead require whistleblower protection, anti-retaliation safeguards, organizational decentralization, and reductions in dependency asymmetries;
- corruption configurations relying on formally legitimate instruments may require enhanced governance transparency, conflict-of-interest regulation, and ethical oversight beyond strict legal compliance.

The framework additionally highlights the importance of differentiating governance responses according to the specific corruption configuration involved. Different corruption configurations generate different organizational dynamics and therefore require different governance interventions. Organizations may require tailored interventions involving whistleblower protection systems, governance transparency mechanisms, ethical escalation channels, accountability redistribution, and AI governance safeguards.

The CCC therefore contributes to reframing corruption not merely as a legal compliance issue, but as a multidimensional governance and sustainability challenge embedded within contemporary organizational systems.

7. Conclusion

This paper proposed the Corruption Configuration Cube (CCC) as a multidimensional conceptual framework aimed at reconceptualizing corruption as a governance and sustainability phenomenon rather than merely as an issue of legal non-compliance or individual misconduct. Building upon and extending classical corruption models, the framework integrates three analytical dimensions - agency structure, legitimacy of instruments, and transactional directionality - in order to capture the configurational complexity of corruption within contemporary organizational environments.

The study contributes to corruption and governance research in several ways. First, it advances existing literature by explicitly incorporating coercion, fear-based compliance, and moral agency erosion into corruption analysis. While traditional models have primarily interpreted corruption through opportunity structures, incentives, and rationalization mechanisms, the CCC highlights how corruption may also emerge through asymmetrical dependence, governance-induced vulnerability, and organizational pressure systems. In doing so, the framework shifts attention from corruption as isolated opportunistic behaviour toward corruption as a systemic governance configuration embedded within organizational architectures and power relations.

Second, the paper contributes to contemporary governance and sustainability debates by emphasizing the relationship between corruption, organizational legitimacy, and governance design. The framework suggests that corruption risks increasingly arise not only through overt illegality, but also through ethically ambiguous governance arrangements, accountability fragmentation, and technologically mediated decision systems capable of weakening ethical reflexivity and diffusing responsibility. This perspective becomes particularly relevant within emerging AI-supported and algorithmically mediated organizational environments characterized by increasing opacity and distributed agency structures.

Third, the CCC contributes methodologically by adopting a configurational perspective capable of integrating organizational, relational, cognitive, and institutional dimensions within a unified analytical architecture. Rather than proposing a linear explanatory model, the framework provides an interpretive structure capable of differentiating corruption configurations according to their

governance dynamics, sustainability implications, and ethical characteristics. This multidimensional approach may support future comparative analyses, organizational diagnostics, governance risk assessments, and empirical operationalization efforts.

The framework also carries important implications for managerial and governance practice. The analysis suggests that anti-corruption systems focused exclusively on compliance and monitoring may be insufficient in organizational contexts characterized by coercion, fear dynamics, legitimacy ambiguity, or technologically mediated accountability diffusion. Effective anti-corruption governance increasingly requires organizational systems capable of protecting moral agency, encouraging ethical dissent, strengthening transparency, and preserving accountability within complex governance environments.

At the same time, the study presents several limitations. The CCC remains a conceptual and exploratory framework that has not yet undergone systematic empirical validation across organizational or institutional contexts. Future research could operationalize the model through qualitative case studies, comparative governance analyses, network approaches, or quantitative configurational methodologies aimed at testing the interaction among the proposed dimensions. Additional research may also explore the applicability of the framework within AI-governance environments, ESG reporting systems, transnational organizational networks, and politically exposed industries. Despite these limitations, the paper argues that understanding corruption within contemporary organizations requires moving beyond simplified distinctions between legal and illegal conduct or between ethical and unethical individuals. Corruption increasingly emerges through complex governance configurations involving power asymmetries, institutional fragmentation, coercive adaptation, and technologically mediated decision structures. By providing an integrative framework capable of analysing these dynamics, the Corruption Configuration Cube seeks to contribute to the development of more nuanced, systemic, and governance-oriented approaches to corruption research and organizational integrity.

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Le emissioni che pesano in Borsa: un confronto tra Scope 1–2 e Scope 3

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Abstract

***Framing della ricerca**. Negli ultimi anni il cambiamento climatico è diventato un fattore centrale nelle decisioni strategiche delle imprese e nelle valutazioni dei mercati finanziari. Le emissioni di gas effetto serra sono sempre più interpretate come indicatori di rischio di lungo periodo; tuttavia, la letteratura si è concentrata prevalentemente sulle emissioni operative (Scope 1 e Scope 2), trascurando il ruolo delle emissioni generate lungo la catena del valore (Scope 3), che rappresentano spesso la quota maggiore dell'impronta carbonica complessiva.*
***Obiettivo della ricerca.** Il lavoro analizza se e in che misura il mercato azionario attribuisca una rilevanza differenziale alle emissioni di Scope 1, Scope 2 e Scope 3 nella determinazione del valore di mercato delle imprese.*
***Metodologia.** Lo studio adotta un approccio quantitativo basato su dati panel relativi a 1.172 imprese europee quotate nel periodo 2015–2024 (11.790 osservazioni). L'analisi empirica si fonda sul framework di valutazione di Ohlson e utilizza modelli di regressione a effetti casuali per stimare l'impatto delle diverse categorie di emissioni sul valore di mercato per azione, controllando per variabili contabili, organizzative e settoriali e conducendo test di robustezza.*
***Risultati**. I risultati mostrano che le emissioni complessive sono negativamente associate al valore di mercato. In particolare, l'effetto è guidato dalle emissioni di Scope 3, che risultano statisticamente significative, mentre le emissioni operative di Scope 1 e 2 non mostrano un impatto rilevante sulle valutazioni di mercato.*
***Limiti della ricerca.** L'analisi si basa su imprese europee quotate e su dati secondari disponibili nei database, che possono riflettere limiti di disclosure e di misurazione, soprattutto per le emissioni di Scope 3.*
***Implicazioni manageriali.** I risultati suggeriscono che le imprese dovrebbero integrare in modo più esplicito la gestione delle emissioni di filiera nelle strategie di sostenibilità, poiché tali emissioni risultano maggiormente rilevanti per gli investitori e per la creazione di valore nel lungo periodo.*
***Originalità della ricerca**. Il contributo principale consiste nell'analisi comparativa della rilevanza valutativa delle diverse categorie di emissioni, evidenziando il ruolo informativo specifico delle emissioni di Scope 3 nei mercati finanziari.*

Keywords: *Emissioni di gas a effetto serra, Scope 1, Scope 2, Scope 3, valore di mercato, regressione multipla*

1. Introduzione

Negli ultimi due decenni il cambiamento climatico è emerso come una delle principali sfide strategiche per le imprese, influenzando in modo crescente le decisioni manageriali, le politiche pubbliche e le valutazioni dei mercati finanziari. La letteratura dimostra infatti che le questioni ambientali, e in particolare le emissioni di gas a effetto serra, non rappresentano più un ambito meramente etico o reputazionale, ma costituiscono un fattore rilevante nella determinazione del valore economico delle imprese. Studi empirici mostrano che i mercati finanziari incorporano sempre più le informazioni legate alla performance ambientale nelle valutazioni azionarie, penalizzando le imprese caratterizzate da elevata intensità carbonica e premiando, al contrario, quelle che dimostrano capacità di riduzione delle emissioni e di gestione proattiva dei rischi climatici (Klassen e McLaughlin, 1996; Matsumura et al., 2014; Choi e Luo, 2021; Clarkson et al., 2015). In questo contesto, le emissioni di gas serra sono diventate un indicatore chiave non solo dell'impatto ambientale delle attività aziendali, ma anche dell'esposizione dell'impresa a rischi operativi, regolatori e reputazionali di lungo periodo. Evidenze empiriche mostrano che un'elevata impronta carbonica è associata a maggiori rischi di transizione, a una più elevata probabilità di interventi regolatori e a una crescente pressione da parte di investitori istituzionali e stakeholder finanziari, con

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effetti negativi sul valore di mercato e sul costo del capitale (Chapple et al., 2013; Busch et al., 2022; Ahyan Panjwani et al., 2022).

Il Greenhouse Gas Protocol distingue le emissioni CO_2 in tre categorie: Scope 1, emissioni dirette derivanti da fonti controllate dall'impresa; Scope 2, emissioni indirette associate al consumo di energia acquistata; e Scope 3, emissioni indirette generate lungo la supply chain a monte e a valle, inclusi fornitori, trasporto, uso e fine vita dei prodotti. Sebbene Scope 1 e Scope 2 siano direttamente sotto il controllo manageriale, numerose evidenze mostrano che, in molti settori le emissioni di Scope 3 rappresentano la componente dominante dell'impronta carbonica complessiva, arrivando in diversi casi a superare la quota delle emissioni operative (Blanco, 2021; Hettler e Graf-Vlachy, 2024).

Fino ad oggi, la letteratura accademica si è concentrata prevalentemente sulle emissioni operative (Scope 1 e Scope 2), in quanto più facilmente misurabili, verificabili e direttamente gestibili attraverso interventi tecnologici o di efficienza energetica. Le emissioni di Scope 3, al contrario, presentano una maggiore complessità informativa e organizzativa, poiché dipendono da relazioni contrattuali con fornitori e clienti, da scelte di modello di business e da comportamenti di attori esterni al perimetro diretto dell'impresa (Tang e Demeritt, 2018; Butt et al., 2025). Tale complessità rende le emissioni di filiera meno controllabili dal management, ma al tempo stesso potenzialmente più informative, in quanto riflettono in misura maggiore la strategia aziendale, la configurazione della supply chain e la capacità manageriale di coordinare attori eterogenei lungo l'intera catena del valore.

Dal punto di vista dei mercati finanziari, tale distinzione è cruciale. La valutazione d'impresa non riflette soltanto la performance corrente, ma incorpora aspettative sulle prospettive future, sui rischi e sulla sostenibilità del modello di business nel lungo periodo. In questo senso, le emissioni Scope 3 potrebbero rappresentare un segnale rilevante per gli investitori, in quanto indicano l'esposizione dell'impresa a rischi climatici e regolatori che non possono essere mitigati esclusivamente attraverso interventi interni. Alti livelli di emissioni Scope 3 potrebbero infatti segnalare una forte dipendenza da fornitori carbon-intensive, una limitata flessibilità strategica o una maggiore vulnerabilità a cambiamenti normativi lungo la catena del valore, elementi che il mercato tende a interpretare come fonti di rischio sistemico (Busch et al., 2022; Blanco, 2021).

Nonostante la crescente attenzione regolatoria e mediatica verso lo Scope 3, manca ancora un'analisi sistematica e comparativa che valuti se e in che misura i mercati finanziari attribuiscano un peso differente alle diverse tipologie di emissioni nella determinazione del valore d'impresa. In particolare, la letteratura esistente tende ad aggregare le emissioni complessive o a focalizzarsi esclusivamente sulle emissioni operative, trascurando il potenziale ruolo strategico e informativo delle emissioni legate alla supply chain. Questa lacuna è particolarmente rilevante dal punto di vista manageriale, poiché può portare le imprese a concentrare risorse e investimenti su ambiti che non sono necessariamente quelli più rilevanti per la creazione di valore nel lungo periodo. Emerge, quindi, l'esigenza di chiarire se i mercati finanziari distinguano effettivamente tra le diverse componenti delle emissioni di gas a effetto serra nella valutazione delle imprese, attribuendo un peso differente alle emissioni generate all'interno dei confini operativi (Scope 1 e Scope 2) rispetto a quelle originate lungo la catena del valore (Scope 3).

Il presente lavoro nasce da questa esigenza e mira a colmare tale lacuna nella letteratura. In particolare, l'obiettivo della ricerca è duplice. Da un lato, il presente studio intende analizzare se le emissioni di Scope 3 esercitino un impatto più rilevante sul valore di mercato delle imprese rispetto alle emissioni di Scope 1 e Scope 2, riflettendo una maggiore sensibilità degli investitori verso i rischi climatici che si estendono oltre i confini organizzativi dell'impresa. Dall'altro lato, la ricerca si propone di esaminare se tale relazione vari in base al settore di attività, con particolare riferimento all'intensità carbonica del settore di appartenenza, che può amplificare o attenuare la rilevanza informativa delle diverse categorie di emissioni.

Alla luce delle evidenze discusse, la ricerca adotta un framework teorico integrato che combina la Stakeholder Theory e la Contingency Theory per interpretare il ruolo informativo delle emissioni di gas a effetto serra nella valutazione di mercato delle imprese. Dal punto di vista della Stakeholder Theory, le emissioni di gas a effetto serra rappresentano un segnale rilevante della capacità

dell'impresa di rispondere alle aspettative degli stakeholder chiave, in particolare degli investitori, sempre più attenti ai rischi climatici di lungo periodo. In questa prospettiva, la rilevanza informativa delle emissioni non dipende esclusivamente dalla loro entità quantitativa, ma dalla loro capacità di segnalare l'esposizione dell'impresa a rischi reputazionali, regolatori e strategici che possono compromettere la sostenibilità del modello di business nel tempo. Le emissioni di Scope 3, in quanto generate lungo relazioni di interdipendenza con fornitori, partner e clienti, riflettono in misura maggiore la qualità della governance delle relazioni di filiera e la capacità dell'impresa di coordinare attori esterni al proprio perimetro organizzativo, rendendole particolarmente salienti per gli stakeholder finanziari. Allo stesso modo, la Contingency Theory consente di estendere questa interpretazione, evidenziando che la rilevanza economica delle emissioni non è uniforme, ma dipende dal grado di allineamento tra la configurazione organizzativa dell'impresa e le pressioni ambientali e istituzionali del contesto in cui opera. In questa prospettiva, le emissioni di gas a effetto serra possono essere interpretate come un indicatore di misfit tra strategie operative, struttura della supply chain e richieste di decarbonizzazione imposte dal contesto competitivo e regolatorio.

Il presente studio contribuisce alla letteratura sulla valutazione d'impresa e sulla sostenibilità ambientale attraverso un'analisi empirica della rilevanza differenziale delle emissioni di Scope 1, Scope 2 e Scope 3 nella determinazione del valore di mercato delle imprese europee quotate. In tal modo, il lavoro fornisce evidenze utili sia sul piano teorico, chiarendo il ruolo informativo delle emissioni lungo la supply chain nei processi di valutazione finanziaria, sia sul piano manageriale, offrendo indicazioni su quali dimensioni della performance ambientale risultino maggiormente rilevanti per la creazione di valore nel lungo periodo.

L'articolo è strutturato come segue. Il paragrafo 2 presenta il framework teorico, il paragrafo 3 sviluppa le ipotesi di ricerca, il paragrafo 4 descrive la metodologia e il paragrafo 5 illustra dati e variabili. Il paragrafo 6 riporta i risultati empirici e i test di robustezza, mentre il paragrafo 7 discute le evidenze. Infine, il paragrafo 8 presenta implicazioni, limiti e conclusioni.

2. Framework teorico

2.1 Stakeholder theory

La stakeholder theory è un quadro centrale per comprendere la sostenibilità come leva di creazione di valore, poiché sostiene che le imprese debbano considerare non solo gli azionisti ma anche tutti gli attori che possono influenzare o essere influenzati dalle loro attività (Freeman, 2002). In questa prospettiva, l'impresa è una rete di relazioni e la performance include dimensioni sociali, ambientali ed etiche oltre ai risultati economici (Kivits e Sawang, 2021); di conseguenza, il valore sostenibile deriva dalla capacità di costruire e mantenere relazioni cooperative di lungo periodo con gli stakeholder, che i manager devono governare riconoscendo le interdipendenze tra attori e decisioni aziendali (Sciarelli, 2012;Parmar et al., 2010; Gutterman, 2023). Entro tale cornice, la riduzione delle emissioni può generare valore perché rafforza fiducia e legittimazione presso gli stakeholder e, attraverso questo canale, accresce la reputazione aziendale come asset intangibile in grado di sostenere la valutazione di mercato (Jo et al., 2016; Raithel et al., 2015). In particolare, la reputazione è interpretata come una risorsa strategica costruita nel tempo tramite relazioni con gli stakeholder, difficilmente imitabile e capace di produrre valore economico duraturo (Romenti et al., 2008). Evidenze empiriche confermano che il miglioramento delle performance ambientali, inclusa la riduzione dei costi ambientali, si associa a un rafforzamento reputazionale e a un incremento del valore aziendale, con effetti più marcati in contesti in cui l'attenzione istituzionale e sociale verso il clima è più elevata (Jo et al., 2016). Coerentemente, gli investitori possono interpretare la riduzione delle emissioni come una componente di valore intangibile, premiando le imprese che mostrano maggiore capacità di contenimento dei gas serra con valutazioni più alte (Nishitani et al., 2012). La reputazione opera quindi come meccanismo di trasmissione tra segnali ambientali e creazione di valore: è generata da segnali al mercato che vengono recepiti dagli stakeholder e trasformati in

vantaggi competitivi, e le percezioni reputazionali, soprattutto quando fondate su dimensioni non finanziarie, risultano predittive di maggiore valore per gli azionisti e di rendimenti futuri più elevati (Raithel et al., 2015;Góis et al., 2017).

2.2 Contingency Theory

La Contingency Theory, sviluppata da Donaldson nel 1995, afferma che la performance organizzativa dipende dall'allineamento (fit) tra assetti organizzativi e contingenze interne ed esterne; quando emerge un disallineamento (misfit), l'organizzazione subisce penalizzazioni di efficacia e tende ad attivare processi di aggiustamento per recuperare coerenza funzionale (Donaldson, 1995; Donaldson, 2001). In questa prospettiva non esiste una configurazione universalmente ottimale, perché la razionalità delle scelte organizzative è funzione delle condizioni contestuali che definiscono vincoli, costi e opportunità; il contesto diventa dunque parte integrante dell'interpretazione degli esiti (Van de Ven, 1984; Drazin and Van de Ven, 1984). Questa cornice è stata scelta perché permette di leggere le emissioni di gas a effetto serra non solo come un dato ambientale, ma come un indicatore di quanto l'impresa sia coerente con le richieste di decarbonizzazione provenienti dal contesto competitivo e istituzionale. In altri termini, livelli emissivi elevati possono segnalare un disallineamento tra il modo in cui l'azienda opera e le pressioni esterne verso la transizione climatica, mentre livelli più contenuti indicano una maggiore capacità di adattamento. Inoltre, la Contingency Theory chiarisce che le conseguenze economiche di questo (dis)allineamento non sono uguali per tutte le imprese, perché dipendono dalle specifiche condizioni in cui esse operano e dall'intensità delle pressioni ambientali e istituzionali cui sono sottoposte (Donaldson, 2001; Berkhout et al., 2012). L'efficacia organizzativa non deriva da soluzioni "ottimali" valide per tutti, ma dalla coerenza tra assetti, decisioni e pressioni esterne, che possono variare per intensità e natura nel tempo e tra contesti competitivi differenti (Van de Ven, 1984; Drazin and Van de Ven, 1984). Inoltre, la teoria enfatizza che le organizzazioni non sono entità statiche, ma sistemi adattivi che, di fronte a disallineamenti rilevanti, attivano processi di aggiustamento strutturale e gestionale per recuperare coerenza e performance , in linea con concezioni più dinamiche del fit (Volberda et al., 2012; Donaldson, 2001). Nel complesso, tale framework offre una lente interpretativa solida per inquadrare come specifiche pressioni ambientali e caratteristiche operative possano incidere sulla performance e sulla valutazione esterna delle imprese, evidenziando che gli effetti osservati tendono a manifestarsi in modo differenziato a seconda delle condizioni in cui le organizzazioni operano (Donaldson, 1995; Donaldson, 2001).

3. Ipotesi di Ricerca

La letteratura evidenzia in modo crescente che le imprese in grado di generare un impatto ambientale positivo tendono a ottenere anche migliori performance economico-finanziarie. Le iniziative orientate alla riduzione degli impatti ambientali contribuiscono infatti a mitigare i rischi regolatori e reputazionali e a rafforzare l'efficienza complessiva dell'impresa. Studi basati su analisi di eventi mostrano che il mercato reagisce positivamente a riconoscimenti ambientali e penalizza, invece, crisi o comportamenti ambientalmente dannosi, riflettendo tali informazioni nei rendimenti azionari (Klassen e McLaughlin, 1996; Yamashita et al., 1999). Evidenze successive confermano che livelli inferiori di emissioni e pratiche più efficaci di prevenzione dei rifiuti sono associati a migliori risultati operativi e finanziari (King e Lenox, 2002). All'interno di questo quadro, le emissioni di gas a effetto serra emergono come una dimensione centrale nella valutazione di mercato delle imprese. Numerosi studi documentano che un'elevata intensità di gas a effetto serra comporta penalizzazioni significative in termini di valore aziendale e capitalizzazione di mercato, mentre il superamento delle quote di emissione è negativamente associato al valore dell'impresa (Chapple et al., 2013; Clarkson et al., 2015). Al contrario, la riduzione delle emissioni di gas serra risulta positivamente correlata al valore di mercato, suggerendo che tali sforzi siano interpretati dagli investitori come investimenti in

risorse intangibili e nella sostenibilità futura dell'impresa (Matsumura et al., 2014; Nishitani e Kokubu, 2012; Choi e Luo, 2021). Tali evidenze possono essere lette alla luce della Stakeholder Theory, secondo cui le imprese creano valore nel lungo periodo quando riescono a soddisfare le aspettative dei diversi stakeholder. Le strategie di riduzione delle emissioni di gas a effetto serra contribuiscono a migliorare la reputazione aziendale e a segnalare un impegno credibile verso la sostenibilità, favorendo una valutazione più positiva da parte di investitori e mercati finanziari. In questo processo, non solo i risultati ambientali effettivi, ma anche la divulgazione volontaria delle strategie e degli obiettivi di riduzione delle emissioni giocano un ruolo rilevante nel rafforzare la fiducia degli stakeholder e nel sostenere la creazione di valore (Jacobs, 2014). Sulla base di tale evidenze si formula la seguente ipotesi:

H1. A parità delle altre condizioni, una riduzione delle emissioni di CO_2 è associata a un aumento del valore di mercato delle azioni.

Il valore di mercato dell'impresa riflette le aspettative informative e i rischi percepiti dagli investitori. Storicamente tali aspettative si sono concentrate prevalentemente sulle emissioni di Scope 1 e Scope 2, in quanto più facilmente misurabili e direttamente controllabili (Eccles et al., 2011; Kalesnik et al., 2021). Tuttavia, la letteratura più recente evidenzia un progressivo spostamento dell'attenzione verso le emissioni di Scope 3, poiché rappresentano la quota predominante dell'impronta carbonica delle imprese e riflettono in misura maggiore i rischi normativi, reputazionali e legati alla catena di fornitura (Blanco, 2021; Hettler e Graf-Vlachy, 2024). Le emissioni di Scope 3 sono infatti generate lungo relazioni di interdipendenza con fornitori, partner e clienti, e possono costituire emissioni di Scope 1 o 2 per altri attori economici, rendendo evidente la natura sistemica della contabilizzazione del gas a effetto serra (Butt et al., 2025). In questo contesto, gli investitori utilizzano sempre più spesso le informazioni di Scope 3 come proxy della capacità dell'impresa di gestire tali relazioni e di affrontare rischi climatici che si estendono oltre i confini organizzativi (Tang e Demeritt, 2018; Blanco, 2021). Sebbene la rendicontazione di Scope 3 sia tuttora volontaria (Blanco, 2021) e alcuni studi riportino risultati contrastanti o non significativi in termini di performance contabile (Kayser et al., 2026), la disclosure accurata di tali informazioni è associata a benefici indiretti rilevanti, quali una riduzione del costo del debito (Ahyan Panjwani et al., 2022), un miglioramento dell'efficienza operativa (Park et al., 2025) e una maggiore trasparenza informativa richiesta dagli investitori (Busch et al., 2022). Alla luce di queste evidenze si formula la seguente ipotesi:

H2. A parità delle altre condizioni, le emissioni di Scope 3 esercitano un'influenza più forte sul valore di mercato delle azioni rispetto alle emissioni di Scope 1 e Scope 2.

La letteratura suggerisce che la relazione tra la riduzione delle emissioni di CO_2 (Scope 1 e Scope 2) e il valore di mercato delle azioni sia fortemente eterogenea e dipenda in misura rilevante dal settore di appartenenza dell'impresa e dal contesto competitivo in cui essa opera. Analisi settoriali mostrano come l'impatto delle emissioni sulla performance finanziaria non sia uniforme: Gonenc e Scholtens (2017), concentrandosi sulle industrie dei combustibili fossili, evidenziano effetti differenziati tra sotto-settori, con impatti nulli nel comparto chimico, effetti negativi sui rendimenti nel settore del carbone e risultati misti nel settore petrolifero e del gas. Evidenze più recenti rafforzano l'idea che la sensibilità settoriale amplifichi l'effetto delle emissioni sulla performance di mercato. Desai et al. (2022) dimostrano che l'impatto negativo delle emissioni di gas a effetto serra sulla performance finanziaria risulta significativamente più marcato per le imprese considerate "sensibili" dal punto di vista ambientale rispetto a quelle non sensibili, suggerendo che l'esposizione settoriale al rischio climatico giochi un ruolo chiave nella valutazione da parte dei mercati. In modo coerente, Yu et al. (2021) evidenziano come i benefici finanziari derivanti dai sistemi di scambio delle emissioni siano più pronunciati per le imprese non statali e per quelle operanti in settori meno energivori. Ulteriori contributi sottolineano che l'impatto delle strategie ambientali sulla performance

economico-finanziaria non è diretto, ma mediato da meccanismi competitivi specifici del settore. López-Gamero et al. (2009) mostrano che il vantaggio competitivo di costo derivante dalle iniziative ambientali incide in modo diverso sulla performance finanziaria nei settori regolamentati rispetto a quelli dei servizi. Analogamente, van Emous et al. (2021) evidenziano che, sebbene la riduzione delle emissioni sia generalmente associata a migliori indicatori finanziari, la forza di tale relazione dipende da caratteristiche specifiche dell'impresa e dal settore in cui essa opera. Infine Le e Nguyen-Phung (2024) mostrano come la connessione tra intensità delle emissioni di gas serra e corporate financial performance vari significativamente tra settori e aree geografiche, suggerendo che le dinamiche istituzionali e di mercato locali influenzino la capacità delle imprese di tradurre le performance ambientali in valore economico. In questa prospettiva, anche la possibilità di trasferire i costi ambientali ai consumatori, approssimata dal grado di concentrazione del settore e dal posizionamento relativo dell'impresa in termini di emissioni, emerge come un ulteriore fattore chiave nel determinare l'impatto delle riduzioni di CO_2 sul valore di mercato delle azioni (Clarkson et al., 2015). Pertanto si ipotizza che:

H3. L'effetto della riduzione delle emissioni di CO_2 sul valore di mercato delle azioni varia in funzione del settore di appartenenza dell'impresa, risultando differenziato tra settori a diversa intensità di gas a effetto serra.

4. Metodologia

Per valutare le nostre ipotesi di ricerca, adottiamo un approccio quantitativo empirico basato sull'analisi di dati panel raccolti da un campione di società europee quotate (Greene, 2011; Wooldridge, 2019). La strategia empirica si basa sul framework di valutazione sviluppato da Ohlson (1995), che spiega il valore di mercato delle aziende combinando fondamentali contabili con informazioni extracontabili rilevanti per le decisioni di valutazione degli investitori. In linea con questo framework, indaghiamo se le emissioni di gas a effetto serra, in quanto dimensione non finanziaria chiave e rilevante per il valore, influenzano il valore di mercato delle aziende al di là delle tradizionali informazioni contabili.

Una delle principali sfide metodologiche nello studio della relazione tra performance ambientale e valutazione aziendale è il potenziale problema dell'endogeneità, derivante da causalità inversa o da bias da variabili omesse. Per mitigare questo problema, sono state ritardate tutte le variabili indipendenti di un anno, seguendo pratiche consolidate nella ricerca in materia di contabilità, corporate governance e sostenibilità (Liang et al., 2013; Ashwin et al., 2015). Questa struttura di ritardo aiuta a stabilire una relazione causale più plausibile, garantendo che le variazioni nelle emissioni e nelle caratteristiche aziendali precedano le variazioni del valore di mercato. Viene adottato un modello di regressione multipla per analizzare l'impatto di diverse misure di emissioni di gas a effetto serra sul valore di mercato delle aziende, operazionalizzato come prezzo di mercato per azione. In linea con il modello di Ohlson (1995), il valore di mercato è specificato in funzione dei fondamentali contabili, ovvero il valore contabile per azione e l'utile per azione, e di un insieme di variabili non contabili che catturano le prestazioni ambientali e le caratteristiche di governance delle aziende.

Le emissioni di gas a effetto serra sono gestite tramite specifiche alternative. In primo luogo, si considerano le emissioni totali di Scope, che aggregano tutte le fonti di emissioni di gas serra. In secondo luogo, per cogliere l'eterogeneità tra le fonti di emissione, è stata fatta una distinzione tra emissioni di Scope 1-2, che riflettono le emissioni dirette e indirette legate all'energia, ed emissioni di Scope 3, che catturano le emissioni indirette lungo la catena del valore. Inoltre, per tenere conto delle differenze strutturali tra i settori, è stato incluso un modello che identifica i settori ad alta intensità di gas a effetto serra e i termini di interazione tra emissioni e intensità di gas a effetto serra settoriale.

Data la struttura a panel del dataset, abbiamo considerato sia modelli a effetti fissi (FE) che a effetti casuali (RE) per controllare l'eterogeneità non osservata tra le imprese (Greene, 2011; Wooldridge, 2019). Per determinare lo stimatore più appropriato, abbiamo condotto il test di Hausman, che confronta la coerenza degli stimatori a effetti fissi e casuali. I risultati del test hanno favorito la specificazione a effetti casuali, indicando che gli effetti non osservati a livello di impresa non sono correlati con le variabili esplicative e consentendo una stima più efficiente (Greene, 2011). I modelli a effetti casuali sono particolarmente adatti in contesti caratterizzati da un'ampia variazione trasversale e una dimensione temporale relativamente breve (Wooldridge, 2019).
Per analizzare la relazione tra emissioni di gas a effetto serra e valutazione aziendale, sono stati stimati i seguenti modelli di regressione:

Modello 1: Valore di mercato = f(Scope totale + Variabili di controllo)

Modello 2: Valore di mercato = f(Scope totale × Settore CO_2 + Variabili di controllo)

Per distinguere ulteriormente gli effetti di valutazione delle diverse fonti di emissione, stimiamo modelli aggiuntivi che distinguono tra categorie di Scope:

Modello 3: Valore di mercato = f(Scope 1–2 + Scope 3 + Variabili di controllo)

Modello 4: Valore di mercato = f(Scope 1–2 × Settore CO_2 + Scope 3 × Settore CO_2 + Variabili di controllo)

In tutte le specifiche, le variabili di controllo includono il valore contabile per azione, l'utile per azione, l'età dell'azienda, la dimensione del consiglio di amministrazione, la diversità di genere nel consiglio, il numero di dipendenti e il ritorno sulle attività (ROA), in linea con la letteratura sulla valutazione aziendale, la governance aziendale e le performance ambientali. Tutti i modelli includono anche un termine costante e sono stimati con errori standard robusti.

5. Dati e variabili

Il campione di ricerca comprende 1.172 società europee quotate, osservate nel periodo 2015-2024, per un totale di 11.790 osservazioni aziendali-anno. Questa struttura longitudinale consente di cogliere sia le differenze trasversali tra le aziende sia le dinamiche temporali nella valutazione di mercato e nei profili delle emissioni di gas a effetto serra.
Per costruire il set di dati, abbiamo integrato informazioni provenienti da due fonti autorevoli. I dati sul valore di mercato delle aziende e sulle variabili contabili basate sulle azioni, tra cui il valore di mercato per azione, il valore contabile per azione e l'utile per azione, sono stati ottenuti da Refinitiv, un fornitore ampiamente riconosciuto di informazioni aziendali finanziarie e relative alla sostenibilità. Refinitiv è stata utilizzata anche come fonte primaria per i dati sulle emissioni di gas a effetto serra, comprese le emissioni totali di Scope, nonché le emissioni di Scope 1, Scope 2 e Scope 3, che vengono riportate utilizzando metodologie standardizzate e garantiscono la comparabilità tra paesi e settori.

Le variabili di controllo a livello aziendale sono state raccolte dal database Orbis, fornito da Bureau Van Dijk. Orbis fornisce informazioni dettagliate sulle caratteristiche strutturali e di governance delle aziende, consentendoci di controllare l'età dell'azienda, le dimensioni del consiglio di amministrazione, la composizione di genere del consiglio, il numero di dipendenti, la redditività (ROA) e la classificazione del settore. Queste variabili catturano dimensioni chiave della struttura organizzativa, della governance aziendale e della scala operativa che possono influenzare la valutazione aziendale.

L'integrazione dei dati Refinitiv e Orbis garantisce un set di dati completo e affidabile, pienamente coerente con il quadro di valutazione di Ohlson (1995), consentendo una valutazione solida per stabilire se le emissioni di gas a effetto serra rappresentino informazioni non contabili rilevanti per il valore, valutate dai mercati finanziari.

La **Tabella 1** riporta le fonti e le definizioni delle variabili dipendenti, indipendenti e di controllo utilizzate nell'analisi empirica.

Tab. 1: Variabili

Variabile	Definizione	Fonte
Variabili dipendenti		
Valore di mercato	Variazione percentuale del valore di mercato per azione alla fine dell'anno di riferimento.	Thomson Reuters
Variabili indipendenti		
Scope totale	Variazione percentuale complessiva delle emissioni di gas a effetto serra dell'impresa, calcolata come somma delle emissioni Scope 1, Scope 2 e Scope 3, espressa in tonnellate di CO_2 equivalente (tCO_2e).	Thomson Reuters
Scope 1-2	Variazione percentuale complessiva delle emissioni dirette (Scope 1) e indirette da consumo energetico (Scope 2) generate dalle attività operative dell'impresa, espresse in tonnellate di CO_2 equivalente (tCO_2e).	Thomson Reuters
Scope 3	Variazione percentuale delle emissioni indirette lungo l'intera catena del valore dell'impresa (fornitori, logistica, uso dei prodotti, fine vita), espresse in tonnellate di CO_2 equivalente (tCO_2e).	Thomson Reuters
Settore CO_2	Variabile dummy che assume valore 1 se l'impresa opera in un settore ad elevata intensità di emissioni di anidride carbonica (CO_2), e 0 altrimenti. In linea con la letteratura, i settori carbon-intensive includono energia, ferro e acciaio, petrolchimico, cemento, ceramica, vetro, carta, alimentare e bevande.	Thomson Reuters
Variabili di controllo		
Valore contabile per azione		Thomson Reuters
Valore degli utili per azione		Thomson Reuters
Età impresa	Numero di anni trascorsi dalla fondazione dell'impresa.	ORBIS
Grandezza board	Numero totale di componenti del consiglio di amministrazione.	Thomson Reuters
Genere board	Percentuale di donne presenti nel consiglio di amministrazione.	Thomson Reuters
Numero dipendenti	Numero totale di dipendenti dell'impresa.	ORBIS
ROA	Rapporto tra reddito e totale delle attività, indicatore della redditività dell'impresa.	ORBIS

Fonte: elaborazione propria

Variabile dipendente. *Valore di mercato*, misurato come variazione percentuale del valore di mercato per azione alla fine dell'anno di riferimento (Macchioni et al., 2024). Tale indicatore consente di cogliere la dinamica della valutazione dell'impresa da parte del mercato, riflettendo le aspettative degli investitori rispetto alle performance economiche e alla capacità dell'impresa di generare valore nel tempo.

Variabili indipendenti. Le principali variabili indipendenti riguardano la performance ambientale dell'impresa in termini di emissioni di gas a effetto serra, misurata attraverso le variazioni percentuali delle emissioni di CO_2 equivalente (Hettler et al. 2024).

In primo luogo, viene considerato lo *Scope totale*, definito come la variazione percentuale complessiva delle emissioni di gas a effetto serra, calcolata come somma delle emissioni Scope 1, Scope 2 e Scope 3, ed espressa in tonnellate di CO_2 equivalente (tCO_2e). Questo indicatore fornisce una misura sintetica dell'impatto climatico complessivo dell'impresa, includendo sia le emissioni operative sia quelle generate lungo la catena del valore. In secondo luogo, viene utilizzata la variabile *Scope 1–2*, che misura la variazione percentuale delle emissioni dirette (Scope 1) e delle

emissioni indirette derivanti dal consumo energetico (Scope 2) associate alle attività operative dell'impresa. Tale indicatore consente di isolare la componente emissiva maggiormente sotto il controllo diretto del management aziendale. In terzo luogo, viene analizzato lo *Scope 3*, definito come la variazione percentuale delle emissioni indirette generate lungo l'intera catena del valore, inclusi fornitori, logistica, utilizzo dei prodotti e fase di fine vita. Le emissioni di Scope 3, pur presentando una maggiore eterogeneità in termini di misurazione e disclosure, rappresentano una componente rilevante dell'impronta climatica complessiva dell'impresa.
Infine, l'analisi include la variabile *Settore CO_2,* una dummy settoriale che assume valore pari a 1 se l'impresa opera in un settore ad elevata intensità di emissioni di anidride carbonica, e 0 altrimenti (Macchioni et al., 2024). In linea con la letteratura esistente, sono classificati come carbon-intensive i settori dell'energia, del ferro e acciaio, del petrolchimico, del cemento, della ceramica, del vetro, della carta, dell'industria alimentare e delle bevande. L'inclusione di tale variabile consente di controllare per differenze strutturali tra settori caratterizzati da diversi livelli di intensità emissiva.

Variabili di controllo. Tra le variabili di controllo, l'analisi include il *valore contabile per azione*, che misura il valore del patrimonio netto dell'impresa attribuibile a ciascuna azione alla fine dell'anno di riferimento (Macchioni et al. 2024). Questo indicatore riflette la solidità patrimoniale dell'impresa e consente di controllare per differenze nella struttura finanziaria e nel valore contabile sottostante alle azioni, elementi che possono influenzare la valutazione di mercato. Viene inoltre considerato il *Valore degli utili per azione*, che misura l'ammontare degli utili attribuibili a ciascuna azione alla fine dell'anno di riferimento (Macchioni et al. 2024). Tale variabile rappresenta un indicatore chiave della redditività dell'impresa e della sua capacità di generare profitti per gli azionisti, permettendo di isolare l'effetto delle performance economiche sulle dinamiche del valore di mercato.
L'analisi include l'età dell'impresa, misurata come il numero di anni trascorsi dalla fondazione, quale indicatore della maturità aziendale e dell'esperienza operativa accumulata nel tempo (Leggerini et al., 2025). Imprese più mature possono beneficiare di una maggiore stabilità, reputazione e prevedibilità dei flussi di cassa, elementi che influenzano le aspettative degli investitori e, di conseguenza, le variazioni del valore di mercato.
Le caratteristiche del consiglio di amministrazione sono considerate attraverso la dimensione del board, misurata come il numero totale dei componenti del consiglio, e la composizione di genere del board, espressa come percentuale di donne presenti (Leggerini et al., 2025). Tali variabili catturano aspetti della struttura di governance che possono incidere sui processi decisionali, sulla qualità del monitoraggio manageriale e sulla percezione del rischio da parte del mercato, con potenziali effetti sull'andamento del titolo.
La dimensione dell'impresa, misurata dal numero totale di dipendenti, è inclusa per controllare le differenze nella scala operativa e nella visibilità sul mercato finanziario (Pan et al., 2021). Imprese di maggiori dimensioni tendono a presentare una copertura informativa più ampia, una minore volatilità e una diversa sensibilità agli shock di mercato, fattori che possono influenzare le variazioni del valore di mercato.
Infine, la redditività è misurata attraverso il Return on Assets (ROA), definito come il rapporto tra reddito e totale delle attività (Pan et al., 2021). Il ROA rappresenta un indicatore chiave della capacità dell'impresa di utilizzare in modo efficiente le proprie risorse per generare profitti e costituisce un determinante fondamentale delle aspettative degli investitori, incidendo direttamente sulla valutazione di mercato e sulle dinamiche del prezzo delle azioni.

6. Risultati

Per valutare la presenza di multicollinearità, sono stati esaminati i fattori di inflazione della varianza (Variance Inflation Factors, VIF), che risultano tutti inferiori alla soglia prudenziale di 5 (O'Brien et al., 2007). Inoltre, sono stati analizzati i livelli di correlazione tra le variabili indipendenti,

che sono risultati moderati, indicando che la multicollinearità non rappresenta un problema nei modelli stimati. La Tabella 2 fornisce una sintesi completa delle statistiche descrittive relative all'intero campione. La Tabella 3 riporta i risultati.

Tab. 2: Statistiche descrittive

Variabile	Obs	Mean	Std. Dev.	Min	Max
Valore di mercato	11790	0.101	0.493	-0.99	9.951
Scope totale	11790	0.474	10.935	-1	887.378
Scope 1	11790	0.8	53.345	-1	5727.182
Scope 2	11790	0.799	26.334	-1	1747.417
Scope 3	11790	0.679	13.107	-1	934.042
Scope 1-2	11790	0.314	14.548	-1	1333.333
Scope totale EVIC	11790	0.673	30.296	-1	3235.898
Scope 1 EVIC	11790	0.675	26.74	-1	2743.263
Scope 2 EVIC	11790	0.957	34.955	-1	2670.227
Scope 3 EVIC	11790	0.966	33.101	-1	3406.018
Scope 1-2 EVIC	11790	0.424	25.105	-1	2703.576
Settore CO_2	11790	0.153	0.36	0	1
Valore contabile per azione	11790	74.401	1589.419	-3885.753	99185.322
Valore degli utili per azione	11790	-5.211	367.533	-15208.955	10923.419
Età impresa	11790	74.037	41.853	1	124
Grandezza board	11790	9.021	3.769	2	31
Genere board	11790	30.751	14.367	0	80
Numero dipendenti	11790	22263.854	58497.246	2	774000
ROA	11790	4.195	12.033	-99.775	77.641

Fonte: elaborazione propria

Tab. 3: Risultati

	Modello 1	**Modello 2**
	Valore di mercato	Valore di mercato
Scope totale	-0.000930***	-0.000977***
	(0.000196)	(0.000211)
Settore CO_2	-0.0193**	-0.0196**
	(0.00962)	(0.00963)
Scope totale*Settore CO_2		0.000553
		(0.000361)
Valore contabile per azione	-6.15e-06***	-6.14e-06***
	(1.61e-06)	(1.61e-06)
Valore degli utili per azione	2.23e-05***	2.23e-05***
	(5.76e-06)	(5.76e-06)
Età impresa	-0.000134	-0.000134
	(0.000110)	(0.000110)
Grandezza board	-0.000114	-0.000114
	(0.00119)	(0.00119)
Genere board	0.000503	0.000503
	(0.000344)	(0.000344)
Numero dipendenti	-2.24e-07***	-2.24e-07***
	(4.33e-08)	(4.33e-08)
ROA	-5.77e-05	-5.91e-05
	(0.000615)	(0.000615)
Costante	0.103***	0.104***
	(0.0179)	(0.0179)
Osservazioni	11,790	11,790
Numero di imprese	1,172	1,172

Fonte: elaborazione propria. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

I risultati riportati in Tabella 3 mostrano che lo *Scope totale* presenta un coefficiente negativo e statisticamente significativo in entrambi i modelli (−0.000930 e −0.000977; $p<0.01$), indicando che un aumento delle emissioni complessive di gas a effetto serra è associato a una riduzione della variazione del valore di mercato. Questo risultato suggerisce che il mercato penalizza le imprese con

peggiori performance emissive, coerentemente con una crescente attenzione degli investitori ai rischi climatici.

La variabile *Settore CO_2* mostra anch'essa un effetto negativo e significativo (−0.0193 e −0.0196; p<0.05), evidenziando che le imprese operanti in settori ad alta intensità carbonica sperimentano variazioni del valore di mercato inferiori rispetto alle imprese appartenenti a settori meno emissivi. Ciò riflette una possibile penalizzazione strutturale legata a maggiori rischi regolatori e di transizione.

Nel Modello 2, l'interazione tra Scope totale e Settore CO_2 risulta positiva ma non statisticamente significativa (0.000553), suggerendo che l'effetto negativo delle emissioni complessive sul valore di mercato non differisce in modo sostanziale tra imprese carbon-intensive e non carbon-intensive. Questo risultato indica che il mercato reagisce in modo simile alle variazioni emissive, indipendentemente dal settore di appartenenza. La Tabella 4 riporta i risultati.

Tab. 4: Risultati

	Modello 3	**Modello 4**
	Valore di mercato	Valore di mercato
Scope 1-2	-7.27e-05	-2.45e-05
	(0.000126)	(0.000101)
Scope 3	-0.000658***	-0.000790***
	(0.000248)	(0.000234)
Settore CO_2	-0.0192**	-0.0193**
	(0.00962)	(0.00962)
Scope1-2*Settore CO_2		-0.00922
		(0.00576)
Scope 3*Settore CO_2		0.000931
		(0.000746)
Valore contabile per azione	-6.15e-06***	-6.14e-06***
	(1.61e-06)	(1.61e-06)
Valore degli utili per azione	2.23e-05***	2.24e-05***
	(5.76e-06)	(5.78e-06)
Età impresa	-0.000134	-0.000134
	(0.000110)	(0.000110)
Grandezza board	-0.000126	-0.000125
	(0.00119)	(0.00119)
Genere board	0.000503	0.000506
	(0.000344)	(0.000344)
Numero dipendenti	-2.24e-07***	-2.24e-07***
	(4.33e-08)	(4.34e-08)
ROA	-5.58e-05	-6.59e-05
	(0.000615)	(0.000615)
Costante	0.104***	0.104***
	(0.0179)	(0.0179)
Osservazioni	11,790	11,790
Numero di imprese	1,172	1,172

Fonte: elaborazione propria. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

I risultati riportati in Tabella 4 per i Modelli 3 e 4 mostrano che le diverse componenti delle emissioni di gas a effetto serra hanno effetti eterogenei sulle variazioni del valore di mercato.

In particolare, le emissioni *Scope 1–2* non risultano statisticamente significative in entrambi i modelli (−7.27e−05 e −2.45e−05), suggerendo che le variazioni delle emissioni operative dirette e indirette da consumo energetico non sono immediatamente incorporate nelle valutazioni di mercato. Questo risultato indica che il mercato potrebbe percepire tali emissioni come più controllabili o già attese, riducendone l'impatto informativo sul prezzo delle azioni.

Al contrario, le emissioni *Scope 3* mostrano un coefficiente negativo e altamente significativo in entrambi i modelli (−0.000658 e −0.000790; $p<0.01$), evidenziando che un aumento delle emissioni lungo la catena del valore è associato a una riduzione significativa del valore di mercato. Questo risultato suggerisce che gli investitori attribuiscono particolare rilevanza alle emissioni indirette,

probabilmente in quanto più difficili da controllare, più esposte a rischi reputazionali e maggiormente soggette a incertezze regolatorie.
La variabile *Settore CO_2* mantiene un effetto negativo e significativo (−0.0192 e −0.0193; $p<0.05$), confermando che le imprese appartenenti a settori ad alta intensità carbonica sperimentano variazioni del valore di mercato inferiori rispetto alle imprese operanti in settori meno emissivi, anche quando si controlla per le diverse componenti delle emissioni.
Nel Modello 4, le interazioni tra le emissioni e il Settore CO_2 non risultano statisticamente significative. In particolare, l'interazione *Scope 1–2 × Settore CO_2* presenta un coefficiente negativo (−0.00922), mentre l'interazione *Scope 3 × Settore CO_2* è positiva (0.000931), ma in entrambi i casi l'assenza di significatività statistica suggerisce che l'impatto delle variazioni emissive sul valore di mercato non differisce in modo sostanziale tra imprese carbon-intensive e non carbon-intensive. Ciò indica che il mercato reagisce in maniera simile alle informazioni sulle emissioni, indipendentemente dal settore di appartenenza.

6.1 Test di robustezza

La Tabella 5 riporta i risultati dei test di robustezza, nei quali le emissioni sono considerate separatamente per Scope 1, Scope 2 e Scope 3; i risultati confermano quanto emerso nelle analisi precedenti, evidenziando la coerenza degli effetti stimati sul valore di mercato.

Tab. 5: Test di robustezza

	Modello 5	**Modello 6**
	Valore di mercato	Valore di mercato
Scope 1	1.11e-05	1.25e-05
	(1.39e-05)	(1.21e-05)
Scope 2	-0.000119	-0.000108
	(7.37e-05)	(7.24e-05)
Scope 3	-0.000644***	-0.000759***
	(0.000230)	(0.000216)
Settore CO_2	-0.0193**	-0.0193**
	(0.00962)	(0.00968)
Scope 1*Settore CO_2		-0.00411
		(0.00518)
Scope 2*Settore CO_2		-0.000790
		(0.00187)
Scope 3*Settore CO_2		0.000899
		(0.000742)
Valore contabile per azione	-6.14e-06***	-6.14e-06***
	(1.61e-06)	(1.61e-06)
Valore degli utili per azione	2.23e-05***	2.24e-05***
	(5.77e-06)	(5.77e-06)
Età impresa	-0.000135	-0.000134
	(0.000110)	(0.000110)
Grandezza board	-0.000123	-0.000117
	(0.00119)	(0.00119)
Genere board	0.000503	0.000505
	(0.000344)	(0.000344)
Numero dipendenti	-2.24e-07***	-2.25e-07***
	(4.34e-08)	(4.34e-08)
ROA	-6.03e-05	-6.50e-05
	(0.000615)	(0.000615)
Costante	0.104***	0.104***
	(0.0178)	(0.0179)
Osservazioni	11,790	11,790
Numero di imprese	1,172	1,172

Fonte: elaborazione propria. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Come ulteriore test di robustezza, le emissioni sono state misurate in termini normalizzati per milione di dollari di valore economico aggiunto (EVIC) (Tabella 6,7,8); anche in questo caso, i risultati risultano pienamente coerenti e consistenti con le evidenze emerse nelle analisi principali.

Tab. 6: Test di robustezza

	Modello 7	**Modello 8**
	Valore di mercato	Valore di mercato
Scope totale EVIC	-0.000266***	-0.000264***
	(2.62e-05)	(2.58e-05)
Settore CO_2	-0.0193**	-0.0193**
	(0.00961)	(0.00962)
Scope totale EVIC*Settore CO_2		-0.000113
		(8.51e-05)
Valore contabile per azione	-6.15e-06***	-6.14e-06***
	(1.61e-06)	(1.61e-06)
Valore degli utili per azione	2.23e-05***	2.23e-05***
	(5.76e-06)	(5.77e-06)
Età impresa	-0.000136	-0.000136
	(0.000110)	(0.000110)
Grandezza board	-0.000127	-0.000126
	(0.00119)	(0.00119)
Genere board	0.000502	0.000502
	(0.000343)	(0.000343)
Numero dipendenti	-2.23e-07***	-2.23e-07***
	(4.33e-08)	(4.33e-08)
ROA	-6.92e-05	-6.97e-05
	(0.000615)	(0.000616)
Costante	0.103***	0.103***
	(0.0178)	(0.0178)
Osservazioni	11,790	11,790
Numero di imprese	1,172	1,172

Fonte: elaborazione propria. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Tab. 7: Test di robustezza

	Modello 9	**Modello 10**
	Valore di mercato	Valore di mercato
Scope 1-2 EVIC	7.61e-06	-2.40e-05
	(0.000369)	(0.000409)
Scope 3 EVIC	-0.000247	-0.000221
	(0.000285)	(0.000317)
Settore CO_2	-0.0193**	-0.0193**
	(0.00961)	(0.00955)
Scope1-2 EVIC*Settore CO_2		0.000295
		(0.00380)
Scope 3 EVIC*Settore CO_2		-0.000249
		(0.000363)
Valore contabile per azione	-6.14e-06***	-6.14e-06***
	(1.61e-06)	(1.61e-06)
Valore degli utili per azione	2.23e-05***	2.23e-05***
	(5.77e-06)	(5.77e-06)
Età impresa	-0.000136	-0.000136
	(0.000110)	(0.000110)
Grandezza board	-0.000128	-0.000128
	(0.00119)	(0.00119)
Genere board	0.000502	0.000502
	(0.000344)	(0.000344)

Numero dipendenti	-2.23e-07***	-2.23e-07***
	(4.33e-08)	(4.33e-08)
ROA	-7.06e-05	-7.00e-05
	(0.000616)	(0.000616)
Costante	0.104***	0.104***
	(0.0178)	(0.0178)
Osservazioni	11,790	11,790
Numero di imprese	1,172	1,172

Fonte: elaborazione propria. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Tab. 8: Test di robustezza

	Modello 11	**Modello 12**
	Valore di mercato	Valore di mercato
Scope 1 EVIC	-0.000268	-0.000307
	(0.000234)	(0.000245)
Scope 2 EVIC	-3.23e-05	-3.88e-05
	(7.63e-05)	(7.49e-05)
Scope 3 EVIC	-2.46e-05	1.37e-05
	(0.000192)	(0.000204)
Settore CO_2	-0.0194**	-0.0201**
	(0.00962)	(0.00961)
Scope 1 EVIC*Settore CO_2		0.00395
		(0.00514)
Scope 2 EVIC*Settore CO_2		0.00109
		(0.00133)
Scope 3 EVIC*Settore CO_2		-0.000509*
		(0.000287)
Valore contabile per azione	-6.14e-06***	-6.16e-06***
	(1.61e-06)	(1.61e-06)
Valore degli utili per azione	2.23e-05***	2.23e-05***
	(5.77e-06)	(5.75e-06)
Età impresa	-0.000136	-0.000136
	(0.000110)	(0.000110)
Grandezza board	-0.000127	-0.000134
	(0.00119)	(0.00119)
Genere board	0.000504	0.000500
	(0.000344)	(0.000343)
Numero dipendenti	-2.23e-07***	-2.23e-07***
	(4.33e-08)	(4.33e-08)
ROA	-7.15e-05	-6.06e-05
	(0.000616)	(0.000616)
Costante	0.104***	0.104***
	(0.0178)	(0.0178)
Osservazioni	11,790	11,790
Numero di imprese	1,172	1,172

Fonte: elaborazione propria. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

7. Discussione dei risultati

Il presente studio analizza se e in che misura i mercati finanziari distinguano tra le diverse componenti delle emissioni di gas a effetto serra nella valutazione delle imprese, con particolare attenzione al ruolo delle emissioni generate lungo la catena del valore (Scope 3). I risultati empirici mostrano che, sebbene le emissioni complessive siano negativamente associate al valore di mercato,

tale relazione è interamente guidata dalle emissioni di Scope 3, mentre le emissioni operative di Scope 1 e Scope 2 non risultano statisticamente significative. Questa evidenza suggerisce che i mercati finanziari attribuiscano un peso differenziato alle diverse fonti di emissione. In primo luogo, la significatività negativa delle emissioni di Scope 3 è coerente con la letteratura che interpreta le emissioni di gas a effetto serra come indicatori di rischio climatico e di transizione incorporati nelle valutazioni di mercato (Matsumura et al., 2014; Choi e Luo, 2021; Busch et al., 2022). Tuttavia, a differenza di molti studi precedenti che si concentrano sulle emissioni operative o su misure aggregate (Clarkson et al., 2015; Matsumura et al., 2014), i risultati evidenziano che la penalizzazione di mercato è associata principalmente alle emissioni generate lungo la supply chain, ovvero quelle scope 3. Questo risultato è coerente con contributi recenti che sottolineano come le emissioni di Scope 3 riflettano in misura maggiore l'esposizione dell'impresa a rischi sistemici e difficilmente mitigabili nel breve periodo (Blanco, 2021; Hettler e Graf-Vlachy, 2024).

In secondo luogo, la non significatività delle emissioni di Scope 1 e Scope 2 suggerisce che il mercato possa considerare tali informazioni come ampiamente standardizzate e già incorporate nei prezzi. Questo risultato è in linea con l'idea che le emissioni operative, essendo più facilmente misurabili, regolamentate e soggette a obblighi di disclosure, abbiano progressivamente perso contenuto informativo marginale (Eccles et al., 2011; Kalesnik et al., 2021). In questa prospettiva, la gestione delle emissioni di Scope 1 e Scope 2 appare maggiormente associata a logiche di conformità regolatoria piuttosto che a un fattore di differenziazione nelle valutazioni di mercato, confermando evidenze precedenti che mostrano effetti eterogenei o nulli delle emissioni operative sulla performance finanziaria (Gonenc e Scholtens, 2017; Kayser et al., 2026).

Un ulteriore risultato rilevante riguarda l'assenza di un effetto moderatore significativo del settore di appartenenza. Sebbene la letteratura suggerisca che l'impatto delle emissioni sulla performance finanziaria possa variare in funzione dell'intensità carbonica del settore (Clarkson et al., 2015; Desai et al., 2022), i risultati indicano che la relazione tra emissioni e valore di mercato non differisce in modo sostanziale tra settori carbon-intensive e non carbon-intensive. Questo suggerisce che il mercato reagisca in modo simile alle informazioni sulle emissioni, interpretandole come una fonte di rischio che incide sulle prospettive di lungo periodo delle imprese indipendentemente dal settore di appartenenza, in linea con evidenze che descrivono il rischio climatico come un rischio finanziario sempre più generalizzato (Busch et al., 2022).

8. Conclusioni, implicazioni e limiti

Il presente studio analizza la rilevanza valutativa delle emissioni di gas a effetto serra distinguendo tra Scope 1, Scope 2 e Scope 3, fornendo evidenze empiriche su come i mercati finanziari incorporino le informazioni ambientali nella determinazione del valore di mercato delle imprese. I risultati mostrano che, sebbene le emissioni complessive siano negativamente associate al valore di mercato, tale relazione è interamente guidata dalle emissioni di Scope 3, mentre le emissioni operative di Scope 1 e Scope 2 non risultano statisticamente significative. Questa evidenza suggerisce che i mercati finanziari non trattano le emissioni di gas a effetto serra come un indicatore omogeneo, ma attribuiscono maggiore rilevanza alle emissioni generate lungo la catena del valore, interpretando come un segnale più credibile dell'esposizione dell'impresa a rischi climatici, regolatori e strategici di lungo periodo.

Dal punto di vista teorico, lo studio contribuisce alla letteratura sulla "value relevance" delle informazioni ambientali mostrando che il contenuto informativo delle emissioni di gas a effetto serra dipende dalla loro natura organizzativa e strategica e non soltanto dalla loro entità quantitativa (Matsumura et al., 2014; Choi e Luo, 2021). In particolare, le emissioni di Scope 3 emergono come un indicatore rilevante della qualità della governance inter-organizzativa e della capacità dell'impresa di gestire relazioni complesse lungo la supply chain, rafforzando una lettura stakeholder-oriented della creazione di valore (Freeman, 2002; Parmar et al., 2010; Blanco, 2021). Coerentemente con la

Contingency Theory, tali emissioni possono inoltre essere interpretate come un segnale di potenziale disallineamento tra modello di business, configurazione organizzativa e pressioni ambientali del contesto, disallineamento che il mercato tende a penalizzare indipendentemente dal settore di appartenenza (Donaldson, 2001; Volberda et al., 2012). L'assenza di un effetto moderatore significativo del settore suggerisce infine che il rischio climatico sia percepito come sistemico e trasversale, piuttosto che circoscritto a specifiche industrie (Busch et al., 2022).

Dal punto di vista manageriale, i risultati suggeriscono che le imprese dovrebbero superare un approccio alla sostenibilità focalizzato prevalentemente sulle emissioni operative (Scope 1 e Scope 2) e integrare in modo più esplicito la gestione delle emissioni generate lungo la catena del valore. Le evidenze mostrano infatti che i mercati finanziari attribuiscono maggiore rilevanza valutativa alle emissioni di Scope 3, interpretando come un indicatore più informativo dell'esposizione dell'impresa a rischi climatici, regolatori e strategici di lungo periodo. La gestione delle emissioni di Scope 3 emerge quindi come una leva strategica centrale per la creazione di valore. Poiché tali emissioni riflettono la struttura della supply chain e le caratteristiche del modello di business, la loro riduzione richiede interventi che vadano oltre l'efficienza operativa interna, coinvolgendo fornitori, partner e clienti attraverso forme avanzate di coordinamento e governance inter-organizzativa. In questo senso, la capacità dell'impresa di orchestrare la decarbonizzazione della filiera diventa una competenza manageriale distintiva.

Sul piano della comunicazione verso gli investitori, i risultati indicano che la disclosure delle emissioni di Scope 3 assume una valenza strategica. Una rendicontazione trasparente e coerente delle emissioni di filiera, accompagnata da una chiara esplicitazione delle strategie di riduzione adottate, può contribuire a ridurre l'incertezza informativa e a rafforzare la credibilità dell'impresa nel contesto della transizione climatica.

Infine, l'assenza di differenze significative tra settori suggerisce che il rischio climatico sia percepito come sistemico e trasversale. Di conseguenza, tutte le imprese, indipendentemente dal settore di appartenenza, sono chiamate a integrare la gestione delle emissioni di Scope 3 nelle decisioni strategiche e nei processi di pianificazione di lungo periodo.

I risultati devono essere interpretati alla luce di alcuni limiti. Il presente studio si concentra su imprese europee quotate e su dati secondari, in un contesto caratterizzato da livelli relativamente elevati di disclosure ambientale. Sebbene ciò garantisca comparabilità e robustezza delle analisi, i risultati potrebbero non essere immediatamente estendibili a contesti istituzionali differenti. Inoltre, in linea con la letteratura esistente, le misurazioni delle emissioni di Scope 3 possono presentare eterogeneità informative. Tuttavia, i risultati principali risultano stabili rispetto a diverse specificazioni del modello e a test di robustezza alternativi, rafforzando la solidità delle evidenze empiriche. Ricerche future potrebbero approfondire i meccanismi organizzativi e strategici alla base della gestione delle emissioni di filiera, integrando approcci quantitativi e qualitativi.

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Navigating the automotive transition. The role of vision capability in adaptation behaviour

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Abstract

Frame of the research. *The global automotive industry is undergoing a period of profound disruption, characterized by rapid technological upheaval, regulatory mandates, and shifting consumer orientations. To survive this transition, firms might adapt by managing ambidexterity.*

Purpose of the paper. *The paper aims to illustrate how the governing role of vision allows automotive firms to successfully navigate the most complex industrial transition of the 21st century.*

Methodology. *This study adopts a qualitative approach to explore the interplay among vision capability, dynamic capabilities, and organizational ambidexterity during the strategic transition of the current disrupted automotive industry. The data consists of the 2023/2024 sustainability and integrated reports from the top ten global automotive firms.*

Results. *The analysis reveals that vision capability is not merely a symbolic articulation of future aspirations but operates as a governing mechanism that filters managerial attention, defines strategic priorities, and legitimizes large-scale resource reconfiguration.*

Research limitations. *The study is based on qualitative data and analysis. Quantitative analyses are necessary to generalize the findings.*

Managerial implications. *These findings underscore that successful transformation requires a coherent, operationalized vision: traditional carmakers must prioritize socio-cognitive renewal alongside asset reconfiguration, while EV-forward firms must anchor rapid innovation in scalable operational systems.*

Originality of the paper. *We propose a framework to conceptualize adaptation as a co-evolutionary process linking vision, dynamic capabilities, and ambidextrous innovation trajectories under conditions of disruption. By distinguishing the "transition bridge" of incumbents from the "radical leapfrog" of EV-forward firms, the research introduces a recursive model of strategic adaptation.*

Keywords: *Vision capability; dynamic capabilities; ambidexterity; automotive industry; carbon transition*

1. Introduction

The global automotive industry is undergoing a period of profound disruption, characterized by rapid technological upheaval, intensifying regulatory mandates, and fundamentally shifting consumer orientations. This moment constitutes the most consequential turning point for the sector since the introduction of the moving assembly line by Henry Ford more than a century ago. Yet this transformation; marked by the transition from internal combustion engines (ICE) to electric vehicles (EVs), the rise of autonomous driving, and the development of software-defined vehicles, extends beyond a purely technical or economic shift. It is equally an attentional and cognitive challenge, requiring incumbent Original Equipment Manufacturers (OEMs) to operate within an environment characterized by heightened institutional pressures and persistent market uncertainty.

To survive this transition, firms might adapt by managing between exploitative and explorative behaviour. Especially for incumbent automotive firms, they might simultaneously exploit their maturing ICE-based profit centers to generate the liquidity required to explore radical, unproven technologies (March, 1991; O'Reilly & Tushman, 2013). Danneels (2002), argues that technological innovation is bifurcated into two distinct categories: exploratory and exploitative. Exploratory innovation is characterized by the pursuit of radical departures from established technological paradigms, whereas exploitative innovation focuses on the incremental refinement of existing

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practices and technologies. The strategic challenge of harmonizing these two divergent modes of innovation, often referred to as organizational ambidexterity (OA), has become a central theme in management literature.

Drawing upon the Dynamic Capabilities (DC) framework, Teece et al. (1997) argue that DCs enable firms to do more than simply allocate resources for product development; they facilitate organizational agility in the face of volatile competitive landscapes. By integrating, building, and reconfiguring both internal and external competencies, DC allow a firm to maintain alignment with a rapidly shifting environment. Building on this foundation, the efficacy of DC is increasingly predicated on the strength of a firm's vision capability (VC). While DCs provide the muscles or engine for resource reconfiguration, VC acts as the eyes or governor, representing the cognitive capacity to anticipate future technological trajectories and conceptualize emerging market states before they fully materialize.

In the contemporary automotive transition, where the industry is undergoing a disruptive shift from ICEs to electrification and autonomous systems, the nexus between VC and DC is critical. VC allows automotive incumbents to look beyond their legacy assets and perceive the necessity of radical change. When effectively coupled with DC, this foresight ensures that resource restructuring is not merely reactive but is strategically directed toward the next-generation mobility ecosystem. Consequently, in technologically disruptive worlds, VC serves as the essential precursor that gives direction to DC, preventing path dependency and enabling firms to successfully navigate the leap from old to new technological regimes.

While extant literature has established that DC are instrumental in managing the tension between exploratory and exploitative innovation, empirical focus has largely remained bifurcated. Research frequently examines the impact of DC on these innovation modes in isolation, often neglecting their simultaneous integration, that is, the combined dimension of ambidexterity (Sheng, 2017). However, a significant conceptual void exists: the role of VC as a cognitive antecedent to these processes is nearly non-existent in current empirical models.

Existing frameworks suggest that DC enables the reconfiguration of resources, yet they often fail to explain where that reconfiguration is directed. To address this, we argue for an integrated model that incorporates corporate VC. It is not merely a static statement of intent but a high-level DC that allows a firm to cognitively transcend current market constraints. By integrating vision into the DC-ambidexterity framework, firms can move beyond reactive adaptation and toward proactive market shaping. This suggests that VC provides the strategic logic that determines how a firm balances the optimization of current assets (exploitation) with the pursuit of disruptive technologies (exploration).

The necessity of this integrated model is most evident when analyzing the path-dependent nature of the automotive industry's transition from Internal Combustion Engines (ICE) to Electric Vehicles (EV). Incumbent (Legacy) OEMs are currently grappling with significant structural and cognitive inertia; their decades-long investment in ICE technology has created a competency trap where existing DC are tethered to a fading technological regime. For these incumbents, VC is essential to break path dependency. It acts as the catalyst for the unlearning of legacy processes and the radical reconfiguration of assets required for electrification.

In contrast, EV-forward OEMs (such as pure-play EV startups) operate without the burden of ICE-related path dependency. Their strategic challenge is not the reconfiguration of old assets, but the rapid assembly and scaling of new ones. Consequently, the transition path for these two types of organizations differs fundamentally: legacy OEMs require vision-driven DC to pivot and survive, while EV-forward firms utilize vision-led DC to establish and dominate new market niches. Current research must, therefore, distinguish between these two cohorts, as the efficacy of their DC is inherently shaped by their historical technological commitments, or lack thereof. By placing VC at the heart of this transition, researchers can better understand why some legacy firms successfully leapfrog to new regimes while others succumb to the rigidity of their past successes.

Despite the proliferation of studies on DC and OA, there remains a significant gap in our understanding of the governance of these constructs. Most existing frameworks treat DC as a neutral

toolkit for change, ignoring the cognitive biases and preconceptions that dictate how those tools are used. Furthermore, the literature has largely overlooked how a firm's vision functions as a functional capability that limits or focuses the use of dynamic resources. Without a governing vision, reconfiguration can lead to organizational chaos, where a firm loses its core identity and fails to maintain the efficiency of its exploitative base.

This research addresses this theoretical gap by proposing an integrated model that positions VC as the antecedent and regulator of DC in the pursuit of OA. The novelty of this work is three-fold: theoretical integration, empirical breath, and the governor concept. First, it provides a unified model that links VC, DC, and OA, demonstrating the relationship between these constructs. Second, by analyzing the 2023/2024 sustainability and integrated reports of ten global leaders including Toyota, Honda, Nissan, Hyundai, GM, Ford, VW, Stellantis, BYD, and Geely, the study provides a comprehensive, global perspective that accounts for different institutional and regional contexts. Third, it shifts the academic discourse from vision as a statement to vision as a capability, emphasizing its role in narrowing the attentional focus to prevent the over-searching and strategic paralysis common in high-velocity industries.

As the subsequent sections will detail, this study utilizes a thematic analysis to explore the theoretical foundations of these concepts. By examining the specific evidence from the global automotive landscape, we aim to illustrate how the governing role of vision allows firms to successfully navigate the most complex industrial transition of the 21st century, ensuring that the engine of DC is steered by a clear and resilient strategic logic. Based on our analysis, we develop a theoretical model on how OEMs respond to the automotive disruptions using the concepts of VC, DC, and OA.

2. Literature Review

2.1 Technological Disruptions in the Automotive Industry

The automotive industry is experiencing an unprecedented wave of technological disruption driven by the convergence of electrification, autonomous driving, artificial intelligence, digitalization, and connectivity (Fojcik, 2012; Koelmel et al., 2025; Pérez-Moure et al., 2023; Renneby & Sommer, 2018; Wittmann, 2016; Ziegler & Abdelkafi, 2023). Electrification and the transition toward battery electric vehicles fundamentally alter powertrain architectures, supply chains, and skill requirements, thereby eroding the traditional competitive advantages of internal combustion engine–focused incumbents, particularly in Germany (Fojcik, 2013; Loder et al., 2024). Empirical evidence shows substantial heterogeneity in how firms interpret and respond to this disruption, with some perceiving electrification as an existential threat and others framing it as a strategic opportunity for renewal and market repositioning (Loder et al., 2024).

At the same time, autonomous driving and AI represent a radical departure from incremental innovation, requiring new competencies in software development, data management, and cloud infrastructure that lie largely outside the historical knowledge base of automotive manufacturers (Renneby & Sommer, 2018). Digitalization and connectivity further transform automotive firms from hardware-oriented manufacturers into software-driven mobility and data platforms, reshaping value creation, sustainability strategies, and industry power dynamics (Pérez-Moure et al., 2023). The convergence of these technologies gives rise to new mobility paradigms, such as mobility-as-a-service and subscription-based models, and generates multiple overlapping technological S-curves that increase strategic complexity and uncertainty (Streloke & Franke, 2024). This environment raises the question of why firms facing similar disruptions pursue markedly different strategic paths.

2.2. The dynamic capabilities

Firms use DC to put their market goals into action (Øyna et al., 2018). These skills are different from the basic skills that keep a business running every day (Randhawa et al., 2021). DC allow a

company to grow and react to what customers want (Teece et al., 1997). They represent the ability of a firm to join and change its internal and external skills to handle a fast world (Bağış et al., 2022; Yuan et al., 2021). According to Teece (2007), these skills have three parts. The first part is sensing. This helps a firm find and check new chances or threats. The second part is learning. This helps a firm move its resources to handle those chances. The third part is changing or transforming. This helps a firm keep its assets fresh and new.

Building these skills requires a company to learn from past experiences and think deeply about its choices (Zollo & Winter, 2002). Some researchers look at how a firm is built and how it connects with others to explore new ideas (Haim Faridian & Neubaum, 2021). On the other hand, exploitation shows how a firm uses what it already has to create value. These skills are vital for making new products for new markets (Teece, 2007). In fast markets, exploitation skills help a firm get value from products that are already for sale (Haim Faridian & Neubaum, 2021). In short, being able to explore and exploit resources helps a company stay strong as the world changes (Monferrer et al., 2021).

The ability to gain a new edge in the market depends on these DC (Øyna et al., 2018; Teece et al., 1997). The word dynamic means a firm can update its skills to stay in harmony with the environment. This is key because technology moves very fast. It is often hard to know what the future of a market will look like. The word capacities highlights the role of managers. Managers must adapt and join resources to meet new needs. Sometimes, these skills can make a firm less efficient because they add more pressure. However, the good side is that they bring more innovation and new chances for the business (Alka et al., 2024; Yuan et al., 2021).

Companies need to include innovation within the larger idea of DC (Monferrer et al., 2021). This helps a company stay competitive by adapting to new information (Grant, 1996). This view also shows that firms have limits when trying to coordinate work or protect their ideas (Teece et al., 1997). Often, there is a gap between what people inside and outside the firm know. While some views focus on these gaps, others argue that social groups can share information to fix these problems (Haim Faridian & Neubaum, 2021).

Resources from both inside and outside the firm create value (Li et al., 2023). How well a company performs depends on many different factors (Battisti et al., 2023; Braunerhjelm & Halldin, 2019; Hou et al., 2024). This is why being ambidextrous is so important for a business (Bhandari et al., 2022; Hughes et al., 2021; Li et al., 2023). Ambidextrous companies are better at being efficient and managing their work. Their goal is to be reliable and sustainable right now. At the same time, they work to find new products that will succeed in the future (Hughes et al., 2021).

Although research shows that being ambidextrous helps companies stay strong, makes them efficient today and ready for tomorrow; our study wants to investigate this further. We will look at our data to see how this works in the automotive sector. A sector of incumbent firms who have different initial operational setup in ICEs and long history of old technology, and EV companies who have no experience of initial ICE setup.

2.3 Organizational ambidexterity

Literature conceptualizes OA as a firm's capacity to simultaneously pursue exploration and exploitation, balancing radical discovery with incremental efficiency (March, 1991). Scholars like O'Reilly & Tushman (2008) found that this is often achieved through structural separation, where distinct units handle different innovation tasks. Conversely, other research highlights contextual ambidexterity, where organizational systems enable individuals to divide their efforts between current alignment and future adaptation (Gibson & Birkinshaw, 2004). This duality is often categorized into balanced and combined dimensions, where the former maintains equilibrium and the latter focuses on the mutual reinforcement of exploratory and exploitative efforts (Cao et al., 2009).

Recent findings suggest that DC serve as a vital link between ambidexterity and business model performance, particularly in complex or shifting markets (Lin & Si, 2018; Yuan et al., 2021). These capabilities allow firms to reconfigure resources and internalize external knowledge through relational networks and strategic alliances (Mondal et al., 2022; Monferrer et al., 2015, 2021).

According to Haim Faridian & Neubaum (2021), ambidextrous firms are defined by learning strategies that influence business model design through resource use and DC. Yuan et al. (2021) examined 493 companies across various sectors in China and found that ambidexterity helps focus business models on both efficiency and innovation. These researchers also show that DC act as a positive mediator between ambidexterity and these specific business models.

The theory of ambidextrous organizations posits a dual function of exploration and exploitation (March, 1991). Monferrer et al. (2021) state that this duality is necessary to understand DC. Their findings suggest that exploratory capabilities are important for development because they support organizational learning. This learning provides the flexibility needed to manage knowledge gained from relationships between firms. It also supports the ability to take in and use new external knowledge (Ramadani et al., 2017). Similarly, Haim Faridian & Neubaum (2021) observe that dynamic environments encourage firms to engage in value capture. In these changing settings, companies often work to create and capture value at the same time. This makes ambidexterity a very effective model for firms to follow. However, Barney (1991) notes that specific resource limits can make this search for both types of value difficult. Lin & Si, (2018) find that firms can create competitive advantages through an ambidextrous strategy. This advantage depends on the ability of the firm to diversify its relationships during times of uncertainty. These authors use the DC perspective to show how firms can be both effective and efficient.

Firms that use ambidextrous approaches often promote incremental innovation. This helps them balance current demand with the search for new opportunities (Farzaneh et al., 2022). Monferrer et al. (2021) suggest that high competition makes collaborative innovation between companies necessary. As a result, relational business networks have become more important for competitive positions. These networks allow members to access knowledge and resources that they could not get alone (Monferrer et al., 2015, 2019, 2021). Lin & Si (2018) link these ambidextrous strategies to higher performance in complex market settings.

While Farzaneh et al. (2022) defines ambidextrous organizations as those that use existing skills for small changes or new opportunities for radical innovation. Ardito et al. (2018) posit that these innovations often come from changes in the capabilities of the organization. When firms pursue market leadership, they look for new developments while also using their own internal knowledge (Farzaneh et al., 2022). Networking strategies, like alliances and joint ventures, help clarify how these firm capabilities work (Dabić et al., 2020; Mondal et al., 2022; Pereira et al., 2022; Zahoor et al., 2020). Tuomisalo & Leppäaho (2019) identify two main impacts of these networks. They help firms gain useful information and accelerate learning through partnerships.

Monferrer et al. (2021) show that knowledge becomes stronger through these networks. Members of a network share benefits from joint innovation and risk taking (Stocker et al., 2022). Bembom & Schwens (2018) show that networks help managers get resources and build trust. This trust can reduce the costs of doing business. Hughes et al. (2021) find that firms seeking legitimacy often use ambidexterity to improve efficiency and value. This helps them stay reliable in the short term while creating new products for the long term.

Research posit that DC serve as a tool to arrange resources for long term success (Lin & Si, 2018). They are used to build new resources and reconfigure them for a new market position (Teece et al., 1997). An ambidextrous approach involves complex routines that help firms win by moving their resources (Lin & Si, 2018). Researchers confirm that ambidexterity and DC are separate constructions but connected ideas (Monferrer et al., 2021; Yuan et al., 2021). While previous studies emphasize the performance benefits of an ambidextrous approach (He & Wong, 2004), current research seeks to investigate how these findings apply to firms with divergent histories. Specifically, the literature suggests that legacy incumbents and EV-forward firms operate with different initial setups, necessitating an examination of how ambidexterity functions across varying business models during technological transitions.

2.4 Vision capability

VC is often defined as the cognitive ability of leaders to create a clear and compelling picture of a future state that does not yet exist (Kirkpatrick, 2011). In management studies, this is characterized as a high-level capability that allows a firm to anticipate market shifts before they happen (Sashkin, 1988). Unlike basic operational goals, VC involves long-term foresight and the ability to inspire a collective effort toward new directions (Kantabutra, 2008). Some researchers argue that this capability is the foundation for strategic intent, acting as a guide for how a firm chooses to grow (Hamel & Prahalad, 1989).

There is a strong link between VC and DC in management literature. Scholars suggest that vision provides the sense of direction that DC need to be effective (Teece, 2007). While DC focus on sensing and seizing chances, VC helps managers decide which chances are worth taking (Adner & Helfat, 2003). In this way, vision acts as a mental framework that helps leaders reconfigure their resources toward a specific future (Schoemaker et al., 2018). However, some studies point out that there is still a lack of empirical research on how exactly VC triggers the different stages of DC, particularly in traditional industries facing total disruption.

VC also plays a central role in achieving OA. Literature suggests that a strong shared vision helps reduce the conflict between exploration and exploitation (O'Reilly & Tushman, 2016). By providing a common goal, VC allows a firm to remain efficient in current operations while also being creative in new areas. It helps employees understand why they must balance these two different tasks (Raisch et al., 2009). While the benefits of vision are often mentioned, some researchers like Jansen et al. (2008) argue that more studies are needed to see how vision affects ambidexterity in sectors with very different types of firms.

In the automotive sector, the role of VC is especially important due to the difference between legacy firms and EV-forward firms. For legacy firms, VC is what helps them break away from their old technology and "unlearn" past habits (Azadegan et al., 2008). For new EV entrants, vision is used to create a new path where one did not exist before. Current research has not yet fully examined how VC directs the transition paths of these two divergent groups. Our study aims to fill this gap by looking at how vision helps both legacy and EV-forward firms use their DC in response to the global disruptions in the automotive sector.

3. Method and Data

This study adopts a qualitative research design to explore the complex interplay between VC, DC, and OA in their strategic transition in the current disrupted automotive industry. Qualitative methods are particularly suited for examining "how" and "why" strategic shifts occur within organizations, allowing for a deep exploration of corporate narratives and strategic intent. The primary data consists of the 2023/2024 formal sustainability and integrated reports from ten global OEMs: Ford Motor Company, Honda Motor Company, Hyundai Motor Company, Stellantis, Volkswagen Group, Nissan Motor Company, Toyota Motor Corporation, Geely Automobile Holdings, BYD Company, and General Motors.

We follow the methodological tradition of Gasbarro & Pinkse (2019), who argue that investigating firm-level responses to systemic disruption requires a deep dive into the organizational narratives that bridge external institutional pressures and internal resource reconfiguration. This approach is particularly suited for our objective of exploring how VC acts as a strategic governor for DC in the pursuit of OA. By treating corporate documents as artifacts of managerial sensemaking, we can observe the noticing and interpreting processes that dictate how a firm navigates technological upheaval. These reports serve as the primary data source because they provide a comprehensive and standardized narrative of a firm's strategic commitments, resource allocations, and long-term environmental goals. In management research, sustainability reports are recognized as high-quality data for qualitative analysis as they reflect the official strategic logic and public accountability of a corporation (Cho et al., 2015). Using these reports allows for a longitudinal view of how firms

articulate their vision and document the evolution of their organizational capabilities over time (Higgins et al., 2020).

3.1 Thematic coding process for VC, DC, and OA

The data analysis followed a systematic, multi-stage coding process to ensure both empirical depth and theoretical rigour. During the initial phase, open coding was employed, allowing for a "free coding" approach where labels were assigned to data segments without the constraints of a pre-existing framework. This initial immersion ensured that the nuances of the automotive transition were captured directly from the raw data.

Following this exploratory phase, a rigorous process of code cleaning and refinement was conducted. Redundant or overlapping labels were merged, and inconsistent terminology was standardized to enhance the clarity of the dataset. These refined labels were then strategically regrouped to develop specific sub-codes that represented distinct organizational behaviors and strategic actions.

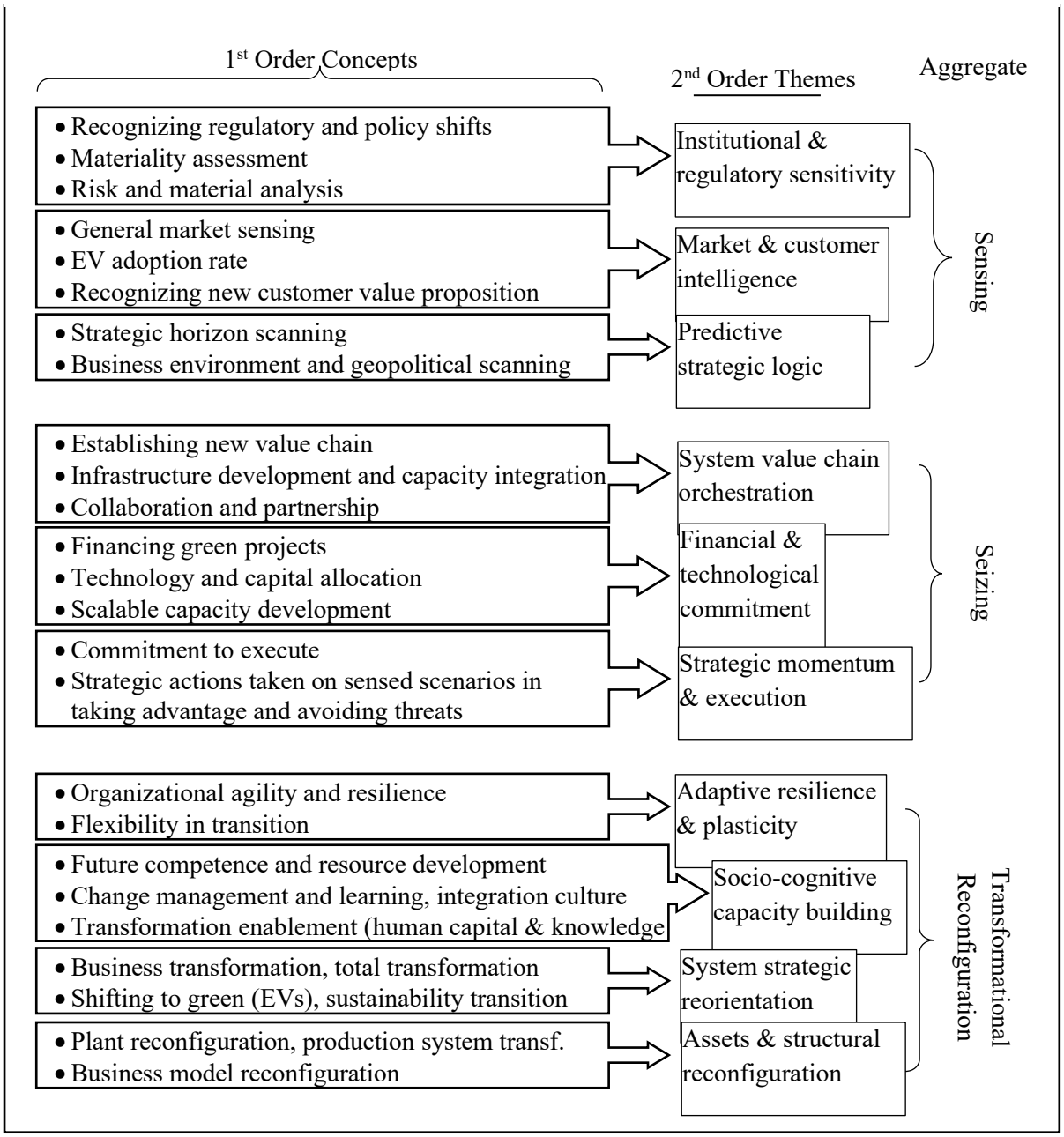
In the final stage of the thematic analysis, these sub-codes were synthesized into a higher-order hierarchy. They were organized under three key thematic areas: 1. vision capability, which acts as the strategic governor; 2. dynamic capabilities, representing the operational processes of sensing, seizing, and reconfiguring; and 3. Organizational ambidexterity, reflecting the firm's ultimate strategic posture in balancing legacy assets with future innovations.

The coding process for DC identifies specific organizational actions categorized into the foundational pillars of sensing, seizing, and transforming. The sensing aggregate dimension is coded through text related to identifying environmental trends, such as monitoring consumer EV adoption or regulatory changes. Key second-order themes include institutional and regulation sensitivity, market and customer intelligence, and predictive strategic logic. Seizing is evidenced by reports of resource mobilization and strategic commitments, such as investments in software hubs, battery gigafactories, or strategic partnerships with technology firms. Associated second-order themes involve system value chain orchestration, financial and technological commitment, and strategic execution momentum. Coding for transformational reconfiguration focuses on factory retooling, employee upskilling, and internal supply chain modifications intended to support electrification. Sub-themes include adaptive resilience, socio-cognitive capacity building, and structural reconfiguration (see Fig. 1).

The coding for OA focuses on identifying a firm's dual commitment to sustaining current operations while simultaneously pursuing future breakthroughs. The first aggregate theme, Legacy Exploitation, is coded from text detailing the continued optimization of the existing fleet and core capabilities, encompassing sub-themes such as operational excellence, legacy reliability and integrity, and structural exploitation. The second theme, Radical Innovation (Exploration), is identified through breakthrough innovations in electric and autonomous mobility, where coding focuses on frontier technological research, platform and software innovation, and sustainable business transitions. Finally, the multi-pathway dimension captures the transitionary phase where firms balance legacy and radical modes, categorized by sub-themes like technological synthesis, such as the simultaneous production of electric vehicles (EVs) and internal combustion engines (ICEs), and a diversified strategic logic (see Fig. 2).

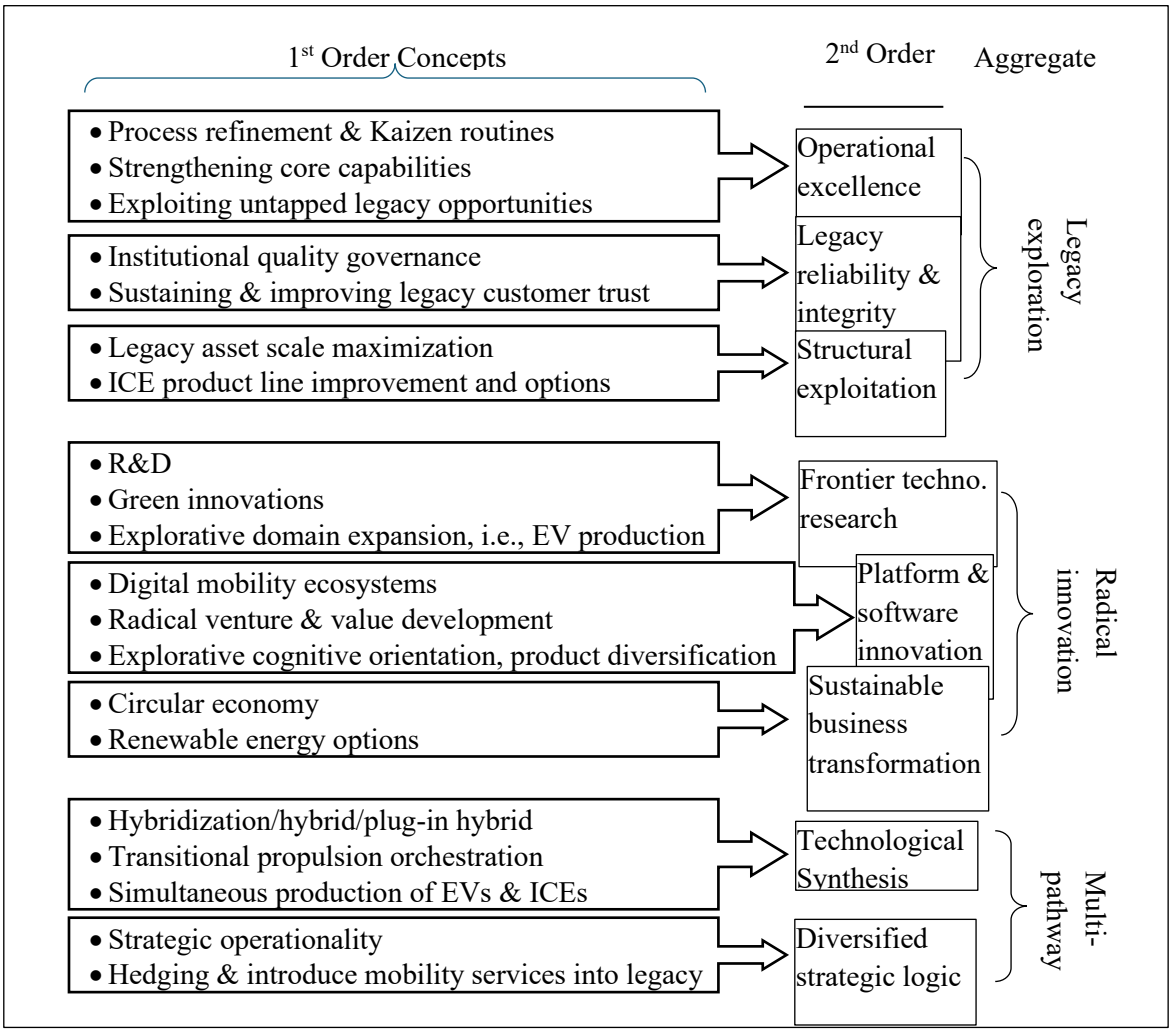
VC coding concentrates on forward-looking statements that define a firm's long-term strategic direction. The aggregate theme of Strategic Intent and Identity is derived from narratives describing a firm's future identity or mission-driven language focused on industry disruption, involving second-order themes such as the pursuit of a new business identity exemplified by the shift from manufacturing to tech-focused firms; electrification, and sustainability consciousness. Parallel to this, the Operational Target and Timelines theme applies codes to specific strategic declarations, such as "2030" or "2050" carbon-neutral targets. This dimension is further defined by themes concerning clear timelines, such as fixing specific ICE phase-out dates, as well as concrete EV transition targets and overarching decarbonization goals.

Fig. 1 -Framing dynamic capability: concepts and coding



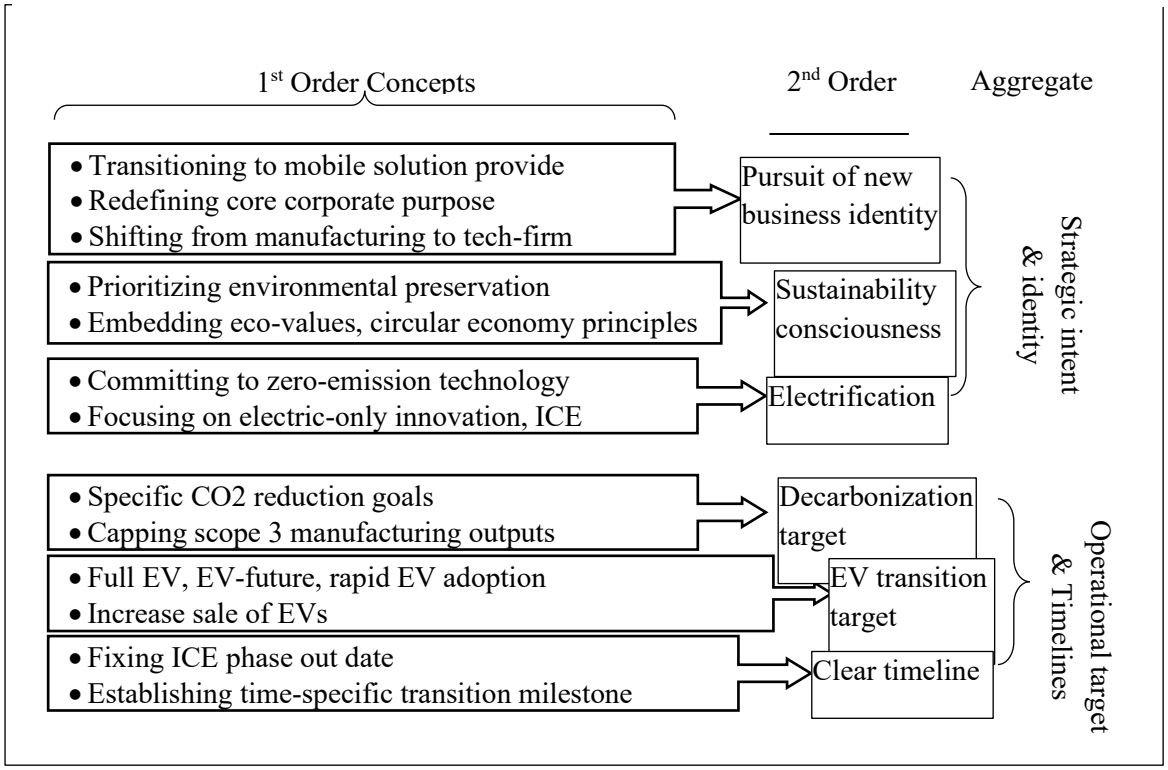
Source: our elaboration

Fig. 2 Framing organizational ambidexterity: concepts and coding



Source: our elaboration

Fig. 3 Framing VC: concepts and coding



Source: our elaboration

By mapping these overlapping codes, the analysis can reveal whether the firm's vision and DC are functioning in a way that supports a successful and coherent strategic transition.

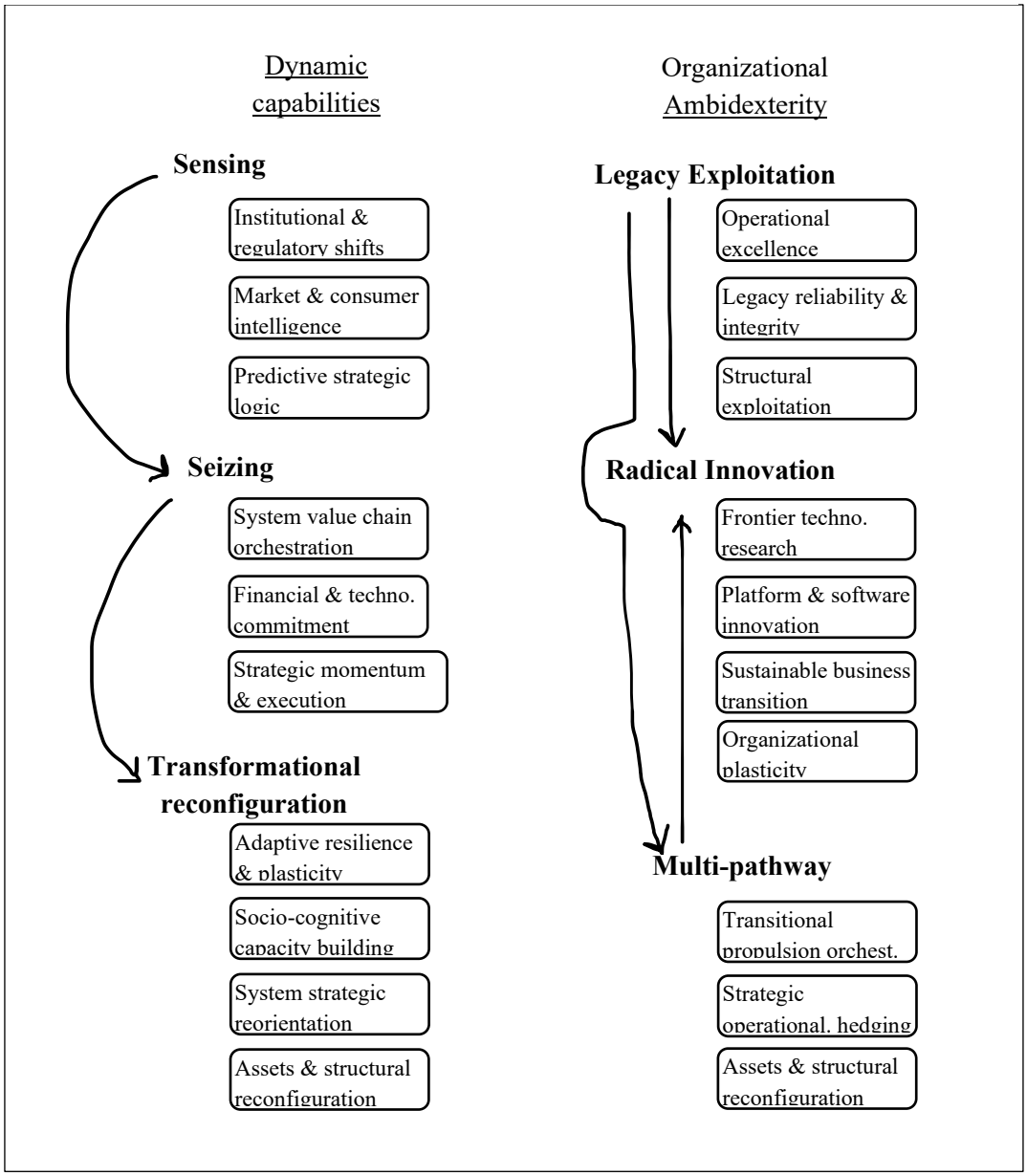
3.2 Internal Linkages and Thematic Relationships

illustrates the internal logical flow within the aggregate dimensions of DC and OA. For DC, Fig. 4 shows a causal progression where Sensing (understanding regulatory and market shifts) directly informs Seizing (orchestrating the value chain and committing capital). Successful seizing then enables Transformational Reconfiguration, which involves deep structural and cognitive shifts within the organization, such as socio-cognitive capacity building and systemic reorientation.

In the context of OA, the figure maps the components that constitute the firm's strategic posture during transition: Legacy exploitation is characterized by operational excellence and maintaining the integrity of legacy products. Radical innovation is driven by frontier research, software innovation, and organizational plasticity. Multi-pathway acts as the synthesis between these two poles, utilizing transitional propulsion orchestration (e.g., hybrids) and strategic operational hedging to manage the shift from legacy assets to future platforms.

By mapping these internal links, the analysis reveals how a firm's internal capabilities and ambidextrous structures function together to support a coherent strategic transition.

Fig. 4 Link within DC and OA



Source: our elaboration

4. Findings

This section presents the qualitative findings structured around the core elements of the conceptual framework (Fig. 1-3): VC, DC, and OA. Following the internal logic illustrated in Fig. 4, results are organized to demonstrate how VC governs the deployment of DC, through sensing, seizing, and transformational reconfiguration, and how these capabilities subsequently shape differentiated transition pathways. The analysis further reveals systematic differences between legacy OEMs and EV-forward firms, reflecting their divergent historical asset bases and strategic constraints.

4.1 Vision capability as strategic governor and cognitive filter

The analysis reveals that VC is not merely a symbolic articulation of future aspirations but operates as a governing mechanism that filters managerial attention, defines strategic priorities, and legitimizes large-scale resource reconfiguration. Vision consistently appears embedded in firm philosophy,

sustainability commitments, and long-term identity narratives, providing both direction and justification for transformation.

For legacy OEMs, VC is typically framed around reconciling continuity with change. Ford articulates this balance by emphasizing responsiveness to both customers and environmental imperatives, stating:

"This values-led approach continues to guide us on the road to a more sustainable and equitable transportation future… as we deliver both what our customers want and what the planet needs" (Ford, pg. 4).

This statement illustrates how vision establishes a dual-objective logic; preserving customer value while advancing sustainability, thereby framing ambidexterity as a moral and strategic necessity.

Honda similarly grounds its transition in a deeply ingrained quality philosophy, emphasizing that even "… a 1% rejection is unacceptable," (Honda, pg. 11), reinforcing its enduring commitment to customer trust while preparing for future technologies. Such narratives indicate that VC in legacy firms often emerges from institutionalized values, which act as stabilizing forces during disruptive change.

Several OEMs further operationalize VC through explicit carbon neutrality targets and electrification milestones. Hyundai, for example, links its 2045 carbon neutrality ambition directly to structural transformation, noting that it is "… transitioning our business structure from internal combustion engine vehicles to an electrification focused approach," (Hyundai, pg. 25) while simultaneously advancing EVs, hybrids, and fuel cell vehicles. This demonstrates how VC delineates both direction (electrification) and modality (multi-technology), shaping subsequent capability deployment.

Toyota's vision reinforces this pluralistic orientation: "we will offer a range of solutions under our multi-pathway strategy to provide options to our customers worldwide. The fundamental idea here is to close in on the "future of energy" and the "expectations of our customers around the world." (Toyota, pg. 4). Here, VC legitimizes technological diversity, positioning ambidexterity not as compromise but as deliberate strategic design.

In contrast, EV-forward firms articulate a more concentrated and directive vision. BYD anchors its identity in long-standing decarbonization principles, "In 2008, we proposed the "three green dreams" of solar energy, energy storage and electric vehicles, and in 2016, we issued the initiative of "Cool the Earth by One Degree", released the strategy of "EVs solve pollution and SkyShuttle solve congestion", and became the first automobile enterprise in the world to stop production of fuel vehicles in 2022." (BYD, pg. 3). This illustrates how VC functions as a path-creation mechanism, eliminating ambiguity surrounding legacy technologies and enabling decisive strategic focus.

Moreover, BYD emphasizes technology as both philosophical foundation and competitive driver, stating that it adheres to:

"The development concept of "Technology Based, Innovation Oriented" and unswervingly adhered to the new energy strategy, constantly spawning, and strengthening new productivity." (BYD, pg.4).

Unlike legacy OEMs, whose visions accommodate historical commitments, BYD's VC enables a singular orientation toward radical innovation. Taken together, these findings indicate that VC operates as a cognitive filter that narrows organizational search spaces and prioritizes specific transition pathways. VC precedes and shapes DC by defining what constitutes relevant opportunities and acceptable strategic trade-offs.

4.2 Dynamic capabilities as the engine translating vision into action

Consistent with Fig. 4, the empirical evidence demonstrates a patterned progression of DC deployment from sensing to seizing and ultimately to transformational reconfiguration. However, the intensity and coherence of this progression vary substantially across firms.

Sensing: Institutional sensitivity and market intelligence

Firms demonstrate strong sensing capabilities through continuous monitoring of regulatory pressures, climate commitments, and evolving customer expectations. For example, Nissan's Arc plan exemplifies this institutional sensitivity:

"Through the Arc plan, Nissan will accelerate the electric vehicle (EV) transition, prioritize reducing CO_2 emissions, innovative technologies, leaner manufacturing systems, smart partnerships and market growth that will contribute to a more sustainable future and our ultimate goal of carbon neutrality." (Nissan, pg. 3).

Volkswagen similarly articulates intermediate emissions targets, aiming to reduce vehicle carbon footprints. "By 2030, we want to reduce the carbon footprint of our passenger cars and light commercial vehicles by 30% per vehicle (compared with 2018)." (Volkswagen, pg. 48).

These statements reflect systematic horizon scanning and predictive strategic logic, aligning with the sensing dimension in Fig. 4. Importantly, sensing is not limited to compliance; it also encompasses emerging customer value propositions. Ford highlights its awareness of heterogeneous market demand by maintaining strong portfolios across EVs, ICEs, and hybrids:

"... We have strong product lineups in all three categories of vehicles – EVs, internal combustion engine vehicles, and hybrids. Hybrid sales rose 20% for the year." (Ford, pg.5).

This illustrates how sensing integrates both regulatory and market signals.

Seizing: Capital commitment and ecosystem orchestration

Sensed opportunities are operationalized through large-scale financial commitments and restructuring of production systems. General Motors demonstrates this seizing capability.

"Under this framework, we issued $2.25 billions of investment-grade green bonds in 2022, our first capital markets activity that specifically supports our EV strategy." (GM, pg. 20)

Ford similarly emphasizes "to facilitate this transformation, we are making substantial investments, recruiting new talent, and optimizing our business model, management system, and organization." (Ford, pg. 56).

Hyundai extends seizing beyond internal investment by actively expanding EV and hydrogen infrastructure: "Additionally, we are actively driving the expansion of electric and hydrogen infrastructure ..." (Hyundai, pg. 25).

These actions reflect system value chain orchestration and strategic execution momentum, as illustrated in Fig. 4.

BYD exhibits particularly rapid seizing dynamics, highlighting its ability to implement R&D outcomes quickly: "implements R&D innovation results as quickly as possible, achieves $1 + 1 > 2$ synergy effects, and continuously reshapes industry standards with continuous disruptive technologies." (BYD, pg. 4). This underscores how EV-forward firms leverage tight coupling between technology development and manufacturing to accelerate strategic momentum.

Transformational Reconfiguration: Structural and socio-cognitive renewal

Transformational reconfiguration emerges as the most demanding phase of DC, involving deep structural, cultural, and cognitive change. Hyundai's repositioning as a Mobility Solution Provider illustrates systemic reorientation across hardware, software, and service domains.

"We will continue to strengthen our business capabilities with the goal of growing into a "smart mobility solution provider" based on sustainability management." (Hyundai, pg. 25).

Toyota similarly emphasizes next-generation BEV architectures and software platforms such as Arene to redefine vehicle design and customer experience:

"… through the software platform Arene, which we developed in collaboration with Woven by Toyota, to make mobility more convenient and fun." (Toyota, pg. 5).

Legacy OEMs face particularly complex reconfiguration challenges due to entrenched ICE assets and organizational routines. Their transformations involve gradual plant retooling, workforce reskilling, and parallel operation of legacy and emerging technologies. EV-forward firms, by contrast,

display higher organizational plasticity. BYD's rapid deployment of proprietary platforms, batteries, and intelligent systems illustrates adaptive resilience enabled by the absence of legacy constraints.

These patterns align with Fig. 4, which conceptualizes reconfiguration as encompassing asset restructuring and socio-cognitive capacity building.

4.3 Organizational ambidexterity as historically conditioned transition outcome

OA emerges as the observable outcome of VC-guided DC, but manifests in structurally different forms.

Legacy OEMs primarily exhibit multi-pathway ambidexterity, balancing exploitation of ICE assets with exploration of electrification and alternative propulsion. Ford explicitly maintains diversified portfolios across EVs, ICE vehicles, and hybrids, reporting a 20% increase in hybrid sales while expanding EV offerings.

"… EVs, internal combustion engine vehicles, and hybrids. Hybrid sales rose 20% for the year." (Ford, pg. 5).

Geely adopts a similar hedging posture to improving carbon performance:

"… improve the carbon emissions performance of ICE vehicle products through technological enhancements (e.g., HEV hybrid technology, methanol technology)." (Geely, pg. 26).

Toyota institutionalizes this approach through hybrids positioned as near-term solutions alongside longer-term investments in BEVs and hydrogen engines

"… while also expanding sales of hybrid vehicles, which are the most promising option for the time being, especially in emerging countries." (Toyota, pg. 5).

These practices exemplify the "multi-pathway" bridge depicted in Fig. 4, where transitional technologies mediate between legacy exploitation and radical innovation.

Conversely, EV-forward firms largely bypass legacy exploitation. BYD's cessation of fuel vehicle production and intensive focus on new energy platforms illustrates an exploration-dominant trajectory characterized by frontier technology development and high organizational flexibility.

"… energy storage and electric vehicles, and became the first automobile enterprise in the world to stop production of fuel vehicles in 2022." (BYD, pg. 3–5). In this context, ambidexterity is expressed not as balance between old and new but as simultaneous radical innovation across multiple emerging domains.

These findings confirm that OA is not a uniform equilibrium but a historically conditioned strategic configuration shaped by prior asset commitments and vision-driven capability deployment.

4.4 Explaining the Transition Pathways

Building on the empirical themes presented in the results section, Fig. 6 and Fig. 7 visually synthesize two fundamentally different transition pathways observed across the sampled firms. These figures illustrate how vision capability conditions the deployment of dynamic capabilities and, ultimately, the form of organizational ambidexterity achieved.

4.4.1 The Transition Bridge Pathway of Legacy OEMs

Fig. 5 captures the dominant trajectory of incumbent automotive manufacturers such as Ford, Toyota, Hyundai, GM, Honda, Nissan, Volkswagen, Stellantis, and Geely. This pathway is characterized by the simultaneous exploitation of internal combustion engine (ICE) assets and gradual exploration of electrification, mediated through what we conceptualize as a multi-pathway bridge; most notably hybrids, plug-in hybrids, and diversified propulsion portfolios.

At the foundation of this bridge lies a vision capability that remains anchored in legacy identity while progressively incorporating sustainability imperatives. Ford exemplifies this dual orientation by explicitly framing its transition as a values-led balancing act:

"This values-led approach continues to guide us on the road to a more sustainable and equitable transportation future… as we deliver both what our customers want and what the planet needs" (Ford, pg. 4).

Here, vision functions as a strategic governor that legitimizes continued ICE exploitation while simultaneously justifying investment in EVs and hybrids.

This duality becomes operationalized through dynamic capabilities. Legacy firms demonstrate strong sensing of institutional and regulatory pressures alongside market signals. Ford highlights its responsiveness to heterogeneous demand by maintaining "strong product lineups in all three categories of vehicles – EVs, internal combustion engine vehicles, and hybrids," while noting that "hybrid sales rose 20% for the year" (Ford, pg. 5).

"… offer a comprehensive and flexible range of electric, hybrid, and internal combustion vehicles." (Ford, pg. 15)

Toyota similarly institutionalizes this logic through its multi-pathway strategy, emphasizing the need to:

"… provide options to our customers worldwide. … close in on the "future of energy" and the "expectations of our customers around the world."" (Toyota, pg. 4).

These sensing activities translate into seizing behaviors characterized by large-scale financial commitments and staged technological investments. GM's issuance of $2.25 billion in green bonds to support its EV strategy (GM, pg. 20), alongside the retooling of Factory ZERO into a fully dedicated EV facility, illustrates how incumbents mobilize capital to incrementally reconfigure production systems. Ford likewise emphasizes "… substantial investments, recruiting new talent, and optimizing our business model, management system, and organization" to facilitate transformation (Ford, pg. 56).

However, Fig. 5 also highlights that transformational reconfiguration for legacy firms is inherently painful and constrained. Unlike EV-forward companies, incumbents must restructure deeply embedded assets, routines, and cognitive frames. Hyundai's transition illustrates this complexity. While committing to carbon neutrality by 2045 and shifting toward an "electrification focused approach," Hyundai continues to develop hybrids, PHEVs, EVs, and FCEVs simultaneously, reflecting the socio-cognitive and structural burden of managing parallel technological regimes (Hyundai, pg. 25).

Geely further illustrates this bridging logic by explicitly retaining ICE offerings:

"The Geely brand will also continue to offer ICE vehicle products to provide options for consumers who, for various reasons, cannot adopt new energy vehicle products." (Geely, pg. 26). This confirms that ambidexterity among legacy OEMs is not a clean switch from old to new, but a prolonged transitional configuration where exploitation finances exploration.

Thus, depicts organizational ambidexterity as an outcome of vision-guided dynamic capabilities operating under historical constraint. The "bridge" represents a necessary intermediary state, allowing firms to preserve profitability from ICE platforms while gradually reallocating resources toward radical innovation. Vision capability here plays a critical stabilizing role: it prevents organizational fragmentation by framing hybridization and hedging as legitimate strategic responses rather than signs of indecision.

4.4.2 The radical leapfrog pathway of EV-forward firms

In contrast, Fig. 6 represents the transition logic of EV-forward firms, most notably BYD. These firms exhibit a qualitatively different configuration of VC, DC, and OA, characterized by the absence of legacy exploitation and a direct leap toward frontier technologies.

BYD's vision capability is both historically consistent and strategically decisive. Its long-standing commitment to decarbonization is evident in its articulation of the "three green dreams" as early as 2008 and its subsequent decision to become "the first automobile enterprise in the world to stop production of fuel vehicles in 2022" (BYD, pg. 3). Unlike legacy OEMs, BYD's vision eliminates ambiguity regarding technological direction, enabling a focused and aggressive transition.

This clarity profoundly shapes its dynamic capabilities. Sensing is oriented primarily toward market and consumer intelligence rather than regulatory compliance, while seizing is expressed through rapid innovation cycles and vertically integrated technology development. BYD emphasizes

its adherence to technology.

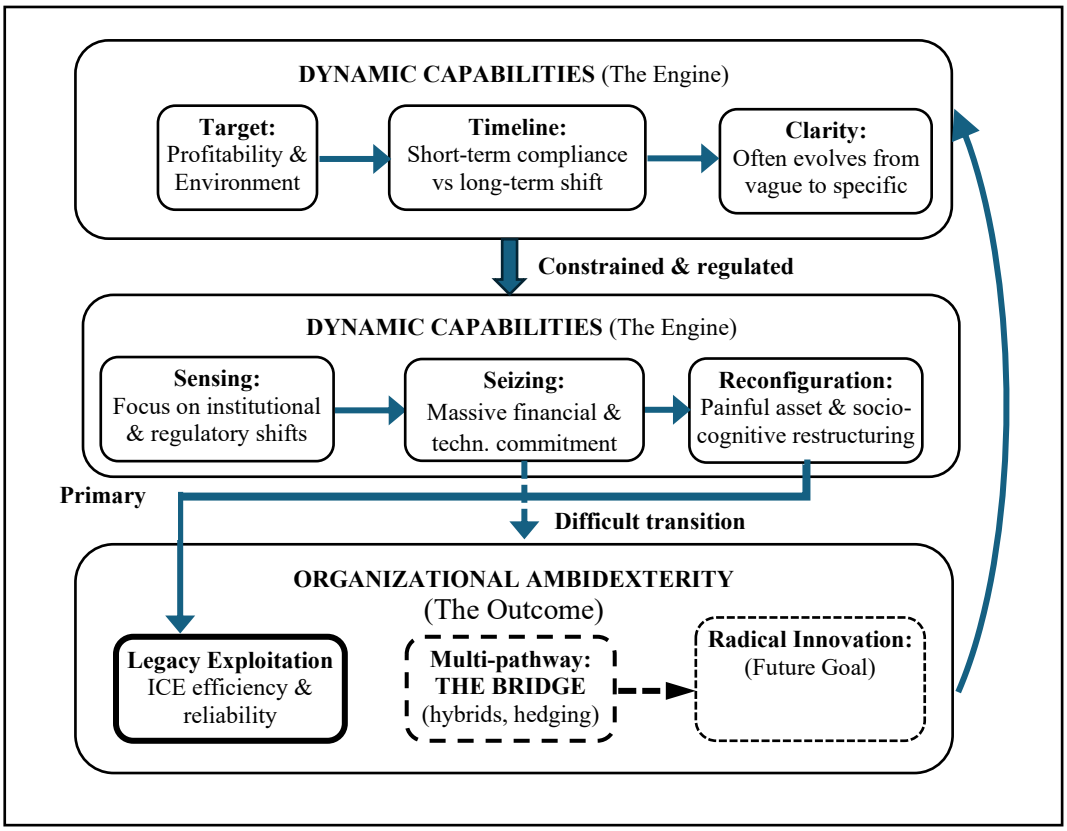
"We have always adhered to the development concept of "Technology Based, Innovation Oriented" and unswervingly adhered to the new energy strategy, constantly spawning, and strengthening new productivity." (BYD, pg. 4)

Transformational reconfiguration in EV-forward firms is correspondingly more direct and systemic. BYD's deployment of proprietary platforms such as Blade Battery, e-Platform 3.0, CTB Technology, and intelligent driving systems demonstrates high organizational plasticity and adaptive resilience (BYD, pg. 4–5). Rather than dismantling legacy structures, these firms build new architectures from the ground up, enabling faster capability alignment and execution speed.

Consequently, organizational ambidexterity in Fig. 6 does not emerge from balancing ICE exploitation with EV exploration. Instead, it manifests as parallel radical innovation across multiple emerging domains (batteries, platforms, intelligent systems), supported by a highly flexible organizational structure. Legacy exploitation is effectively bypassed, allowing EV-forward firms to pursue a rapid and direct transition path.

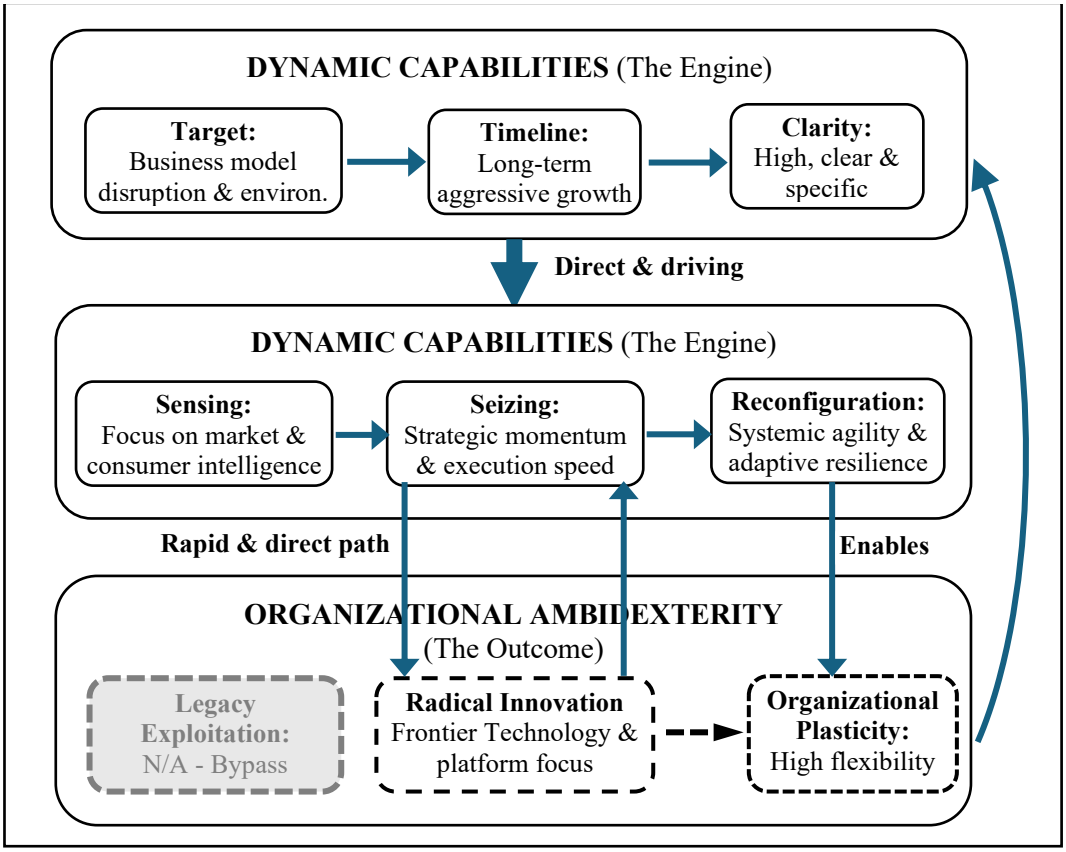
Together, Fig. 5 and Fig. 6 demonstrate that ambidexterity is not a uniform organizational state but a historically conditioned outcome shaped by vision-guided dynamic capabilities. While incumbents must traverse a complex bridge between old and new, EV-forward firms enact a leapfrog strategy enabled by focused vision and organizational plasticity.

Fig. 5 The "Transition Bridge" path - incumbent/legacy automotive companies



Source: our elaboration

Fig. 6 The "Radical Leapfrog" - EV-forward companies



Source: our elaboration

5. Discussion

Building on the literature review and the findings of the study, the study advances a general framework (see Fig. 7) in which vision capability (VC) operates as a higher-order strategic antecedent shaping dynamic capabilities (DC) and firms' transition pathways. Path c captures the indirect effect of VC on transition outcomes through DC, whereby vision guides sensing, seizing, and reconfiguration, leading to exploitation, exploration, or their simultaneous pursuit. Path a reflects the direct influence of VC on transition pathways, enabling firms to accelerate or redirect strategic responses to disruption independent of fully developed operational capabilities. Path b represents recursive feedback effects, through which enacted transition paths prompt re-articulation of organizational vision and recalibration of subsequent sensing and capability deployment. Collectively, the framework conceptualizes adaptation as a co-evolutionary process linking vision, dynamic capabilities, and ambidextrous innovation trajectories under conditions of disruption.

This study examined how vision capability governs dynamic capabilities in shaping organizational ambidexterity during the automotive industry's transition from ICE-based manufacturing to electrified and software-driven mobility. Integrating the study findings with the conceptual framework, the discussion advances a process model in which vision capability operates as a higher-order strategic antecedent that directs the development and deployment of dynamic capabilities, thereby determining firms' transition pathways and ambidextrous outcomes.

First, the findings establish vision capability as a strategic governor rather than a symbolic managerial artifact. Across both legacy and EV-forward firms, vision defines the object of analysis, legitimizes strategic trade-offs, and narrows organizational search spaces. For incumbent OEMs, vision integrates sustainability with continuity, enabling hybridized strategies that preserve customer trust while advancing electrification. For EV-forward firms such as BYD, vision performs a path-

creation function by reducing technological ambiguity and enabling decisive concentration of resources on new energy platforms. In this sense, vision capability shapes not only how firms interpret environmental change but also how rapidly they commit to particular innovation trajectories.

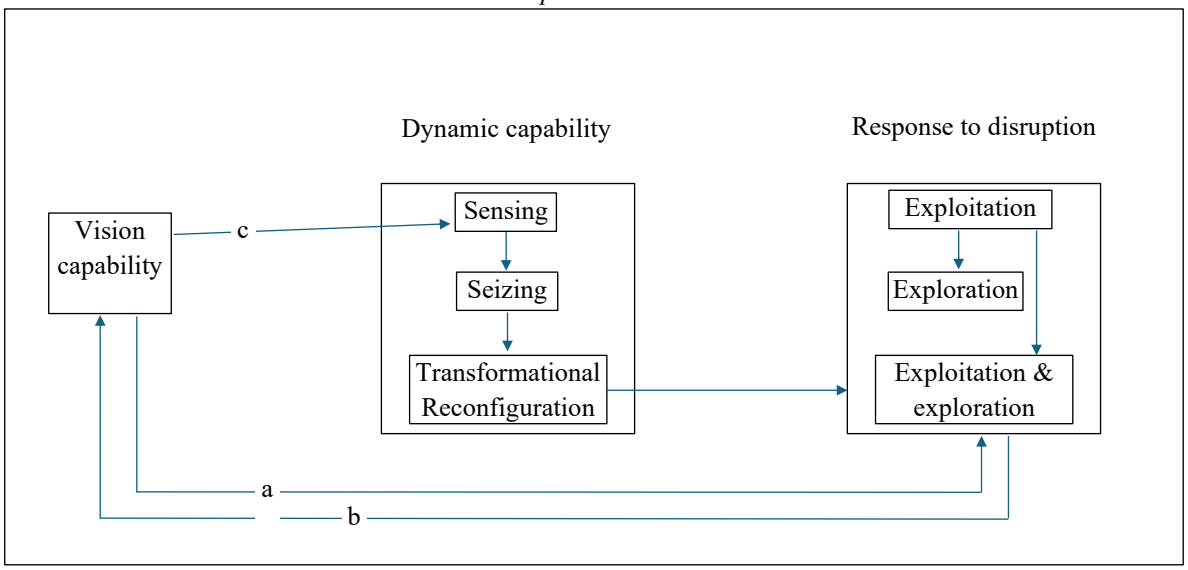
Second, dynamic capabilities emerge as the executional mechanism through which vision is translated into organizational transformation. Vision capability directs managerial attention toward salient environmental signals, thus, regulatory pressures for incumbents and market opportunities for EV-forward firms. This activates sensing processes that lead to seizing behaviors in the form of financial, technological, and organizational commitments. These commitments subsequently enable transformational reconfiguration encompassing both asset restructuring and socio-cognitive change. While this patterned progression from sensing to seizing and reconfiguration is evident across cases, its enactment differs sharply by organizational history. Legacy OEMs deploy dynamic capabilities incrementally, constrained by embedded ICE assets and institutionalized routines, resulting in gradual and socially complex reconfiguration. In contrast, EV-forward firms exhibit tighter coupling between sensing, seizing, and reconfiguration, supported by vertically integrated innovation systems and higher organizational plasticity.

Third, organizational ambidexterity is revealed as a contingent and path-dependent outcome rather than a stable equilibrium. Incumbent firms predominantly enact multi-pathway ambidexterity, balancing exploitation of legacy platforms with exploration of EVs, hydrogen technologies, and software ecosystems. EV-forward firms, by contrast, express ambidexterity through simultaneous radical innovations, largely bypassing legacy exploitation altogether. These findings challenge static conceptualizations of ambidexterity and instead position it as an evolving strategic configuration shaped by historical asset bases and vision-driven capability deployment.

The integrated framework further highlights both indirect and direct effects of vision capability on transition outcomes. While vision primarily influences ambidexterity through dynamic capabilities, it may also directly accelerate strategic shifts in advance of fully developed operational capabilities, helping to explain the rapid transition trajectories observed among EV-forward firms. Moreover, enacted transition paths generate recursive feedback effects, prompting re-articulation of organizational vision and recalibration of sensing and capability deployment. Strategic adaptation is therefore conceptualized as a co-evolutionary process in which vision capability, dynamic capabilities, and innovation trajectories mutually reinforce one another over time.

Collectively, these findings position vision capability as the foundational driver of strategic transformation, dynamic capabilities as the operative bridge between foresight and execution, and ambidexterity as a historically conditioned outcome of their interaction. By foregrounding the recursive and path-dependent nature of this process, the study reframes organizational ambidexterity not as a fixed balance but as a dynamically constructed response to disruption.

Fig. 7 Conceptual framework of how automotive OEMs respond to the disruption leveraging on their DC and corporate vision



Source: our elaboration

6. Conclusion

This study bridges the gap between academic theory and organizational practice by offering a dual-lens perspective that refines dynamic capability frameworks while providing actionable strategic guidance for navigating large-scale industrial transformations. Theoretically, it advances the literature by elevating vision to a higher-order dynamic capability that governs the coherence of sensing, seizing, and reconfiguration, while reconceptualizing organizational ambidexterity as a historically embedded configuration rather than a generic balance. By distinguishing the "transition bridge" of incumbents from the "radical leapfrog" of EV-forward firms, the research introduces a recursive model of strategic adaptation as illustrated in the feedback loops of Fig. 7. This incorporates cognitive governance and temporal co-evolution.

Practically, these findings underscore that successful transformation requires a coherent, operationalized vision to prevent dynamic capabilities from becoming fragmented; legacy OEMs must prioritize socio-cognitive renewal alongside asset reconfiguration, while EV-forward firms must anchor rapid innovation to scalable operational systems. Ultimately, by addressing how firms navigate the shift toward electric mobility, this research confirms that the divergence in strategic outcomes is rooted in the interplay between cognitive foresight and structural agility. These insights provide a comprehensive roadmap for understanding how both legacy and emergent players can maintain competitive advantage by treating ambidexterity as a fluid strategic state requiring continuous recalibration.

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Strategic Configurations of Circular Economy in the Battery Value Chain: Evidence from Global Automotive OEMs

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Abstract

Frame of the research. *The study is positioned within the Circular Economy (CE) literature in the automotive sector, focusing on how Original Equipment Manufacturers (OEMs) strategically implement circular practices along the battery value chain.*

Purpose of the paper. *This paper aims to analyze how automotive OEMs configure differentiated CE strategies along the battery value chain through the ReSOLVE levers (Loop, Exchange, Optimise) and to identify whether firms specialize in particular levers and which strategic configurations emerge. In doing so, the study addresses the limited attention paid in the literature to how firms select and combine specific operational and managerial levers into differentiated strategic configurations at the sector level.*

Methodology. *The study adopts quantitative content analysis of 2024 non-financial reports from 45 automotive OEMs, followed by lever-share analysis and ascending hierarchical clustering. This methodological design allows us to map the CE levers mobilized by each OEM, identify dominant strategic priorities, and detect recurring strategic configurations across firms.*

Results. *Findings show that OEMs do not adopt CE uniformly but tend to specialize around a dominant lever. Governance-related actions are particularly recurrent, highlighting the importance of coordination across the battery value chain.*

Research limitations. *The study focuses on three ReSOLVE levers and two managerial levers, rather than the full set of framework dimensions. Moreover, the analysis is based on a single year of reporting.*

Managerial implications. *The results imply the need to clearly define strategic priorities within the battery value chain, avoiding generic CE approaches and focusing resources on the most coherent levers, as effective CE strategies require alignment among strategic choices, organizational structure, internal capabilities, and regulatory frameworks.*

Originality of the paper. *The paper extends the ReSOLVE framework empirically to the battery value chain and adopts a configurational approach, integrating operational and managerial levers to interpret CE strategies in the automotive sector.*

Keywords: *circular economy; battery; automotive OEMs; ReSOLVE framework; quantitative content analysis; cluster analysis*

1.Introduction

The growing and rapid diffusion of electric vehicles (EVs) is profoundly transforming the automotive industry, creating new challenges related to the availability of critical raw materials and the increasingly urgent sustainable management of end-of-life batteries (Rezaei et al., 2025; Dixit et al., 2024; Jannesar et al., 2024; Tembo et al., 2024). The increase in demand, extraction and processing of strategic raw materials such as lithium, nickel and cobalt, characterized by high price volatility, social impact and concentration in specific geographical areas (Zackrisson et al., 2010; Song et al., 2019; Yan et al., 2020; Castro et al., 2022; Abdelbaky et al., 2023; Chen et al., 2023; Lai et al., 2023), require the adoption of production models capable of reducing both dependence on scarce resources and the environmental impact throughout the entire life cycle of batteries.

In this context, the CE emerges as a strategic paradigm to combine sustainability, industrial resilience and competitiveness, allowing automotive OEMs to extend the useful life of batteries, recover materials, contributing to waste reduction and costs along the entire supply chain (Cintra et al., 2025; Beaudet et al., 2020). From this perspective, the adoption of CE principles turns end-of-life

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management into a value-creation opportunity, as it helps reduce reliance on suppliers concentrated in specific regions of the world while enhancing the efficiency of production systems. Despite the growing scholarly interest in battery circularity, three gaps remain. First, the CE is mostly interpreted as a holistic transformation of the value chain, with limited attention to the specific operational and managerial levers firms actually mobilize. Second, the literature has rarely examined how these levers combine into differentiated strategic configurations at the sector level. Third, systematic comparative evidence on how automotive OEMs configure CE strategies along the battery value chain is still missing. Addressing these gaps is particularly relevant given the role of OEMs as system integrators and supply chain orchestrators, whose decisions on technology, design, organization and governance shape circularity along the entire battery life cycle.

This study connects two types of research fields that have so far progressed in parallel: on the one hand, studies on the circular economy in operations and supply chain management has produced taxonomies of practices (Centobelli et al., 2020; Bertassini et al., 2021), but tends to treat them as stand-alone instruments rather than as elements of integrated strategic architectures. On the other hand, configurational and neo-configurational approaches in strategic management (Misangyi et al., 2017; Greckhamer et al., 2018; Furnari et al., 2021) have demonstrated the power of multiple, alternative configurations of conditions leading to the same outcome in explaining firm-level heterogeneity, but have only marginally engaged with sustainability transitions and, even less, with the battery value chain. Bridging these streams, OEMs' CE engagement is conceptualized as a strategic configuration in which operational levers (Loop, Optimize, Exchange) interact with two managerial levers (Design, Govern). The empirical relevance of the setting is reinforced by the EU Battery Regulation (Regulation (EU) 2023/1542) and the digital battery passport requirements, which raise the strategic stakes of CE positioning for global automotive OEMs. The aim of this study derives from the above considerations. In line with the aim, we adopt a configurational perspective to empirically examine how automotive OEMs implement CE strategies in the battery value chain through an adapted version of the ReSOLVE framework (Ellen MacArthur Foundation, 2015a). From this perspective, firms are understood as systems of interdependent elements, where strategic outcomes depend on the coherence among organizational structures, processes, capabilities and strategic choices rather than on isolated practices (Miller, 1987; Meyer et al., 1993). The analysis focuses specifically on the levers of the aforementioned framework that are most relevant and observable in the battery supply chain "Loop", "Optimise" and "Exchange" — integrated with two additional managerial levers, "Design" and "Govern", considered enabling factors to make circular practices implementable in complex industrial supply chains. To construct the dataset to be used for the empirical analysis, the non-financial reporting published by OEMs in 2024 (the last year for which reports were available) was used as an institutional source, in order to identify recurring strategic patterns and differentiated configurations of CE implementation. Although these reports have a declarative nature, they represent the formalized communication tool capable of defining and legitimizing one's CE strategies towards all stakeholders (Lanzalonga, 2025; Kamińska-Witkowska & Kaźmierczak, 2024). In addition, non-financial disclosure is an appropriate source for comparatively observing the declared sustainability strategies and strategic priorities communicated by companies to stakeholders.

In line with the objective, the following research questions are formulated:

RQ1: How are automotive OEMs configuring CE strategies along the battery value chain through the "Loop", "Optimise" and "Exchange" levers integrated with "Design" and "Govern"?

RQ2: Do OEMs tend to specialize in specific levers or combinations of levers in the implementation of battery circularity?

RQ3: What recurring strategic configurations emerge among automotive OEMs when CE strategies are analyzed from a comparative configurational perspective?

The results contribute to the literature on the CE by showing that the CE in the battery value chain emerges empirically as a set of differentiated and recurring strategic configurations to interpret the implementation of the CE, assuming that circularity does not emerge from the isolated adoption of

individual practices, but from the combination of operational and managerial levers that configure different strategic trajectories among automotive OEMs. From an empirical point of view, this work offers one of the first comparative analyses on a large international sample of automotive OEMs, identifying recurring strategic configurations of CE based on the strategies declared in non-financial reporting.

Building on these foundations, an alternative view of Circular Economy (CE) is adopted in this paper. Rather than being treated as a toolkit or as a set of practices from which organisations may choose (Ellen MacArthur Foundation, 2015; Centobelli et al., 2020), CE is here approached through a configurational architecture lens. Drawing on the neo-configurational perspective in management research (Furnari et al., 2021; Misangyi et al., 2017), the implementation of CE strategies is conceptualized as a bundle of operational levers (Loop, Optimise, Exchange) and managerial levers (Design and Govern) whose joint deployment, more than the additive contribution of each lever taken in isolation, gives rise to distinct strategic configurations. The shift from a list-based to a configuration-based reading constitutes the conceptual pivot of the paper.The remainder of the paper is organized as follows. After the next section where the theoretical framework and literature review are developed, the process for the composition of the dataset and the methodological approach used is described. Then the results of the analyses are presented and discussed in the light of the existing literature. Finally, the theoretical and managerial implications, as well as the limitations of the research, are illustrated together with the conclusions.

2. Circular Economy and strategic configurations: a theoretical background

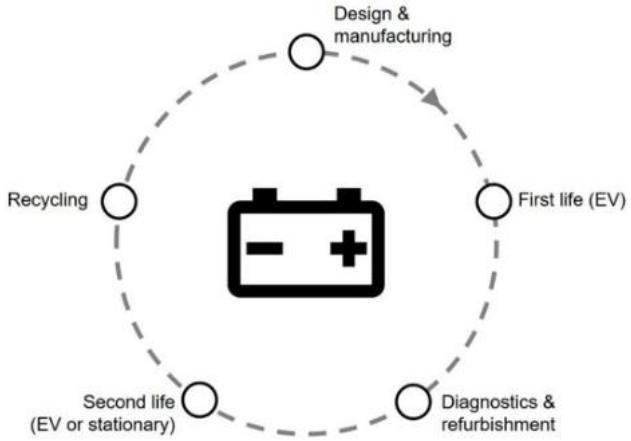
In recent years, the automotive industry has been undergoing a profound structural transformation driven by the need to reduce emissions of carbon dioxide and other greenhouse gases associated with road transport, increasingly shifting production towards EVs (Niri et al., 2024; Bonsu, 2020). Forecasts indicate that, after 2030, about half of the new vehicles produced will be electrified (BloombergNEF, 2024). All this makes sustainable battery management a central issue for the industrial competitiveness and environmental sustainability of the sector.

The transition towards EVs requires adopting CE practices that are able to reduce resource consumption and improve the overall efficiency of production systems (Demartini et al., 2023). The CE is based on the principle that what reaches the end of its life and which would be waste can be transformed into a new production resource, extending the economic and environmental value of materials over several cycles of use (Fedele & Hysa, 2024; Kirchherr et al., 2017; MacArthur, 2013).

However, there is still limited understanding of how these principles are translated into concrete strategic configurations by automotive OEMs, making it useful to analyse the operational and managerial configurations through which circularity is implemented along the battery value chain. In the automotive sector, circularity is particularly important in managing the entire life cycle of batteries, which are destined to generate increasing volumes of waste in the coming decades. Circular management of the value chain, from design to recycling, can mitigate raw material scarcity and reduce the accumulation of industrial waste (Dutta et al., 2026; Almahri & Heungjo, 2025; Bruno et al., 2025; Machala et al., 2025; Bobba et al., 2019). Batteries, indeed, do not generate benefits exclusively during their automotive life cycle, but can be reused or reconfigured when their capacity drops to 70–80% of the original state of health (Machala et al., 2025; Etxandi-Santolaya et al., 2023).

The circular value chain of batteries includes a plurality of interdependent activities: design and production, use during the first life, health assessment, second life in alternative applications and final recycling of materials (Olsson et al., 2018).

Fig. 1: The circular value chain of batteries for electric vehicles



Source: Olsson et al., 2018

During the design and manufacturing phases of batteries, the selection of materials directly affects the possibility of future reuse and recovery, while diagnostic and reconditioning activities require close collaboration among supply chain actors to ensure the safety and quality of reuse (Saari et al., 2026). Similarly, the implementation of circularity requires the development of reverse logistics systems and coordinated collection, disassembly and recycling activities (Gonzales-Calienes et al., 2022; Tadaros et al., 2022). The implementation of CE practices within the battery value chain generates significant environmental and economic benefits, contributing to the possibility of reducing costs and enhancing *brand reputation* in response to increasing consumer sensitivity toward sustainability (Hu et al., 2022; Kautish et al., 2019). However, the multiplicity of activities, processes, and actors involved makes the battery value chain intrinsically complex, configuring circularity as a multidimensional and systemic phenomenon. This complexity necessitates the adoption of an analytical perspective capable of capturing not only individual practices but also their strategic combinations. Within this context, the ReSOLVE framework, developed by the Ellen MacArthur

Foundation in collaboration with McKinsey (2015), represents one of the primary analytical tools utilized to interpret the implementation of CE practices within firms (Sell et al., 2023; Tedesco et al., 2022). The framework translates the fundamental principles of the CE into the six strategic levers, Regenerate, Share, Optimise, Loop, Virtualise and Exchange, which guide operational and organizational choices oriented towards sustainability. In particular, the "Optimise", "Loop" and "Exchange" levers are more observable in the industrial context of the battery value chain: the first concerns process efficiency and waste reduction (Mhatre et al., 2021), the second the closure of material cycles through reuse and recycling, while the third involves the adoption of innovative technologies and materials. In this perspective, the ReSOLVE framework can be interpreted not only as a classification of circular practices, but as a set of combinable policy options, the integration of which generates alternative strategic configurations of CE implementation.

The multidimensional character is linked to the fact that CE integrates economic, environmental and social dimensions and requires technological, organisational and institutional transformations along the entire value chain (Geissdoerfer et al., 2017), highlighting its systemic nature. In line with the configurational perspective, according to which organizations are systems of interdependent elements (Miller, 1987; Meyer et al., 1993), CE can be interpreted not as the result of the isolated adoption of individual practices, but as the outcome of coherent and interdependent strategic configurations of strategies and contextual factors (Zhu et al., 2022). Recent studies have shown that the effective implementation of circularity in batteries requires coordination between different business functions and supply chain actors (Schulz-Mönninghoff et al., 2023), as well as the presence of enabling factors such as technology and infrastructure (battery eco-design, modularization, monitoring, diagnosis, tracking and digitization), interorganizational collaborations (information

sharing, collaboration and alignment of stakeholders), economic incentives (incentives for recycling, more favorable market conditions), consistency with policy and regulatory principles (eco-design directives, standards, certifications, regulatory consistency) and social aspects (social commitment) (Sopha et al., 2022). Since the implementation of circularity in complex industrial supply chains depends not only on operational practices but also on organizational and coordination skills, the need to integrate managerial dimensions into the framework emerges. As a result of adopting the configurational perspective, additional managerial levers become relevant: "Design" and "Govern".

The "Design" lever concerns the design of products and components oriented towards reuse, repair, regeneration and recycling, enabling circular strategies to be technically implemented (Moreno et al., 2016; Shahbazi & Jönbrink, 2020). The "Govern" lever, encompasses the set of supply chain governance mechanisms - formal (policy and audit) or relational (partnership) - necessary to guide and coordinate supply chain partners towards CE and sustainability objectives (Perdana et al., 2023; de Haan-Hoek et al., 2020; Formentini & Taticchi, 2016). In the context of the battery value chain, these mechanisms are particularly relevant because the complexity of battery production and chemical composition affects disassembly and reverse logistics activities, making coordination between the players in the supply chain essential. The integration between operational and managerial levers is reflected in the literature on CE, which highlights the complementary role of technologies and interorganizational collaboration as enabling factors of circular implementation (Cagno et al., 2021; Rusch et al., 2023). Despite the wide diffusion of the ReSOLVE framework in various sectors (Ta et al., 2024; Payne & Kwofie, 2024), there is still limited systematic comparative evidence on automotive OEMs and there is a lack of analyses that explicitly examine the CE as a set of strategic configurations resulting from the integration of operational and managerial levers. Overall, the existing literature has made key contributions in mapping the technical and operational dimensions of battery circularity and in highlighting the enabling role of organizational coordination, governance mechanisms and inter-firm collaboration along the value chain. What remains underexplored, however, is how these dimensions are systematically combined by automotive OEMs into recurring strategic configurations.

Taken together, the CE literature can be understood as comprising two complementary yet largely disconnected strands: on the one hand, rich descriptions of the *what* (i.e., the practices and levers of circularity, often presented as toolkits), and on the other, a separate body of work addressing the *who* and the *why* (i.e., organisational behaviour, capabilities, and managerial commitment in the CE transition) Bertassini et al., 2021. What remains under-theorised is the *how they combine*: the conjunctural logic through which OEMs assemble these levers into coherent strategic profiles. The neo-configurational turn in strategic management (Misangyi et al., 2017; Furnari et al., 2021; Roshan et al., 2025) offers a suitable conceptual scaffolding to address this gap. Building on three core tenets of neo-configurational theory - equifinality, conjunctural causation and causal asymmetry - this study examines whether and how OEMs' CE engagements cluster into recurrent configurations rather than dispersing along a continuum of incremental adoption.

In the light of the theoretical framework outlined, the need emerges to adopt a research design capable of capturing the multidimensional and configurational nature of CE strategies along the battery value chain. In particular, the empirical analysis is oriented towards identifying emerging strategic patterns among automotive OEMs, overcoming a reading of circular practices based on single isolated dimensions. For this purpose, the study adopts a blended methodological approach that combines content analysis techniques and configurational analysis, described in the following section.

3. Methodology

In line with the theoretical framework and the research questions formulated, the methodological design was developed to empirically analyse the strategic configurations of CE adopted by

automotive OEMs along the battery value chain. Each research question is addressed through a specific analytical step: RQ1 through the quantitative content analysis of non-financial reports, which maps the levers mobilized by each OEM; RQ2 through the calculation of OEM-level lever shares and the identification of a dominant lever for each company; RQ3 through the hierarchical clustering performed on OEM-level lever profiles. Although presented separately, these steps form an integrated research design whose joint application is what allows the configurational nature of CE strategies to emerge.

As shown, this study adopts a mixed analysis method. The first phase consists of a quantitative analysis of the contents (Nicmanis, 2024; White et al., 2006; Rourke et al., 2004) of non-financial reports aimed at identifying the ReSOLVE framework levers attributable to individual OEMs across the battery value chain. The second phase involves a cluster analysis designed to identify and classify OEMs into homogeneous groups based on the CE strategies they pursue, in order to highlight any recurring patterns, structural differences or distinct strategic models within the automotive sector.

Consistent with the configurational perspective adopted, the methodological approach seeks to identify emerging strategic configurations and recurring patterns, rather than the verification of causal relationships between variables. In practical terms, the content of non-financial reports was coded (Nicmanis, 2024; White et al., 2006; Rourke et al., 2004) to assign to the relevant fragments of texts both the ReSOLVE levers and the two managerial levers. The resulting OEM-level profiles were then analysed using ascending hierarchical clustering to uncover recurring strategic patterns from the configurational point of view (Miller, 1987; Meyer et al., 1993). The empirical basis is made up of secondary data drawn from the non-financial reporting published by automotive OEMs (sustainability report, integrated report, annual report), which is widely regarded as a reliable and privileged institutional source for the analysis of declared strategies in the field of sustainability. All the reports date to the year 2024, the last accessible at the time of download. The initial sample included 77 brands; however, for 32 of them a standalone report was not available, as non-financial reporting was included in the parent company's documents. The final sample analysed is therefore made up of 45 brands that include both traditional operators in the automotive sector and new leaders in the electric mobility segment, ensuring coverage of the main regulatory areas (European Union, United States, China, Japan and India), as well as the presence of pioneering companies in activities related to the CE. The decision to rely on official non-financial disclosure is grounded in its role as a privileged institutional source for the analysis of sustainability strategies declared by companies (Hahn & Kühnen, 2013; Gray et al., 1995).

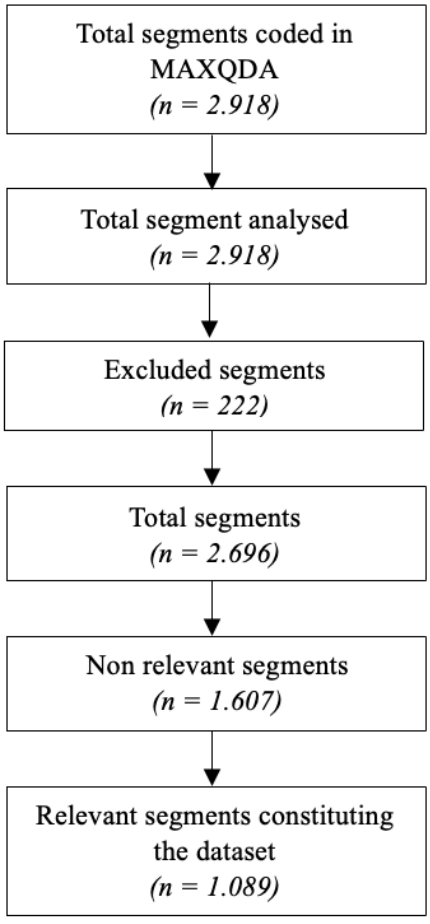
For quantitative content analysis, each report was imported into MAXQDA (version 24.11.1) and subjected to qualitative coding the text segments containing the term "battery" and its variants (e.g. "batteries" or *"BEV" or "BEVs" as acronyms for Battery Electric Vehicle). A "textual segment" refers to the unit of semantic context extracted by MAXQDA around the keyword, preserving the syntactic integrity of the sentence in which the term appears. Among the keywords, terms such as “Battery Energy Storage Systems” and “Battery Storage Systems” were excluded. This methodological decision was made to enhance the precision, avoiding confusion about the terms of the study. In fact, the keyword “Battery Energy Storage System” is mainly used to describe battery storage as a stationary storage system referring to the electricity grid and renewable energies (Meyer et al., 2024; Thakur et al., 2022; Hannan et al., 2021), rather than as a component of the battery value chain of automotive OEMs.

The analysis of the documents, conducted as illustrated in figure 2, led to the identification of 2,696 text segments. The coding procedure was carried out following systematic criteria defined in advance, based on the literature and consistent with the operational definitions of the strategic levers adopted in the study, to ensure interpretative consistency in the attribution of the strategic levers. The coding process was also conducted following iterative procedures of revision and interpretative comparison, to reduce possible classification ambiguities and strengthen the analytical reliability of the assignment of levers. The coding was carried out by a researcher and then subjected to an internal review on a subset of segments (corresponding to 30% of the total and randomly selected) to verify

consistency and interpretative stability of the criteria adopted. Disagreements or ambiguous coding cases were discussed iteratively against the operational definitions of each lever until interpretative consistency was achieved. This procedure strengthened the reliability and theoretical coherence of the coding process. A manual analysis was conducted on this dataset aimed at attributing, where possible, to each segment a specific lever of the ReSOLVE framework with the exclusion of the following three levers: "Regenerate", "Share" and "Virtualise", as they are considered less directly observable and theoretically relevant in the specific context of the battery value chain of automotive OEMs.

This procedure showed that only 1,089 segments, each of which represents a unit of analysis, had characteristics that allowed the attribution of one or more ReSOLVE (multi-tagging) levers, based on the content. The textual segment has been considered an analytical unit as it represents the smallest empirically observable expression of the declared strategies related to the battery value chain. Each segment analysed, which includes the term "battery", was considered as significant for the purposes of the analysis whenever a reference was found for example to cells, battery materials (lithium, nickel, cobalt, graphite, black mass, etc.), production, recovery, reuse, recycling, re-manufacturing, or other R-strategies of the CE, end-of-life, battery supply chain, use of batteries in energy systems. This allowed us creating the final dataset for the analyses (see Figure 2).

Figure 2: Segment identification, screening, and selection



Source: our elaboration

Once the dataset was defined, the analysis was designed in a way that was consistent with the configurational perspective adopted in the study (Miller, 1987; Meyer et al., 1993). Since the implementation of circularity in complex and technology-intensive industrial supply chains, such as batteries and specifically lithium batteries, is inherently multidimensional, it is detectable through the

adoption of a systemic combination of strategic levers (Geissdoerfer et al., 2017). In line with the configurational perspective adopted in the study, the objective of the analysis is not to evaluate the isolated effect of the individual levers, but to identify emerging strategic configurations deriving from their combination. Consequently, the cluster analysis was conducted using an integrated set of variables, combining levers of the ReSOLVE framework relevant to the industrial sector ("Loop", "Optimise", "Exchange") with additional industrial managerial dimensions ("Design" and "Govern") precisely to highlight the multidimensional configuration of the circular strategies adopted by OEMs (Kirchherr et al., 2017). This methodological choice is consistent with configurational studies, in which organizational phenomena are interpreted as the result of simultaneous combinations of conditions rather than as independent effects of single variables. In addition, the approach adopted is in line with studies on sustainability and industrial transitions that emphasize the co-evolution of technological, organizational and institutional elements. Applying the content analysis method, the "Loop" lever was associated with the individual segment analysed whenever closed-loop strategies, recycling, recovery, reuse, second life, end-of-life and battery remanufacturing were detected; the "Optimise" lever was associated whenever aspects related to resource efficiency were found, including energy, emissions and water, battery life, cost reduction, impact reduction and emission reduction; the "Design" lever was associated with the segment analysed when concepts referring to battery safety, battery product architecture, durability and disassembly and recycling oriented design were detected; the "Exchange" lever has been associated when the segment analysed is talking about new chemical formulations or more generally about process innovations or recycling technologies; the "Govern" lever, on the other hand, was associated with the segment analysed when it comes to sourcing, supplier, audit, traceability, partnerships, regulation, and policy. While the text only talks about ESG factors in general, the segment has not been associated with any strategic leverage. The final dataset has a qualitative-quantitative structure, consistent with the methodology adopted and is organized at OEM level of analysis. For each brand, descriptive information was collected through secondary sources, such as the year the company was founded, the group to which it belongs or ownership (i.e. whether it belongs to a group or is independent), the continent and state of the registered office, the market segment served divided into supercars, luxury cars, premium, generalist and multi-segment, as well as an indication of the exclusive production of electric or plug-in hybrid vehicles. From a quantitative point of view, the dataset has been enriched with variables relating to the number of relevant textual segments associated with each strategy of the ReSOLVE framework adapted and integrated with managerial levers applicable to the industrial sector. A relevance share was then calculated, as the ratio between the number of relevant segments and the total of segments identified for each company.

$$\text{Relevance Share}_i = \frac{\text{Number of Relevant Segments}_i}{\text{Total Identified Segments}_i} \times 100$$

As already mentioned, an analysed segment is relevant when the text contained in it allows the association with one or more levers of the ReSOLVE framework adapted and augmented with the managerial levers. This indicator was introduced for standardisation purposes, to mitigate potential distortions arising from differences in report length or from the different degree of in-depth treatment of battery-related issues. Similarly, a share was calculated for each lever. This captures the relative frequency with which each lever is adopted in relation to the total relevant content identified for each OEM.

$$\text{Lever Share}_i = \frac{N_{\text{rows in which lever } i \text{ is identified}}}{N_{\text{relevant rows}}}$$

Finally, a dominant lever was associated with each OEM, intended as a synthesis of the strategies adopted with respect to the entire ReSOLVE framework, identified as the lever that has the highest

share value compared to the others. To achieve the research aim, the statistical analyses were conducted in R (version 4.5.2) to identify the most recurring strategic configurations among OEMs.

For each OEM, the two levers with the highest share (Top1 and Top2) were selected, and the relative pairs were aggregated by frequency. The results were represented through a bubble chart, where the position indicates the combination of levers and the size of the bubble indicates the number of associated OEMs. Finally, an analysis was carried out by groups of companies, taking as a reference variable the dominant lever, identified as the lever with the highest share for each OEM. Following the groupings by dominant lever, a hierarchical cluster analysis was conducted aimed at identifying homogeneous groups of OEMs characterized by similar strategic profiles in terms of CE.

A principal component analysis (PCA) was preliminarily carried out with the aim of synthesizing the complexity of the dataset. On this basis, ascending hierarchical clustering was carried out in R (version 4.5.2) aimed at grouping OEMs according to their degree of similarity. The analysis of the dendrogram made it possible to identify the most appropriate number of clusters (equal to five). This methodological approach therefore makes it possible to systematically and comparatively analyse the strategies declared by automotive OEMs, while preserving the multidimensional complexity of the CE in the battery value chain. The results deriving from this analytical approach are presented in the following section, with the aim of highlighting the empirically observable emerging strategic configurations and structural differences between the OEMs analysed.

Two limitations arise from the use of corporate sustainability reports as the primary data source. First, these documents are prepared autonomously and, in most regulatory contexts, are not yet subject to external assurance comparable to that required for financial reporting; this exposes content analysis to a potential risk of greenwashing, whereby narrative emphasis may overstate actual commitment (He et al., 2024). The recent diffusion of IFRS S1/S2 and the proposed ISSA 5000 sustainability assurance standard indicate a move toward more verifiable disclosure; however, at the time of coding, the institutional infrastructure for assurance remains in a phase of development. Second, reporting practices remain heterogeneous across different frameworks (GRI, SASB, TCFD, IFRS S2) and jurisdictions; even with the entry into force of the EU CSRD in 2024, comparability across OEMs remains limited.

4. Results

4.1 Initial data analysis

In line with the research questions, this section describes the composition of the sample and the distribution of the levers (and their combinations) to provide a preliminary picture of the strategic configurations of CE adopted by OEMs. The descriptive analysis of the sample allows us to contextualize the differences observed in the levers of CE. The primary descriptive statistics relating ownership structure, geographical location, market positioning and technological orientation are presented below. In terms of ownership structure, the reference sample is mainly group-driven, in line with the presence of large multinational groups in the automotive sector. Specifically, 31 brands belong to multinational automotive groups, while 14 brands operate as independent manufacturers, highlighting a substantial presence of operators not integrated into large industrial groups. Regarding the overall distribution of automotive brands based on the registered office, the sample shows a marked geographical polarization, with a strong concentration in some areas of the world that are driving the development of the automotive industry. Europe, America, and East Asia emerge as the main poles: the sample of automotive brands with registered offices in Asia includes 19 OEMs and is characterized by a strong heterogeneity. In terms of market positioning, there is a clear prevalence of the generalist segment, which represents the dominant configuration, while only a minority of brands are in the premium and luxury car segments.

In the sample, EV-only brands coincide with new entrants (recently established brands). The sample of automotive brands with registered offices in Europe is made up of 20 OEMs. From a

chronological point of view, the data show a structure unbalanced towards historical OEMs, with a residual presence of new entrants; only very few cases of recent foundation are placed in the nineties or later. In terms of ownership, there is a clear prevalence of brands belonging to large multinational groups, particularly European, with a more limited share of independent brands, often concentrated in the higher value-added segments. In terms of market positioning, the sample has a distribution strongly oriented towards the premium segments, luxury cars and supercars, which are overrepresented compared to the generalist segment, although present through some major historical brands. This distribution indicates a greater presence, in the European subsample, of brands placed in the premium, luxury, and supercar segments.

As far as technological orientation is concerned, exclusively electric production is marginal and limited to a very small number of brands, while the majority adopts multi-technological strategies
The sample of automotive brands headquartered in the United States is made up of 6 OEMs and has a marked heterogeneity from a historical, proprietary and strategic point of view. From a temporal point of view, the sample includes both historical and recently founded brands, mainly located in the 2000s. In terms of ownership, independent brands prevail, flanked by some OEMs belonging to large multinational groups. Historical brands are more frequently integrated into consolidated industrial groups, while more recently founded brands tend to maintain an independent ownership structure. In terms of market positioning, the sample shows a balanced presence between generalist brands and brands located in the premium and luxury car segments. The generalist brands are mainly attributable to the historical OEMs, while the most recent brands are more concentrated in the higher value-added segments. With a view to technological orientation, exclusively electric production is adopted by a significant part of the sample and is concentrated in newly founded brands, while historical OEMs present a multi-technological offer. Overall, the US sample is characterized by a higher incidence of native electric brands than in the European context. Table 1 reports the respective shares that the five levers occupy in the dataset.

Table 1: Lever-relevant shares

	Loop share	*Optimise share*	*Design share*	*Exchange share*	*Govern share*
Mean	0,353	0,151	0,182	0,161	0,352
Median	0,327	0,100	0,143	0,083	0,333
Standard deviation	0,301	0,204	0,222	0,212	0,259

Source: our elaboration

The shares indicate the relative frequency with which each lever appears compared to the total of the relevant segments identified for each OEM (i.e., relevant rows). All lever shares have values between 0 and 1. The highest average share is associated with the “Loop” lever (0.353) immediately followed by the “Govern” lever (0.352), indicating a higher relative incidence of “Loop” content in the sample (Table 1).

The medians of the “Loop” and “Govern” levers indicate a relatively balanced distribution of values in the sample. The standard deviation varies between levers: “Loop” records the highest value (0.301) so it has the greatest variability between brands. Within the sample analysis, as shown by the distribution of frequencies per dominant lever in Table 2, the two most relevant levers in absolute terms are “Loop” and “Govern”.

Table 2: Frequency distribution per dominant lever

Levers	*No. of OEM*
Design	3
Exchange	6
Exchange/Govern	1
Govern	16
Loops	11
Loop/Govern	1
Loop/Optimise	1
Loop/Optimise/Exchange	1
Optimise	5
Total	45

Source: our elaboration

Moreover, across the different market segments (supercars, luxury cars, premium, generalist and multi-segment) substantial differences emerge in the configuration of the CE levers (see Table 3).

The values shown in Table 3 represent the sum of OEM-level shares calculated on relevant rows for each lever within each market segment. As a result, results can exceed one and reflect the overall lever intensity in the segment. Furthermore, since these are aggregate values, they are also affected by the different number of OEMs per segment. In aggregate terms, "Loop" and "Govern" are prevalent, but with varying intensity between segments. The generalist segment has the highest values, especially for "Loop" and "Govern", suggesting that, in sectors with high production intensity and greater logistical complexity, the emphasis on "Loop" and "Govern" is consistent with a reading of the CE as a supply chain coordination challenge (traceability, standardization and inter-organizational collaboration). The management of end-of-life battery flows, in this context, takes on greater industrial importance where economies of scale require systemic recovery and traceability solutions. In the premium and luxury car segments, there is a higher relative incidence of "Design", indicating an approach to CE that is predominantly oriented towards product design, durability and perceived quality, rather than large-scale cycle closure. In the supercar segment, the reduced values - for "Exchange" and "Optimise" - indicate a more limited integration of circular practices, probably related to reduced production volumes and industrial models less dependent on process efficiencies.

Therefore, the CE in the battery value chain does not follow a uniform path among OEMs but develops through differentiated trajectories according to the industrial model and the competitive positioning of the different market segments.

Table 3: Sum of shares on relevant rows by lever and market segment

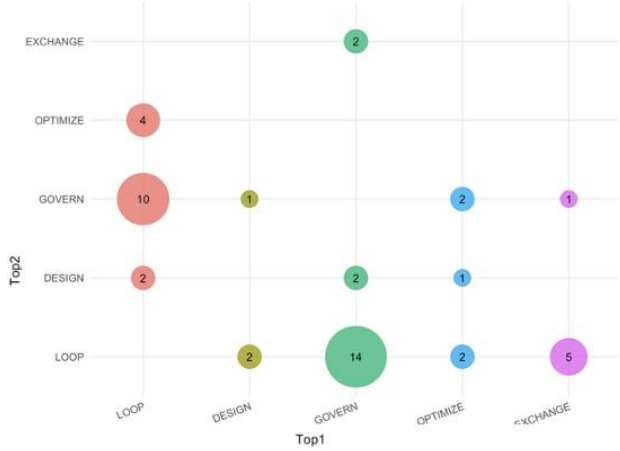
Segment\ Lever	*GOVERN*	*EXCHANGE*	*DESIGN*	*OPTIMISE*	*LOOP*
Luxury cars	3,2	1,5	2,3	1,9	1,6
Generalist	7,8	3,5	3,3	3,3	10,3
Multi-segment	0,5	0,7	0,3	0,1	0,5
Premium	2,2	1,2	1,8	1,1	2,2
Supercars	1,8	0,0	0,3	0,1	1,0
Total	15,8	7,2	8,1	6,7	15,8

Source: our elaboration

Through the R (version 4.5.2), an exploratory analysis was conducted aimed at identifying the strategic configurations of levers most frequently adopted by OEMs. To this end, for each OEM, the

two levers with the greatest relative weight, measured through the share on the relevant rows, were identified, and the corresponding pairs were subsequently aggregated and analyzed (Figure 3).

Figure 3: Distribution of strategic configurations



Source: our elaboration

The most frequent combination is “Govern-Loop” (top1: govern, top2: loop), with a count of 14. This is followed by “Loop-Govern” (top1: “Loop”, top2: “Govern”) with 10 and “Exchange-Loop” with 5. It should be noted that this analysis does not constitute a cluster analysis in the strict sense, as it is not based on distance measurements or aggregation algorithms, but represents a descriptive exploration of the most recurrent strategic configurations among the dominant levers. The fact that the most frequent combination associates a ReSOLVE lever (“Loop”) and a managerial lever (“Govern”) is consistent with the research assumption that managerial levers can act as enablers in the implementation of ReSOLVE levers.

4.2 *Analysis of groups by dominant lever*

In order to achieve the objective set in this work and for the sake of completeness of information with respect to the analysis of the strategic configurations of the most frequent levers, the sample was divided into groupings taking as a classification variable the dominant lever in absolute terms, defined as the lever with the highest share for each OEM. On this basis, nine distinct groupings have been identified: five composed of OEMs characterized by a single dominant lever and four groupings that include OEMs for which multiple levers are dominant simultaneously (Table 4). The groups' analysis highlights differentiated strategic configurations, associated with geographical and structural patterns. European OEMs show a greater incidence of the "Govern" and "Optimise" levers. Asian OEMs, on the other hand, have a greater emphasis on the operational levers of "Loop" and "Exchange". In addition, the fact that multi-lever strategic configurations are represented exclusively by groupings composed of a single brand highlights a tendency towards focus, rather than balance between different dimensions.

Table 4: Groups Characteristics

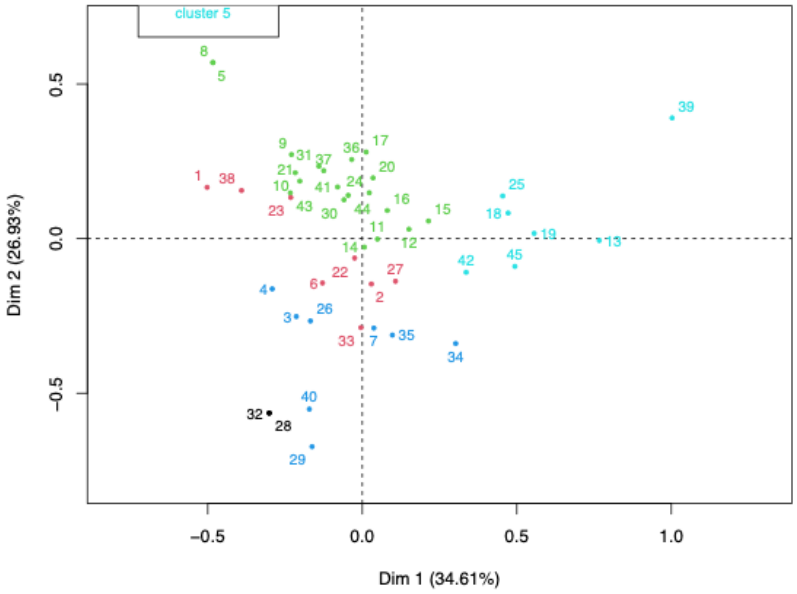
	Groups	Features
1	Govern	It mainly includes OEMs with registered offices in Europe, flanked by American and Asian brands, operating mainly in the generalist and luxury car segments and characterized by heterogeneous ownership structures, united by a strategy in which the "Govern" lever is predominant.
2	Loop	It mainly includes generalist OEMs with registered offices in Asia, flanked by individual cases in America and Europe, characterized by heterogeneous ownership structures and a strategic profile in which the "Loop" lever is predominant compared to the other levers considered.
3	Design	It includes a limited number of OEMs with registered offices equally distributed between Europe and Asia, operating exclusively in the premium segments and luxury cars with all-electric production, characterized by heterogeneous ownership structures and a strategy in which battery eco-design practices are predominant.
4	Exchange	It mainly includes OEMs with registered offices in Asia, supported by some European brands, operating in heterogeneous market segments – with a prevalence of generalist OEMs – characterized by diversified ownership structures and a strategic profile in which the "Exchange" lever is predominant.
5	Optimise	It includes OEMs mainly with registered offices in Europe, supported by some Asian brands, operating in the luxury, generalist and to a lesser extent premium car segments, characterized above all by belonging to large industrial groups and by a strategic profile in which the "Optimise" lever is predominant.
6	Loop-govern	Isuzu is a generalist OEM based in Asia, characterized by a joint dominance of the "Loop" and "Govern" levers, reflecting a balanced distribution between battery circularity strategies and content related to supply chain governance.
7	Exchange-govern	Mazda is an independent OEM based in Asia with a generalist positioning that reflects a greater incidence of exchange and collaboration strategies flanked by supply chain governance content.
8	Loop-Optimise	SEAT is a European-based generalist OEM belonging to the Volkswagen Group, characterized by a dominant combination of the "Loop" and "Optimise" levers, reflecting the coexistence of circularity and resource efficiency strategies
9	Loop-Optimise-exchange	Škoda is a European-based generalist OEM belonging to the Volkswagen Group, reflecting a relatively balanced distribution between circularity, resource efficiency and exchange/partnership strategies.

Source: our elaboration

4.3 *Cluster Analysis*

To maximize the descriptive capability of the dataset and identify homogeneous groups of OEMs characterized by similar strategic profiles, a cluster analysis was conducted. As a preliminary to the cluster analysis, a Principal Component Analysis (PCA) was carried out with the aim of reducing the dimensionality of the data and synthesizing the information contained in the original variables (Figure 4). PCA was used exclusively as an exploratory dimensionality-reduction technique aimed at visualizing similarities and differences among OEMs. The actual classification of firms into homogeneous groups was instead obtained through hierarchical cluster analysis.

Figure 4: Factor Map. PCA



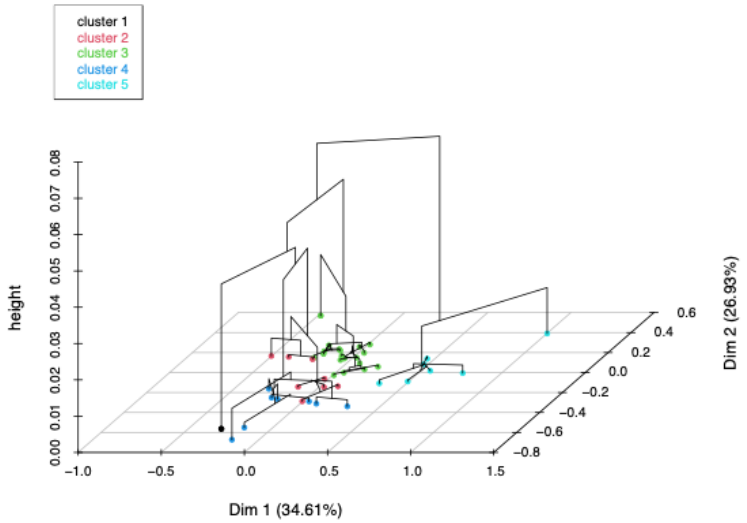
Source: our elaboration

The factor map highlights how OEMs are distributed in the space defined by the first two components, suggesting the presence of structural differences in the strategic profiles of the CE. The distance between the observations reflects the degree of similarity between the strategies adopted, while the presence of densities indicates the existence of recurring strategic configurations among OEMs. Although OEMs are displayed in five colours in the factor map, it should be noted that this colour reflects the membership of the clusters identified later through hierarchical cluster analysis.

The PCA, in fact, does not produce a classification of the observations, but provides an exploratory representation that allows to highlight densities and structural differences in space. Based on this evidence, a hierarchical cluster analysis was applied, to formalize these strategic configurations in homogeneous groups of observations. The hierarchical cluster analysis was conducted on share variables (standardized in z-score), using a Euclidean distance measure and a Ward linkage criterion.

The application of hierarchical cluster analysis has led to the creation of the dendrogram whose analysis allows evaluating the degree of "separation" between the groups and to identify the most appropriate number of clusters, through the observation of jumps in the levels of dissimilarity. In the case at hand, the five-cluster solution is the most suitable as it allows maintaining a good balance between internal homogeneity and differentiation between groups. The dendrogram projected onto the factor map (Figure 5) allows you to visualize the hierarchical structure of the clusters in the space defined by the principal components. The graph shows that OEMs belonging to the same cluster tend to be in contiguous regions of the factor map, confirming the spatial coherence of the identified groups. Branches of the dendrogram that develop at lower levels indicate aggregations between very similar observations, while mergers that occur at higher levels reflect the union of clusters characterized by more distant strategic profiles. The separation between the main branches of the tree is consistent with the distribution of points along the factor dimensions, suggesting that the differences between the clusters are indeed driven by the size identified by the PCA. The consistency between the separation of the dendrogram branches and the distribution of the OEMs on the factor map confirms the validity of the five-cluster solution, highlighting how the identified groups reflect real structural differences in the strategic profiles analyzed.

Figure 5: Hierarchical tree on the factor map



Source: our elaboration

To understand which levers contribute significantly to the definition of the identified clusters, a quantitative characterization analysis of the clusters was conducted (Table 5). Specifically, for each cluster, the levers that show a statistically significant difference compared to the overall average of the sample were identified.

Table 5: Quantitative characterization of clusters

Cluster	Lever	v-test	Mean in category	Overall mean	p-value
1	DESIGN.share.on.relevant.rows	5.323491	1	0.1815324	1.017944E-07
1	GOVERN.share.on.relevant.rows	-1.971908	0	0.3523800	4.862016E-02
2	EXCHANGE.share.on.relevant.rows	5.637479	0.5437882	0.1613531	1.725572E-08
3	GOVERN.share.on.relevant.rows	4.600118	0.55059178	0.3523800	4.222524E-06
3	EXCHANGE.share.on.relevant.rows	-1.978540	0.09157541	0.1613531	4.786780E-02
3	OPTIMISE.share.on.relevant.rows	-2.502368	0.06578716	0.1508673	1.233657E-02
4	OPTIMISE.share.on.relevant.rows	5.396132	0.5037743	0.1508673	6.809270E-08
4	GOVERN.share.on.relevant.rows	-2.543520	0.1415674	0.3523800	1.097417E-02
5	LOOP.share.on.relevant.rows	5.186241	0.8948479	0.3529625	2.145815E-07

Source: our elaboration

For each lever, the *Mean in category* column indicates the average value within the cluster. Overall mean represents the average value over the entire sample. The v-test measures the magnitude of the difference between the cluster and the overall average: positive values indicate an over-representation of lever in the cluster, while negative values indicate an under-representation. The v-test therefore measures how much the average value of a variable within a cluster deviates from the overall average of the sample. The p-value indicates the statistical significance of the observed difference, which is always relevant.

4.3.1 Clusters Description

Cluster 1 is made up of two European OEMs operating in the high-end segment, namely Polestar and Rolls-Royce. Both are part of large industrial groups (Geely Holding and BMW Group respectively) and have a long history, with years of foundation very distant from each other but united by a strong brand identity. From the point of view of market positioning, the cluster includes premium

and luxury car brands, characterized by a high focus on brand value and perceived quality. Only Polestar stands out for its purely electric strategy, while Rolls-Royce maintains a traditional approach.

A key element that unites both OEMs is the dominant lever "Design", (i.e., design with a circularity perspective) which is the only area with a significant share on the rows considered, while the other strategic levers are absent or marginal.

The profile of the cluster shows a concentration of the declared strategies on the dimension of planning and design with a view to circularity. In particular, the average share of the "Design" lever within the cluster is equal to 1, indicating a total concentration of relevant content on the "Design" lever with a view to circularity. The strongly positive value of the v-test and the extremely small p-value confirm that this difference is highly statistically significant. On the contrary, the "Govern" lever is significantly under-represented in the cluster, with an average share of 0, compared to an overall average of 0.35. Again, the negative v-test is statistically significant: it indicates that the OEMs belonging to the cluster show limited attention to this managerial lever.

Cluster 2 is composed of 8 OEMs, founded mainly in the first half of the twentieth century, with a strong geographical presence in Asia and Europe. The cluster includes both industrial groups and independent manufacturers and covers a wide spectrum of market positions, from the generalist segment to premium and luxury. From an electrification perspective, only one player is entirely focused on EVs. On a strategic level, the cluster is clearly characterized by the centrality of the "Exchange" lever, which is dominant or at least prevalent for almost all the OEMs that are part of it.

From a statistical point of view, the "Exchange" lever is strongly over-represented compared to the overall average of the sample. The average share of the "Exchange" lever within the cluster is 0.54, compared to an overall average of 0.16, indicating a marked focus on technological and process innovations (including new chemical formulations and/or recycling technologies) aimed at making the battery value chain more sustainable. The high value of the v-test (5.64) and the extremely low p-value confirm that this difference is highly significant from a statistical point of view.

Cluster 3, consisting of 20 OEMs, represents the largest and most structurally heterogeneous group in the analysis, including large global OEMs with a long industrial tradition and a geographical presence spanning Europe, America and Asia. The brands that are part of it were founded mainly during the twentieth century and include both consolidated industrial groups and independent manufacturers. From the point of view of market positioning, the cluster covers a wide spectrum of segments ranging from generalist to premium and luxury, also including players with high technological specialization.

Electrification is not a uniform hallmark: only a few OEMs are entirely focused on electric vehicles, while the majority take a more traditional approach.

In terms of levers, the cluster is characterized by the centrality of the "Govern" lever, which is dominant for most OEMs. This is confirmed on a quantitative level, in fact the "Govern" lever is significantly over-represented compared to the overall average of the sample. The average share of the "Govern" lever within the cluster is 0.55, compared to an overall average of 0.35. The high value of the v-test (4.60) and the very low p-value confirm the statistical significance of this difference.

Cluster 4 is made up of 8 OEMs operating mainly in Europe and Asia, belonging to both the generalist and premium and luxury car segments. All the brands included have a strong integration within large industrial groups (such as Volkswagen Group, BMW Group and Tata Motors), an element that testifies to a structured industrial approach. The years of foundation are very variable and range from historic brands of the late nineteenth century to OEMs born during the last decade, highlighting a coexistence between tradition and more recent players. From the point of view of market positioning, the cluster includes both high-end brands and generalist brands. The presence of EVs is limited or selective for most OEMs, with some exceptions, but overall electrification is not the distinctive element of the cluster.

From a quantitative perspective, cluster 4 is distinctively characterized by the "Optimise" lever, which is strongly over-represented compared to the overall average of the sample. The average share of the "Optimise" lever within the cluster is 0.50, compared to an overall average of 0.15, highlighting a marked focus on interventions to optimize production processes, efficiency in the use of resources and the incremental improvement of operating performance. The high value of the v-test (5.40) and the extremely low p-value confirm that this difference is highly significant from a statistical point of view. On the other hand, the "Govern" lever is significantly under-represented in the cluster.

Cluster 5 is made up of 7 mainly Asian OEMs, operating primarily in the generalist segment, with the presence of only one supercar brand. The OEMs included have a combination of membership in large industrial groups and strategic independence: some are part of structured groups (such as Great Wall Motors, Hyundai Motor Group, Volkswagen Group and Mitsubishi Motors), while others operate as independent entities. The years of foundation cover a wide period, ranging from historic brands born in the first half of the twentieth century to recently established OEMs, highlighting a strong heterogeneity from the point of view of industrial maturity. From a market positioning perspective, the cluster is dominated by generalist, high-volume, high-volume brands, flanked by a niche OEM in the supercar segment and a newer premium player. The presence of electric vehicles is overall limited to a single OEM. From a statistical point of view, cluster 5 is distinctively characterized by the "Loop" lever, which is strongly over-represented compared to the overall average of the sample. The average share of the "Loop" lever within the cluster is 0.89, compared to an overall average of 0.35, indicating a marked focus on CE practices aimed at closing the cycles of materials and resources. The high value of the v-test (5.19) and the extremely low p-value confirm that this difference is highly significant from a statistical point of view. This cluster is characterized by a profile strongly oriented towards the closure of cycles (recycling/recovery/reuse/second life/remanufacturing). The levers "Optimise" and "Exchange" are present only marginally, while the two managerial levers "Design" and "Govern" take on a secondary or residual role.

5. Discussion

The results of our analyses confirm that OEMs do not apply CE principles uniformly. Instead, they configure differentiated strategies by combining the ReSOLVE framework levers with managerial enabling factors, in line with studies that highlight how the adoption of CE in manufacturing industries takes place through heterogeneous paths that are highly dependent on the industrial and organizational context (Geissdoerfer et al., 2017; Kirchherr et al., 2018). Regarding the first research question (*How are automotive OEMs configuring CE strategies along the battery value chain through the "Loop", "Optimise" and "Exchange" levers integrated with "Design" and "Govern"?*), the high frequency of the "Govern" lever shows that, for many OEMs, circularity can be interpreted as a supply chain coordination challenge. This evidence is consistent with the literature on circular supply chains, which interprets the transition to circular models as a process strongly dependent on mechanisms of inter-organizational governance, traceability and collaboration between actors in the supply chain (Genovese et al., 2017; Batista et al., 2018). This also highlights the systemic nature of the battery value chain, for which traceability, audits and partnerships are fundamental prerequisites to ensure the recovery and valorisation of batteries at the end of their life (Gaines, 2014; Harper et al., 2019).

In contrast, the "Exchange" and "Optimise" levers show lower levels of adoption, suggesting that while technological innovation and resource efficiency are recognized as relevant, they are not yet the main strategic drivers for most OEMs. With regard to the second research question (*Do OEMs tend to specialize on specific levers or strategic configurations of levers in the implementation of battery circularity?*) the results reveal that the adoption of the CE may follow a logic of strategic specialization rather than a path of simultaneous integration, in line with the configurational perspectives of the business strategy, according to which firms favor coherent combinations of

practices rather than the full adoption of all available instruments. As highlighted above, most OEMs focus on "Govern" or "Loop" as dominant lever. This is consistent with the configurational perspectives of organizational strategy, according to which firms tend to develop coherent and selective combinations of practices rather than simultaneously adopting all possible strategic dimensions (Miller, 1996; Fiss, 2007). The higher standard deviation associated with "Loop" lever also shows significant variability in how OEMs pursue closed-loop systems, supporting the idea that while some OEMs are pioneers in recycling and recovery activities, others are still in a more exploratory phase of experimenting with circular practices (Bocken et al., 2016; Frishammar & Parida, 2019).

Finally, regarding to the third and final research question (*What recurrent strategic configurations emerge among automotive OEMs when CE strategies are analyzed in a comparative configurational perspective?*), the most relevant result concerns the emergence of the "Govern–Loop" dyad as the most frequent configuration. This result empirically supports the theoretical approach of the ReSOLVE framework, highlighting how closed-loop strategies require the existence of enabling organizational and institutional mechanisms, such as supply chain governance systems and partnerships with suppliers (Ellen MacArthur Foundation, 2015b; Lacy & Rutqvist, 2015). In the absence of such mechanisms, the operational implementation of "Loop" strategies becomes difficult to scale along the entire supply chain. The analysis of the combinations showed that the "Govern–Loop" dyad is closely followed by the "Loop–Govern" combination. This result confirms the theoretical framework of the study: suggesting that the effective implementation of "Loop" strategies appears empirically associated with the presence of "Govern" mechanisms, including traceability and partnerships with suppliers, necessary to facilitate the return and quality of batteries at the end of their life. Overall, the results offer relevant evidence for the debate on CE in the automotive sector and, more specifically, in the battery value chain. Firstly, the absence of fully integrated strategic configurations of the levers of the ReSOLVE framework suggests that, in the sample analyzed, CE is not implemented as a holistic and cross-cutting approach, but through selective approaches. This evidence is consistent with cluster analysis, which shows the prevalence of groups characterized by the dominance of a single lever rather than by balanced multi-leverage configurations. This evidence differs from a part of the literature that interprets CE as a holistic transformation of industrial value chains (Geissdoerfer et al., 2017; Korhonen et al., 2018), indicating instead a more incremental and partial declination of circular practices.

The prevalence of clusters characterized by the dominance of a single lever (especially "Govern", "Loop" or "Exchange") highlights that OEMs, despite the simultaneous integration of multiple strategic levers along the entire value chain, tend to specialize on specific operational dimensions, rather than evenly distributing efforts along all levers.

The results, in fact, allow us to problematize the concept of integration discussed in the literature.

More generally, the study contributes to the literature on the CE by shifting the focus from a normative and universalistic view of CE adoption to a configurational and contingent perspective. If the theoretical framework interprets CE as a process that requires a simultaneous and consistent coordination of multiple levers along the entire value chain, empirical evidence suggests that such integration does not represent the prevailing configuration among the OEMs analyzed. The strategies observed are in fact mainly focused on a dominant lever, while the remaining ones take on a complementary or marginal role. The application of the ReSOLVE framework as an empirical classification tool allows us to highlight how the CE, in the automotive sector, is not adopted as a unitary model, but as a set of differentiated strategic configurations that reflect selective industrial priorities. Consistent with this, the main contribution of the study consists in demonstrating that the circularity of batteries does not follow a single evolutionary trajectory but develops through a plurality of strategic approaches that vary in intensity, focus, and combination of levers (Kirchherr et al., 2017; Bocken et al., 2016). Beyond the descriptive characterisation of the five clusters, the configurations are interpreted against the backdrop of the incremental versus systemic debate in circular economy transitions (Centobelli et al., 2021; Bertassini et al., 2021). Cluster 4 (Optimise)

and Cluster 5 (Loop) follow an incremental logic: they capture efficiency improvements within the existing linear architecture (Optimise) or end-of-pipe material recovery practices (Loop), without affecting upstream design choices. Cluster 2 (Exchange) represents a substitution-based trajectory, whereby inputs and technologies are replaced while the overall strategic architecture remains largely unchanged. By contrast, Cluster 1 (Design) and Cluster 3 (Govern), as well as the recurring Govern-Loop combination observed in 14 OEMs, reflect a systemic orientation: design for circularity and governance mechanisms act as enabling architectures that shape the deployment of all other levers.

We argue that the prevalence of the Govern-Loop combination indicates that, for global OEMs, governance has become the integrative layer through which circular ambitions are translated into operational practice, consistent with the institutional pressures generated by the EU Battery Regulation and the CSRD.

Theoretically, these findings invite a reconsideration of how the CE literature conceptualizes the integration of circular practices. Whereas mainstream contributions tend to treat integration as a normative end-state our results suggest that integration is more usefully understood as configurational coherence: a fit among a subset of levers that is consistent with the firm's industrial position, supply chain role and strategic priorities. From this perspective, the recurrence of "Govern" as a dominant lever is not merely an empirical regularity, but a theoretically meaningful signal that, in technologically complex and globally distributed value chains, the operational implementation of circular practices is conditional on the prior establishment of governance and traceability mechanisms. This refines the configurational perspective on sustainability by specifying the role of managerial levers not as one dimension among others, but as enabling conditions whose presence determines whether operational levers can effectively unfold. Therefore, the study advances CE theory by showing that circular strategies in complex supply chains should be interpreted not as the simple accumulation of practices, but as coherent strategic configurations in which managerial levers enable, constrain or amplify the operational deployment of circular actions.

6. Conclusions

The present study looks at how automotive OEMs configure their CE strategies along the battery value chain, adopting a configurational perspective, through which the combinations between the operational levers of the ReSOLVE framework (“Loop”, “Exchange” and “Optimise”) and managerial levers (“Design” and “Govern”) are examined. The findings show that OEMs do not adopt a uniform approach to the CE, but have heterogeneous strategic profiles, in which one or more levers emerge as dominant according to the priorities declared in the content analysed.

From a theoretical standpoint, the primary contribution lies in the extension of the ReSOLVE framework to the specific context of the battery value chain and in its integration with two levers of a managerial nature, “Design” and “Govern”, according to the perspective of configurational theory (Meyer et al., 1993; Fiss, 2007). More specifically, the contribution does not consist solely in the empirical application of the framework to a new sectoral context, but rather in its reinterpretation through a configurational lens, showing how the ReSOLVE levers operate empirically as combinable and interdependent elements rather than as simultaneously implemented dimensions. This is particularly relevant in complex industrial supply chains, where the CE emerges from the interaction between technological, organizational and institutional conditions that are difficult to isolate through linear approaches (Fiss, 2007; Misangyi et al., 2017). Indeed, the findings demonstrate how the ReSOLVE framework emerges empirically as a modular set of levers selected and combined by OEMs in accordance with the interorganizational complexity of the battery value chain. The integration of the “Design” and “Govern” levers makes it possible to render explicit the organizational and decision-making dimensions that are implicitly present in the original framework yet not formalized as autonomous analytical components. This study highlights the role of managerial levers as enablers of circularity, showing how supply chain governance and design choices are necessary

organizational conditions to make circular practices implementable (Lieder & Rashid, 2016; Farooque et al., 2019).

In particular, the findings indicate that the "Govern" lever is the most frequently occurring in the content analysed, confirming that governance represents an indispensable element for the circularity of batteries. Managing relationships between manufacturers, cell suppliers, recycling operators and other partners along the value chain requires clear decision-making structures, coordination mechanisms and control systems that reduce information opacity. In this context, traceability requirements emerge with considerable force: in order to effectively disassemble end-of-life batteries, recover critical components and materials and reintroduce them into production cycles, automotive manufacturers must have access to precise information regarding the battery composition, origin of materials, assembly methods and use of batteries. In the absence of adequate traceability and information-sharing systems, the closure of material cycles proves difficult to implement at industrial scale, thereby constraining the effective operationalization of CE strategies. In conclusion, the CE within the battery value chain does not take the form of a standardized model but rather manifests as a set of differentiated strategic configurations, in which circularity results from the dynamic integration of operational levers and managerial capabilities. This evidence suggests that the transition toward circular models in complex industries should be interpreted as an evolutionary configurational process, in which circularity emerges from the progressive alignment among technological innovation, organizational capacities and governance mechanisms, rather than from the linear and universalistic adoption of a single paradigm (Fiss, 2011). From this perspective, the study contributes to a more in-depth realistic understanding of circular transition pathways in technologically complex industries.

7. Implications of the study

The findings allow to deriving three significant theoretical implications. Firstly, the adoption of circular practices in complex industrial supply chains does not follow a logic of linear or cumulative implementation but rather assumes the form of selective strategic configurations. Secondly, the findings extend the ReSOLVE framework by empirically highlighting the role of managerial levers as enabling conditions necessary for the concrete implementation of operational levers. Finally, the research contributes to the configurational perspective applied to sustainability by demonstrating that CE can be interpreted as a multidimensional phenomenon emerging from the coherent combination of technological, organizational and governance choices, rather than as the isolated adoption of individual practices.

The empirical evidence further allows for the derivation of several operational implications for business decision-makers involved in the transition towards circular models. From a managerial standpoint, the findings suggest that the definition of an CE strategy within the battery value chain requires a clear identification of the strategic leverage, but also a structural investment in governance mechanisms and traceability systems. In particular, OEMs should prioritize the development of digital battery traceability systems, interorganisational governance structures and eco-design practices integrated from the earliest stages of product development. In practical terms, managers should first identify the dominant circularity priority of the firm - such as recovery, efficiency, technological substitution, eco-design or governance - and then align investments, supplier relationships, reporting systems and organizational capabilities around that strategic focus. In a complex and global supply chain, the CE needs interorganizational coordination, transparency, and standardization of information. This implies that managers should regard CE not as a set of isolated operational initiatives, but as a strategic process requiring the alignment of supply chain governance, product design and information systems, favoring coordinated investments over non-integrated incremental interventions.

The fact that quantitative content analysis also reveals groupings capable of combining multiple framework levers in a balanced way, a finding that is nonetheless not confirmed from a quantitative and statistical standpoint in the cluster analysis, indicates that CE adoption still appears fragmented and highly dependent on the strategic priorities and structural characteristics of OEMs. From a managerial perspective, this implies the necessity of explicitly defining strategic priorities within the battery value chain, avoiding generic approaches to CE and concentrating resources on the levers considered most consistent with one's own business model. The presence of a dominant lever suggests that CE strategies require consistency among strategic choices, organizational structure, internal competencies and relevant regulatory framework.

From a broader perspective, the findings indicate that the transition toward CE models in technologically complex industries should not be interpreted as a process of convergence toward a single organizational model, but as an evolutionary pathway characterized by plural and dynamic strategic configurations. Circularity emerges from the progressive alignment between technological innovation, managerial skills and interorganizational governance mechanisms, highlighting how industrial sustainability does not represent a predetermined endpoint, but an adaptive process of continuous strategic reconfiguration.

8. Limitations and future research directions

Notwithstanding these findings, several methodological limitations must be considered when interpreting the results. One limitation of the research lies in the fact that the analysis is based on a single reporting year. This choice allows for a snapshot of strategic configurations at a given point in time, but does not permit the capture of their evolution over time. Furthermore, the use of declarative data drawn from public documents may reflect communicated rather than fully implemented strategies; however, the literature on sustainability disclosure highlights how non-financial reporting represents an institutional space through which companies build and legitimize their strategic priorities (Hahn & Kühnen, 2013; Michelon et al., 2015). Moreover, extending the study through a panel analysis over several years would also allow for a better understanding of trends, verification of the stability of the strategic configurations identified and highlight any changes in the CE strategies adopted by OEMs along the battery value chain.

Finally, the research opens avenues for further investigation. Future studies could longitudinally analyse the evolution of strategic configurations, examining whether the current specialization on single levers evolves towards more integrated arrangements. Further research could also extend the analysis to other actors in the battery value chain, in order to understand how governance dynamics develop at the ecosystem level. Future research could also combine content analysis with interviews, case studies or operational performance data in order to compare declared CE strategies with implemented practices and measurable circularity outcomes.

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Strategy mix coherence in corporate environmental engagement: Configurations in the global food and beverage industry

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Abstract
Firms increasingly deploy multiple environmental initiatives across products, operations, governance, and stakeholder relationships, yet research rarely examines whether these initiatives form coherent strategy systems. We study environmental strategy mix coherence, defined as the internal alignment of initiatives across strategic domains, using Refinitiv Eikon ESG disclosures for 311 global food and beverage firms. Environmental engagement is captured across five dimensions - product, internal organizational, external stakeholder, CSR governance, and carbon-neutral strategies. Using a two-step clustering procedure, we identify three empirically recurring configurations: All-Round Leaders, characterized by high and balanced engagement; Active Followers, characterized by moderate but outward-skewed engagement; and Shy Laggards, characterized by low and fragmented engagement. The findings show that heterogeneity in corporate environmental engagement reflects not only intensity but also internal balance, distinguishing firms that integrate initiatives across domains from those that expand selectively. The study advances a configurational understanding of corporate environmental strategy and provides an empirically grounded taxonomy of coherence profiles.

Keywords: *Corporate environmental strategy; strategy mix coherence; sustainability management; configurations; cluster analysis; food and beverage industry*

1. Introduction

Environmental sustainability has become an increasingly salient dimension of corporate strategy, influencing how firms design products, organize operations, interact with stakeholders, and govern their activities (Walsh & Dodds, 2017). In response to regulatory pressures, stakeholder expectations, and growing awareness of environmental risks, firms across industries have adopted a wide range of environmental initiatives, including eco-design practices, internal process improvements, governance mechanisms, and carbon reduction policies (Dong et al., 2026). As these initiatives proliferate, managers face a central strategic challenge: how to integrate multiple environmental actions into a coherent and effective strategic approach.

Existing research on corporate environmental strategy has generated substantial insights into the drivers and consequences of firms' engagement with environmental sustainability (Wagner, 2015). Prior studies have extensively examined specific environmental practices, such as pollution prevention, eco-efficiency initiatives, green innovation, and the adoption of environmental management systems, highlighting their implications for competitiveness, legitimacy, and firm performance (Aragón-Correa & Sharma, 2003; Delmas & Toffel, 2004). This stream of research has demonstrated that environmental initiatives can represent strategic resources when aligned with organizational capabilities and external pressures (Aragón-Correa & Sharma, 2003). However, much of the literature has tended to analyze these practices in isolation or as additive elements, implicitly assuming that the adoption of multiple environmental actions naturally translates into a coherent strategy. As a result, we still lack a system-level understanding of how firms combine heterogeneous environmental initiatives into internally consistent strategic systems, despite evidence that organizational structures and internal dynamics shape the configuration of environmental practices

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(Delmas & Toffel, 2008). This gap matters because many firms simultaneously expand sustainability portfolios while struggling to align product, operational, governance, and stakeholder-facing initiatives into a unified strategic architecture.

From a business research perspective, addressing this gap is relevant because environmental initiatives typically require coordination across organizational units, alignment with governance structures, and integration with external stakeholder relationships (Hart, 1995; Hoffman, 2001). When sustainability actions are implemented in a fragmented or poorly coordinated manner, firms may incur substantial coordination costs, experience internal inconsistencies, or generate symbolic rather than substantive environmental outcomes, thereby undermining their strategic value (Delmas & Burbano, 2011). In contrast, when environmental initiatives are aligned and mutually reinforcing, they can enhance strategic coherence, organizational credibility, and the overall effectiveness of sustainability efforts (Porter & Kramer, 2006; Hart & Dowell, 2011). Accordingly, understanding how firms structure, coordinate, and integrate their environmental strategies represents a critical managerial and strategic issue, with important implications for both performance and stakeholder relationships.

Building on this premise, the present study focuses on the coherence of the environmental strategy mix, defined as the degree of internal alignment among multiple dimensions through which firms enact environmental sustainability. Rather than examining single practices in isolation, we originally apply a configurational perspective (Meyer et al., 1993) to the study of environmental strategy, viewing it as a system of interdependent strategic choices. Within this perspective, the effectiveness of environmental engagement depends not only on the presence of specific initiatives, but on how these initiatives are combined and governed as part of a unified strategic architecture. In this study, we conceptualize strategy mix coherence as a combination of (i) intensity - how extensively firms engage across strategic domains - and (ii) internal balance - how evenly initiatives are distributed across domains in ways that reduce internal contradictions.

Thus, we aim at answering the following research question: Which configurations of environmental strategy mix coherence emerge among firms, and how do these configurations differ in terms of (i) the overall intensity of environmental engagement and (ii) the internal balance with which initiatives are combined across strategic domains?

Empirically, the study examines firms in the global food and beverage industry, a sector characterized by significant environmental impact and increasing scrutiny along the entire value chain (Clark et al., 2020; Crippa et al., 2021; Sovacool et al., 2021). Using ESG data from the Refinitiv Eikon database (Refinitiv, 2021), we analyze the environmental strategies of 311 firms across five dimensions: product strategy, internal organizational strategy, external stakeholder strategy, CSR governance strategy, and carbon-neutral strategy. These dimensions capture key areas through which firms operationalize environmental sustainability and reflect both internal and external aspects of environmental engagement.

To identify distinct patterns of environmental strategy coherence, we apply a two-step clustering procedure combining hierarchical and k-means methods. This approach allows us to uncover empirically grounded configurations of environmental engagement based on similarities in how firms combine sustainability initiatives across strategic domains. The analysis reveals three configurations. All-Round Leaders exhibit high levels of engagement and balanced integration across all five dimensions. Active Followers display moderate engagement with partial and uneven alignment among dimensions. Shy Laggards show low levels of engagement and fragmented approaches, characterized by limited strategic integration. Taken together, these configurations highlight that environmental strategy heterogeneity is not only a matter of "how much" firms do, but also of how coherently initiatives are combined into an internally aligned system.

By identifying these configurations, the study provides three main contributions. First, it advances a configurational understanding of corporate environmental strategy by shifting attention from the presence of individual practices to the coherence of the environmental strategy mix as a distinguishing feature among firms. Second, it operationalizes coherence in terms of intensity and internal balance and provides an empirically grounded taxonomy of configurations in a high-impact industry,

illustrating how firms differ in the structure - not merely the breadth - of their environmental engagement. Third, it offers actionable insight for aligning sustainability initiatives across domains by showing where configurations concentrate effort (e.g., outward-facing governance and stakeholder initiatives versus product and operational change) and where internal balance is weaker.
Thus, the study reframes corporate environmental engagement from a list of discrete initiatives to a coherent strategy architecture, and provides an empirical taxonomy that can be used to compare firms' sustainability systems across contexts and over time.
The remainder of the paper is organized as follows. Section 2 develops the theoretical framework and motivates the research question. Section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 provides further analysis adopting a geographical perspective and including a set of financial and economic characteristics. Section 6 discusses the findings, and Section 7 concludes.

2. Literature review

Corporate environmental strategy has attracted extensive scholarly attention, reflecting the growing recognition that environmental issues are no longer peripheral to business decision-making. Early contributions conceptualized firms' environmental engagement primarily in terms of compliance, efficiency, and pollution control, emphasizing internal process improvements and cost reduction as responses to regulatory pressures (Hart, 1995; Rugman & Verbeke, 1998). Subsequent research broadened this view by highlighting the strategic potential of proactive environmental initiatives and by distinguishing among different strategic types, such as pollution prevention, product stewardship, and sustainable development (Orsato, 2006; Kolk & Pinkse, 2005).
Building on these foundations, scholars have sought to operationalize corporate environmental strategy through measurable categories of practices spanning the value chain and organizational arrangements. For instance, Albino et al. (2009) proposed a classification encompassing material and energy efficiency, green management, and green supply-chain integration. Similarly, research has emphasized governance mechanisms, environmental management systems, and stakeholder engagement as key dimensions through which firms institutionalize sustainability practices (Delmas & Toffel, 2008; Lindgreen & Swaen, 2010). Collectively, these contributions document substantial heterogeneity in environmental initiatives and the organizational domains they cover.
Despite these advances, much of the literature still analyzes environmental practices as discrete or additive elements, focusing on the presence, intensity, or breadth of specific initiatives (Aragón-Correa & Sharma, 2003; Walsh & Dodds, 2017; Naidoo & Gasparatos, 2018). This practice-by-practice perspective offers limited understanding of how heterogeneous environmental initiatives interact within the firm and how they are combined into broader strategic approaches. This limitation is consequential because environmental initiatives typically span multiple organizational domains and require coordination across functions, hierarchical levels, and external relationships; fragmented implementation may generate internal inconsistencies and increase the likelihood of symbolic adoption, decoupling, or greenwashing dynamics (Delmas & Toffel, 2008; Delmas & Burbano, 2011; Lee & Raschke, 2023).
Configurational theory provides a useful lens to address this gap by treating strategies as systems of interdependent choices and by emphasizing internal fit among multiple dimensions of strategy (Meyer et al., 1993). This insight resonates with the natural resource–based view, which argues that environmental strategies create value not simply through individual practices, but through the orchestration of resources and capabilities into complex and difficult-to-imitate configurations (Aragón-Correa & Sharma, 2003; Hart & Dowell, 2011). Accordingly, the present study focuses on the coherence of the environmental strategy mix, defined as the degree of internal alignment and mutual reinforcement among multiple dimensions of corporate environmental engagement. Rather than viewing environmental strategy as a checklist of practices, we conceptualize it as a

multidimensional configuration encompassing product-related initiatives, internal organizational practices, governance mechanisms, stakeholder relationships, and carbon-related actions.
This focus implies that two properties are central for distinguishing firms' environmental strategy systems: intensity (how extensively firms engage across domains) and balance (how evenly and consistently initiatives are combined across strategic domains). Strategy research emphasizes that value creation depends on fit and complementarities among activities: the payoffs from one initiative often increase when other aligned initiatives are in place, whereas misaligned choices can erode effectiveness (Porter, 1996; Milgrom & Roberts, 1995). In environmental strategy, complementarities similarly depend on supporting management systems and complementary assets that enable coordinated execution (Christmann, 2000; Sharma & Vredenburg, 1998). More broadly, organizations can be conceived as "bundles" of interacting elements, where coherence emerges when multiple choices reinforce each other within an activity system (Siggelkow, 2011).
A configurational perspective is particularly appropriate for theorizing such coherence because it treats strategies as multidimensional constellations that tend to recur as empirically observable patterns (Meyer, Tsui, & Hinings, 1993). It also foregrounds equifinality - different internally consistent combinations can exist - while stressing that only a subset of all theoretically possible combinations is likely to be viable in practice (Doty, Glick, & Huber, 1993; Fiss, 2007). This implies that firms facing similar environmental pressures can still develop distinct configurations depending on motivations, resources, and capability-building paths (Bansal & Roth, 2000; González-Benito & González-Benito, 2005). Methodologically, uncovering such recurring patterns aligns with the use of cluster-based taxonomies widely adopted in strategy research (Ketchen & Shook, 1996).
Building on this logic, we expect firms to differ systematically not only in "how much" they engage environmentally, but also in how coherently they integrate initiatives across domains. Some firms should exhibit high coherence, characterized by strong and balanced engagement; others may display partial coherence, with meaningful but uneven engagement across dimensions; and others may show low coherence, where initiatives remain isolated and weakly coordinated, increasing the risk of symbolic adoption and decoupling (Bromley & Powell, 2012; Delmas & Burbano, 2011). Coherent configurations should be more likely when firms possess complementary assets and supporting organizational arrangements that enable coordinated implementation (Christmann, 2000; Delmas & Pekovic, 2018).

3. Data and methodology

The empirical analysis focuses on firms operating in the global food and beverage industry, a sector characterized by significant environmental impact and increasing scrutiny along the entire value chain (Poore & Nemecek, 2018; Springmann et al. 2018). Environmental issues related to food production, processing, packaging, and distribution have become central to corporate strategy in this industry, making it a suitable empirical context for examining how firms structure and coordinate environmental initiatives (Maloni & Brown, 2006; Hartmann, 2011).
Firm-level data were collected from the Refinitiv Eikon database (Refinitiv, 2021), which provides standardized information on corporate environmental, social, and governance practices based on publicly available disclosures. The database compiles data from sustainability reports, annual reports, and corporate websites, allowing for cross-firm comparability of environmental engagement. The analysis focuses on firms that disclosed sufficient environmental information to allow a systematic assessment of their sustainability initiatives.
As of 2021, the Refinitiv Eikon database included a broad population of food and beverage firms worldwide. From this population, the sample consists of 311 firms that published a CSR or sustainability report in 2021. Restricting the analysis to firms with available sustainability disclosures ensures consistency in the measurement of environmental initiatives, while still preserving substantial heterogeneity in firm size, geographic location, and strategic orientation. The resulting sample

provides a comprehensive overview of environmental engagement patterns within the global food and beverage industry.

To operationalize corporate environmental strategy, we identify five strategic dimensions capturing key areas through which firms enact environmental sustainability: product strategy, internal organizational strategy, external stakeholder strategy, CSR governance strategy, and carbon-neutral strategy. These dimensions reflect both internal and external aspects of environmental engagement and are consistent with the multidimensional nature of corporate environmental strategy discussed in the literature review.

Each strategic dimension is measured using a set of specific environmental initiatives available in the Refinitiv Eikon database. Individual initiatives are coded as binary variables (1 = initiative disclosed/implemented; 0 = otherwise). For each firm, indicators are summed within each strategic dimension, yielding a dimension score that captures the breadth of engagement in that domain. This operationalization ensures cross-firm comparability while retaining variation in the scope of environmental initiatives.

The five resulting scores capture how firms allocate attention across distinct areas of environmental strategy. Product strategy reflects initiatives related to eco-design, sustainable materials, and product impact reduction. Internal organizational strategy captures actions aimed at embedding sustainability within internal processes and organizational practices. External stakeholder strategy includes initiatives related to supply-chain management and partnerships with external actors. CSR governance strategy reflects the formalization of sustainability through governance mechanisms and incentive structures. Carbon-neutral strategy captures initiatives related to emissions reduction and climate-related targets (GHG Protocol, 2016; Task Force on Climate-related Financial Disclosures [TCFD], 2017). Appendix Table A1 reports the complete list of initiatives composing each dimension.

Each dimension is computed as an equal-weighted sum of its binary indicators, to enhance measurement consistency across domains. The five dimension scores share the same bounded range (0–4), thus the main clustering analysis is conducted on unstandardized scores to preserve the substantive meaning of differences in the number of disclosed initiatives across domains. Hierarchical clustering is implemented using Ward's method with squared Euclidean distance to explore the data structure and inform the number of clusters (Kaufman & Rousseeuw, 2009; Murtagh & Legendre, 2014). Ward's method with squared Euclidean distance is appropriate here because it constructs clusters by minimizing the increase in within-cluster variance, providing a parsimonious hierarchical baseline for selecting k. We then apply k-means clustering (k = 3) with multiple random initializations (n_init = 5) and retain the solution minimizing within-cluster sum of squares. K-means then refines membership by directly minimizing within-cluster sum of squares for the chosen k, improving separation relative to the hierarchical initialization.

Appendix Tables A4–A5 report internal validity indices and stability checks supporting the three-cluster solution, and a sensitivity check using standardized (z-scored) dimensions (ARI ≈ 0.49; ~22% reassignment), with reassignments concentrated between Cluster 2 and Cluster 3.

Table 1 reports descriptive statistics for the five environmental strategy dimensions.

[Table 1 around here]

Table 1 indicates that environmental engagement in the sample is generally moderate across the five dimensions (median = 2 for all), with the highest average levels in CSR governance (M = 2.10) and external stakeholder strategies (M = 1.99) and comparatively lower engagement in internal organizational (M = 1.52) and carbon-neutral strategies (M = 1.65), alongside substantial heterogeneity particularly for external stakeholder (SD = 1.46) and product strategies (SD = 1.32).

4. Results

We employed a two-step clustering procedure aimed at uncovering empirically recurring patterns in how firms combine environmental initiatives across product, internal organizational, external stakeholder, CSR governance, and carbon-neutral strategies, to identify distinct configurations of corporate environmental strategy in the global food and beverage industry (Ketchen & Shook, 1996; Kodinariya & Makwana, 2013). In the first step, hierarchical clustering (Ward's method) was used to explore the underlying structure of the data and to inform the appropriate number of clusters.
Figure 1 displays the dendrogram from the hierarchical clustering procedure.

[Figure 1 around here]

Figure 1 suggests that firms separate into a small number of groups, with a three-cluster solution offering the most interpretable and parsimonious representation of the sample. The dendrogram shows a marked increase in within-cluster heterogeneity when fewer than three clusters are retained, whereas additional clusters yield finer partitions that add limited interpretive value. Appendix Tables A4–A5 report internal validity indices (k = 2–6) and stability checks.
In the second step, we implemented non-hierarchical k-means clustering to refine cluster membership and maximize within-cluster similarity while enhancing between-cluster separation. We assessed between-cluster differences across the five environmental strategy dimensions using ANOVA and post-hoc comparisons (Hair et al., 2010). Table 2 reports cluster means and ANOVA results.

[Table 2 around here]

Table 2 shows that the three clusters are statistically distinct across all five dimensions and differ both in overall intensity and in the balance with which initiatives are combined across domains. Cluster 1 exhibits consistently high engagement across dimensions (e.g., product = 3.77; internal organizational = 2.03; external stakeholder = 3.22), indicating a broad and internally aligned sustainability approach. Cluster 2 displays an intermediate but outward-skewed profile: engagement is comparatively stronger in external stakeholder (3.04) and CSR governance (2.49) strategies than in product (1.77) and carbon-neutral (1.86) strategies. Cluster 3 shows uniformly low engagement (e.g., product = 1.01; internal organizational = 1.03; external stakeholder = 0.66), consistent with weak and fragmented environmental engagement. The cluster-average score reinforces this ordering (2.65 for Cluster 1; 2.10 for Cluster 2; 0.97 for Cluster 3), and the distribution of firms supports meaningful comparison (82 firms, 26%, in Cluster 1; 113 firms, 36%, in Cluster 2; 116 firms, 37%, in Cluster 3).
We computed an outward–inward imbalance index defined as average engagement in outward-facing dimensions (external stakeholder and CSR governance strategies) minus average engagement in operational and product-facing dimensions (product, internal organizational, and carbon-neutral strategies), to make "balance versus unevenness" explicit[2]. As reported in Table 2, this index is close to zero for Cluster 1 (0.24), positive for Cluster 2 (0.93), and close to zero (slightly negative) for Cluster 3 (−0.07), indicating that Cluster 2 concentrates disproportionately on governance and stakeholder-facing initiatives relative to product/operational and carbon-related actions. We also computed a relative dispersion (RD) index capturing within-firm balance across the five dimensions (standard deviation divided by the mean across dimensions) to complement this measure[3]. RD is

[2] The outward–inward imbalance index is computed as the difference between average engagement in outward-facing dimensions (external stakeholder and CSR governance strategies) and average engagement in operational and product-facing dimensions (product, internal organizational, and carbon-neutral strategies): $OI_i = (ES_i + GOV_i)/2 - (PROD_i + ORG_i + CN_i)/3$. Positive values indicate a relative emphasis on governance and stakeholder-oriented initiatives, whereas values close to zero indicate a more balanced engagement across domains.

[3] The relative dispersion (RD) index captures within-firm balance across the five environmental strategy dimensions and is computed as the standard deviation divided by the mean across dimensions: $RD_i = \sqrt{[(1/5) \cdot \sum_{k=1}^{5} (x_{ik} - \bar{x}_i)^2]} / \bar{x}_i$, where $\bar{x}_i = (1/5) \cdot \sum_{k=1}^{5} x_{ik}$.

lowest for Cluster 1 (0.34), moderately higher for Cluster 2 (0.39), and higher for Cluster 3 (0.87), consistent with decreasing strategy mix coherence across configurations.

We labeled the three clusters based on their combination of overall engagement and internal alignment across the five dimensions to provide an interpretable typology consistent with the concept of strategy mix coherence. We label Cluster 1 as All-Round Leaders because firms in this group combine high and comparatively balanced engagement across product initiatives, internal practices, stakeholder strategies, governance mechanisms, and carbon-neutral actions—consistent with high strategy mix coherence. We label Cluster 2 as Active Followers because firms show meaningful environmental activity but a less balanced architecture, with stronger outward-facing governance and stakeholder engagement that is not matched by comparable depth in product and carbon-neutral strategies - consistent with partial coherence. We label Cluster 3 as Shy Laggards because firms display low engagement across all dimensions, indicating low or absent strategy mix coherence.

To facilitate comparison and make configuration differences visually explicit, Figure 2 illustrates the three profiles as a radar chart.

[Figure 2 around here]

Figure 2 shows that All-Round Leaders form a broad and relatively rounded profile, reflecting high and balanced engagement across dimensions. Active Followers display a more uneven shape, driven by comparatively stronger external stakeholder and governance strategies alongside weaker product and carbon-neutral engagement. Shy Laggards show a compact profile close to the center, indicating consistently low engagement across domains.

Appendix Table A2 reports anonymized firm examples (selected to be close to the cluster centroids). Appendix Table A3 provides short vignettes grounded only in the pattern of disclosed initiatives reflected in the five dimension scores (i.e., no additional firm-level information is used), to facilitate interpretation of the three configurations.

5. Further analysis

5.1. Geographical distribution of configurations

We analyzed the distribution of cluster membership across firms' headquarters regions to examine whether environmental strategy mix coherence is patterned by geographical context. Figure 3 reports the regional composition of the three configurations.

[Figure 3 around here]

Figure 3 suggests systematic cross-regional differences in the prevalence of All-Round Leaders, Active Followers, and Shy Laggards, indicating that the identified configurations are not randomly distributed across institutional environments. In some regions, firms are overrepresented among All-Round Leaders and Active Followers, whereas in other regions Shy Laggards constitute a comparatively larger share. This pattern is consistent with the idea that regional contexts shape both (i) the overall intensity of environmental engagement and (ii) the internal structuring of that engagement across domains[4].

These differences plausibly reflect variation in regulatory stringency and enforcement, the salience of stakeholder scrutiny, and the maturity of ESG reporting norms across regions. In settings where disclosure expectations and external monitoring are stronger, firms may have both greater incentives and greater organizational impetus to formalize sustainability initiatives across multiple domains,

Lower values indicate a more even distribution of engagement across strategic domains, whereas higher values indicate a more uneven strategy mix.

[4] We performed a chi-square test of independence to formally assess whether configuration membership varies across headquarters regions. The association is statistically significant ($\chi^2(14) = 41.45$, $p = 0.00015$) with Cramer's $V = 0.26$, indicating a moderate relationship. Standardized residuals indicate that All-Round Leaders are overrepresented in Japan ($z = 4.29$) and underrepresented in China ($z = -3.35$), while Shy Laggards are underrepresented in Europe ($z = -3.05$) and overrepresented in China ($z = 2.08$). Table A6 in the Appendix reports the full cluster-by-region contingency table and standardized residuals.

thereby increasing the likelihood of high-coherence profiles. Conversely, where environmental requirements and stakeholder pressures are weaker or more heterogeneous, sustainability initiatives may remain more fragmented and selectively adopted, increasing the share of low-coherence profiles. Importantly, the regional distribution also aligns with the notion that institutional contexts can encourage different "routes" to environmental engagement - for instance, some environments may promote outward-facing governance and stakeholder initiatives earlier than deeper operational or product-oriented change - thereby contributing to the emergence of partially coherent profiles.

5.2. Firm characteristics across environmental strategy configurations

We compared firms' governance and economic characteristics across clusters to further contextualize the three configurations. Table 3 reports mean differences and ANOVA tests for board size, employees, revenues, and accounting performance (ROA and ROE), while Table 4 provides Tukey HSD post-hoc comparisons for characteristics showing statistically significant differences.

[Table 3 around here]

Table 3 indicates that the most robust differences across configurations relate to organizational scale. All-Round Leaders are substantially larger than the other groups both in terms of employees and revenues, suggesting that resource availability and organizational capacity are closely associated with the ability to develop an internally aligned environmental strategy system. This is consistent with the view that high coherence requires investments in coordination, cross-functional integration, and monitoring systems that are more feasible for large firms with broader managerial infrastructure and greater slack resources. Active Followers occupy an intermediate position, which is consistent with a configuration where firms can sustain meaningful sustainability initiatives but may face constraints in extending and integrating them evenly across all strategic domains.

In contrast, board size does not significantly differ across clusters, suggesting that the sheer size of the board is not a discriminating governance characteristic for environmental strategy mix coherence in this sample. This result also implies that what matters for coherence is less likely to be board "capacity" measured by headcount and more likely to be board attention, expertise, incentive alignment, or committee structures - features that are not captured by board size alone.

Finally, the absence of statistically significant differences in ROA and ROE should be interpreted cautiously. Accounting performance is often noisy and temporally lagged relative to strategic investments; moreover, environmental coherence may affect outcomes such as risk exposure, reputational resilience, cost of capital, or long-term productivity rather than contemporaneous ROA/ROE. Thus, the pattern is consistent with an interpretation in which coherence is primarily associated with capability-building and strategic organization, with performance implications that may unfold over longer horizons or through channels not captured by short-term accounting indicators.

[Table 4 around here]

Table 4 clarifies that the significant ANOVA results for employees and revenues are driven primarily by the contrast between All-Round Leaders and Shy Laggards. The magnitude of these differences is substantial, reinforcing the interpretation that highly coherent strategy systems are disproportionately observed among large firms. Differences between All-Round Leaders and Active Followers are also statistically significant for both employees and revenues, indicating that the transition from partial to high coherence is associated with a further step change in scale.

By contrast, the comparison between Active Followers and Shy Laggards is weaker and does not reach conventional significance thresholds, suggesting that the key structural divide is between firms that develop a fully integrated, high-coherence strategy system and those that do not, rather than between the two lower-coherence groups. Substantively, this pattern supports a "threshold" interpretation: scale appears especially important for achieving high and balanced integration across domains, while moderate outward-facing engagement (typical of Active Followers) may be attainable even without the scale associated with fully coherent systems.

As an additional external validation, we estimated OLS models with firm size as the outcome, using log(employees) and log(revenues) as dependent variables and configuration dummies as predictors

(All-Round Leaders as the reference category), controlling for headquarters region. Consistent with the descriptive comparisons, Active Followers and Shy Laggards are significantly smaller than All-Round Leaders in terms of employees and revenues. Regression results are reported in Table A7 in the Appendix.

6. Discussion

This study asked which empirically recurring configurations of environmental strategy mix coherence emerge among firms, and how these configurations differ in terms of overall intensity and internal balance across strategic domains. Using a configurational perspective, we identified three empirically recurring profiles of environmental engagement in the global food and beverage industry - All-Round Leaders, Active Followers, and Shy Laggards - distinguished by the overall intensity of engagement and, crucially, by the internal alignment with which initiatives are combined across strategic domains. The first configuration, All-Round Leaders, reflects a highly integrated environmental strategy system. Firms in this cluster exhibit strong and relatively balanced engagement across product-related initiatives, internal organizational practices, governance mechanisms, stakeholder-oriented actions, and carbon-related strategies. This pattern is consistent with a sustainability approach that is embedded across organizational domains rather than concentrated in a single area. Importantly, the profile suggests that high engagement is accompanied by a relatively even distribution across dimensions, indicating that environmental action is organized as a coordinated bundle rather than as a set of disconnected interventions.

The Active Followers configuration exhibits a different architecture. While these firms show meaningful environmental engagement, their initiatives are unevenly distributed across domains. The outward-facing dimensions - governance and stakeholder-related strategies - are comparatively more developed than product/operational and carbon-related actions, consistent with an environmental strategy system characterized by partial alignment. This "imbalance" pattern indicates that sustainability engagement can expand selectively, with some domains advancing faster than others. One plausible interpretation is that governance and stakeholder-oriented initiatives are comparatively easier to introduce and communicate, whereas product redesign and operational transformations are more resource-intensive and require longer investment horizons, cross-functional coordination, and technical capabilities. In this sense, Active Followers may represent a configuration in which firms formalize and externalize sustainability commitments without fully translating them into deep operational and product-oriented change.

The Shy Laggards configuration reflects low engagement and limited integration across all dimensions. Firms in this cluster implement fewer initiatives overall and display a fragmented strategy mix, suggesting that sustainability remains peripheral to core strategic priorities. The low and relatively flat profile indicates that environmental actions, when present, are not organized into an internally reinforcing system, which is consistent with a compliance-oriented or episodic approach rather than an integrated strategy system.

The three configurations highlight that heterogeneity in corporate environmental engagement is not only a matter of "how much" firms do, but also of how initiatives are structured across domains. The results point to two analytically separable dimensions underlying this heterogeneity: intensity (the overall level of engagement) and balance (the extent to which engagement is distributed evenly across strategic domains). Importantly, the Active Followers profile illustrates that intermediate intensity can coexist with pronounced unevenness, suggesting that partial coherence may arise when sustainability engagement is built around outward-facing commitments that outpace product, operational, and carbon-related transformation.

These findings underscore that environmental sustainability can be understood as a multidimensional strategy system in which the internal alignment of initiatives varies meaningfully across firms. Examining configurations of engagement - and distinguishing intensity from balance - helps clarify why firms facing similar sustainability pressures may nonetheless exhibit different strategic

architectures, ranging from integrated bundles to selective outward-facing engagement and fragmented low-activity profiles.

7. Conclusion

This study examined how firms combine multiple environmental initiatives into coherent strategy systems and introduced the concept of environmental strategy mix coherence, defined as the internal alignment and mutual reinforcement among strategic dimensions of environmental engagement. Using a configurational approach on ESG disclosures for global food and beverage firms, the analysis identified three empirically recurring profiles - All-Round Leaders, Active Followers, and Shy Laggards - showing that heterogeneity in environmental engagement is not only a matter of "how much" firms do, but also of how initiatives are organized and integrated across domains.

From a theoretical standpoint, the results support a system-level view of corporate environmental strategy (Mårtensson and Westerberg, 2016). Rather than treating sustainability practices as isolated or additive elements, the findings indicate that firms differ in the degree to which environmental initiatives are structured as coordinated bundles spanning product, internal organizational, governance, stakeholder, and carbon-related dimensions. In doing so, the study reinforces a configurational understanding of environmental engagement (Walker et al., 2015) and clarifies that intensity and internal balance represent distinct properties of corporate environmental strategy systems.

For managers, the configurations provide a diagnostic lens for assessing whether environmental engagement reflects an integrated strategy system or a selective, uneven mix of initiatives. Firms resembling Active Followers may strengthen coherence by translating outward-facing commitments (governance and stakeholder-oriented actions) into deeper product and operational initiatives, thereby reducing domain imbalances. For Shy Laggards, progress is likely to require building basic internal foundations and governance mechanisms that can support a more coordinated expansion of initiatives over time. More broadly, the results suggest that environmental efforts are likely to be more credible and effective when designed as interdependent elements of a unified strategic architecture rather than as disconnected programs.

The cross-regional differences in the prevalence of configurations also point to the relevance of institutional environments in shaping not only the adoption of environmental initiatives but their internal structuring. Policy frameworks focused primarily on disclosure or isolated practices may risk encouraging symbolic compliance, whereas mechanisms that facilitate coordinated implementation - particularly for smaller firms facing resource constraints - may support the development of more coherent environmental strategy systems.

This study has limitations that offer avenues for future research. First, the cross-sectional design does not allow assessment of how firms transition across configurations over time; longitudinal studies could examine pathways of capability building and the dynamics through which coherence emerges or deteriorates. Second, the focus on a single industry limits generalizability; comparative analyses across sectors with different environmental pressures would help clarify boundary conditions. Third, while the study provides a taxonomy of strategy systems, it does not establish causal relationships between coherence and performance outcomes; future research could investigate how configurations relate to longer-term competitiveness, risk exposure, and value creation. Finally, our measures capture disclosed environmental initiatives from Refinitiv Eikon, which may reflect differences in reporting practices as well as substantive implementation.

Data availability statement

Data were retrieved from the Refinitiv Eikon database. Access to the underlying ESG data is available via Refinitiv subscription. The derived variables used in the analyses (dimension scores, imbalance/dispersion indices, and cluster assignments) can be made available by the authors upon request.

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Tables

Table 1. Descriptive statistics of environmental strategy dimensions (N = 311).

Frequency	Product strategy	CSR governance strategy	Internal organizational strategy	External stakeholder strategy	Carbon-neutral strategy
0	53	27	60	77	15
1	80	54	81	42	114
2	87	130	122	57	154
3	38	62	44	76	22
4	53	38	4	59	6
Mean	1.86	2.10	1.52	1.99	1.65
Median	2.00	2.00	2.00	2.00	2.00
Mode	2	2	2	0	2
Std. Dev.	1.32	1.10	1.00	1.46	0.76
Obs.	311	311	311	311	311

Source: our elaboration

Table 2. Environmental strategy configurations: clusters and ANOVA results.

Environmental strategy dimension	Cluster 1	Cluster 2	Cluster 3	ANOVA p-value
Product strategy	3.77	1.77	1.01	$p < 0.001$
CSR governance strategy	2.54	2.49	1.41	$p < 0.001$
Internal organizational strategy	2.03	1.87	1.03	$p < 0.001$
External stakeholder strategy	3.22	3.04	0.66	$p < 0.001$
Carbon-neutral strategy	2.13	1.86	1.26	$p < 0.001$
Cluster average score	2.65	2.10	0.97	
Outward–inward imbalance index	0.24	0.93	-0.07	
Number of firms (%)	82 (26%)	113 (36%)	116 (37%)	
Relative dispersion (RD) ↓	0.34	0.39	0.87	

Source: our elaboration. Note: RD lower values indicate more balanced engagement across dimensions.

Table 3. Firm characteristics across environmental strategy configurations (ANOVA).

Firm characteristic	Cluster 1 (mean; SD)	Cluster 2 (mean; SD)	Cluster 3 (mean; SD)	F	p-value
Board Size	10.07; 2.87	10.40; 3.90	9.29; 3.84	1.819	$p = 0.165$
Number of Employees	41967.97; 69989.40	21719.75; 32625.95	8627.90; 11019.51	9.798	$p < 0.001$
Revenues (million)	13432.37; 19407.38	5463.08; 7381.52	2268.00; 3344.68	15.976	$p < 0.001$
ROA	5.9%; 3.3%	7.3%; 11.5%	6.4%; 9.3%	0.429	$p = 0.652$
ROE	16.9%; 16.1%	19.1%; 26.5%	11.2%; 24.2%	2.215	$p = 0.112$

Source: our elaboration

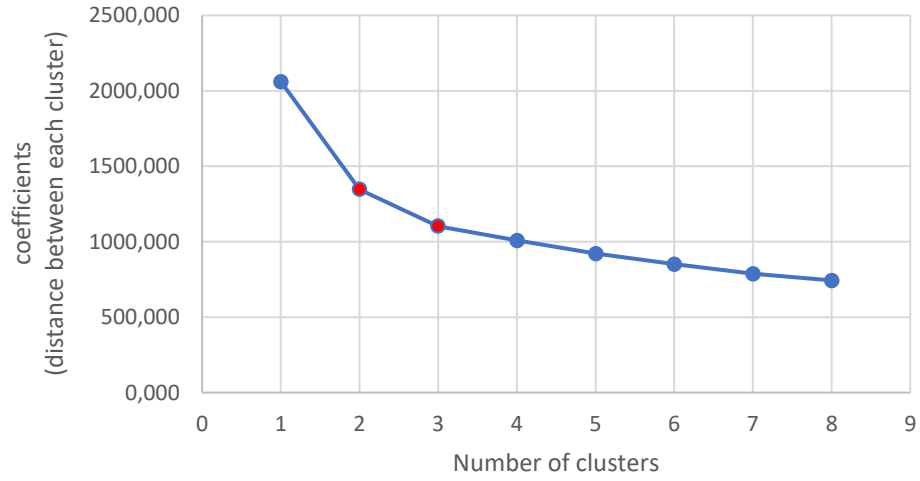
Table 4. Tukey HSD post-hoc comparisons for selected firm characteristics.

Dependent variable	Comparison (I − J)	Mean difference (I − J)	Std. error	Sig.
Number of Employees	Cluster 1 – Cluster 2	17829.53	5955.76	p = 0.008
Number of Employees	Cluster 2 – Cluster 3	12389.77	5449.47	p = 0.061
Number of Employees	Cluster 1 – Cluster 3	30219.30	5955.76	p < 0.001
Revenues (million)	Cluster 1 – Cluster 2	7201.74	1603.46	p < 0.001
Revenues (million)	Cluster 2 – Cluster 3	2889.26	1467.15	p = 0.122
Revenues (million)	Cluster 1 – Cluster 3	9223.37	1603.46	p < 0.001

Source: our elaboration

Figures

Figure 1. Dendrogram from hierarchical clustering (Ward's method).



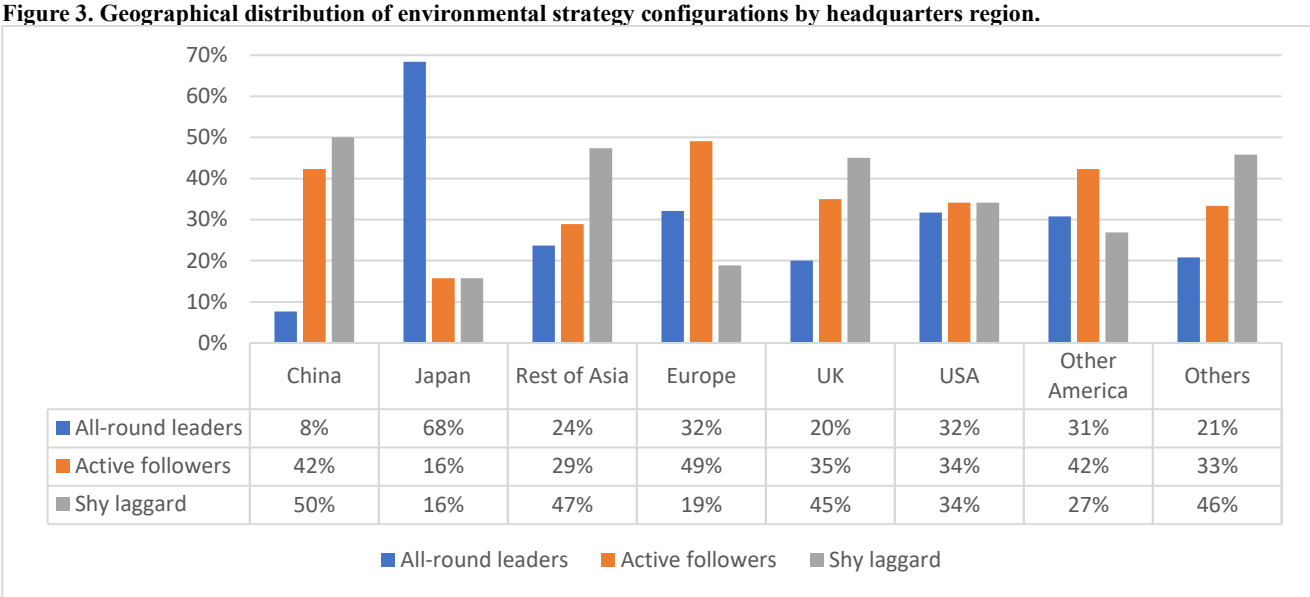
Source: our elaboration

Figure 2. Environmental strategy profiles by configuration (radar plot).



Source: our elaboration

Figure 3. Geographical distribution of environmental strategy configurations by headquarters region.



	China	Japan	Rest of Asia	Europe	UK	USA	Other America	Others
All-round leaders	8%	68%	24%	32%	20%	32%	31%	21%
Active followers	42%	16%	29%	49%	35%	34%	42%	33%
Shy laggard	50%	16%	47%	19%	45%	34%	27%	46%

Source: our elaboration

Appendix

Table A1. Environmental strategy dimensions and underlying initiatives (Refinitiv Eikon indicators).

Dimension	Indicator 1	Indicator 2	Indicator 3	Indicator 4
Product strategy	Environmental products	Environmental material sourcing	Product impact minimization	Policy sustainable packaging
Internal organizational strategy	Environment management team	Environment management training	Staff transportation impact reduction	Green buildings
External stakeholder strategy	Environmental partnerships	Environmental supply chain management	Environmental supply chain monitoring	Environmental supply chain partnership termination
Carbon-neutral strategy	Internal carbon pricing	Emissions trading	Energy efficiency policy	Set emissions targets
CSR governance strategy	Climate change commercial risks opportunities	Sustainability compensation incentives	CSR sustainability committee	Executive compensation ESG performance policy

Source: our elaboration

Table A2. Illustrative anonymized firm examples for each configuration (selected to be close to cluster centroids).

Configuration	Anonymized firm	Product	Internal organizational	External stakeholder	CSR governance	Carbon-neutral	Cluster average	Outward–inward imbalance
All-Round Leaders	L1	4	2	3	3	2	2.80	0.33
All-Round Leaders	L2	4	2	3	2	2	2.60	-0.17
All-Round Leaders	L3	3	2	3	2	2	2.40	0.17
Active Followers	F1	2	2	3	2	2	2.20	0.50
Active Followers	F2	2	2	3	3	2	2.40	1.00
Active Followers	F3	2	2	2	2	2	2.00	0.00
Shy Laggards	S1	1	1	0	1	1	0.80	-0.50
Shy Laggards	S2	1	1	1	1	1	1.00	0.00
Shy Laggards	S3	1	1	0	2	1	1.00	0.00

Source: our elaboration. Note: Examples are anonymized and selected as the firms with the smallest Euclidean distance to the cluster centroids in standardized space (based on the five dimension scores).

Table A3. Brief descriptive vignettes for anonymized firm examples (illustrative).

Configuration	Anonymized firm	Descriptive vignette
All-Round Leaders	L1	This profile combines strong product-oriented initiatives, well-developed stakeholder engagement, formal governance mechanisms supporting sustainability, with concrete carbon-related actions. Internal organizational practices are present, supporting a relatively balanced strategy system across domains.
All-Round Leaders	L2	This profile combines strong product-oriented initiatives, well-developed stakeholder engagement, governance mechanisms in place, with concrete carbon-related actions. Internal organizational practices are present, supporting a relatively balanced strategy system across domains.
All-Round Leaders	L3	This profile combines solid product-related initiatives, well-developed stakeholder engagement, governance mechanisms in place, with concrete carbon-related actions. Internal organizational practices are present, supporting a relatively balanced strategy system across domains.
Active Followers	F1	This profile shows meaningful engagement but a more selective architecture: stakeholder-facing initiatives are comparatively stronger than product and internal practices. Governance mechanisms are present but do not fully translate into stronger product or internal initiatives. Overall, the pattern reflects a pronounced outward–inward imbalance.
Active Followers	F2	This profile shows meaningful engagement but a more selective architecture: stakeholder-facing initiatives are comparatively stronger than product and internal practices. Governance structures are particularly developed, reinforcing an outward-facing orientation. Overall, the pattern reflects a pronounced outward–inward imbalance.
Active Followers	F3	This profile shows meaningful engagement but a more selective architecture: stakeholder-facing initiatives are comparatively stronger than product and internal practices. Governance mechanisms are present but do not fully translate

		into stronger product or internal initiatives. Overall, the pattern reflects moderate imbalance and partial integration across domains.
Shy Laggards	S1	This profile reflects limited environmental engagement across domains, with few initiatives reported in product, internal processes, and carbon-related actions. Stakeholder-oriented initiatives are largely absent, suggesting weak external integration. Governance structures are minimal, consistent with a fragmented and low-coherence strategy mix.
Shy Laggards	S2	This profile reflects limited environmental engagement across domains, with few initiatives reported in product, internal processes, and carbon-related actions. Stakeholder engagement is present but remains modest. Governance structures are minimal, consistent with a fragmented and low-coherence strategy mix.
Shy Laggards	S3	This profile reflects limited environmental engagement across domains, with few initiatives reported in product, internal processes, and carbon-related actions. Stakeholder-oriented initiatives are largely absent, suggesting weak external integration. Governance mechanisms appear somewhat more developed than other domains, but the overall mix remains sparse and weakly coordinated.

Source: our elaboration. Note: Vignettes summarize the pattern of disclosed initiatives reflected in the five dimension scores reported in Appendix Table A2; no additional firm-level information is used.

Table A4. Internal validity indices for alternative cluster solutions (k = 2–6).

k	Silhouette (avg) ↑	Calinski–Harabasz ↑	Davies–Bouldin ↓
2	0.341	216.91	1.145
3	0.255	157.08	1.441
4	0.214	131.65	1.560
5	0.212	116.34	1.549
6	0.215	108.22	1.464

Source: our elaboration. Note: Indices are computed on unstandardized dimension scores using k-means clustering; higher values indicate better fit for Silhouette and Calinski–Harabasz, whereas lower values indicate better fit for Davies–Bouldin.

Table A5. Stability checks for the three-cluster solution.

Check	Specification	ARI mean	ARI SD	ARI min–max
Multiple initializations	k = 3; 10 different random seeds (n_init = 5), compared to baseline solution	0.881	0.128	0.682–1.000
Subsampling stability	k = 3; 10 random 80% subsamples (n_init = 3), compared to baseline labels on the subsample	0.878	0.118	0.676–0.987

Source: our elaboration. Note: These diagnostics indicate that the three-cluster solution is stable under alternative initializations and resampling. While internal validity indices are highest for k = 2 in this dataset, the three-cluster solution provides additional interpretive resolution consistent with the dendrogram-based assessment and the study's focus on distinguishing intensity and internal balance across domains.

Table A6. Cluster membership across headquarters regions.

Configuration	Americas	Asia	China	Europe	Japan	Others	UK	USA	Total (N)
All-Round Leaders	8 (30.8%)	18 (23.7%)	4 (7.7%)	17 (32.1%)	13 (68.4%)	5 (20.8%)	4 (20.0%)	13 (31.7%)	82
Active Followers	11 (42.3%)	22 (28.9%)	22 (42.3%)	26 (49.1%)	3 (15.8%)	8 (33.3%)	7 (35.0%)	14 (34.1%)	113
Shy Laggards	7 (26.9%)	36 (47.4%)	26 (50.0%)	10 (18.9%)	3 (15.8%)	11 (45.8%)	9 (45.0%)	14 (34.1%)	116
Total (N)	26	76	52	53	19	24	20	41	311

Source: our elaboration. Note: Cell entries report count (column percentage within region). Chi-square test of independence: $\chi^2(14) = 41.45$, $p < 0.001$; Cramer's V = 0.26.

Table A7. OLS models linking configuration membership to firm size (external validation).

	log(Employees)	log(Revenues)
Active Followers (vs. All-Round Leaders)	-0.909*** (0.235)	-0.749*** (0.222)
Shy Laggards (vs. All-Round Leaders)	-1.624*** (0.227)	-1.582*** (0.234)
Headquarters region controls	Yes	Yes
Constant	10.490*** (0.466)	8.656*** (0.329)
Observations	271	311
R-squared	0.243	0.317

Source: our elaboration. Note: Robust standard errors (HC3) in parentheses. The dependent variables are natural logs. Configuration dummies use All-Round Leaders as the reference category. *** p < 0.001; ** p < 0.01; * p < 0.05.

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Experience Economy Dimensions and Guest Satisfaction in Peer-to-Peer Accommodation: Comparative Analysis of Airbnb Reviews in Rome and Paris

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Abstract

Frame of the research. *Peer-to-peer accommodation platforms such as Airbnb increasingly position accommodation as an experiential product, yet large-scale empirical applications of the Experience Economy framework to Airbnb user-generated content remain limited.*
Purpose of the paper. *The paper investigates how the four Experience Economy dimensions — education, entertainment, escapism, and esthetics — shape guest satisfaction in Airbnb accommodation reviews, comparing Rome and Paris.*
Methodology. *The study analyzes nearly one point six million Airbnb accommodation reviews from Rome and Paris. Experiential dimensions are operationalized through validated scales from Mody et al. combined with NLP-assisted coding, validated against human-coded reviews. Satisfaction is measured through sentiment scores and listing ratings.*
Results. *Esthetics is the strongest predictor of affective satisfaction, while education has the strongest association with rating-based satisfaction. Entertainment has positive but moderate effects across both outcomes. Escapism shows a more complex pattern: it is negatively associated with sentiment and non-significant in the baseline rating model, but becomes a significant rating driver in Paris. City interaction models show that experiential effects differ between Rome and Paris.*
Research limitations. *The study uses publicly available Airbnb data and relies on automated text analysis; therefore, sentiment classification and experiential coding may not fully capture irony, implicit meanings, or culturally specific expressions.*
Managerial implications. *Hosts and platforms should treat accommodation not only as functional lodging but also as an experiential product, investing in esthetics, cultural guidance, and destination-specific experiential positioning.*
Originality of the paper. *The paper provides large-scale empirical validation of the Experience Economy framework in peer-to-peer accommodation and demonstrates that experiential dimensions influence affective and cognitive satisfaction differently across destination contexts.*

Keywords: *Experience Economy, Airbnb, guest satisfaction, Rome, Paris, large-scale analysis*

1. Introduction

Peer-to-peer accommodation has transformed the urban tourism sector, giving travelers flexibility and affordability owing to Airbnb's popularity in this accommodation space (Gutiérrez et al., 2017; Moon et al., 2019). Airbnb has changed the norms of what a host property can be, positioning accommodation as more than simple lodging and connecting it to local culture, authenticity, and a sense of belonging (Mody et al., 2017; Guttentag, 2019; Capineri & Romano, 2021). Nevertheless, the constant and rapid increase in listings (over 8 million, as reported by Airbnb last year) has led to commodification and serious competition between hosts, making increasingly challenging what is already difficult - to continually meet guests' varying expectations (Sthapit, 2019; Voltes-Dorta & Inchausti-Sintes, 2020; Airbnb, 2025, July 5).

In this context, the Experience Economy (EE) framework (Pine & Gilmore, 1999) represents a compelling solution for differentiation by providing engaging experiences with four dimensions: education, entertainment, escapism, and esthetics. While previous research has examined the four realms in bed-and-breakfasts (Oh et al., 2007), cruise tourism (Hosany & Witham, 2010), festivals (Mehmetoglu & Engen, 2011), and Airbnb studies (Mody et al., 2017; Bao et al., 2021), confirming its applicability in tourism, hospitality, and that the experience varies depending on context, most

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studies have been conceptual, survey-based with small sample sizes, or descriptive analyses with a limited scope of reviews.

Furthermore, although these studies underscore the significance of reviews, they have not applied the framework broadly in relation to Airbnb review datasets, hence restricting the generalizability of findings. Empirical applications of the EE framework to peer-to-peer accommodations are quite limited, and only a few studies have utilized reviews to extract their dimensions. Comparative analyses across destinations are even scarcer, despite evidence suggesting that reviews of Airbnb properties differ by market and cultural dimensions prioritized in online reviews (Mody et al., 2017; Zhang & Fu, 2020). This highlights a serious gap: A lack of scalable and data-driven approaches to quantify how experiential dimensions contribute to satisfaction in Airbnb.

The present study seeks to fulfil this gap through a comparison of two cities (Rome, Paris), with each city offering thousands of Airbnb reviews, and to examine whether the experiential dimensions appear consistently or reflect the distinctive characteristics of the two destinations. Guest reviews on Airbnb frequently emphasize different experiential aspects that contribute significantly to the overall guest satisfaction during the stay, for example, host-guest interaction, the host's hospitality, location, feeling welcome, home experience, apartment facilities (Tussyadiah & Zach, 2017; Xu et al., 2019; Sthapit et al., 2021), which makes the EE framework particularly relevant and provides a natural way to operationalize these dimensions.

Various research has highlighted that satisfaction in tourism and hospitality has mostly been examined using star ratings, structured surveys, and service quality models such as SERVQUAL or HOLSERV (Pizam & Ellis, 1999; Li et al., 2013; Pizam et al., 2016; Oh & Kim, 2017). In the context of Airbnb reviews, different studies link review scores, sentiment, and booking outcomes (Lawani et al., 2019; Zhu et al., 2019; Zhu et al., 2020; Thomsen & Jeong, 2020; Zervas et al., 2021) and show that Airbnb review scores correlate well with sentiment scores from both titles and full content of reviews (Subroto & Christianis, 2021).

Two cities, Paris and Rome, were chosen as the two empirical cases because of the size and maturity of the Airbnb market (Heo et al., 2019; InsideAirbnb.com, 2025, August 10), ensuring sufficient data availability. The choice for this study enables a comparative analysis that captures both destination-specific and generalizable experiential patterns, thereby generating insights of relevance not only for hosts and destination managers in these cities, but also for stakeholders operating in other urban tourism contexts.

This paper, therefore, aims to extend the EE to peer-to-peer accommodation by investigating how the four dimensions are represented in user-generated content (UGC) and to what extent they contribute to guest satisfaction. The analysis focuses specifically on Airbnb accommodation-related reviews and does not include Airbnb Experiences, tours, or activities. Accordingly, the paper examines how accommodation stays acquire experiential value through guests' review narratives. Moreover, the study offers a new approach that employs natural language processing as a methodology that can scale experiential constructs rather than adopting survey or small sample approaches as previous studies have.

The study addresses the following research questions:

RQ1 How do the four EE dimensions (education, entertainment, esthetics, and escapism) influence guest satisfaction in peer-to-peer accommodation?

RQ2 Do the effects of EE dimensions on guest satisfaction differ when satisfaction is operationalized as affective (textual sentiment) versus cognitive (numerical ratings)?

RQ3 Which EE dimensions are most salient in Airbnb guest reviews, as reflected in the intensity of experiential language used in review texts?

RQ4 How do the salience and satisfaction effects of EE dimensions differ between Rome and Paris?

2. Methodology

2.1 Data Source

Data for both cities were retrieved from the website called InsideAirbnb.com, a project that was launched in 2015 by Murray Cox. This platform compiles, cleans, and aggregates data from Airbnb to inform communities about rentals' housing impacts (InsideAirbnb, 2025, August 2). For this study, datasets for Rome and Paris were downloaded as separate CSV files containing different information about listings and reviews. After cleaning and merging, the combined dataset yielded approximately 1,600,000 reviews; all preprocessing and analyses were conducted using Python.

The qualitative coding process was grounded in Pine and Gilmore's (1999) four realms of experience - education, entertainment, escapism, and esthetics - as operationalized and validated by Mody et al. (2017) in the comparative study about hotels and Airbnb accommodations. Their validated scale items (Table 2) provided the conceptual and linguistic anchors and were integrated directly into the system prompt developed to instruct OpenAI models to classify user reviews according to the defined dimensions. The following sub-sections, taken from Mody et al. (2017), describe how each dimension was defined and operationalized during the coding process.

Table 1. Validated scales from Mody et al. (2017). The accommodation experiencescape: a comparative assessment of hotels and Airbnb

Entertainment (Fun, Amusement, Enjoyment)	Education (Learning, Enrichment)	Escapism (Immersion, Escape, Transformation)	Esthetics (Design, Surroundings, Atmosphere)
The hotel / Airbnb experience was fun The hotel / Airbnb was entertaining I really enjoyed this hotel / Airbnb experience	I learned a lot through my experience The hotel/Airbnb experience stimulated my curiosity to learn new things Staying at the hotel/Airbnb was a real learning experience	Staying at the hotel / Airbnb made me feel I was in a different world Staying at the hotel / Airbnb made me feel I was living in a different time or place I completely escaped from reality during the hotel / Airbnb experience	It was pleasant just being at the hotel / Airbnb The setting of the hotel / Airbnb provided pleasure to my senses The setting of the hotel / Airbnb really showed attention to detail in terms of design

Source: our elaboration

Mody et al. (2017) adapted these realms for the peer-to-peer accommodation sector from the study by Oh et al. (2007) and also added new dimensions (e.g., serendipity, localness, communitas, and personalization). The current study focuses on the four core realms, and any other extended dimensions are noted for future research directions.

2.2 Coding Procedure

For manual coding, a random sample of 100 reviews per city (200 total) was selected using simple random sampling without replacement from the cleaned review corpus, and each dimension was scored on a 0-4 Likert scale (0 = not present; 1 = minor presence; 2 = moderate presence; 3 = strong; 4 = dominant presence), capturing intensity of experiential language (Koo & Yang, 2025). The zero-to-four scale was selected because it captures increasing intensity of experiential language, from absence to dominant presence, while remaining sufficiently simple for reliable human coding and automated replication. Two coders independently read each review of the subset and scored all four dimensions. All discrepancies were discussed between coders to align interpretation standards, enhancing consistency in coding decisions.

The manual coding sub-sample of 200 reviews (100 per city) serves as a reference benchmark against which GPT-4.1-nano-generated EE scores are evaluated, enabling validation of automated coding accuracy prior to full-scale application. The validated model was subsequently applied to the

complete dataset of approximately 1.6 million reviews, and all analyses reported in this study are based on this full-scale corpus.

2.3 Validation

To develop an automated measurement tool that will be both accurate and reliable in its ability to classify each review, this study utilized a multi-step validation model selection process considering human coded results. Instead of relying on a single AI configuration, different large language model (LLM) variants were tested against a manually coded review dataset in terms of accuracy, reliability, and performance.

Multiple coding configurations, each assisted by OpenAI's coding, were used for a single review set. The three configurations include: (1) GPT-4.1-nano vs. human coding, (2) GPT-4.1 vs. human coding, and (3) GPT-4.1-nano classification across independent runs. Four separate measures of model performance are examined: Pearson correlation coefficients (to determine if there is an association in linear terms), mean absolute error (MAE) (the average difference between GPT-4.1-nano and human coding), exact score agreement, and the proportion of scores within ±1 point of the 0-4 EE Scale.

As shown in Table 3, GPT-4.1-nano achieves high correlation with human ratings ($r \approx 0.73–0.96$) as well as very low MAE values (0.20 or less). In addition, GPT-4.1-nano achieves 100% agreement within ±1 of human judgments on every dimension. While Table 4 shows that the GPT-4.1 model had strong correlations, it had higher MAE values than GPT-4.1-nano, and much smaller exact match rates, which indicates much more variability around human scores.

Table 2. GPT4.1 Nano versus Human Validations

City	Dimension	Pearson r	MAE	Exact match (%)	Within ±1 (%)	N used
Rome	Education	0.949	0.120	88.0	100.0	100
Rome	Entertainment	0.858	0.100	90.0	100.0	100
Rome	Escapism	0.735	0.120	88.0	100.0	100
Rome	Esthetics	0.910	0.190	81.0	100.0	100
Paris	Education	0.961	0.060	94.0	100.0	100
Paris	Entertainment	0.719	0.200	80.0	100.0	100
Paris	Escapism	0.846	0.130	87.0	100.0	100
Paris	Esthetics	0.902	0.190	81.0	100.0	100
All	Education	0.964	0.090	91.0	100.0	200
All	Entertainment	0.809	0.150	85.0	100.0	200
All	Escapism	0.807	0.125	87.5	100.0	200
All	Esthetics	0.910	0.190	81.0	100.0	200

Source: our elaboration

Table 3. GPT4.1 versus Human Validations

City	Dimension	Pearson r	MAE	Exact match (%)	Within ±1 (%)	N used
Rome	Education	0.885	0.320	68.0	100.0	100
Rome	Entertainment	0.570	0.520	48.0	100.0	100
Rome	Escapism	0.539	0.360	64.0	100.0	100
Rome	Esthetics	0.868	0.460	55.0	99.0	100
Paris	Education	0.850	0.260	75.0	99.0	100
Paris	Entertainment	0.671	0.230	78.0	99.0	100
Paris	Escapism	0.661	0.400	61.0	99.0	100
Paris	Esthetics	0.898	0.250	75.0	100.0	100
All	Education	0.899	0.290	71.5	99.5	200
All	Entertainment	0.659	0.375	63.0	99.5	200
All	Escapism	0.612	0.380	62.5	99.5	200
All	Esthetics	0.886	0.355	65.0	99.5	200

Source: our elaboration

The reliability of GPT-4.1-nano was also assessed by running it independently two times on the same review set (Table 5). Agreement between these two runs was extremely high ($r > 0.9$ for each dimension) with a very close to 100% exact match rate and minimal MAE. These results indicate that GPT-4.1-nano, when provided with a well-defined and specific prompt, provides consistent and reliable classification and minimizes the potential for random variability in automated coding.

Table 4. GPT4.1 Nano Consistency (Attempt 1 vs 2)

City	Dimension	Pearson r	MAE	Exact match (%)	Within ±1 (%)	N used
Rome	Education	1.000	0.000	100.0	100.0	100
Rome	Entertainment	0.986	0.010	99.0	100.0	100
Rome	Escapism	0.924	0.040	96.0	100.0	100
Rome	Esthetics	0.974	0.050	95.0	100.0	100
Paris	Education	0.950	0.080	92.0	100.0	100
Paris	Entertainment	0.972	0.020	98.0	100.0	100
Paris	Escapism	0.930	0.050	96.0	99.0	100
Paris	Esthetics	0.933	0.080	94.0	98.0	100
All	Education	0.984	0.040	96.0	100.0	200
All	Entertainment	0.981	0.015	98.5	100.0	200
All	Escapism	0.906	0.045	96.0	99.5	200
All	Esthetics	0.956	0.065	94.5	99.0	200

Source: our elaboration

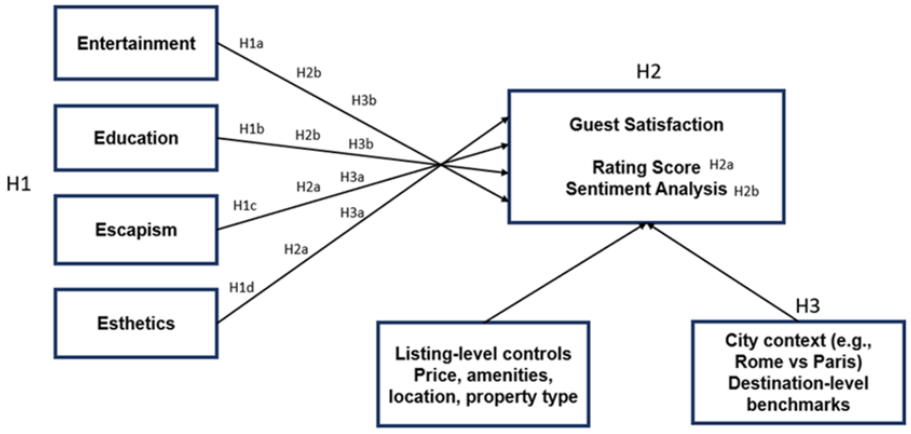
The comparative analysis led to the selection of GPT-4.1-Nano to use as the operational model for EE measurements within this study. As a result of its superior performance relative to both accuracy and computational resources, the model was able to replicate human-coding with an acceptable level of error, while also providing consistent results from run-to-run. Therefore, all further analysis is based upon EE scores generated by GPT-4.1-Nano that were compared to human-coded benchmarks.

3. Conceptual Framework and Econometric Models

3.1 Conceptual Explanation

Drawing on Pine and Gilmore's (1999) EE framework, Figure 1 proposes that the four dimensions constitute key experiential value drivers in tourism settings.

Fig. 1: A Conceptual Model for Understanding the Influence of the Experience Economy Framework on Guest Satisfaction



Source: our elaboration

Prior empirical studies demonstrate that these dimensions are measurable and significantly associated with tourist satisfaction, although their relative importance varies across contexts. Moreover, prior research indicates that the four EE dimensions do not exert uniform effects across contexts, with certain dimensions (e.g., esthetics or entertainment) often emerging as more salient depending on the experiential setting and type of activity (Oh et al., 2007; Hosany & Witham, 2010; Mehmetoglu & Engen, 2011; Flores-Gómez et al., 2025). This suggests that the influence of experiential dimensions on satisfaction may vary rather than follow a strictly uniform pattern.

Building on this literature, the four experiential dimensions are generally expected to contribute positively to guest satisfaction in the Airbnb context, articulated in the following hypotheses:

H1: The four EE dimensions - education, entertainment, escapism, and esthetics have a positive effect on guest satisfaction.

H1a: Education - Satisfaction (+)

H1b: Entertainment - Satisfaction (+)

H1c: Escapism - Satisfaction (+)

H1d: Esthetics - Satisfaction (+)

Review sentiment analysis was implemented by VADER, Valence Aware Dictionary and sEntiment Reasoner (Hutto & Gilbert, 2014), yielding scores from -1 (negative) to +1 (positive). Reviews > +0.05 were positive (satisfied), < -0.05 negative (dissatisfied), and in-between neutral. Macro-level satisfaction is drawn from review scores, aggregating guest ratings per listing for long-term quality insights. Prior research demonstrates that numerical ratings primarily capture an overall, evaluative judgment of service performance, while textual reviews convey richer emotional and experiential responses expressed through language (Oliver, 1980; Pang & Lee, 2008; Sparks & Browning, 2011). Using both measures allows for a more comprehensive assessment of satisfaction and reduces reliance on a single evaluative metric. Affective-experiential (sentiment) and cognitive-evaluative (ratings) (Wang et al., 2023) are both captured by this dual approach, providing long-term quality insights for satisfaction in peer-to-peer stays for this study.

H2: The EE dimensions influence both rating-based satisfaction and sentiment-based satisfaction, but the magnitude of effects differs across the two measures.

H2a: The effects of esthetics and escapism on guest satisfaction are stronger for rating scores than for sentiment measures.

H2b: The effects of entertainment and education on guest satisfaction are stronger for sentiment measures than for rating scores.

To isolate the experiential contribution of the EE dimensions, the model incorporates listing-level control variables (price, amenities, neighborhood, and property type), which are known to influence guest evaluations in peer-to-peer accommodation markets (Guttentag et al., 2017; Huang et al., 2025).

Finally, the model introduces city context (Rome vs. Paris) as a comparative benchmark logic, consistent with destination competitiveness research (Crouch, 2010), enabling an assessment of whether the relative importance of experiential dimensions varies across two globally competitive tourism cities with distinct experiential profiles. Prior literature provides conceptual grounds for expecting such destination-level moderation. Paris is widely recognized as a global center of aesthetic culture, architecture, and fashion, an urban identity deliberately constructed through spatial engineering for the tourist gaze (Urry, 2002; Montagné Villette & Hardill, 2010). This culturally saturated esthetic environment is likely to amplify the salience of esthetics and escapism in guest evaluations, as visitors arrive with elevated aesthetic expectations and aspirational identity narratives (Seyfi et al., 2020). Rome, by contrast, is rooted in tangible historical and cultural heritage (Gemmiti, 2019), positioning it as a site of knowledge acquisition and cultural enrichment. Prior studies in cultural and heritage tourism contexts show that educational value is a particularly strong driver of

satisfaction in destinations with dense historical resources (Radder & Han, 2015; Hwang & Lyu, 2015). Together, these distinct destination identities provide a theoretical basis for expecting that esthetics and escapism effects will be stronger in Paris, while education and entertainment effects will be more pronounced in Rome.

H3: The strength of the relationship between EE dimensions and guest satisfaction differs between Rome and Paris.

H3a: The positive relationship between Esthetics and Escapism on guest satisfaction will be stronger for listings in Paris compared to those in Rome.

H3b: The positive relationship between Education and Entertainment on guest satisfaction will be stronger for listings in Rome compared to those in Paris.

3.2 Econometric Specification

To examine the relationship between EE dimensions and guest satisfaction, the empirical analysis employs linear regression models specified at both the review level and the listing level, reflecting the dual operationalization of satisfaction as affective and cognitive.

At the review level, affective guest satisfaction is measured using sentiment scores derived from review text. The baseline econometric specification models review-level sentiment as a function of the four Experience Economy dimensions and a vector of control variables:

$$Sentiment_i = \alpha + \beta^1 Education_i + \beta^2 Entertainment_i + \beta^3 Esthetics_i + \beta^4 Escapism_i + \gamma X_i + \varepsilon_i$$

where $Sentiment_i$ denotes the sentiment score of review i, $Education_i$, $Entertainment_i$, $Esthetics_i$, and $Escapism_i$ represent the intensity of the four Experience Economy dimensions expressed in the review, X_i is a vector of review- and listing-level control variables (including price, accommodation capacity (accommodates, bedrooms, beds), availability, and host listing characteristics), and ε_i is an error term. This model is used to test Hypotheses H1 and H2 regarding affective satisfaction.

Because numerical ratings are available only at the listing level and reflect cumulative guest evaluations over time, a separate listing-level model is estimated to capture cognitive satisfaction. Experience Economy dimensions are aggregated to the listing level by averaging review-level scores for each listing. The corresponding specification is:

$$Rating_l = \alpha + \beta^1 Education_l + \beta^2 Entertainment_l + \beta^3 Esthetics_l + \beta^4 Escapism_l + \gamma Z_l + \varepsilon_l$$

where $Rating_l$ denotes the average rating score of listing l, $\bar{Education}_l$, $\bar{Entertainment}_l$, $\bar{Esthetics}_l$, and $\bar{Escapism}_l$ represent the mean Experience Economy scores across all reviews associated with listing l, Z_l is a vector of listing-level control variables, and ε_l is the error term. This specification allows for testing Hypotheses H1 and H2 using rating-based satisfaction.

To test whether effects differ between Rome and Paris, we estimate interaction models with a city indicator and EE × city. A binary city indicator is defined, where City = 1 for Paris and City = 0 for Rome, which serves as the reference category. At the review level, city-level moderation for sentiment-based satisfaction is examined using the following interaction model:

$$\begin{aligned} Sentiment_i = {} & \alpha + \beta_1 Education_i + \beta_2 Entertainment_i + \beta_3 Esthetics_i + \beta_4 Escapism_i \\ & + \theta City_i + \delta_1 (Education_i \times City_i) + \delta_2 (Entertainment_i \times City_i) \\ & + \delta_3 (Esthetics_i \times City_i) + \delta_4 (Escapism_i \times City_i) + \gamma X_i + \varepsilon_i \end{aligned}$$

In this specification, coefficients β capture the effects of Experience Economy dimensions in Rome, while interaction coefficients δ indicate whether and how these effects differ for Paris. Positive

and statistically significant interaction terms imply stronger effects in Paris, whereas negative interaction terms indicate stronger effects in Rome. This model directly tests Hypotheses H3a and H3b for affective satisfaction.

An analogous interaction specification is estimated at the listing level to assess city-level moderation for rating-based satisfaction:

$$Rating_l = \alpha + \beta_1 Education_l + \beta_2 Entertainment_l + \beta_3 Esthetics_l + \beta_4 Escapism_l + \theta City_l + \delta_1(Education_l \times City_l) + \delta_2(Entertainment_l \times City_l) + \delta_3(Esthetics_l \times City_l) + \delta_4(Escapism_l \times City_l) + \gamma' Z_l + \varepsilon_l$$

Categorical listing characteristics (e.g., room type and property type) are included as dummy variables. Together, these models allow for a systematic examination of how EE dimensions influence guest satisfaction across destinations and whether their relative importance differs between Rome and Paris.

4. Results

Table 5 reports descriptive statistics of Experience Economy dimension scores by city based on approximately 798,000 reviews per destination (1,596,000 total). Esthetics exhibits the highest mean values in both Paris and Rome, followed by education and entertainment, while escapism shows the lowest average intensity. Standard deviations indicate substantial within-city variation across all dimensions.

Tab 5: Descriptive Statistics of Experience Economy Dimensions by City

City	Education (Mean)	Education (SD)	Entertainment (Mean)	Entertainment (SD)	Esthetics (Mean)	Esthetics (SD)	Escapism (Mean)	Escapism (SD)	Reviews
Paris	0.646	0.86	0.419	0.67	1.591	1.09	0.200	0.60	798,000
Rome	0.748	0.86	0.395	0.64	1.434	1.08	0.148	0.51	798,000

Source: our elaboration

Table 6 reports descriptive statistics of sentiment scores by city. Mean sentiment values are nearly identical across Paris (0.845) and Rome (0.845), with the difference statistically non-significant (p = 0.591), with comparable dispersion and quartile distributions. Median sentiment scores exceed 0.92 in both destinations, indicating generally positive affective evaluations.

Tab 6: Descriptive Statistics of Sentiment Scores by City

City	Number of Reviews	Mean (The average sentiment score)	SD (Standard Deviation)	Min (The most negative sentiment score observed)	Q1 (First Quartile)	Median (Q2)	Q3 (Third Quartile)	Max (The most positive sentiment score observed)
Paris	798,000	0.8451	0.228	-0.988	0.839	0.931	0.969	0.999
Rome	798,000	0.8449	0.223	-0.989	0.826	0.925	0.965	0.999

Source: our elaboration

Table 7 presents the distribution of sentiment polarity categories by city. In both Rome and Paris, more than 97% of reviews are classified as positive, while neutral and negative sentiment together account for less than 3% of observations.

Tab 7: Sentiment Polarity Distribution by City

City	Positive %	Neutral %	Negative %
Paris	97.83%	0.88%	1.30%
Rome	97.98%	0.85%	1.18%

Source: our elaboration

Table 8 reports descriptive statistics of rating scores by city based on the review sample. Average ratings are high in both destinations, with limited dispersion.

Tab 8: Descriptive Statistics of Rating Scores by City

City	Number of reviews	Mean Rating	SD	Min	Max
Paris	798,000	4.769	0.17	2.75	5.0
Rome	798,000	4.803	0.15	2.67	5.0

Source: our elaboration

Table 9 reports results from the review-level regression estimating the relationship between Experience Economy dimensions and sentiment-based satisfaction using 1,596,000 reviews. The model is jointly significant (Prob > F < 0.001).

Education ($\beta = 0.037$, $p < 0.001$), entertainment ($\beta = 0.039$, $p < 0.001$), and esthetics ($\beta = 0.055$, $p < 0.001$) exhibit positive and statistically significant associations with sentiment. Escapism displays a small but statistically significant negative association ($\beta = -0.012$, $p < 0.001$).

Tab 9: Review-Level Regression of Sentiment-Based Satisfaction

Variable	Coefficient	Std.Error	t-value	p-value
Constant	0.7226	0.002	343.187	<0.001
Education	0.0372	0.001	33.454	<0.001
Entertainment	0.0394	0.002	21.532	<0.001
Esthetics	0.0545	0.001	51.187	<0.001
Escapism	-0.0115	0.002	-4.756	<0.001

Source: our elaboration

Table 10 presents results from the listing-level regression estimating the relationship between aggregated Experience Economy dimensions and rating-based satisfaction across 23,918 listings. The model is jointly significant (Prob > F < 0.001) and explains approximately 19.7% of the variation in listing ratings.

Education ($\beta = 0.133$, $p < 0.001$), entertainment ($\beta = 0.036$, $p < 0.001$), and esthetics ($\beta = 0.105$, $p < 0.001$) exhibit positive and statistically significant associations with rating scores. Escapism shows a positive but non-significant coefficient ($\beta = 0.012$, $p = 0.190$), indicating that its effect on cognitive satisfaction is not robust at scale.

Tab 10: Listing-Level Regression of Rating-Based Satisfaction (n = 23,918)

Variable	Coefficient	Std. Error	z-stat	p-value
Intercept	4.3370	0.016	269.266	0.000
Education	0.1326	0.006	21.503	0.000
Entertainment	0.0355	0.009	4.032	0.000
Esthetics	0.1052	0.005	20.390	0.000
Escapism	0.0121	0.009	1.310	0.190
Price	0.0151	0.004	4.065	0.000
Amenities count	0.0032	0.000	28.001	0.000
Accommodates	-0.0113	0.002	-7.098	0.000

Bedrooms	0.0118	0.004	3.284	0.001
Bathrooms	0.0050	0.004	1.381	0.167
Beds	-0.0018	0.002	-0.928	0.354
Availability_30	-0.0016	0.000	-7.950	0.000

Source: our elaboration

Table 11 reports results from the listing-level regression including city interaction terms, allowing the relationship between Experience Economy dimensions and rating-based satisfaction to differ between Rome and Paris. In the baseline category, Rome, education, entertainment, and esthetics are positively and significantly associated with ratings. Escapism is negative but not statistically significant, indicating that it is not a general rating driver in Rome. The interaction term for escapism is positive and statistically significant ($\beta = 0.0495$, $p = 0.013$), indicating that escapism becomes a distinct driver of rating-based satisfaction in Paris. The interactions for education, entertainment, and esthetics are not statistically significant in the rating model.

Tab 11: Listing-Level Regression of Rating-Based Satisfaction with City Interaction Effects (n = 23,918)

Variable	Coefficient	Std. Error	z-value	p-value
Constant	4.3650	0.018	242.167	<0.001
Education (mean)	0.1317	0.008	15.587	<0.001
Entertainment (mean)	0.0317	0.013	2.391	0.017
Esthetics (mean)	0.1020	0.007	13.705	<0.001
Escapism (mean)	-0.0171	0.017	-1.014	0.311
City: Paris	-0.0659	0.016	-4.079	<0.001
Education × city	-0.0173	0.012	-1.434	0.152
Entertainment × city	0.0147	0.018	0.840	0.401
Esthetics × city	0.0157	0.010	1.568	0.117
Escapism × city	0.0495	0.020	2.482	0.013
Price	0.0198	0.004	5.300	<0.001
Amenities count	0.0030	0.000	26.308	<0.001
Accommodates	-0.0128	0.002	-8.122	<0.001
Bedrooms	0.0101	0.003	3.063	0.002
Bathrooms	0.0041	0.004	1.138	0.255
Beds	-0.0017	0.002	-0.864	0.388
Availability 30	-0.0021	0.000	-10.084	<0.001

Source: our elaboration

This study examined the extent to which Pine and Gilmore's (1999) four Experience Economy dimensions shape guest satisfaction in peer-to-peer accommodation. Overall, the findings provide partial support for Hypothesis H1.

At the review level, sentiment-based analyses show that education, entertainment, and esthetics are positively and significantly associated with affective guest satisfaction. Among these, esthetics emerges as the strongest predictor of sentiment, confirming earlier hospitality and tourism research that highlights the central role of design, atmosphere, and sensory appeal in shaping emotional responses to accommodation experiences (Oh et al., 2007; Mehmetoglu & Engen, 2011; Mody et al., 2017). These results suggest that experiential elements related to learning, enjoyment, and aesthetic appreciation are consistently reflected in guests' emotional narratives.

By contrast, escapism exhibits a small but negative association with sentiment, indicating that explicit references to escape or immersion may be linked to more ambivalent emotional expressions in review texts. This suggests that escapism does not uniformly translate into positive affective evaluations in accommodation contexts, consistent with prior research emphasizing the context-dependent nature of experiential effects (Mehmetoglu & Engen, 2011; Bao et al., 2021).

At the listing level, education, entertainment, and esthetics display positive and statistically significant associations with rating-based satisfaction. Escapism is positive but not statistically significant in the baseline rating model, suggesting that its effect on cognitive satisfaction is conditional rather than general. This indicates that escapist experiences do not operate as a general satisfaction driver in the baseline models, but may become relevant under specific destination conditions. Taken together, these results indicate that H1a, H1b, and H1d are supported, while H1c is not supported in the baseline models because escapism is negatively associated with sentiment and non-significant for ratings.

A central contribution of this study lies in its dual operationalization of guest satisfaction, distinguishing between affective satisfaction captured through sentiment analysis and cognitive satisfaction measured through numerical ratings. The findings confirm the broader premise of H2 that Experience Economy dimensions operate differently across affective and cognitive satisfaction measures. However, H2 is not supported in its directional form. Contrary to the original expectation, esthetics has the strongest effect on sentiment-based satisfaction, while education has the strongest association with rating-based satisfaction. Entertainment shows positive but moderate effects across both outcomes, whereas escapism is negatively associated with sentiment and non-significant in the baseline rating model.

These results reinforce the view that satisfaction is not a unidimensional construct. Rather, emotional expression in review text and overall evaluative judgment in ratings capture distinct aspects of guest satisfaction. The findings, therefore, highlight the importance of modeling sentiment and ratings separately when examining experiential value in peer-to-peer accommodation.

Hypothesis H3 proposed that the strength of the relationship between Experience Economy dimensions and guest satisfaction differs between Rome and Paris. The results provide partial support for H3.

City interaction models reveal that escapism has a significantly stronger association with rating-based satisfaction in Paris than in Rome ($\beta = 0.050$, $p = 0.013$), providing partial support for H3a. In Paris, escapism, expressed as aspirational identity performance, living like a local, or immersion in romantic urban aesthetics, constitutes a distinct value driver for ratings, while it does not significantly influence ratings in Rome. This distinction is theoretically grounded in Paris's identity as a deliberately aestheticised urban spectacle (Urry, 2002) where visitors arrive with aspirational self-narratives, and corroborates prior research on place-based meaning and cultural immersion (Seyfi et al., 2020; Mody et al., 2017). Additionally, sentiment-level interaction models (not shown) confirm that esthetics exerts a significantly stronger effect on affective satisfaction in Paris ($\beta = +0.005$, $p < 0.001$), while education is comparatively more salient for sentiment in Rome ($\beta = -0.004$, $p < 0.001$).

In contrast, education and entertainment do not show statistically significant city differences in the rating model. Therefore, H3b is not supported in the rating-based analysis. Overall, H3 receives partial support: esthetics is more strongly associated with sentiment in Paris, while escapism becomes a significant rating driver in Paris, but the remaining city interaction effects are not consistently significant. These findings indicate that while the EE framework is broadly applicable across destinations, esthetic and escapist experiences are particularly sensitive to city context, reinforcing the importance of experiential benchmarking in destination analysis (Bao et al., 2021).

5. Research limitations

The research complies with ethical guidelines for research using publicly available online data and poses no risk to individual users. Publicly available data obtained from InsideAirbnb.com were considered reliable for this study, and no private, identifiable, or sensitive personal data was collected or analyzed. Analyses were conducted at the review and listing levels, and reviewer usernames or identifiers were not used for profiling or inference.

The use of automated OpenAI-assisted text analysis introduces some limitations. VADER's sentiment analysis, while suitable for short informal review texts, may not fully capture sarcasm, irony, or culturally specific references. Similarly, the way in which the EE dimensions are classified using prompts depends on the strength and the clarity of the experiential cues expressed in the review text and may underrepresent implicitly conveyed experiences. Although the automated coding method was tested against manually coded reviews, some degree of measurement error is unavoidable when attempting to automate qualitative constructs through automated methods.

Another limitation concerns the structure of Airbnb rating data. InsideAirbnb.com does not provide any numeric ratings for individual reviews. This is because rating scores are provided as a full listing level only and reflect cumulative evaluations over time. Consequently, the study cannot directly associate specific review narratives with corresponding numerical ratings. This limitation is addressed by operationalizing satisfaction in two ways, distinguishing affective review-level sentiment from cognitive listing-level ratings.

6. Managerial implications

The results, based on nearly 1.6 million Airbnb accommodation reviews, demonstrate that esthetics and education are the strongest experiential drivers of affective and cognitive satisfaction, respectively. Hosts should therefore invest in both sensory-atmospheric design and informational richness rather than treating accommodation as purely functional lodging. Improvements in lighting, visual coherence, decoration, spatial atmosphere, and attention to detail can strengthen the emotional tone of guest reviews. At the same time, clear instructions, curated local recommendations, neighborhood guides, and cultural information can improve guests' overall evaluative judgments.

The results also suggest that experience design should be destination-sensitive. In Paris, where escapism becomes a distinct driver of rating-based satisfaction, listings that facilitate aspirational "living like a local" identities through curated interiors, neighborhood immersion, and locally embedded recommendations are more likely to receive higher evaluations. In Rome, where education is comparatively more salient for sentiment, hosts can benefit from structured cultural and historical guidance, including explanations of nearby heritage sites, walking routes, and practical information that helps guests interpret the city.

At the platform level, Airbnb could enrich recommendation and ranking systems by incorporating destination-relevant experiential attributes alongside aggregate star ratings. Experience-oriented listing tags, such as design atmosphere, local immersion, cultural learning, or neighborhood authenticity, could help guests identify listings that match their desired form of experience. In competitive urban Airbnb markets, experience design becomes a strategic differentiation mechanism rather than a cosmetic enhancement.

7. Originality of the paper

This study stands out on three grounds. First, it provides one of the first large-scale empirical validations of the EE framework, analyzing nearly 1.6 million Airbnb accommodation listing reviews, two orders of magnitude larger than prior EE studies in hospitality (Oh et al., 2007; Bao et al., 2021), demonstrating that the four dimensions are detectable and analytically robust at scale using NLP. Second, by simultaneously modeling affective (sentiment) and cognitive (rating) satisfaction, it reveals asymmetries that single-measure studies cannot detect: esthetics shapes emotional narratives most strongly, while education dominates evaluative judgments. Third, city-level interaction effects demonstrate that experiential value is destination-sensitive, escapism drives ratings in Paris but not Rome, and esthetics amplifies sentiment more strongly in Paris, opening new ground at the

intersection of Experience Economy theory and destination competitiveness research (Crouch, 2010; Seyfi et al., 2020).

8. Conclusions

This study examined how the four Experience Economy dimensions shape guest satisfaction in peer-to-peer accommodation using nearly 1.6 million Airbnb accommodation reviews from Rome and Paris. The findings show that experiential value is present in Airbnb reviews, but its effects vary across dimensions, satisfaction measures, and destination contexts. Esthetics is the strongest driver of sentiment-based satisfaction, while education is the strongest predictor of rating-based satisfaction. Escapism shows a more complex and context-dependent pattern, being negatively associated with textual sentiment but positively associated with ratings in Paris.

The study contributes to Experience Economy research by demonstrating that validated experiential constructs can be scaled through user-generated content, by distinguishing affective and cognitive satisfaction mechanisms, and by showing that experiential value is shaped by destination identity. For practitioners, the findings suggest that hosts, platforms, and destination managers should combine reliable functional service with destination-specific experience design. Future research could extend the analysis to additional cities, compare alternative sentiment models, and incorporate extended peer-to-peer accommodation dimensions such as localness, communitas, personalization, and serendipity.

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Rethinking Tourism Intensity: A Compositional Approach to Resident Life Satisfaction

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Abstract

Frame of the research. *Tourism-intensive destinations increasingly face tensions between economic reliance on visitor flows and residents' quality of life. Public debate often frames these tensions as a problem of "too many tourists," typically measured through officially recorded overnight stays. However, tourism pressure is rarely decomposed into distinct visitor typologies, and same-day visitation is largely absent from official statistics despite its potential relevance for congestion and short-term disruption.*

Purpose of the paper. *This paper examines whether different visitor typologies—overnight and day visitors—are associated differently with residents' short-term life satisfaction in a highly seasonal destination.*

Methodology. *The study combines survey data from 897 residents across thirteen municipalities in Garda Trentino (Italy), collected during a tourism week in May 2025, with anonymized municipal-level mobility data from Vodafone Italy. Tourism intensity is measured as overnight visitors per resident and day visitors per resident. OLS and ordered probit models with municipality-clustered standard errors are estimated, including quadratic terms to test for non-linear effects.*

Results. *Overnight visitor intensity shows no statistically significant association with life satisfaction. In contrast, day visitors display a robust non-linear relationship consistent with short-term disruption dynamics: negative marginal effects are strongest at lower exposure levels and attenuate as exposure increases.*

Research limitations. *The analysis focuses on one destination and a single high-intensity week, limiting causal inference and generalizability.*

Managerial implications. *Governance strategies should differentiate between overnight tourism and excursionism, prioritizing the management of day visitors rather than indiscriminate visitor reduction.*

Originality of the paper. *The study integrates mobility data with individual well-being measures and conceptualizes tourism pressure as compositional rather than homogeneous.*

Keywords: *tourism intensity; day visitors; resident well-being; mobile data; seasonality*

1. Introduction

Across Europe and beyond, residents of tourism-intensive destinations increasingly voice concerns about being "overrun" by visitors. Public debates often call for limiting tourism growth, reducing promotional efforts, or capping accommodation capacity. In these discussions, tourism pressure is typically framed in aggregate terms, as a matter of "too many tourists." Yet the category of "tourist" conceals important differences in how visitor flows are composed and experienced in everyday life (Koens et al., 2018; Milano et al., 2019).

Academic research has long documented that tourism generates both benefits and costs for host communities, and that residents' support for tourism depends on the balance between these outcomes (Ap, 1992; Perdue et al., 1990; Gursoy et al., 2002). More recently, the debate on overtourism has shifted attention toward the limits of growth and toward the effects of congestion and crowding on residents' quality of life (Koens et al., 2018; Dodds & Butler, 2019; Milano et al., 2019). However, empirical assessments of tourism pressure frequently rely on aggregate indicators, most commonly overnight stays per resident, derived from official statistics (United Nations, 2010; Ivlevs, 2017; Croes et al., 2021). Such measures implicitly treat all visitors as equivalent and focus predominantly on those who spend at least one night in the destination.

From the standpoint of everyday lived experience, however, residents do not encounter "overnight stays" as statistical units; they encounter people in space—on streets, in public transport, in parking areas, and along access routes. Research on perceived crowding emphasizes that congestion is experienced through spatial density and interference with daily routines rather than through abstract numerical indicators (Shelby & Heberlein, 1987; Manning, 1999; Vaske & Shelby, 2008). The

operational definition of a "tourist," as established by international statistical standards, typically requires at least one overnight stay in the destination (United Nations, 2010). Yet the experiential reality of congestion does not differentiate between individuals who spend the night and those who return home the same day.

Despite their growing prominence in public debates and overtourism discussions (Koens et al., 2018; Milano et al., 2019; Peeters et al., 2021), excursionist flows remain insufficiently distinguished in empirical analyses of social impacts. Existing research has extensively examined residents' perceptions of tourism impacts and their implications for quality of life (Andereck & Nyaupane, 2011; Woo et al., 2015), but relatively few studies explicitly disentangle different visitor typologies when analysing well-being outcomes (Tokarchuk et al., 2021). As a result, tourism pressure is often operationalized as a homogeneous aggregate construct.

This paper addresses this gap by examining whether different components of tourism intensity, overnight visitors, and same-day visitors, are differently associated with residents' week-specific life satisfaction. The study is conducted in a mature, highly seasonal destination in Northern Italy, characterized by substantial cross-municipal heterogeneity in visitor-to-resident ratios. Using anonymized and aggregated mobile phone data to measure objectively both overnight and day visitors per resident during an intense tourism week in 2025 and linking these measures to individual-level survey data on life satisfaction collected within the same temporal window, the analysis disentangles the compositional and temporal dimensions of tourism pressure.

The findings indicate that same-day visitation is more strongly associated with lower levels of residents' week-specific life satisfaction than overnight tourism, whose relationship with well-being appears weaker and, in some cases, non-negative. By distinguishing visitor typologies and aligning objective flow measurement with short-term well-being assessments, the study contributes to the literature on tourism impacts and overtourism in three ways. First, it shifts attention from aggregate tourism volume to the compositional structure of visitor flows. Second, it highlights the importance of short-term disruption dynamics in shaping residents' everyday evaluations. Third, it provides policy-relevant evidence suggesting that strategies aimed at reducing "tourists" in general may be less effective than differentiated governance approaches targeting specific forms of visitation.

In doing so, the paper bridges the growing sophistication in measuring tourism flows (Ahas et al., 2008; Salas-Olmedo et al., 2018) with the still-limited empirical understanding of their differentiated social consequences for host communities.

2. Literature review

2.1 Residents, tourism, and well-being

A substantial body of research has examined how tourism development affects host communities, with particular attention to residents' attitudes, perceived impacts, and overall quality of life (Ap, 1992; Gursoy et al., 2002). Early studies were largely grounded in social exchange theory and focused on residents' support for tourism as a function of perceived economic benefits and social or environmental costs. Over time, this literature has progressively incorporated broader well-being constructs, including subjective quality of life and life satisfaction (Andereck & Nyaupane, 2011; Woo et al., 2015). More recent reviews highlight the growing integration of tourism and well-being research, emphasizing multidimensional and community-based perspectives (Uysal et al., 2016).

Research consistently shows that tourism generates both positive and negative outcomes for residents (Perdue et al., 1990; Jurowski et al., 1997). On the one hand, tourism development may contribute to local income, employment opportunities, improved services, and infrastructure. On the other hand, it may produce congestion, environmental degradation, rising housing costs, and perceived erosion of local identity (Andereck et al., 2005; Milano et al., 2019). These tensions are reflected in long-standing conceptual models such as Doxey's Irridex and Butler's tourism area life cycle, which emphasize that residents' responses evolve with increasing tourism intensity (Doxey,

1975; Butler, 1980). Consequently, the net effect of tourism on residents' well-being is contingent rather than uniform, potentially varying across destinations, stages of development, and social groups (Nunkoo et al., 2013b; McCool & Lime, 2001).

Empirical approaches in this stream of research typically rely on two main types of measurement. One strand adopts residents' subjective perceptions of tourism impacts—economic, social, or environmental—and relates them to overall support for tourism or to individual quality of life (Andereck & Nyaupane, 2011; Kim et al., 2013). These studies frequently employ structural equation models or attitudinal frameworks that capture perceived rather than objectively measured tourism exposure (Nunkoo et al., 2013a). A second strand links macro-level indicators of tourism development, such as tourist arrivals or overnight stays, to aggregated measures of economic performance or national well-being (Ivlevs, 2017; Croes et al., 2021). While these approaches have generated valuable insights, they tend to operationalize tourism intensity as a single, undifferentiated construct.

Only a limited number of studies have directly linked objectively measured tourism intensity to individual-level well-being within the same temporal framework (e.g., Tokarchuk et al., 2021). Much of the empirical literature instead relies either on subjective perceptions of tourism impacts (e.g., Bimonte & Faralla, 2016) or on aggregate indicators of tourism development, most commonly overnight stays per resident. As a result, tourism pressure is frequently operationalized as a single aggregate measure that implicitly treats all non-resident presence as equivalent. Such an approach overlooks the possibility that overnight tourists and same-day visitors differ not only in duration of stay, but also in their spatial concentration, patterns of infrastructure use, and potential to generate short-term congestion and disruption effects.

2.2 Overtourism and the problem of measurement

In recent years, the concept of overtourism has gained increasing prominence in both academic research and policy debates. Overtourism is commonly described as a situation in which tourism intensity leads to a perceived deterioration in residents' quality of life and visitors' experience, shifting the focus from growth-oriented development toward the social limits of tourism expansion (Koens et al., 2018; Milano et al., 2019). The concept builds on earlier discussions of carrying capacity (Butler, 1980; McCool & Lime, 2001) and resident irritation or antagonism (Doxey, 1975), but reframes them in light of contemporary urban pressures and global mobility patterns.

A defining feature of the overtourism debate is its relational character: tourism becomes problematic not merely because of its scale, but because of the interaction between visitor presence, spatial concentration, and the lived experience of host communities. As emphasized in recent contributions, overtourism is not solely a matter of absolute numbers, but of how tourism intensity intersects with local infrastructures, governance capacity, and residents' everyday routines (Koens et al., 2018; Milano et al., 2019).

Policy discussions and destination governance practices have responded to concerns about tourism pressure by developing benchmarking systems to identify thresholds for congestion or "excessive" tourism intensity. These monitoring frameworks often draw on concepts derived from debates over carrying capacity (Butler, 1980; McCool & Lime, 2001) and, more recently, from overtourism scholarship (Koens et al., 2018; Milano et al., 2019). In practice, however, the operationalization of tourism pressure often relies on official statistics, particularly the number of tourist arrivals or overnight stays, as primary indicators of intensity. Such metrics are attractive because they are standardized, comparable across destinations, and embedded in established statistical systems. Public debate tends to mirror this statistical framing, referring generically to "too many tourists" as the source of local tensions, without further differentiation across visitor types. As a result, governance responses often focus on reducing overall tourist numbers or capping accommodation capacity, implicitly assuming that tourism pressure is adequately captured by overnight-based measures and that all visitors contribute similarly to local disruption.

However, from the perspective of everyday lived experience, residents do not encounter tourism

as a statistical aggregate. They encounter people in space—on streets, in public transport, in parking areas, and along access routes. Research on perceived crowding has long emphasized that congestion is experienced through spatial density and interference with daily routines rather than through abstract numerical indicators (Shelby & Heberlein, 1986; Manning, 2011). The operational definition of a "tourist," as established by international statistical standards, typically requires at least one overnight stay in the destination (United Nations, 2010). Yet the experiential reality of crowding and congestion does not differentiate between individuals who spend the night and those who return home the same day. From the standpoint of social impacts and quality of life, the presence of non-residents in shared spaces—regardless of duration of stay—may generate similar or even differentiated pressures, a distinction that remains underexplored in overtourism research (Koens et al., 2018; Milano et al., 2019).

This creates a conceptual gap. While the dominant measurement frameworks privilege overnight stays as the central indicator of tourism pressure, the composition of visitor flows—particularly the distinction between overnight tourists and same-day visitors—may matter substantially for social impacts. Despite growing attention to overtourism, the empirical distinction between different visitor typologies remains largely unexplored in the analysis of residents' well-being.

2.3 Day visitors and short-term disruption

Day visitors are increasingly mentioned in public debates as a source of congestion, pressure on infrastructure, and deterioration of everyday livability in tourism-intensive areas. Media reports and local policy discussions frequently attribute traffic saturation, parking shortages, and spatial crowding to same-day flows, particularly during peak weekends and holiday periods. Although academic research has traditionally focused on overnight tourism, several studies highlight that short-stay or excursionist flows can generate disproportionate pressure on public space and urban infrastructure due to their temporal concentration and limited economic embeddedness (Peeters et al., 2021). Research on overtourism further documents how congestion and crowding during peak periods—rather than aggregate annual volumes—are central to residents' perceptions of tourism-related stress (Milano et al., 2019; Dodds & Butler, 2019).

Despite this growing recognition, day visitation remains rarely measured in a systematic and comparable manner. Official tourism statistics, following international statistical standards, primarily capture arrivals and overnight stays (United Nations, 2008), while same-day flows are often only indirectly estimated or remain unrecorded (Koens et al., 2018; Peeters et al., 2018). As a consequence, empirical research on residents' well-being has largely relied either on subjective perceptions of tourism impacts (Andereck et al., 2005) or on aggregate tourism development indicators at the macro level (Croes et al., 2021). Even studies that link objective tourism intensity to social outcomes have seldom distinguished systematically between different visitor typologies (Tokarchuk et al., 2021).

The literature on crowding and perceived congestion provides important insights into how individuals experience dense environments. However, much of this research focuses on perceptual constructs—such as perceived crowding or perceived impact—rather than on objectively measured visitor flows. Studies rarely isolate excursionism as a distinct component of tourism intensity, and even more rarely link objectively measured day visitation to individual-level well-being outcomes.

This limitation is conceptually relevant. Day visitors differ structurally from overnight tourists in several respects: they are typically more temporally concentrated and spatially clustered, display distinct time–space consumption patterns, and are less dispersed through accommodation infrastructures (Shoval & Isaacson, 2007; Grinberger et al., 2014). In contrast to overnight tourism, which is mediated through formal accommodation and service systems, same-day visitation is often more dependent on private mobility and concentrated around highly accessible nodes and public spaces (Gutiérrez et al., 2017).

Their presence may therefore generate acute, short-term disruptions of daily routines—such as traffic congestion, parking shortages, noise, and overcrowding of public spaces—without necessarily contributing proportionally to longer-term economic integration within the local community (Milano

et al., 2019; Peeters et al., 2018; Bimonte & Farfalla, 2016).

Building on this distinction, the present study proposes that tourism pressure operates through multiple temporal channels. In addition to long-term structural effects on housing markets, labor structures, and local development trajectories, tourism intensity may generate short-term disruptions of everyday routines—such as congestion and crowding—that fluctuate sharply during peak periods and may directly shape residents' week-specific well-being. In mature, highly seasonal destinations, fluctuations in visitor intensity may produce episodic stress dynamics that are not adequately captured by annual statistics or generalized evaluations of tourism development. By explicitly distinguishing overnight tourism from day visitation and linking both to week-specific life satisfaction, the analysis shifts attention from static notions of tourism volume toward the dynamic and compositional nature of tourism pressure.

2.4 Measuring tourism intensity: limits and opportunities

Recent years have witnessed a rapid expansion in the use of digital trace data to measure tourism flows. Beyond traditional accommodation statistics, researchers increasingly rely on data derived from mobile phone networks, GPS tracking, social media geotags, Wi-Fi sensors, and other location-based technologies to capture spatial and temporal patterns of visitor presence. These data sources enable fine-grained observation of mobility dynamics, allowing the identification of peak periods, spatial concentration, and intra-destination movement patterns (Girardin et al., 2008; Frias-Martinez et al., 2012; Ahas et al., 2010). Despite these methodological advances, the analytical focus of digital mobility data has remained largely centred on analyzing tourist mobility behaviour, destination attractiveness, spatial clustering, and the distribution of visitors across urban and natural areas (Ahas et al., 2008; Raun et al., 2016; Salas-Olmedo et al., 2018).

Such applications demonstrate the methodological potential of digital mobility data to overcome key limitations of official statistics, especially the inability to systematically capture same-day visitation and real-time fluctuations in exposure. The social consequences of these flows, particularly their diverse effects on residents' well-being, remain largely unexplored. Even when mobility indicators are available at fine spatial and temporal scales, they are rarely integrated with individual-level measures of life satisfaction or everyday quality of life within the same observation window.

Building on these strands of literature, the present study seeks to bridge a conceptual and empirical gap. While previous research has examined residents' well-being primarily through subjective perceptions or aggregate tourism indicators, and while digital mobility data have increasingly refined the measurement of tourism flows, the two approaches have rarely been integrated. In particular, the differentiated social consequences of structurally distinct visitor typologies, overnight tourists, and same-day visitors, remain underexplored in relation to individual-level well-being within the same temporal window.

By combining high-resolution mobility data with week-specific measures of residents' life satisfaction, the present analysis advances a compositional perspective on tourism pressure. Rather than treating tourism intensity as a single aggregate volume, the study distinguishes between different forms of non-resident presence and examines how their temporal and spatial characteristics relate to short-term well-being dynamics in host communities. In doing so, it contributes to a more nuanced understanding of how tourism pressure operates across multiple temporal and structural channels.

3. Methodology

3.1 Empirical setting

The empirical analysis is conducted in a mature tourism system located in Northern Italy, characterized by high seasonal intensity and substantial variation in visitor exposure across municipalities. The empirical setting corresponds to the territorial area governed by the local Destination Management Organization (APT Garda Dolomiti), which includes thirteen municipalities

in the northern part of the Lake Garda basin and its surrounding hinterland.

Importantly, not all municipalities are directly located on the lake shore. While Riva del Garda, Arco, and Nago-Torbole constitute the core lakefront areas, other municipalities are situated inland and differ substantially in terms of accessibility, spatial structure, and exposure to tourism flows. Despite operating under a shared tourism governance framework, municipalities exhibit marked heterogeneity in visitor-to-resident ratios and tourism pressure.

The area hosts approximately 49,000 residents and records more than four million overnight stays annually. Tourism represents a central economic sector of the local economy. At the same time, the territory experiences significant volumes of same-day visitors, particularly during the summer season, although these flows are not systematically recorded in official statistics.

Accessibility constraints contribute to the intensity of perceived pressure. The area is primarily reachable by road, and seasonal congestion, limited parking capacity, and bottlenecks along main access routes amplify the spatial concentration of visitor flows. Internal heterogeneity is therefore not only quantitative but also spatial and infrastructural.

In recent years, increasing tourism intensity has been accompanied by visible public concern and resident protests related to congestion, environmental pressure, and perceived declines in quality of life. These tensions coexist with the economic relevance of tourism, creating a context in which different forms of visitor presence may generate differentiated social impacts.

The coexistence of structurally distinct visitor typologies—overnight tourists and day visitors—within a territorially heterogeneous multi-municipal system makes this setting particularly suitable for examining whether different components of tourism intensity are associated with residents' life satisfaction. The pronounced cross-municipality variation in exposure during the same seasonal period provides the empirical variation necessary to investigate these relationships within a shared institutional and governance framework.

3.2 Survey Design and Measurement of Resident Well-being

Primary data on residents' well-being were collected through an online survey administered to adult residents across the thirteen municipalities included in the study area. The survey remained open for ten days and was conducted immediately after the first high-intensity tourism weekend of the season, following the May 1st holiday period. This timing was intentional. In mature destinations characterized by strong seasonality, tourism pressure is expected to operate primarily through short-term disruptions of daily routines—such as crowding, congestion, and mobility constraints—that fluctuate sharply during peak moments. Anchoring the well-being question to the previous week increases temporal precision and reduces reliance on generalized attitudes toward tourism.

The questionnaire was disseminated by APT Garda Dolomiti through its official communication channels, including direct email invitations to registered contacts and announcements on institutional social media platforms. Participation was voluntary and open to all residents of the municipalities included in the destination's governance area. Although the territorial framework comprises fourteen municipalities, one municipality was excluded from the empirical analysis due to insufficient survey responses and the absence of anonymized mobility data at the required aggregation level.

Tourism intensity is conceptualized in this study as a short-term contextual exposure, and the analysis tests whether its association with residents' well-being exhibits non-linear patterns consistent with seasonal disruption dynamics. Rather than capturing long-run or trait-like life satisfaction, the survey was explicitly designed to measure residents' evaluation of their everyday life during a period of salient tourism pressure.

The key dependent variable was measured through the following question:"Thinking about the intensity of tourism presence in the past week (May 5–11), how satisfied were you with your everyday life as a resident in Garda Trentino?". Responses were recorded on a ten-point scale. The survey instrument also included standard socio-demographic controls, such as age and length of residence in the municipality.

The final analytical sample for the first wave consists of 897 valid responses distributed across the

thirteen municipalities included in the empirical analysis. Participation reflects both the demographic relevance and the tourism salience of the largest municipalities. In absolute terms, the highest number of responses originates from Riva del Garda (302) and Arco (337), followed by Nago–Torbole (84), Ledro (57), and Dro (43), while smaller municipalities contribute more limited but non-negligible observations.

When expressed relative to municipal population, participation rates range approximately between 0.1% and 3.6%, with an average participation rate close to 1.5% across the area. Larger municipalities such as Riva del Garda and Arco exhibit participation rates around 2%, while Nago–Torbole—characterized by the highest tourism pressure per resident—shows one of the highest participation rates in proportional terms (approximately 3.6%). Participation is also comparatively visible in Tenno (around 1.6%), a municipality experiencing substantial day visitation to Lake Tenno. This spatial distribution is consistent with the timing of the survey, conducted immediately after a high-intensity tourism weekend, when tourism exposure was particularly salient across the destination.

Life satisfaction responses span the full ten-point scale (1–10), indicating substantial heterogeneity in week-specific evaluations. Mean values differ across municipalities, with averages ranging roughly between 4.5 and 7.9. This cross-municipality dispersion is coherent with the analytical strategy, which exploits variation in tourism exposure within the same temporal window rather than intertemporal changes.

The sample is predominantly composed of long-term residents. Overall, 59.5% of respondents report being born in the municipality, and an additional 19.2% have lived there for more than twenty years. Only 5.7% report residing in the municipality for less than five years. This distribution suggests that responses largely reflect evaluations from established residents with deep local attachment rather than recent movers.

In terms of age composition, the sample is concentrated in middle and older age groups. The largest share of respondents falls in the 50–65 age category (35.5%), followed by 40–49 (24.9%) and 30–39 (21.1%). Younger adults (21–29) account for approximately 9.5% of responses, while individuals above 65 represent 8.7%. The age distribution therefore reflects substantial representation of mature residents, consistent with the demographic structure of many small and medium-sized Italian municipalities.

The aim of this study is to identify the relationships between contextual tourism exposure and short-term well-being. To achieve this, the analysis examines variations across different municipalities within a similar time frame. The survey is not designed to generate population-representative prevalence estimates; instead, it focuses on providing detailed individual assessments that are connected to the objectively measured intensity of tourism in each municipality.

3.3 Visitor Intensity Data (Vodafone Mobility Data)

Visitor intensity is measured using anonymized and aggregated mobility data provided by Vodafone Italy. These data are derived from mobile network activity and enable the identification of the presence of individuals within municipal boundaries during the reference period. The information is aggregated at the municipality–week level and does not permit any form of individual identification.

For the week corresponding to the survey reference period (May 5–11, 2025), the Vodafone data allow the classification of individuals based on presence patterns within each municipality. Users are identified as residents when their habitual presence is detected within the municipality. Non-residents are classified as overnight visitors if they spent at least one night within the municipality during the reference week, and as day visitors if they were present during the day without an overnight stay.

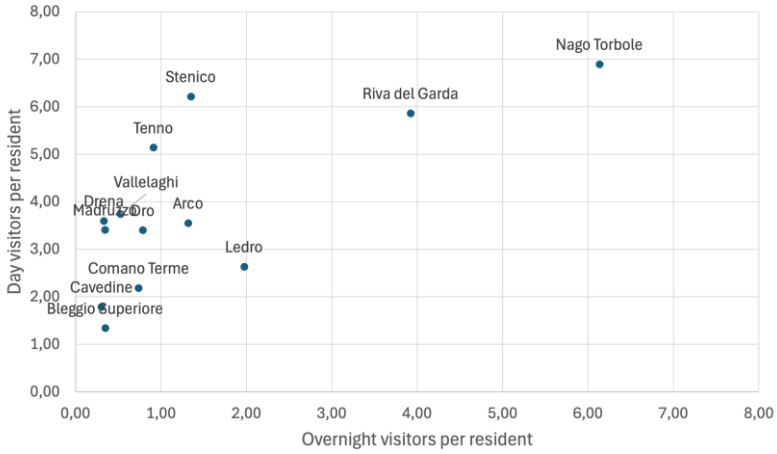
Importantly, the measure of overnight visitors is not restricted to officially recorded accommodation stays. It captures all individuals who physically spent the night in the municipality, including those staying in private apartments, second homes, or with friends and relatives. This feature allows the analysis to overcome a key limitation of administrative tourism statistics, which typically exclude informal or non-registered stays.

The identification of day visitors constitutes a central methodological contribution of the study. Unlike overnight stays, same-day flows are not systematically recorded in official statistics, despite their potential relevance for congestion, crowding, and short-term disruption dynamics. The availability of mobility data makes it possible to quantify this component of visitor pressure at the municipal level.

To ensure comparability across municipalities of different demographic size, both visitor categories are normalized by resident population. We therefore construct two measures of tourism intensity at the municipal level: overnight visitors per resident (ON_j) and day visitors per resident (DV_j). Resident population figures are derived from the same Vodafone dataset to ensure internal consistency in measurement.

Substantial cross-municipality heterogeneity is observed. During the reference week, overnight visitors per resident range from approximately 0.30 in smaller inland municipalities to over 6 in Nago–Torbole. Day visitors per resident vary between roughly 1.34 and nearly 6.9, with the highest levels recorded in lakefront and highly accessible municipalities. Riva del Garda and Nago–Torbole exhibit the highest overall exposure, whereas inland municipalities display lower overnight intensity but, in some cases, still substantial levels of day visitation. Figure 1 illustrates the joint distribution of overnight and day visitors per resident across municipalities.

Fig. 1: Cross-municipality variation in overnight and day visitors per resident during the reference week (Vodafone mobility data)



3.4 Econometric model

To examine the association between tourism intensity and residents' life satisfaction, we estimate cross-municipality regression models exploiting variation in visitor exposure across municipalities within the same observation period. The empirical design compares individuals residing in municipalities characterized by different levels and compositions of tourism pressure.

The dependent variable, LS_{ij}, denotes self-reported life satisfaction of individual i living in municipality j, measured on an ordered scale from 1 to 10. Tourism intensity is captured through two distinct measures defined at the municipal level: ON_j, overnight visitors per resident living in municipality j; DV_j day visitors per resident living in municipality j. Both variables are normalized by resident population to ensure comparability across municipalities and to reflect tourism pressure from the residents' perspective.

3.4.1 OLS specifications

We estimate three alternative specifications:

Model (1): Overnight visitors only

$$LS_{ij} = \beta_0 + \beta_1 ON_j + \beta_2 ON_j^2 + \gamma X_{ij} + \varepsilon_{ij}$$

Model (2): Day visitors only

$$LS_{ij} = \beta_0 + \beta_1 DV_j + \beta_2 DV_j^2 + \gamma X_{ij} + \varepsilon_{ij}$$

Model (3): Joint specification

$$LS_{ij} = \beta_0 + \beta_1 ON_j + \beta_2 ON_j^2 + \beta_3 DV_j + \beta_4 DV_j^2 + \gamma X_{ij} + \varepsilon_{ij},$$

where X_{ij} includes individual-level controls (age and length of residence) for resident *i* living in municipality *j*.

Quadratic terms allow for potential non-linear effects of tourism intensity. All models are estimated using ordinary least squares with standard errors clustered at the municipality level (13 clusters) to account for intra-municipality correlation in unobserved contextual factors.

The inclusion of separate and joint specifications enables us to assess whether the association of one visitor category remains robust when controlling for the other, and whether different visitor typologies exhibit structurally distinct relationships with life satisfaction.

For quadratic specifications, the turning point is computed as:

$$-\frac{\beta_1}{2\beta_2}$$

To assess whether a U-shaped pattern is statistically meaningful, we evaluate the marginal effect at the minimum and maximum observed values of tourism intensity. This procedure verifies whether the slope is negative at the lower bound and positive at the upper bound of the observed range.

3.4.2 Ordered probit robustness

Given that life satisfaction is measured on an ordered categorical scale, we re-estimate all three specifications using ordered probit models.

We assume the existence of a latent continuous well-being variable LS_{ij}^* such that:

$$LS_{ij}^* = \beta_0 + \beta_1 ON_j + \beta_2 ON_j^2 + \beta_3 DV_j + \beta_4 DV_j^2 + \gamma X_{ij} + u_{ij}$$

with u_{ij} following a standard normal distribution.

$$u_{ij} \sim N(0,1)$$

The observed outcome LS_{ij}^* is determined by threshold parameters

$$LS_{ij} = k \quad if \quad \mu_{k-1} < LS_{ij}^* \leq \mu_k$$

Separate ordered probit models are estimated corresponding to the three OLS specifications (overnight only, day visitors only, joint model). Standard errors are clustered at the municipality level.

Although ordered probit coefficients are not directly comparable in magnitude to OLS estimates, consistency in sign, statistical significance, and curvature across models provides robustness to the ordinal scaling of the dependent variable. Marginal effects at the lower and upper bounds of tourism intensity are evaluated analogously to the OLS framework to confirm the non-linear pattern.

4. Results

We begin by examining the aggregate association between visitor intensity and residents' life satisfaction across municipalities (Table 1). The estimates exploit cross-municipality variation in tourism exposure within the same observation period, comparing contexts characterized by different levels of visitor intensity.

Overnight visitors per resident do not exhibit a statistically significant association with life satisfaction. Neither the linear nor the quadratic term reaches conventional levels of significance (Table 1, columns 1 and 3). The estimated coefficients are small and statistically indistinguishable from zero.

This suggests that cross-municipality differences in the intensity of overnight stays are not systematically associated with differences in residents' reported life satisfaction.

In contrast, day visitors per resident display a statistically significant non-linear association with life satisfaction. When estimated separately (column 2), the linear term is negative and significant ($\beta = -1.162$, $p < 0.05$), while the quadratic term is positive and significant ($\beta = 0.117$, $p < 0.05$). When both visitor types are included simultaneously (column 3), the magnitude increases (linear term β =

−2.379, $p < 0.01$; quadratic term $\beta = 0.289$, $p < 0.01$), indicating a robust convex relationship.

The estimated turning point of the quadratic specification is located at approximately 4.1 day visitors per resident, within the observed range (1.34–6.89). Marginal effect tests confirm this non-linear pattern: at the minimum observed level of day visitation, the marginal effect is negative and statistically significant ($\beta = -1.60$, $p = 0.009$), while at the maximum observed level the marginal effect becomes positive and statistically significant ($\beta = 1.61$, $p = 0.019$).

Figure 1 illustrates the predicted life satisfaction as a function of day visitors per resident based on the OLS specification.

The curve shows a pronounced negative slope at lower and moderate levels of day visitation, reaching a minimum around the estimated turning point. Beyond this level, the curve flattens and gradually increases. Importantly, the right-hand side of the curve does not indicate a strong recovery of life satisfaction; rather, it reflects an attenuation of the marginal negative effect in highly exposed municipalities.

Thus, the results do not suggest the existence of a normative "optimal" threshold. Instead, they indicate that the marginal impact of additional day visitors diminishes as exposure increases.

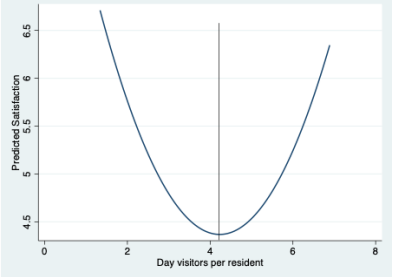
The contrast between the absence of significant aggregate effects for overnight stays and the significant non-linear association observed for day visitors highlights the importance of distinguishing visitor typologies. Aggregate measures of tourism intensity that do not separate overnight tourism from day visitation may obscure materially different patterns across municipalities.

Tab. 1: Visitor Intensity and Residents' Life Satisfaction (OLS Estimates)

Variables	(1) Overnight only	(2) Day visitors only	(3) Both types
	(1)	(2)	(3)
Overnight visitors	-0.179		0.034
	(0.186)		(0.306)
Overnight²	0.023		-0.063
	(0.026)		(0.036)
Day visitors		-1.162**	-2.379***
		(0.402)	(0.751)
Day²		0.117**	0.289***
		(0.045)	(0.094)
Age	-0.225**	-0.222**	-0.216**
	(0.100)	(0.098)	(0.098)
Length of residence	-0.013	-0.017	-0.019
	(0.095)	(0.093)	(0.093)
Constant	6.244***	8.633***	10.762***
	(0.408)	(0.862)	(1.413)
Observations	891	891	891
R^2	0.011	0.015	0.017
Clusters	13	13	13

Source: our elaboration

Fig. 2. Predicted life satisfaction by day visitors per resident (OLS estimates).
Predicted values are based on the OLS model reported in Table 1, with control variables held at their means. The dashed vertical line indicates the estimated turning point (4.1 day visitors per resident).



Source: our elaboration

Tab. 2.: Visitor Intensity and Residents' Life Satisfaction (Ordered Probit Estimates)

Variables	(1) Overnight only	(2) Day visitors only	(3) Both types
Overnight visitors	-0.059		0.014
	(0.063)		(0.097)
Overnight²	0.007		-0.022†
	(0.009)		(0.012)
Day visitors		-0.391***	-0.815***
		(0.139)	(0.247)
Day²		0.039**	0.099***
		(0.016)	(0.032)
Age	-0.081**	-0.080**	-0.078**
	(0.035)	(0.034)	(0.034)
Length of residence	-0.007	-0.009	-0.009
	(0.033)	(0.033)	(0.033)
Observations	891	891	891
Clusters	13	13	13
Pseudo R^2	0.003	0.004	0.004

Source: our elaboration

To account for the ordinal nature of the life satisfaction measure, we re-estimate the models using ordered probit specifications (Table 2).

The results are fully consistent with the OLS estimates. Overnight visitor intensity remains statistically insignificant across specifications, both in linear and quadratic form. This confirms that cross-municipality differences in overnight tourism are not systematically associated with residents' reported life satisfaction.

In contrast, day visitors per resident display a robust non-linear association. In the joint specification (Table 2, column 3), the linear term is negative and statistically significant ($\beta = -0.815$, $p < 0.01$), while the quadratic term is positive and statistically significant ($\beta = 0.099$, $p < 0.01$), confirming a convex relationship.

Following the same marginal effect procedure, the effect evaluated at the minimum observed level of day visitation (1.34) is negative and statistically significant ($\beta = -0.549$, $p = 0.001$), whereas at the maximum observed level (6.89) it becomes positive and statistically significant ($\beta = 0.550$, $p = 0.007$).

The ordered probit estimates, therefore, reinforce the substantive interpretation derived from OLS: the marginal negative impact of day visitors diminishes at higher levels of exposure, indicating attenuation rather than a strong reversal.

5. Discussion

This study examined whether different forms of tourism intensity are associated with residents' life satisfaction across municipalities within a highly tourism-dependent territory. By explicitly distinguishing overnight visitors from day visitors, the analysis provides a more differentiated perspective on tourism pressure and its potential implications for resident well-being.

Two central patterns emerge from the results. First, overnight visitor intensity does not exhibit a statistically significant association with life satisfaction at the aggregate municipal level. Neither the linear nor the quadratic specification produces significant coefficients, and this finding is consistent across both OLS and ordered probit models. Taken together, these results indicate that cross-municipality differences in overnight stays per resident are not systematically linked to variations in reported well-being. In this context, overnight tourism appears to be economically and institutionally embedded in ways that do not translate into measurable differences in average life satisfaction across municipalities.

By contrast, day visitors per resident display a robust non-linear association with life satisfaction.

Across modelling strategies, the linear term is negative while the quadratic term is positive and statistically significant, pointing to a convex functional form. The estimated turning point lies within the observed range of the data, and marginal effect tests confirm that the effect is significantly negative at lower levels of exposure and significantly positive at the upper bound. However, the graphical representation clarifies that the right-hand side of the curve should not be interpreted as a substantive improvement in well-being. Rather than indicating recovery, the pattern reflects attenuation of the marginal negative effect as exposure increases. In substantive terms, increases in day visitation are associated with reductions in life satisfaction at low to moderate levels of pressure, but the marginal disruptive impact of additional visitors weakens in municipalities that are already highly exposed.

This attenuation may reflect multiple, non-mutually exclusive mechanisms. Highly exposed municipalities may have developed infrastructural capacities, traffic management systems, or institutional routines that absorb additional flows more effectively. Residents in such contexts may also display forms of adaptation to structurally high levels of day-based tourism. Importantly, the results do not suggest that high levels of excursionism enhance well-being; instead, they indicate that the relationship between exposure and life satisfaction is not linear and that marginal effects vary across the distribution. Linear models would therefore misrepresent the nature of the association and potentially overstate the uniformity of negative impacts.

The contrast between the absence of aggregate effects for overnight stays and the significant non-linear pattern for day visitors underscores the analytical importance of distinguishing visitor typologies. Public debates frequently frame “tourism intensity” as a homogeneous phenomenon, yet the present evidence suggests that different forms of visitor flows may be associated with different well-being patterns. In this setting, day-based tourism appears more closely related to cross-municipality differences in life satisfaction than overnight tourism. This distinction has implications for how tourism pressure is measured, interpreted, and governed.

From a governance perspective, the findings speak directly to ongoing public debates on tourism pressure. In many destinations, including the one examined here, public discussions and media narratives tend to focus primarily on overnight stays, as these are the only visitor figures that are systematically available through official statistics. Residents’ concerns are often directed toward perceived increases in overnight accommodation, particularly in privately rented apartments that may not be fully captured by administrative records.

However, the present analysis relies on a behavioural definition of overnight presence—capturing all individuals who spent the night in the area, including those staying in informal or non-commercial accommodation. Within this broader measurement framework, overnight intensity does not exhibit a significant association with life satisfaction. By contrast, day visitation, which is typically absent from publicly reported statistics, shows a clear and robust relationship with well-being outcomes.

This suggests a potential misalignment between the indicators that structure public debate and the forms of visitor pressure that are statistically associated with resident life satisfaction. In the period examined, it is day-based tourism rather than overnight stays that appears more closely linked to variations in perceived quality of life across municipalities. Consequently, governance systems that rely exclusively on official accommodation statistics may overlook a structurally relevant component of tourism exposure.

The estimated turning point should not be interpreted as a normative policy threshold. Rather, it indicates that the marginal association between day visitors and life satisfaction is not constant across exposure levels. What emerges is not a prescriptive optimal level of tourism, but the need for monitoring systems capable of distinguishing between different types of visitor flows and their potentially distinct implications for resident well-being.Overall, the study contributes to ongoing debates on tourism intensity and resident well-being by showing that the relationship between exposure and life satisfaction is neither uniform nor linear. Distinguishing between overnight and day visitors offers a clearer understanding of how tourism intensity relates to residents’ perceived quality of life across municipalities and highlights the limitations of treating tourism pressure as a single

aggregated construct.

6. Conclusions

This study started from a simple but often overlooked question: when residents call for "fewer tourists," who are they referring to? In destinations where tourism pressure is framed in aggregate terms, visitor flows are typically measured through overnight statistics, implicitly treating all non-residents as equivalent contributors to congestion and social impact.

By distinguishing between overnight visitors and same-day visitors and linking objectively measured mobility data to individual-level, week-specific life satisfaction, this study shows that tourism pressure is not compositionally neutral. The findings indicate that same-day visitation is more strongly and consistently associated with lower levels of residents' short-term well-being, whereas overnight tourism exhibits weaker and in some cases non-negative associations. These results suggest that the social consequences of tourism depend not only on volume, but on the structural characteristics and temporal concentration of different visitor flows.

Conceptually, the analysis contributes by shifting attention from static notions of tourism intensity toward the dynamic and compositional nature of tourism pressure. It highlights the importance of short-term disruption dynamics—such as congestion peaks and spatial crowding—in shaping residents' everyday evaluations. Methodologically, it demonstrates the value of integrating fine-grained mobility data with temporally aligned well-being measures, bridging the gap between advanced flow measurement and social impact analysis.

From a governance perspective, the findings imply that undifferentiated strategies aimed at reducing "tourists" may overlook the specific forms of visitation that generate the greatest short-term disruption. More nuanced policies that distinguish between overnight tourism and excursionism may be better aligned with residents' lived experiences and quality-of-life concerns. Ultimately, the study suggests that understanding who is present in space, and when, matters as much as how many visitors a destination records annually.

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Strategie di valorizzazione dell'enoturismo di montagna: il caso del Trentino

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Abstract

Frame of the research. *L'enoturismo sta evolvendo da visita in cantina a esperienza culturale e relazionale. Cambiamenti della domanda, trasformazione digitale e assetti di governance incidono sulla competitività delle wine destination. Tali fattori risultano amplificati nei contesti montani nei quali emergono criticità strategico-manageriali connesse a sistemi multistakeholder e stagionalità dell'offerta.*
Purpose of the paper. *La ricerca esplora come un territorio di montagna possa sviluppare un'offerta enoturistica distintiva, ricostruendo visioni, priorità e strategie degli attori territoriali per evolvere verso un modello di destinazione integrato e coordinato.*
Methodology. *Lo studio adotta un approccio esplorativo-interpretativo nell'analisi di un caso studio. Dati e informazioni sono stati raccolti tramite 21 interviste semi-strutturate a stakeholder chiave del territorio. L'analisi dei dati si avvale del metodo Gioia.*
Results. *Emergono tre dimensioni chiave per lo sviluppo di una wine destination: (1) governance e coordinamento: regia unitaria, strumenti condivisi e pratiche di coopetition; (2) value proposition e design dell'esperienza integrati: connessione tra vino, gastronomia, cultura e outdoor; (3) fattori abilitanti: digitalizzazione e customer relationship management (CRM), professionalizzazione dell'ospitalità, visione di lungo periodo.*
Research limitations. *Natura esplorativa della ricerca riferita all'analisi di un'unica destinazione.*
Managerial implications. *La ricerca contribuisce a identificare buone pratiche per la valorizzazione dell'offerta enoturistica di una destinazione montana. Per policy maker e DMO emerge necessità di attivare una cabina di regia multi-attore con mandato operativo, definire standard minimi di accoglienza e un calendario integrato, sviluppare un hub unico orientato al booking e alla misurazione di KPI. Per le imprese diviene prioritario progettare prodotti modulari e prenotabili, adottare pratiche condivise di CRM e follow-up e investire in competenze di ospitalità.*
Originality of the paper. *La ricerca propone una lettura integrata dell'enoturismo come progetto di destinazione, traducendo evidenze qualitative in condizioni organizzative e priorità operative.*

Keywords*: enoturismo; sistema multi-stakeholder; governance; destinazioni territoriali; Trentino*.

1. Introduzione

L'Organizzazione Mondiale del Turismo definisce l'enoturismo come un segmento del turismo enogastronomico il cui scopo principale è visitare vigneti, cantine e festival del vino. Durante queste esperienze, la degustazione, il consumo o l'acquisto di vino rappresentano la motivazione principale del viaggio, che spesso si svolge proprio nel luogo di produzione o nelle sue vicinanze[5]. Proprio in virtù del legame con il territorio, l'enoturismo si è affermato come uno dei campi più dinamici del turismo contemporaneo perché incrocia trasformazioni economiche, culturali e organizzative che investono sia i consumi turistici, sia le filiere territoriali (Scarpellini 2019; Alonso et al., 2023; Cohen & Ben-Nun, 2023).

La rilevanza del comparto è oggi sostenuta da evidenze di mercato che mostrano un ampliamento della base di domanda e una qualificazione dei comportamenti di spesa. In una prospettiva storica, le stime di metà anni 2000 già indicavano volumi considerevoli in Italia (Censis, 2007 in Maizza & Rosato, 2008), ma analisi più recenti descrivono un comparto in forte evoluzione e sempre più

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[5] Per la definizione proposta da UN Tourism si rinvia al glossario disponibile al link www.untourism.int/gastronomy-wine-tourism

orientato all'esperienza (Garibaldi, 2020, 2022; Censis, 2023; UNWTO, 2023). Il Rapporto sul Turismo Enogastronomico Italiano del 2024 evidenzia una partecipazione diffusa ad attività legate al vino nei viaggi degli italiani, con un progressivo spostamento da un consumo di nicchia a una pratica più trasversale (Garibaldi, 2024b). Dal lato dell'offerta, analisi settoriali mostrano che l'enoturismo non è soltanto leva di immagine: è un canale capace di generare ricavi diretti (ticket di visita, esperienze, shop) e ricadute territoriali indirette, perché la spesa si distribuisce su ospitalità, ristorazione, trasporti e cultura (Wine Suite, 2024; Nomisma Wine Monitor, 2024). Non meno importante, i comportamenti di fruizione evidenziano vincoli concreti di progettazione: la domanda tende a concentrarsi nel fine settimana, rendendo centrali continuità di apertura, gestione delle prenotazioni e qualità dell'accoglienza, cioè quelle componenti che trasformano il desiderio in visita effettiva. Parallelamente, la presenza di visitatori internazionali richiede standard di servizio, capacità multilingue e processi "frictionless" lungo l'esperienza (Wine Suite, 2024).

Queste evidenze rendono chiara una specificità strutturale dell'enoturismo: è un turismo intrinsecamente "di sistema". L'esperienza enoturistica non dipende unicamente dall'impresa vitivinicola, ma da una molteplicità di attori e servizi (si pensi ai trasporti, alla ricettività, alla ristorazione, alle infrastrutture digitali, per citare alcuni esempi) che concorrono a determinare qualità percepita, valore e reputazione (Mastroberardino, 2002; Quadri-Felitti & Fiore, 2012; Scorrano et al., 2013; Mastroberdino et al., 2022). La letteratura sul wine tourism individua driver ricorrenti di successo delle wine destination - qualità dell'esperienza, integrazione di prodotto, accessibilità informativa e logistica, coerenza identitaria e capacità di coordinamento - sottolineando come la performance dipenda dall'interdipendenza di tali dimensioni, e non dalla sola eccellenza del vino (Getz & Brown, 2006; Mitchell & Hall, 2006; Festa et al., 2020; Alonso et al., 2023).

All'interno di tale dibattito scientifico, il paper presenta e discute i risultati di una ricerca avente un duplice obiettivo: *a)* analizzare se e come i key player coinvolti nella governance e nel management di destinazione, e le imprese e le organizzazioni che operano nel settore vitivinicolo, condividono visioni, priorità e strategie orientate ad affermarsi come destinazione enoturistica; *b)* identificare possibili fattori abilitanti il posizionamento di un territorio come destinazione enoturistica. La ricerca, di natura esplorativa, è stata svolta avvalendosi di un caso studio. Tra agosto e ottobre 2025 sono state condotte 21 interviste semi-strutturate a stakeholder chiave del territorio. Per l'analisi dei dati, ci si è avvalsi del metodo Gioia (Gioia et al., 2013).

Il paper si articola in cinque sezioni principali. Il paragrafo che segue illustra il contesto teorico di riferimento, evidenzia i concetti chiave e le specificità dell'enoturismo nonché le sfide che i territori devono affrontare per emergere come *wine destination*. Il terzo paragrafo descrive la metodologia di ricerca. I risultati sono illustrati e discussi alla luce della letteratura di riferimento, ponendo in evidenza le tre principali dimensioni emerse dalla ricerca (par. 4). Nella quinta sezione si illustrano le principali implicazioni manageriali e di policy riferite alla destinazione oggetto di studio. Nelle conclusioni sono evidenziati i limiti della ricerca e alcune proposte di linee di ricerca future.

2. Contesto teorico di riferimento

L'enoturismo si configura oggi come una delle forme più dinamiche e promettenti di turismo esperienziale, capace di coniugare la scoperta del territorio, la valorizzazione delle produzioni vitivinicole e l'immersione culturale del visitatore. Si tratta di una pratica che, nel tempo, ha assunto significati e funzioni diversi, evolvendo da semplice visita in cantina a esperienza multisensoriale legata alla narrazione del territorio, alla convivialità, al benessere e alla sostenibilità (Garibaldi, 2024).

Getz e Brown (2006) definiscono l'enoturismo come una tipologia turistica interpretabile da tre prospettive distinte: quella dei produttori (che vedono nel turismo un'opportunità di reddito supplementare), quella degli operatori turistici (che ne colgono le potenzialità commerciali), e quella dei consumatori (alla ricerca di esperienze edonistiche e culturali). Per Carlsen (2004), l'enoturismo

rappresenta uno strumento di sviluppo locale e una leva per la valorizzazione delle piccole e medie imprese vitivinicole. Hall e Mitchell (2000) lo descrivono come un fenomeno ibrido, in cui industria turistica e vitivinicola si intrecciano, dando vita a un prodotto situato all'interno di paesaggi rurali ad alta valenza culturale. In tale prospettiva si inseriscono ulteriori studi che evidenziano come nell'offerta enoturistica il vino assolva al ruolo di dispositivo interpretativo del territorio: paesaggi vitati, pratiche agricole, patrimoni immateriali, identità locali e relazioni sociali diventano parte integrante della proposta di valore (Hall & Mitchell, 2002; Carlsen & Charters, 2006; Mitchell & Hall, 2006; Capitello et al. 2013; Panke, 2020; Richards, 2018; Richards, 2021a, b).

L'adozione di tale prospettiva pone in luce implicazioni strategico-manageriali non solo per la singola impresa, ma anche per il territorio in cui l'esperienza è vissuta. Coerentemente con l'idea di destinazione come amalgama di prodotti, servizi ed esperienze (Buhalis, 2000; Pike & Page 2014) anche nel caso dell'enoturismo la competitività dell'offerta non dipende unicamente dalla qualità del prodotto, bensì dalla capacità di costruire un sistema coerente di significati, servizi, accessibilità e narrazione lungo tutta la customer journey, dal momento dell'ispirazione all'acquisto e al follow-up (Getz & Brown, 2006; Festa et al., 2020; Privitera et al., 2024; Durrieu et al., 2026).

Dal punto di vista scientifico, numerosi studi hanno sottolineato l'importanza del *terroir turistico* (Hall & Mitchell, 2002) come fattore chiave dell'attrattività delle regioni vinicole. Il terroir turistico è definito come la combinazione di caratteristiche fisiche, naturali e culturali che conferiscono a ogni regione vinicola un fascino distintivo e un'identità percepita come unica. La percezione e l'immagine delle regioni vinicole sono evolute dagli anni '90, passando da una focalizzazione sulla produzione a un'immagine più ampia e sensoriale, che include paesaggi, cucina, tempo libero e attività all'aperto (Williams, 2001). Inoltre, il passaparola e la reputazione del binomio prodotto-territorio sono tra i fattori più influenti nelle scelte degli enoturisti, pari o superiori a quelli legati alla conoscenza diretta del prodotto o alle guide specialistiche (Maizza & Rosato, 2008; Scorrano et al., 2013).

In virtù del legame tra prodotto (vino) e territorio, la valorizzazione dell'enoturismo pone in luce almeno quattro sfide di carattere strategico-manageriale. La prima riguarda la governance: la destinazione non è un soggetto unitario, ma una rete di attori con obiettivi e capacità differenti; la costruzione di value proposition e standard richiede dunque forme di governance collaborativa e strumenti condivisi (Ansell & Gash, 2008; Provan & Kenis, 2008; Dredge, 2006; D'Angella & Go, 2007). La seconda concerne la coerenza identitaria: la destinazione deve bilanciare semplificazione (per essere riconoscibile sui mercati) e profondità (per valorizzare pluralità e autenticità) evitando sia la frammentazione narrativa, sia l'appiattimento (Mitchell & Hall, 2006; Kavaratzis & Hatch, 2013; Cai, 2002). La terza riguarda l'interazione con il cliente in tutte le fasi della customer journey attraverso canali digitali, informazioni standardizzate, processi di prenotazione e pagamento, e gestione del post-visita (Buhalis, 2000; Serio et al., 2024; Divinea, 2025; Wine Suite & Divinea, 2025). La quarta riguarda competenze e standard di ospitalità: l'esperienza promessa dalla destinazione deve essere "consegnata" in modo coerente, soprattutto in presenza di domanda internazionale e segmenti più selettivi (Dodd, 2022; Garibaldi, 2024b). In questo quadro, l'enoturismo diventa un laboratorio utile anche per la ricerca su reti, innovazione place-based, e creazione di valore territoriale: sono gli attori, attraverso scelte di cooperazione, standardizzazione e investimento in abilitatori a "fare il sistema".

Vergamini et al. (2019) evidenziano il ruolo cruciale delle strategie di marketing territoriale e della capacità di racconto del vino come parte integrante di un sistema culturale. I territori che riescono a posizionarsi in modo distintivo sono quelli che trasformano il vino in simbolo identitario, collegandolo a narrazioni profonde che includono storia, tradizioni, tecniche colturali e paesaggi. La narrazione enoturistica - intesa come processo di co-creazione di senso tra visitatore e territorio - rappresenta dunque una leva fondamentale per attrarre segmenti di domanda qualificati, interessati non solo alla degustazione, ma all'interazione autentica con il luogo visitato.

Alla luce di quanto evidenziato, emerge chiaramente che l'enoturismo contemporaneo si configura come un sistema articolato di relazioni tra attori, territori, prodotti e visitatori. La dimensione di rete è particolarmente sensibile: laddove i territori sono frammentati e policentrici, la cooperazione

competitiva (coopetition) può diventare un meccanismo essenziale per costruire massa critica e valore collettivo, ma solo se sostenuta da governance e strumenti operativi (Bouncken et al., 2015; Bouncken et al., 2019; Zamarreño Aramendia et al., 2021).

In questa prospettiva, l'enoturismo rende particolarmente evidente una tematica insita nel management e nella governance delle destinazioni territoriali, ossia il coordinamento in contesti multistakeholder. Ampiamente dibattute al riguardo sono le criticità che concernono l'integrazione di risorse diffuse in un'offerta integrata, coordinata e riconoscibile (Bramwell & Lane, 2011; Pike & Page, 2014; Martini 2017; Reinhold et al. 2023). Esempi emblematici in tal senso sono le destinazioni montane che si caratterizzano per gli elementi distintivi delle destinazioni turistiche di tipo community (Flagestad & Hope, 2001; Murphy & Murphy, 2004). In questi territori, la capacità degli attori di fare rete e di alimentare relazioni collaborative rappresenta una delle principali sfide del management per raggiungere obiettivi condivisi e creare valore a livello collettivo (Beritelli et al., 2016; Beritelli, 2011). Tali sfide si riflettono anche nella definizione e promozione dell'offerta enoturistica di destinazione che richiede pertanto visione e scelte strategiche ed operative che permettano di superare la frammentazione ed evolvere verso un'offerta integrata e condivisa.

Le destinazioni montane possono considerare le opportunità di sviluppo connesse all'enoturismo come leva per raggiungere obiettivi di destagionalizzare e redistribuzione dei flussi turistici. Nel fare ciò, tuttavia, esse incontrano vincoli amplificati dalle specificità territoriali ossia, accessibilità geografica (raggiungibilità) non sempre garantita, frammentazione spaziale, pluralità di micro-territori, rischi di disallineamento tra offerta e picchi di domanda e, spesso, competizione con altre motivazioni turistiche già consolidate (Dalla Torre & Marchiori, 2021). In tali contesti, l'enoturismo richiede un disegno di destinazione capace di organizzare la pluralità di prodotti e offerte turistiche espresse dal territorio, integrando vino, gastronomia, cultura e outdoor, e rendendolo fruibile e prenotabile (Mitchell & Hall, 2006; Getz & Brown, 2006).

3. Metodologia della ricerca

La ricerca adotta un disegno qualitativo con finalità esplorativo-interpretative avvalendosi di un caso studio (Eisenhardt 1989; Yin, 2018). Tale scelta è coerente con l'oggetto di indagine: quando il fenomeno è contestualizzato, multi-attore e guidato da interpretazioni e decisioni organizzative, la ricerca qualitativa consente infatti di ricostruire logiche d'azione, tensioni e *trade-off* (Maxwell, 2013; Creswell & Poth, 2018; Patton, 2023).

La destinazione eletta a caso studio è il Trentino. Tale scelta è motivata da due condizioni: a) la presenza di un capitale turistico e reputazionale rilevante e di un patrimonio vitivinicolo stratificato e riconoscibile di alto valore che rende possibile interrogarsi su come una destinazione "*non wine-first*" possa costruire riconoscibilità enoturistica; b) la presenza di una traiettoria di consolidamento esplicita che consente di osservare dinamiche di pre-*governance* e implementazione (Dalla Torre & Marchiori, 2021; Cimino & Rigger, 2025). Al contempo si riscontrano criticità tipiche dei contesti community che ostacolano la definizione di strategie orientate al raggiungimento di un posizionamento chiaro, riconoscibile e difendibile come *wine destination*. Il caso è quindi informativo perché permette di analizzare "cosa manca" per trasformare iniziative e risorse in un sistema operativo, non perché rappresenti statisticamente tutte le destinazioni montane. Le evidenze non sono quindi generalizzabili statisticamente, ma offrono spunti di riflessione per altre destinazioni montane vitivinicole con caratteristiche organizzative simili.

La raccolta dati si basa su 21 interviste semi-strutturate a stakeholder chiave dell'ecosistema enoturistico provinciale (istituzioni e governance turistica; consorzi e associazioni; cantine di diversa scala; intermediari digitali; formazione), integrate da analisi documentale. La scelta dei key player da intervistare si basa su un campionamento ragionato orientato alla massima variabilità per coprire differenti prospettive, scale organizzative e ruoli nella filiera (Patton, 2015). In particolare, sono stati inclusi: cantine con modelli di business e dimensioni differenti, attori coinvolti nell'attività di

promozione e governance territoriale (destination management organisation - DMO, aziende per il turismo[6] e istituzioni), consorzi, soggetti di servizio/intermediazione e formazione. La numerosità del campione è stata definita in modo progressivo, fino a raggiungere un livello soddisfacente di saturazione concettuale sulle principali dimensioni analitiche emerse (Guest et al., 2006). Di seguito i dati di campo complessivi relativi alle interviste effettuate (Tabella 1) e il profilo degli intervistati (Tabella 2).

Tab. 1: Le interviste effettuate, dati di campo complessivi

Voci	Dati di campo
Interviste programmate	36
Interviste effettuate	21
Tasso di risposta	58%
Periodo	Agosto-ottobre 2025
Modalità	Videocall (Google Meet) oppure risposte via mail.
Lingua	Italiano
Durata delle interviste	Mediamente 30 minuti (Range: 11 - 68 minuti)
Registrazione & Trascrizione	Registrazioni previo consenso. Trascrizioni integrali con utilizzo del software Transkriptor

Fonte: Elaborazione propria

Tab. 2: La composizione del campione

Rispondente	Tipologia di realtà	N. dipendenti[7]	Data intervista
R1	Associazione locale di promozione	*nd*	20/08/2025
R2	Produttore	2-10	20/08/2025
R3	DMO provinciale	51-200	25/08/2025
R4	APT	11-50	26/08/2025
R5	Associazione tematica di promozione enoturistica	2-10	26/08/2025
R6	Ente di ricerca e alta formazione agro-enologica	501-1.000	26/08/2025
R7	Consorzio di tutela	2-10	27/08/2025
R8	Produttore	2-10	28/08/2025
R9	Produttore	2-10	30/08/2025
R10	Produttore	11-50	04/09/2025
R11	Consorzio turistico	2-10	04/09/2025
R12	Produttore + Consorzio di categoria	2-10	04/09/2025
R13	APT	11-50	05/09/2025
R14	Marketplace/OTA enoturistica	2-10	12/09/2025
R15	Produttore	2-10	19/09/2025
R16	Produttore	501-1.000	23/09/2025
R17	Produttore	201-500	24/09/2025
R18	Produttore	51-200	30/09/2025
R19	Produttore	11-50	07/10/2025
R20	Consorzio di tutela/promozione	2-10	15/10/2025
R21	Produttore	51-200	20/10/2025

Fonte: Elaborazione propria

Le interviste sono state condotte con traccia semi-strutturata, consentendo comparabilità tra casi e, al contempo, flessibilità per approfondire temi emergenti (Kallio et al., 2016). La traccia è stata progettata per: (1) rilevare percezioni sullo stato dell'offerta (punti di forza, criticità, opportunità, barriere); (2) esplorare visioni di sviluppo (azioni prioritarie, modelli di riferimento, plausibilità del posizionamento competitivo entro dieci anni). La Figura 1 riporta i principali quesiti utilizzati nel protocollo di intervista, con i relativi obiettivi e la letteratura di riferimento.

[6] Le aziende di promozione turistica (APT) del Trentino sono denominate Aziende per il Turismo.
[7] Per il numero di dipendenti si è fatto riferimento ai dati della Camera di Commercio di Trento (2025).

La ricerca è stata svolta nel rispetto dei principi etici della ricerca qualitativa e del Regolamento (UE) 2016/679 – GDPR. Ad ogni intervistato/a è stato richiesto il consenso informato alla partecipazione e alla registrazione audio, precisando finalità e trattamento dei dati; è stata garantita la possibilità di mantenere l'anonimato (Orb et al., 2001). Le interviste sono state realizzate tra agosto e ottobre 2025 da remoto tramite Google Meet. Previo consenso, le interviste sono state trascritte integralmente con l'ausilio di Transkriptor.

Fig. 1: Quesiti inseriti nel protocollo di intervista con indicazione di obiettivo di raccolta delle informazioni e raccordo con la letteratura di riferimento

#	Quesito	Obiettivo	Fonti bibliografiche
1	Perché, secondo lei, il Trentino dovrebbe puntare sull'enoturismo?	Comprendere i vantaggi percepiti (economici, identitari, relazionali) da parte degli stakeholder nel valorizzare questo comparto.	Cimino & Rigger (2025), Getz & Brown (2006), Carlsen (2004), Hall et al. (2000); Festa et al. (2020); Getz et al. (1999)
2	Quale parola chiave le viene in mente quando pensa al legame tra enoturismo e Trentino?	Individuare concetti guida, parole simboliche e immagini forti per un posizionamento autentico.	R.Kavaratzis & Ashworth (2005), Cai (2002); Vergamini et al. (2019)
3	Quali sono, oggi, i principali punti di forza e di debolezza dell'offerta enoturistica in Trentino?	Mappare le percezioni SWOT attuali (Strengths & Weaknesses), utile per analisi strategica bottom-up.	Garibaldi (2023), Dredge & Jenkins (2011), Cimino & Rigger (2025), UNWTO (2020); Festa et al. (2020); Getz et al. (1999)
4	Si sente parte di un sistema territoriale che si riconosce come destinazione enoturistica?	Verificare il senso di appartenenza e l'identità collettiva nella filiera enoturistica.	Saxena et al. (2007), March & Wilkinson (2009), Hall (2005); Vergamini et al. (2019)
5	Quali sono, se ne scorge, le criticità che la preoccupano maggiormente rispetto a un piano di sviluppo enoturistico?	Identificare le Threats percepite (ambientali, gestionali, identitarie), cruciali nella pianificazione strategica.	Cimino & Rigger (2025), Hall & Mitchell (2008), Maizza & Scorrano (2008), Garibaldi (2023); Festa et al. (2020)
6	In che direzione dovrebbe evolvere l'enoturismo in Trentino nei prossimi anni per essere competitivo e attrattivo?	Far emergere visioni desiderate e scenari di sviluppo sostenibile e distintivo.	Cimino & Rigger (2025), Getz (2000), Panke (2020), Hall et al. (2004); Vecchio et al. (2024)
7	Quali sono, secondo lei, le azioni più urgenti o strategiche che aziende, consorzi e istituzioni dovrebbero intraprendere?	Elicitare raccomandazioni pratiche e priorità operative dagli attori locali.	D'Angella & Go (2007), Bramwell & Lane (2011), UNWTO (2020); Vergamini et al. (2019); Festa et al. (2020)
8	Ci sono destinazioni enoturistiche, in Italia o all'estero, che considera un modello di riferimento positivo? E perché?	Raccogliere benchmark spontanei, utili per un confronto competitivo e per comprendere buone pratiche.	Hall & Mitchell (2008), Garibaldi (2020, 2023); Festa et al. (2020); Getz et al. (1999)
9	Cosa dovrebbe fare il Trentino di diverso rispetto alle altre regioni vinicole italiane per distinguersi come destinazione enoturistica di montagna?	Far emergere il potenziale differenziante rispetto a competitor nazionali (brand positioning alpino).	Getz & Brown (2006), Cimino & Rigger (2025), Dalla Torre & Marchiori (2021), Panke (2020); Vergamini et al. (2019)
10	Quanto ritiene plausibile (da 1 a 10) che il Trentino, entro 10 anni, sia tra le prime 5 destinazioni enoturistiche italiane?	Misurare il grado di fiducia degli stakeholder sulla scalabilità e visibilità futura dell'enoturismo trentino.	Hall et al. (2000), Wine Suite (2024), Nomisma (2024); Vecchio et al. (2024)

Fonte: Elaborazione propria

L'analisi dei dati è stata condotta seguendo la metodologia Gioia, che struttura la costruzione teorica a partire dalle evidenze empiriche in modo tracciabile e replicabile (Gioia et al., 2013). Per aumentare la robustezza analitica, sono state utilizzate matrici di sintesi trasversale per verificare ricorrenze e differenze tra intervistati e mantenere una catena di evidenze coerente con le pratiche di analisi qualitativa rigorosa (Miles et al., 2014; Saldaña, 2021). La codifica delle interviste è stata sostenuta da un confronto costante dati - letteratura e attenzione ai criteri di credibilità e trasferibilità (Lincoln & Guba, 1985). I risultati sono stati interpretati anche alla luce di un'analisi documentale volta a contestualizzare le interviste sulla base di materiali di contesto (documenti pubblici,

comunicazione e materiali informativi di consorzi/enti, report di settore, dataset e pubblicazioni di riferimento). Come suggerito dalla letteratura (Bowen, 2009; Denzin, 1978), l'obiettivo di tale analisi documentale è stato quello di rafforzare la credibilità interpretativa, ridurre il rischio di dipendere esclusivamente dal discorso degli attori e ricostruire cornici normative e comunicative.

4. Presentazione e discussione dei risultati della ricerca

Come anticipato, i dati emersi dalle 21 interviste sono stati analizzati con l'approccio di Gioia et al. (2013), procedendo in tre passaggi successivi. Le trascrizioni sono state codificate partendo da concetti di primo ordine, poi aggregate in temi di secondo ordine e infine sintetizzate in dimensioni interpretative. Nella prima fase sono stati quindi estratti i concetti (*1st order concepts*) direttamente dal linguaggio degli intervistati (ad esempio "superare la frammentazione", "standard minimi condivisi", "prenotazione frictionless").

Nella seconda fase i concetti emersi sono stati raggruppati in temi (*2nd order themes*) capaci di spiegare regolarità e differenze (ad esempio Sviluppo della destinazione-sistema, Coopetition, Brand identity, Offerta integrata, Digitalizzazione, Orientamento al futuro). Infine, tramite iterazione tra dati e letteratura, i temi sono stati aggregati in tre dimensioni (*Aggregate dimensions*) che organizzano l'intero fenomeno:

1. Governance & Coordinamento: comprende gli snodi di visione unitaria/regia, convivenza tra grandi e piccoli, standard e allineamento di filiera.
2. Value proposition & Design dell'esperienza: integra brand identity, progettazione dell'offerta e calendarizzazione eventi.
3. Fattori abilitanti: comprendono digitalizzazione e dati, competenze e formazione, raggiungibilità, mobilità e orientamento all'innovazione e al posizionamento futuro.

Seguendo l'approccio della metodologia Gioia (Gioia et al., 2013) la Tabella 3 riporta sinteticamente il *Coding Tree* dei risultati, evidenziando la progressione dai concetti iniziali (*1st order concept*) alle astrazioni teoriche (*2nd order themes*) fino alle dimensioni aggregate (*Aggregate dimenions*), e fornendo una guida alla lettura dei risultati.

Tab. 3: Sviluppo offerta enoturistica: Coding Tree visione degli stakeholders

1st order concepts	***2nd order themes***	***Aggregate dimensions***
● Superamento della frammentazione & Visione unitaria ● Regia unica	● Sviluppo della Destinazione-Sistema	(1) Governance & Coordinamento
● Autonomia operatori, meno paternalismo istituzionale ● Convivenza grandi-piccoli ● Standard minimi & Orientamento alla qualità ● Allineamento Ho.re.ca & Valorizzazione prodotti locali	● Coopetition	
● Trento Doc come porta ● La narrazione della futura Wine destination ● Canali di comunicazione	● Brand Identity	(2) Value proposition & Design dell'esperienza
● Complementarietà dell'enoturismo al turismo ● Sostenibilità ● Sviluppo dell'esperienza & Innovazione ● Destinazione Wine-related, Eventi & calendario integrato	● Offerta integrata	
● Prenotazione frictionless ● Approccio data-driven	● Digitalizzazione	(3) Fattori abilitanti
● Formazione & nuove competenze: l'hospitality manager territoriale ● Ricambio generazionale ● I trend: GenZ, la crisi del vino & Esperienze ● Vino come asset culturale & Riconoscimento UNESCO	● Orientamento al futuro	
● Pricing, mobilità & ricettività	● Raggiungibilità, mobilità	

Fonte: Elaborazione propria

3.1 Dimensione 1 - Governance & coordinamento: dall'"arcipelago" alla destinazione-sistema

Un primo nucleo di evidenze riguarda governance e coordinamento. Gli attori descrivono un contesto in cui la ricchezza di iniziative locali non è sempre traducibile in posizionamento e continuità perché mancano dispositivi comuni. La richiesta non è una struttura centralizzata pesante, ma una regia "leggera ma esigente", cioè capace di selezionare priorità, definire responsabilità, e soprattutto costruire strumenti operativi condivisi. Tre strumenti ricorrono con particolare intensità: un hub digitale enoturistico che consenta discovery e prenotazione; un calendario integrato che renda leggibile la continuità e abiliti co-programmazione; una carta/standard minimi di accoglienza che riduca incertezza e variabilità della qualità percepita. La rilevanza di questo risultato aumenta se letta alla luce dei trend riscontrati nell'enoturismo di montagna: la concentrazione delle visite nel weekend implica che aperture, staffing e standard non possono essere lasciati alla discrezionalità individuale, perché il "momento di domanda" coincide con il "momento di fragilità organizzativa" di molte imprese (Wine Suite, 2024). Qui la letteratura sulle reti e sui policy network è utile per interpretare la richiesta degli attori: in sistemi turistici complessi, la rete esiste quasi sempre, ma ciò che fa la differenza è la capacità di governarla attraverso regole, strumenti condivisi e coordinamento inter-organizzativo (Dredge, 2006; D'Angella & Go, 2007; Pike & Page, 2014).

In questa dimensione emergono anche pratiche e bisogni di coopetition. Gli intervistati descrivono il rischio di polarizzazione su pochi marchi/attori "forti" e, specularmente, la difficoltà delle micro-cantine e dei territori minori nel trasformare autenticità e qualità in flussi e ricadute economiche. La coopetition viene interpretata come dispositivo organizzativo capace di comporre queste tensioni: i grandi player possono fungere da piattaforme di visibilità e garanzia; i piccoli da laboratori di autenticità e differenziazione. Tuttavia, secondo gli intervistati, questa complementarità produce valore territoriale solo se la destinazione dispone di meccanismi operativi (referral, pacchetti multi-attore, standard comuni) che consentano al visitatore di muoversi tra offerte diverse senza attrito. La letteratura sulla coopetition nei cluster turistici spiega che la cooperazione competitiva può costruire massa critica e aumentare performance collettiva, ma richiede governance e coordinamento, altrimenti resta collaborazione episodica (Bouncken et al., 2015; Bouncken et al., 2019; Zamarreño Aramendia et al., 2021). Nel caso trentino, il risultato implica che la rete potenziale è alta, ma la sua attivazione come "catena di esperienza" è ancora incompleta.

3.2 Dimensione 2 - Value proposition & experience design: identità "a doppio respiro" e prodotti prenotabili

Un secondo nucleo di evidenze riguarda la *value proposition* e l'architettura identitaria. Gli *stakeholder* convergono su una configurazione "a doppio respiro": Trento DOC come *gateway* di riconoscibilità e "vini di montagna" come cornice narrativa e strategica per valorizzare pluralità di micro-territori, vitigni autoctoni e paesaggi vitati senza perdere leggibilità verso l'esterno. Questo risultato è coerente con le ricerche in questo ambito che evidenziano come le destinazioni vinicole debbano bilanciare semplificazione e profondità: una narrazione troppo complessa genera confusione, una troppo semplice genera appiattimento (Mitchell & Hall, 2006; Festa et al., 2020). Nel caso trentino, la tensione è particolarmente rilevante perché l'identità di montagna può diventare un elemento di differenziazione solo se tradotta in un portafoglio di esperienze coerenti e fruibili: l'identità "montana" non è un attributo descrittivo, ma un principio progettuale che dovrebbe orientare format, stagionalità, servizi e linguaggi.

Dal lato dell'offerta, emerge l'esigenza di trasformare degustazioni isolate in prodotti integrati, modulari e prenotabili che connettano vino, gastronomia, cultura e *outdoor*. Questa evidenza si allinea con la letteratura *sull'experiential turn* e con la lettura dell'enoturismo come forma di turismo culturale-relazionale (Panke, 2020; Richards, 2018; Richards, 2021a, b). Si allinea anche con i *trend* di domanda: crescita di esperienze immersive, premiumizzazione selettiva e attenzione a sostenibilità e autenticità (Garibaldi, 2024a; Garibaldi, 2024b). In questa cornice, l'offerta trentina appare competitiva quando integra il valore paesaggistico e la fruizione lenta con l'ospitalità e la capacità di prenotazione; appare fragile quando non è intermediabile, quando manca continuità, e quando la

filiera ricettiva/ristorativa non "aggancia" la proposta enoturistica. Qui l'evidenza empirica rafforza un punto spesso discusso nella letteratura sulle *wine destination*: la destinazione non è la cantina, è l'ecosistema (Getz & Brown, 2006; Pike & Page, 2014). Anche gli eventi, spesso evocati come *asset*, emergono in modo non retorico: la loro utilità dipende dal passaggio da episodicità a calendario integrato, capace di trasformare i picchi in un percorso continuativo verso l'offerta ordinaria. Emerge quindi dalle interviste la necessità di avere un calendario unico e prenotabile che permetta di coordinare gli eventi e le esperienze del territorio. In particolare, un intervistato richiama un esempio di destinazione che ha costruito un calendario unico per gestire l'offerta di esperienze: *"[La destinazione "X"] per me è il paradiso. Tu hai questo calendario che si apre su un unico sito in cui puoi prenotare esperienze… all'epoca c'erano un paio di esperienze al giorno, ad oggi ne trovi 20 esperienze diverse…"* (R5).

3.3 Dimensione 3 - Fattori abilitanti: digitale/CRM, competenze e standard, raggiungibilità

Il terzo nucleo di evidenze riguarda i fattori abilitanti e spiega perché la "strategia" rischi di restare retorica. Gli stakeholder descrivono un gap tra ispirazione e conversione: il Trentino non è ancora percepito immediatamente come *wine destination* e il percorso digitale appare frammentato. Ne deriva un risultato cruciale: la digitalizzazione è un'infrastruttura di destinazione, non solo un canale. *Hub* digitale, prenotazione *frictionless*, disponibilità e prezzi chiari, pagamenti e conferme, *policy* condivise, logistica post-acquisto e CRM sono considerati elementi necessari per ridurre attrito e aumentare conversione e qualità percepita. A questo proposito, le dichiarazioni degli stakeholder intervistati riflettono quanto emerso dalla letteratura sul turismo digitale (Buhalis, 2000) e da fonti settoriali specifiche sul turismo del vino digitale e sul *direct-to-consumer* (DTC) (Divinea, 2025; Wine Suite & Divinea, 2025; Serio et al., 2024). Le evidenze su tecnologie immersive e *gamification* – che mostrano impatti su interazioni e prenotazioni dirette – rafforzano l'idea che l'innovazione digitale può essere leva competitiva quando è integrata in un disegno di *customer journey* e non frammentata in sperimentazioni isolate (Osservatorio Innovazione Digitale nel Turismo, 2024; Wine Tech Observatory, 2023).

Accanto al digitale emerge con forza l'esigenza di professionalizzazione dell'ospitalità e di standardizzazione della qualità. Per esempio, l'internazionalizzazione della domanda e la crescente selettività (anche generazionale) richiedono accoglienza multilingue, capacità di service design e coerenza tra promessa e consegna. Gli stakeholder richiamano la necessità di investire in competenze trasversali e in figure professionali dedicate (ad esempio, hospitality manager territoriale) per ridurre asimmetrie tra imprese, presidiare standard e alimentare un ciclo di apprendimento data-driven (Garibaldi, 2024b). In questo senso, il Trentino appare come un caso in cui la sfida non è "inventare nuove esperienze", ma rendere l'offerta enoturistica integrata a livello di destinazione attraverso *governance*, digitale e competenze. Tale interpretazione è coerente con l'ambizione di posizionamento come wine destination e con l'idea che l'enoturismo di montagna diventi competitivo quando è trattato come progetto di destinazione (Cimino & Rigger, 2025; Dalla Torre & Marchiori, 2021).

5. Implicazioni manageriali e di policy

La ricerca suggerisce che la transizione verso una wine destination in contesto montano dipende fortemente dalla capacità di trasformare pluralità e frammentazione in coerenza di sistema e in conversione lungo la customer journey. Questo risultato è coerente con la letteratura, che identifica nella governance e nella progettazione dell'esperienza - insieme alla capacità digitale - i fattori critici che distinguono le destinazioni in grado di raggiungere risultati concreti da quelle che restano somme di iniziative (Mitchell & Hall, 2006; Getz & Brown, 2006; Pike & Page, 2014).

I risultati confermano e specificano, nel caso del Trentino, la tesi secondo cui le wine destination competono come sistemi: risorse e reputazione non bastano se non vengono tradotte in strumenti

operativi, qualità diffusa e prenotazione *frictionless* (Pike & Page, 2014; Mitchell & Hall, 2006). Il contributo del caso studio è mostrare come, in una destinazione montana non completamente *wine-first*, il nodo competitivo sia l'implementazione: trasformare una pluralità di micro-identità e attori intermedi in un *funnel* di destinazione, con regia, standard e infrastrutture digitali condivise. In tale prospettiva, la proposta di posizionamento del Trentino come *wine destination* richiede un passaggio da *vision* a *operating model* (Cimino & Rigger, 2025): chi fa cosa, con quali strumenti, con quali metriche. Affinché si realizzi uno sviluppo enoturistico di destinazione, l'identità (vini di montagna) deve quindi diventare principio progettuale (prodotti, servizi, stagionalità, mobilità) non solo frame narrativo. Inoltre, la coopetition si qualifica come meccanismo chiave: non basta la collaborazione simbolica, servono pacchetti e standard condivisi per distribuire valore e aumentare la permanenza.

Alla luce di tali considerazioni, dalla ricerca emergono chiare quattro principali evidenze: 1) senza una governance efficace, la destinazione non costruisce strumenti condivisi; 2) senza strumenti condivisi non ottieni sistemi di prenotazione accessibili ed efficaci; 3) senza tali sistemi e standard comuni non intercetti e consolidi la domanda; 4) senza il consolidamento della domanda non si consolida valore territoriale e posizionamento. Per i *policy maker* e le DMO ciò significa spostare l'attenzione dalla sola promozione alla costruzione di una regia di destinazione, coerente con l'evoluzione delle DMO come orchestratori di ecosistemi (Pike & Page, 2014). Nel caso del Trentino, la priorità è attivare una cabina di regia multi-attore con mandato operativo e responsabilità su *deliverable* misurabili, in modo da rendere scalabile la pluralità di attori e micro-identità che caratterizza una destinazione montana (Dalla Torre & Marchiori, 2021; Cimino & Rigger, 2025). Questa regia dovrebbe concentrarsi su un set minimo di infrastrutture di sistema: un *hub* unico orientato al *booking* (inventario esperienze, pagamenti, *policy* e conferme), un calendario integrato esperienze-eventi per la co-programmazione e la destagionalizzazione, e una carta di standard minimi di accoglienza, idealmente costruita con un modello "a soglie" che permetta anche alle micro-imprese di innalzare progressivamente diffusione e qualità degli strumenti operativi di prenotazione e commercializzazione online (Mitchell & Hall, 2006; Getz & Brown, 2006).

Contestualmente, la governance dovrebbe adottare KPI di sistema per favorire un approccio data-driven consapevole nella gestione del territorio (ad es. *conversion rate, no-show*, valutazioni/Net Promoter Score, permanenza media, spesa media, stagionalità e distribuzione territoriale dei flussi) (Divinea, 2025; Wine Suite, 2024). Per una destinazione montana, le politiche di mobilità non sono accessorie: diventano leve per rendere fruibili territori periferici e sostenere l'obiettivo di diffusione dei flussi, con ricadute su sostenibilità e coesione territoriale (Dalla Torre & Marchiori, 2021).

Per *imprese e consorzi*, le implicazioni sono speculari ed operative: l'offerta deve essere riprogettata come portafoglio modulare e prenotabile (format chiari, durata/prezzo, *add-on* come trasporti/guide/spedizione), coerente con *driver* di successo delle wine destination e con la trasformazione dell'enoturismo in esperienza culturale-relazionale (Getz & Brown, 2006; Panke, 2020; Richards, 2018; Richards, 2021). Il CRM e il *follow-up* dovrebbero diventare pratiche standard per trasformare la visita in relazione e riacquisto, in linea con le dinamiche DTC e con l'evidenza settoriale sull'importanza della conversione digitale (Divinea, 2025; Wine Suite & Divinea, 2025; Serio et al., 2024).

Infine, la professionalizzazione dell'ospitalità (accoglienza multilingue, service design, storytelling, gestione prenotazioni) è condizione per intercettare domanda internazionale e segmenti più selettivi; investire in competenze e in figure "ponte" territoriali per ridurre asimmetrie tra imprese e sostenre qualità diffusa (Garibaldi, 2024b).

In questa prospettiva, la coopetition diventa un meccanismo concreto di scalabilità: pacchetti multi-attore e *referral* strutturati permettono di distribuire valore, aumentare la permanenza e mitigare la polarizzazione su pochi *player*, in coerenza con la letteratura sui cluster turistici (Bouncken et al., 2015; Bouncken et al., 2019; Zamarreño Aramendia et al., 2021).

6. Conclusioni, limiti e sviluppi futuri della ricerca

La ricerca ha analizzato lo sviluppo dell'enoturismo in Trentino con l'obiettivo di comprendere come un territorio di montagna possa sviluppare un'offerta enoturistica distintiva e sostenibile a livello di destinazione. In particolare, si è analizzato a) se e come i key player coinvolti nella governance e nel management di destinazione, e le imprese e le organizzazioni che operano nel settore vitivinicolo, condividono visioni, priorità e strategie orientate ad affermarsi come destinazione enoturistica, e b) i possibili fattori abilitanti il posizionamento di un territorio come destinazione enoturistica.

Dai key player intervistati emerge una visione coerente. La ricerca suggerisce che la competitività di una wine destination montana dipende dall'orchestrazione congiunta di governance, value proposition e abilitatori (digitale/CRM, standard e competenze, raggiungibilità). Il caso studio mostra un paradosso tipico delle destinazioni in consolidamento: la presenza di asset e iniziative non produce automaticamente posizionamento e performance; questi emergono quando la pluralità viene organizzata in un modello operativo coerente e prenotabile (Mitchell & Hall, 2006; Pike & Page, 2014). In questo senso, l'ambizione di posizionamento come wine destination (Cimino & Rigger, 2025) richiede un salto implementativo: regia multi-attore, infrastrutture comuni (hub, calendario, standard) e metriche di sistema per trasformare visibilità in conversione, permanenza e valore territoriale (Buhalis, 2000; Garibaldi, 2024b).

Il principale limite della ricerca è riconducibile alla natura esplorativa e alla considerazione di un unico caso studio che ne limita la generalizzazione dei risultati. Tuttavia, le evidenze emerse suggeriscano implicazioni manageriali e di policy di rilievo, che si ritiene possano essere di ispirazione per altre destinazioni montane che presentano potenzialità ancora inespresse con riferimento all'offerta enoturistica territoriale.

Studi multi-caso in altri contesti montani potrebbero testare la robustezza delle dimensioni emerse, integrando misure quantitative su KPI di conversione e impatti (permanenza, spesa, destagionalizzazione, distribuzione dei flussi). Ulteriori ricerche potrebbero valutare l'efficacia comparata di strumenti di sistema (hub, standard a soglie, figure ponte) nell'abilitare la coopetition e la qualità diffusa.

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Long papers

Track:
Transforming Management in the Era of Post-Globalization and Agentic Economy



A “dual-purpose” teammate: working with GenAI

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Abstract

Frame of the research. *Human-AI teams hold substantial promise due to the complementary strengths of human cognition and artificial intelligence. Despite this potential, a growing body of research suggests that AI-augmented teams do not consistently deliver the expected performance and in some cases contribute to undermine core team properties introducing negative aspects that may adversely affect employee well-being, including psychological distress and depression (Kim et al., 2025). A critical but underexplored question concerns whether these outcomes depend not merely on AI access, but on the structural properties of the human team through which AI is used.*

Purpose of the paper. *This study asks: (RQ1) how do team size and seniority composition influence performance outcomes in AI-enabled task execution? And (RQ2) how do team size and seniority composition shape emotional dynamics in the same context? We argue that the introduction of GenAI as a broadly capable collaborator alters the mechanisms through which team diversity traditionally confers its advantage — shifting the primary performance bottleneck from idea generation to coordination and integrative execution.*

Methodology. *To address these questions we conducted an experiment within Accenture, where consultants were randomly assigned to teams consisted of either a single individual or two individuals working with AI, who could hold the same or different roles within the organization. Participants received a use case to be developed throughout the day. Each solution submitted received three independent single-blind evaluations from different experts to reduce evaluation bias and increase reliability. Evaluators rated each solution on five dimensions: quality, impact, novelty feasibility, and technical sophistication.*

Results. *Our findings indicate that homogeneous teams, characterized by the same level of seniority, outperformed both individuals and heterogeneous teams, attaining the highest levels of feasibility. In contrast, heterogeneous teams did not exhibit statistically significant performance advantages relative to individuals. Beyond performance outcomes, teamwork was associated with more favorable emotional experiences. Participants working in teams reported lower increases in frustration and stress compared to individuals, for whom both measures rose substantially. These results suggest that collaborative settings can mitigate negative emotional responses connected with working with Generative AI.*

Managerial implications. *hese findings reframe AI as a dual-purpose organizational tool: one that simultaneously enhances team performance and buffers workers against the negative emotional consequences of AI-enabled work — but whose benefits are strongly contingent on seniority composition. Organizations should treat team structure, not merely AI access, as a strategic lever for realizing AI's competitive value.*

Research limitations. *We also acknowledge two key limitations. First, our experiment relied on one-day virtual collaborations, which do not fully capture the day-to-day complexities of organizational. Second, we examined small, two-person teams specifically constructed for the experiment. These factors may influence both performance and emotional dynamics in ways that our experimental design could not fully replicate.*

Originality of the paper. *This study makes three contributions. First, it qualifies the diversity–performance relationship under AI augmentation, showing that seniority homogeneity outperforms heterogeneity when GenAI externalizes ideational variety. Second, it extends exploration–exploitation theory to hybrid human-AI configurations, arguing that AI decouples the two functions by handling exploration and leaving convergence to the human team. Third, it advances human–AI teaming theory by demonstrating that seniority composition is a first-order boundary condition for AI-enabled team performance, a dimension largely absent from prior experimental designs.*

Keywords: *Artificial intelligence, Teamwork, Human-machine interaction, Feasibility, Impact, Field experiment.*

1. Introduction

Recent scholarship converges in framing artificial intelligence (AI) not merely as a technological innovation, but as a systemic driver of change operating across multiple levels of analysis. At the macro-economic and industry level, AI has been conceptualised as a general-purpose technology with pervasive implications for productivity, value creation, and competitive dynamics, requiring firms to

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[2] Accenture

rethink how economic value is generated and scaled in data-intensive environments (Wagner, 2020). At the organizational level research highlights how AI reshapes strategic architectures, pushing firms toward modular experimentation, human–machine collectives, and new forms of organisational configuration suited to managing learning systems and continuous recombination of capabilities (Wagner, 2020; Secundo et al., 2024).

At the micro level of everyday work, AI-driven transformation requires organizations to reconcile agility with stability, and individual agency with collective coordination.

Prior research demonstrates that team performance is not simply the aggregation of individual abilities, but is fundamentally shaped by complex collective processes and team-level dynamics (DeChurch & Mesmer-Magnus, 2010; Mathieu et al., 2008; Woolley et al., 2010). Effective team functioning relies on collaboration, coordination, the development of shared understanding among team members (Bittner et al., 2019; Seeber et al., 2020) and the ability to cultivate and foster a positive emotional climate. Although generative AI holds considerable promise for enhancing these processes, how to design and manage hybrid human-AI teams to enhance productivity while mitigating AI's potential adverse effects on workers remains an open and critical question (Ju & Aral, 2025). A growing body of empirical evidence underscores the urgency of this question. A large-scale study by Upwork (n = 2,500) shows that while 96% of managers expect productivity gains from GenAI adoption, 47% of workers report difficulty meeting these heightened expectations, and 77% perceive AI tools as decreasing their productivity or increasing their workload (Burlacu & Monahan, 2024). These figures suggest that the value of AI is not automatically realized, and that the organizational conditions under which AI is deployed —including team structure and composition — may be decisive. Crucially, the emerging literature on human–AI teaming has documented performance effects of AI augmentation while largely treating the human side of the team as undifferentiated — comparing individuals to teams, or human-only to human-AI configurations, without examining how variation in human composition moderates AI-augmented outcomes (Seeber et al., 2020; McNeese et al., 2021; Dell'Acqua et al., 2025). At the same time, the team diversity literature, which has long positioned heterogeneity as a driver of performance on complex tasks (Van Knippenberg et al., 2004; Page, 2007), has not been tested in contexts where AI serves as a broadly capable collaborator that may itself supply the ideational variety heterogeneous teams traditionally provided. Our study addresses this intersection directly.

To address this challenge and systematically examine how to manage this new technology to enhance team and individual performance, we conducted a large-scale field experiment at Accenture, a global consulting firm, between October and December 2025. Participants were randomly assigned to teams with different configurations based on their seniority level (Analyst, Consultant, or Manager) and their functional background (i.e., more technical versus more functional).

In contrast to prior research designs, which typically rely on control groups composed of individuals or teams without access to AI, this study grants all participants access to GenAI. This design choice reflects contemporary workplace dynamics, in which rapid technological advancement and the growing diffusion of artificial intelligence increasingly require individuals to collaborate not only with other humans but also with AI technologies to achieve complex goals. From healthcare, where professionals work alongside AI systems for diagnostic and decision support (Kocak et al., 2026), to emergency response teams operating with autonomous agents and intelligent support systems (McNeese et al., 2021), from organizational and decision-making contexts in which managers and knowledge workers rely on AI tools for analysis, forecasting, and coordination, to our daily life, the prevalence of human–AI collaboration continues to expand significantly.

Building on the considerations outlined above and the design of our empirical experiment, this study departs from two assumptions that are largely taken for granted in prior literature. First, that collaboration, whether human–human or human–AI, systematically leads to superior outcomes in both performance and individual well-being. Second, the study of GenAI requires a shift from technology-driven questions toward a human-centred perspective that places individuals and evolving teams at the core of analysis (Berretta, 2023).

On this basis, and grounded in the empirical structure of our experiment, we formulate the following research questions, which jointly address performance outcomes and emotional dynamics across individual and team-based AI-enabled work configurations:

RQ1. How do teamwork and team composition influence performance outcomes in AI-enabled task execution?

RQ2. How do teamwork and team composition influence emotional dynamics in AI-enabled task execution?

These two research questions position the study between two theoretical traditions that have largely developed in isolation. The first is the diversity–performance literature in organizational behavior, which has long held that heterogeneous teams, by virtue of their broader informational resources and cognitive repertoires, outperform homogeneous teams on complex, non-routine tasks (van Knippenberg, De Dreu & Homan, 2004; Page, 2007; Harrison & Klein, 2007). The second is the emerging literature on human–AI teaming, which has documented the performance effects of AI augmentation but has overwhelmingly treated the human side of the team as undifferentiated. This literature so far compared individuals to teams, or human-only teams to human-AI configurations, without examining how variation in human team composition moderates AI-augmented outcomes (Seeber et al., 2020; McNeese et al., 2021; Dell'Acqua et al., 2025).

Our study addresses this intersection directly. By holding AI access constant across all conditions and varying only the human composition of the team, we are able to isolate the role of seniority homogeneity as a moderating factor in AI-enabled performance. This design allows us to test whether the performance advantages traditionally attributed to heterogeneous teams generalize to AI-augmented contexts, or whether the introduction of GenAI as a broadly capable collaborator alters the underlying mechanisms through which diversity confers its advantage.

The paper is structured as follows. Section 2 reviews relevant literature on AI's impact on work, individual-level effects, team dynamics, diversity and performance trade-offs, and emotional well-being in AI-enabled contexts. Section 3 describes the experimental design and context. Section 4 outlines the data collection procedures. Section 5 reports the empirical findings, comparing performance and emotional outcomes across individual, homogeneous team, and heterogeneous team conditions. Section 6 concludes with a discussion of theoretical contributions, managerial implications, study limitations, and promising avenues for future research.

2. Related Literature

As generative AI becomes increasingly embedded in organisational workflows, scholars have begun to reassess foundational assumptions about performance, collaboration, and well-being at work. The emerging literature develops along two complementary streams that examine AI's impact at the individual and team levels. This body of research collectively reframes AI not merely as a technological artefact, but as an actor that reshapes coordination patterns, diversity dynamics, and the psychological experience of work.

A first stream of research has examined the extent to which AI augments individual capabilities (Grønsund & Aanestad, 2020; Jia et al., 2024; Raisch & Krakowski, 2021). Field experiments at the individual level document substantial productivity gains, with evidence that generative AI increases task completion rates by approximately 14% in customer support contexts (Dell'Acqua et al., 2023). Importantly, these effects are highly heterogeneous. Prior studies show that novice and lower-skilled workers benefit disproportionately from AI assistance, whereas more experienced workers exhibit more modest performance improvements. Complementing these findings, recent evidence indicates that lower-skilled workers primarily benefit from AI in terms of output quality, whereas higher-skilled workers tend to gain mainly in efficiency (Marsal et al., 2025). Extending this heterogeneity perspective, Wang et al. (2023) show that while AI generally benefits workers with greater task-based experience, senior workers realise smaller productivity gains than their junior counterparts.

Importantly, this attenuated effect is not attributable to seniority per se, but rather to lower levels of trust in AI, likely stemming from senior workers' broader job responsibilities and heightened accountability.

Alongside these positive effects, emerging research has begun to document potential behavioural downsides of AI use. In particular, heavy reliance on AI systems may induce a form of attentional disengagement, or "falling asleep at the wheel," in which individuals reduce critical evaluation, allocate less cognitive effort to task execution, and develop excessive trust in AI-generated outputs (Dell'Acqua, 2022). Extending this concern, recent evidence suggests that outsourcing tasks to, or co-creating tasks with, GenAI can substantially narrow the scope of human work, thereby reducing the range of tasks associated with certain roles and weakening existing knowledge ties (Glaser et al., 2024; Retkowsky et al., 2024). This contraction of task portfolios appears especially consequential for novice workers, whose roles often centre on low-status, mundane activities —so-called *scut work* — that traditionally serve as important entry points for learning and skill development (Huising, 2015). Consequently, the involvement of GenAI complicates the attribution of individual contributions to work outputs, making performance evaluation more difficult. This reduced transparency may, in turn, hinder the assessment of employees' skill development and obscure emerging career trajectories.

Whereas a first stream of research has robustly documented the impact of generative AI on individual performance (Dell'Acqua et al., 2023; Jia et al., 2024; Noy & Zhang, 2023), an emerging second stream redirects attention toward teams, examining how AI is adopted and embedded within team dynamics and structural characteristics to accomplish collective objectives.

Throughout history, teams have been the cornerstone of human achievement, enabling us to tackle complex tasks that require diverse ideas and collaborative efforts (Woolley, Chabris, Pentland, Hashmi, & Malone, 2010; Wu, Wang, & Evans, 2019; Wuchty, Jones, & Uzzi, 2007, T. Malone, 2018). Yet, teams are not always effective. Some of the major challenges to successful collaboration include poorly designed tasks, ineffective collaborative work practices, and inadequate technological systems that fail to facilitate teamwork (Hackman, 2009).

Prior to the emergence of generative AI, research on team dynamics largely adopted a human-centric perspective, in which technology was conceptualized as an incremental enabler of human work rather than a core component of team functioning (Grønsund & Aanestad, 2020; Puranam, 2021). Technologies were typically treated as supplementary artefacts that supported or optimised existing human capabilities, with AI systems primarily deployed as specialized tools for automating discrete tasks (Dell'Acqua, Kogut, & Perkowski, 2025; Jia et al., 2024). As a result, AI was rarely theorized as an active team participant with the capacity to generate novel ideas, engage in open-ended communication, and contribute across multiple domains. However, when AI is treated as a broadly capable partner rather than a narrow tool (Dell'Acqua et al., 2023; Noy & Zhang, 2023; Hagemann et al., 2023; McNeese et al., 2021; Seeber et al., 2020), and potentially as an equal team member (Haase & Hanel, 2023), established assumptions in the team and management literature warrant systematic re-examination.

Building on insights related to team performance and distinctive characteristics, such as collaboration (Puranam, 2021; Seeber et al., 2020) and the capacity to integrate and leverage diverse perspectives (Kozlowski & Ilgen, 2006; Mathieu et al., 2008; Woolley et al., 2010), this stream of literature raises a fundamental question: can human teams, with their rich social and cognitive dynamics, be meaningfully compared to "cyborg" configurations consisting of an individual working with AI, or do teams that collectively collaborate with AI ultimately outperform both individual-AI pairings and traditional human teams? Dell'Acqua et al.'s recent evidence from Procter & Gamble workers (2025) reveals that AI enhances the performance of both individuals and teams, suggesting that AI may replicate certain functional benefits typically associated with human collaboration (Dell'Acqua et al., 2025).

In a similar vein, Ning Li et al. (2024) compared the general performance of individual-AI dyads with that of human-only teams and AI-assisted teams to assess whether generative AI can scale

individual productivity to levels comparable to or exceeding those achieved through team collaboration. Consistent with prior research, their findings confirm that generative AI enhances productivity (Noy & Zhang, 2023; Dell'Acqua et al., 2025). However, the incremental contribution of AI at the team level accounted for only an additional 2–4% of the variance in performance outcomes, a substantially smaller effect size than those reported in studies focusing on individual-level augmentation.These findings underscore the persistent benefits of collaboration that cannot be fully reproduced by individuals, even when working intensively with generative AI (Woolley et al., 2010; Lebovitz et al., 2022). Moreover, the experiment suggests that while individual-AI dyads can eventually achieve performance levels comparable to those of traditional teams when given sufficient time, AI-assisted teams continue to exhibit a performance advantage.

McNeese et al. (2021) found that mixed human-AI teams outperformed human-only teams in a simulated emergency response scenario, with AI-only teams achieving the highest performance. In a comparison of human-only, human-human-AI, human-AI-AI, and AI-only teams, their findings revealed that perceived team cognition was highest in human-only teams and significantly lower (58% below) in mixed teams. This dichotomy between objective performance and subjective experience represents a critical challenge for human-AI team design.

Carter et al. (2024) synthesise research from the literature on team effectiveness, decision making, and human-technology interaction to develop a comprehensive theory of AI–human team effectiveness. The authors argue that introducing AI as a member of decision-making teams can generate confusion, uncertainty, and fragmented cognitive processes, as well as erode trust among team members-ultimately undermining team effectiveness.

Importantly, this work highlights the central role of leadership in mitigating these challenges, especially when managers promote transparency, clarify the role of AI within the team, set explicit performance expectations, and foster open and participative leadership. Together, these factors shape whether AI functions as a disruptive presence or as a productive contributor to team decision-making.

A substantial body of organizational research positions team diversity as a driver of innovation and complex problem-solving because heterogeneous teams access broader informational resources and cognitive repertoires (Page, 2007). The dominant theoretical framework in this tradition — the Categorization-Elaboration Model (CEM) — holds that information elaboration, defined as the exchange, discussion, and integration of task-relevant knowledge, is the primary mechanism through which diversity translates into performance gains (van Knippenberg, De Dreu & Homan, 2004). However, meta-analytic evidence consistently shows that the diversity–performance relationship is contingent rather than universally positive, depending on the type of diversity and the nature of task demands (Horwitz & Horwitz, 2007). Conceptually, diversity may reflect variety (knowledge differences), separation (value or opinion divergence), or disparity (status inequalities), each carrying distinct process implications (Harrison & Klein, 2007). Seniority diversity, in particular, maps primarily onto the disparity dimension, which is associated with status-based tensions, evaluation apprehension, and coordination costs, effects that may attenuate or reverse the performance benefits associated with informational variety.

From an exploration–exploitation perspective, diversity has traditionally been valued for its contribution to exploration, the generation of novel ideas, broad search, and recombination of distant knowledge, whereas homogeneity has been associated with exploitation: convergence, efficiency, and disciplined execution (March, 1991; Gupta, Smith & Shalley, 2006). Crucially, however, this theoretical logic presupposes that ideational variety is primarily a function of the human team's composition. The emergence of generative AI as a broadly capable collaborator challenges this assumption at its root.

Recent empirical evidence demonstrates that while GenAI can substantially enhance individual creativity and output quality, it simultaneously reduces the collective diversity of ideas due to shared model priors and anchoring effects (Doshi & Hauser, 2024; Meincke, Nave & Terwiesch, 2025). This suggests that GenAI functions as an external generator of synthetic variety (Lee & Chung, 2024) partially substituting for the exploratory function historically attributed to heterogeneous human

teams. In this context, GenAI may partially substitute for the exploratory function historically attributed to team heterogeneity.

If the ideational variety that diverse teams traditionally provided is increasingly externalized through AI, then the marginal benefit of within-team heterogeneity for exploration may decline, while the demands for coordination, convergence, and disciplined integration of AI-generated alternatives remain, or intensify. Under these conditions, the primary performance bottleneck may shift from idea generation to idea selection and execution, favoring teams whose shared cognitive frames and aligned seniority expectations reduce integration frictions. Homogeneity in seniority can facilitate faster alignment around planning horizons, role expectations, and feasibility thresholds: what team cognition research describes as shared mental models and transactive memory systems, both of which are central predictors of performance in interdependent tasks (Mathieu et al., 2000; DeChurch & Mesmer-Magnus, 2010). This theoretical reframing generates a non-obvious prediction: in AI-enabled contexts, seniority-homogeneous teams may outperform heterogeneous teams not despite their relative uniformity, but because of it and specifically on dimensions such as feasibility and quality that require integrative alignment rather than exploratory breadth.

Indeed, as with other workplace technologies, GenAI influences multiple aspects of work life, affecting not only performance outcomes but also employees' psychological and emotional well-being (Parteka et al., 2024). The adoption of new technologies is often accompanied by anxiety, arising either from difficulties in mastering new systems or from concerns about inadequate performance when using them in professional settings (Havrda & Klocek, 2023). At the same time, the study by Shahzad et al. (2025) showed that the use of GenAI can have positive effects on psychological well-being, but these vary depending on the social context and the mode of use. Favourable employee attitudes toward generative AI are typically associated with the belief that these technologies can enhance work effectiveness, streamline routine activities, and enable faster, more precise outcomes (Sallam et al., 2024). Employees tend to be more receptive to AI when they perceive it as instrumental in supporting goal attainment and easing task execution. Individuals who experience a strong sense of personal agency, or who interpret AI as a developmental challenge rather than a barrier, are more inclined to adapt, reskill, and embed AI into their everyday work practices, thereby fostering higher levels of engagement and performance (Innocenti & Golin, 2022).

In contrast, workers who experience limited autonomy within their organizations, as well as those at earlier stages of their careers, tend to approach AI with greater scepticism and apprehension, which can undermine their confidence in their own capabilities and hinder adaptive responses (Leonard & Tyers, 2021). In these cases, unfavourable attitudes toward GenAI are frequently rooted in concerns that these technologies may displace jobs, constrain career advancement, or render existing competencies obsolete (Innocenti & Golin, 2022). Accordingly, employees who construe AI as a threat are more likely to report heightened job insecurity, increased anxiety, lower work engagement, and diminished organisational commitment (Arias-Pérez & Vélez-Jaramillo, 2022).

Although group-level evidence is comparatively limited, Vats & Sharma (2025) conducted a systematic review process to understand the impact of AI on teams, revealing that shared perceptions of AI within teams influence collective well-being and coping responses. Teams that engage in collective sensemaking around AI-discussing its purpose, limitations, and implications-are better able to normalise AI use and reduce uncertainty among members (Murphy, 2025). Such shared understanding contributes to lower stress and greater psychological safety in AI-enabled work environments.

Supportive team climates, characterized by open communication and collaborative problem-solving, help buffer negative emotional responses to AI-related change (Alkhayyal et al., 2024; Aubouin-Bonnaventure et al., 2023). In contrast, fragmented teams and weak leadership exacerbate negative perceptions, intensifying anxiety and resistance to AI adoption.

As evidenced by the existing literature, scholarly attention has increasingly shifted toward understanding how AI shapes both individual and team performance in organizational contexts. While early studies concentrated on the human-AI relationship or on comparisons between human-only and

hybrid teams, more recent research broadens the perspective to examine variations in team composition, including homogeneous and heterogeneous configurations. Furthermore, the focus is progressively extending beyond performance metrics to encompass well-being, investigating how AI influences team processes, collective affect, and individual psychological experiences.

3. Experimental Design

From October 2025 to December 2025, we conducted an experiment within Accenture with the primary objective of investigating how artificial intelligence can enhance teamwork and how such changes the company's organisational structure in the context of its "Reinvention" initiative. Accenture operates in more than 120 countries and employs nearly 800,000 people worldwide, with a strong focus on continuous reinvention to deliver tangible value.

Over several months, we worked closely with Accenture Italia to tailor the experimental design, ensuring alignment with the company's organisational structure, operational practices, and strategic priorities. The decision to investigate the effects of AI on project quality, innovation outcomes, and interfunctional relationships within teams, as well as its potential implications for organisational structure and well-being, emerged from a series of discussions with the organisation's leadership team, and it is part of the overall global reorganisation program.

As is common in organisations of this size and complexity, work at Accenture is predominantly team-based and follows well-defined routines, often requiring close cross-functional collaboration. Teams are generally structured according to a classical pyramidal model, with analysts, consultants, and managers at progressively higher levels of seniority, responsibility and autonomy. Analysts are typically responsible for executing more elementary tasks under the guidance and supervision of consultants, who operate autonomously and can independently deliver specific project workstreams. Managers ensure the overall quality of deliverables, cultivate professional relationships with clients, and oversee team management and project economics across multiple engagements. Within individual projects, teams are composed of both functional profiles, characterised by deep knowledge of and expertise in the relevant business context, and technical profiles capable of efficiently and effectively integrating the technologies required to address project-specific challenges. This structure represents a standard configuration for generating, refining, and ultimately translating innovative ideas into practical, client-ready projects. Enhancing innovativeness at this stage, together with improving the ability to define appropriate project steps from the outset, is critical for maximising client value and retention, project effectiveness, creative performance, and overall impact at speed and at scale. This motivation is further reinforced by the need to understand how to design the most effective teams in the AI era, for project execution and how such design choices may influence organisational structure. Consistent with existing research and leading organisations (Challapally et al., 2025), Accenture aims not only to enhance individual performance and efficiency through AI, but also to realise its full potential at the organisational level. These considerations are particularly salient in light of Accenture's new strategy announced in June 2025, which reorganised all services, bringing them together into a single integrated business unit, *Reinvention Services,* grounded in the assumption that AI, data, and cloud are foundational capabilities rather than add-ons, and that value is created faster when capabilities are integrated rather than deployed sequentially. In practice, this model reveals a profound organisational reconfiguration in which the boundaries between consulting, technology, and operations become increasingly blurred, supporting a more holistic approach to value creation. Collaboration across roles and seniority levels is enabled through an organizational structure that becomes less constrained and hierarchical, forming the foundation for a new way of addressing client challenges and sustaining long-term growth.

3.1 Accenture Italia

With a workforce exceeding 22,000 professionals - an increase of 70% over the past five years - Accenture Italia represents a cornerstone of the Industry, Consumer good-Goods & Services, Energy and

Goverment (ICEG) market unit and a strategic hub within the company's global network. Its national footprint is articulated through a system of 11 Innovation Centers, including the Industry X hubs in Modena and Turin and the Digital Platform, Cloud, and Government Innovation Center in Rome, complemented by four Advanced Technology Centers in Southern Italy (Naples, Bari, Cagliari, and Cosenza) that integrate design, prototyping, and end-to-end delivery capabilities. This infrastructure enables Accenture to support nearly all major industrial and banking groups across 13 industries and four divisions (Strategy & Consulting, Song, Technology, and Operations), powered by a broad ecosystem of partners. Italy remains the fourth-largest country within Accenture in terms of workforce and revenue, sustained by a hiring rate of approximately 3,500 new professionals per year.

This scientific study has been facilitated by the Strategy & Consulting division that supports public and private organizations in defining and implementing high-impact business, technology, and operating strategies.

3.2 Experimental Approach

A total of 330 consultants were initially recruited for the study. Of these, 291 (88.2%) completed the experimental protocol and were included in the final analysis. The experiment was designed to reflect the organisation's existing structures and working practices. A total of 291 consultants participated in the study; 56% were female, and 44% were male. The sample is predominantly young (majority under 34); participants are highly educated, with a large majority holding a master's degree. The dataset includes comprehensive information on participants' professional context, including their business unit, team, job level, years of experience at Accenture, and whether their role is primarily technological or functional. Skills and competencies were treated as distinct from formal roles and functions.

Participants were randomly assigned to teams with different configurations based on their seniority level (Analyst, Consultant, or Manager) and the functional unit they belonged to (technical or functional). Team composition also reflected varying levels of organisational experience, with Managers typically exhibiting higher tenure and experience than Analysts, who generally had lower tenure and experience within the organisation. Teams consisted of either a single individual or two individuals, who could hold the same or different roles within the organisation. In total, nine team types were defined (see Table 1), ensuring a combination of functional and cross-functional collaboration aligned with Accenture's actual organisational arrangements.

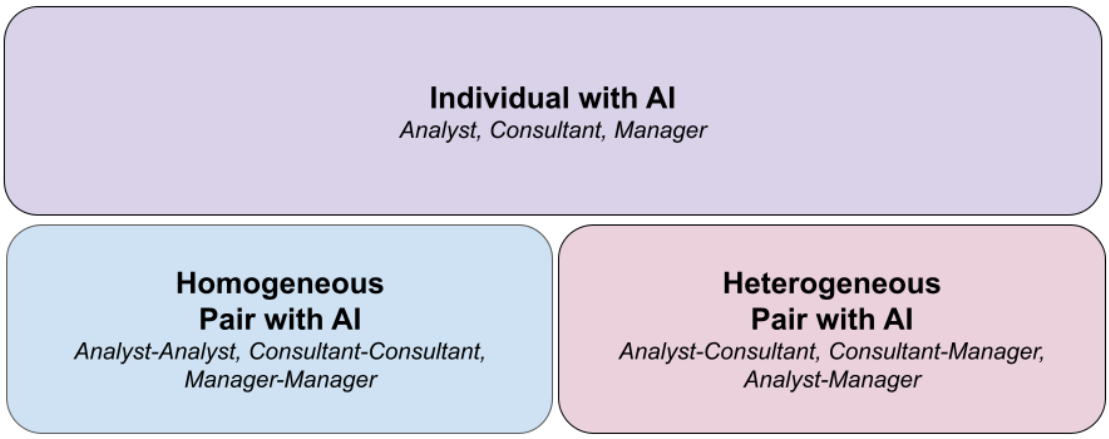
Tab. 1: Sample Distribution by Team Composition

Team composition	**n**
Individual - Analyst	41
Individual - Consultant	40
Individual - Manager	20
Team - Analyst & Analyst	36
Team - Consultant & Consultant	46
Team - Manager & Manager	16
Team - Analyst & Consultant	56
Team - Analyst & Manager	20
Team - Consultant & Manager	16
TOTAL	**291**

Source: our elaboration

Participants were assigned to one of three work conditions (see Figure1): (1) working individually, (2) working in a homogeneous team, or (3) working in a heterogeneous team.

Fig. 1: Treatment Matrix



Source: our elaboration. Note: This figure illustrates the experimental design, which includes a between-condition comparison (individual vs. team) and a within-team comparison (homogeneous vs. heterogeneous teams), all working with AI assistance.

All teams could use generative AI tools, including ChatGPT, Microsoft Copilot, and Amethyst Studio, an agent-based AI platform developed by Accenture. Amethyst leverages advanced large language models (LLMs) from OpenAI's GPT (Generative Pre-trained Transformer) family. The internal platform is designed to support a broad spectrum of activities. This approach mirrored both the typical working practices of consultants, who autonomously select the AI tools they consider most effective, and Accenture's broader bottom-up organisational approach, which allows employees the freedom to choose the tools best suited to their tasks.

Tab. 2: AI tools used during the experiment.

GenAI tool used	n	Proportion
Accenture Copilot 365	226	51.36%
Amethyst Studio	59	13.41%
Accenture ChatGPT Enterprise	56	12.73%
ChatGPT	39	8.86%
Reinvention Console	37	8.41%
Other tools	23	5.22%

Source: our elaboration

The experiment was conducted over a single day, starting at 8:30 a.m. and concluding at 5:00 p.m. Throughout the day, research staff from both Accenture and the University of Turin were present to assist participants with practical and technical issues. The day began with a one-hour training session on prompting techniques led by the University of Turin Research team. This session focused not only on effective interaction with generative AI tools but also on formulating questions that support idea generation and project structuring, including evaluating multiple perspectives and identifying potential practical pitfalls. This standardised training ensured that all participants had comparable familiarity with

GenAI tools. Following this session, the use case was presented, and the teams were given time to ask questions and clarify any remaining doubts.

The experiment was conducted remotely via Microsoft Teams. Within each team, one member was designated to share the screen, interact directly with the GenAI tools, and submit the final solution. This configuration was designed to allow both team members to contribute in real time while maintaining a consistent and controlled workflow.

Following the training session, participants received a use case to be developed throughout the day. The use case was aligned with the types of projects consultants typically encounter in their professional activities, and the organisation provided all relevant background information and materials necessary for its development.

4. Collected data and outcome

The data collection occurred in multiple stages. All data were collected in compliance with privacy and confidentiality requirements, ensuring the protection of participants' personal information. Prior to the training session, participants completed a baseline survey designed to collect individual-level information. Following the experiment, participants completed a post-experiment survey assessing their interactions with AI and its perceived impact on task execution, skill development, emotional responses, solution quality, and team dynamics.

During the experimental period, all prompts submitted to GenAI tools, the corresponding AI-generated responses, and team member interactions were transcribed. This data collection enabled an in-depth analysis of the relationships among AI usage, team interactions, and the resulting solutions, as well as the dynamics among team members. Following the submission of the deliverables, a post-activity questionnaire was administered to collect feedback and examine participants' interactions with AI, as well as its perceived impact on task execution, skill development, emotional responses, delivery outcomes, and team management. The study thus draws on three primary data sources: (1) a pre-experiment survey, (2) a post-experiment survey, and (3) transcripts of AI interactions and team communications.

The pre-experiment survey (1) consists of 330 unique participants (after removing four duplicates identified by email address). The dataset comprises 37 variables capturing demographic characteristics (gender, age, education, and job level), professional background (years of experience, skills, and role), and baseline perceptions of AI technology. In addition, the pre-survey includes measures of participants' emotional states prior to the experiment (e.g., enthusiasm, anxiety, and stress), which serve as control variables to assess the emotional changes induced by the experimental task.

The post-experiment survey (2) collected 291 responses, corresponding to a retention rate of 88.2%. Thirty-nine participants completed only the pre-survey, resulting in an attrition rate of 11.8%. The post-survey contains 39 variables, including experimental group assignment, deliverable identifiers, patterns of GenAI tool usage, perceived solution quality, measures of team coordination, and post-experiment emotional states.

4.1 Experts and Evaluation

Each solution received three independent single-blind evaluations to reduce bias and enhance reliability. The evaluation dataset consists of 586 expert assessments. Evaluators—senior Accenture Italia executives with business and technical expertise—rated each deliverable on five dimensions using 10-point scales: quality (clarity, structure, and coherence), impact (potential to generate value), novelty (originality and innovation), feasibility (realistic implementability), and technical sophistication (technical vs. business orientation).

5. Results

Participants were assigned to one of three work conditions: (1) working individually, (2) working in a homogeneous team, or (3) working in a heterogeneous team.
To estimate the causal effect of working in a team – relative to working individually – we estimate a series of linear regression models, one for each outcome variable. There are five basic outcome variables – quality, feasibility, novelty, impact, and technicality – which the evaluators use to measure the participants' deliverables. In addition, we construct three summary performance scores designed to capture overall task performance using different aggregation approaches.

Score 1, a composite performance index, is constructed using principal component analysis (PCA). Due to the fact that the five performance measures are positively correlated (e.g., higher quality may co-occur with higher feasibility), PCA offers a data-driven method for summarising the shared variance across these dimensions. This score is a linear combination of the five measures that captures the largest share of the total variance and can be interpreted as an overall performance index. Score 2 is simply the average of the five performance measures for each observation. Some analysts might prefer this to the PCA-based score, since it is easy to understand and interpret. Finally, score 3 is an average performance score based on three core dimensions - quality, impact, and feasibility - excluding technical sophistication and novelty. By excluding dimensions that may be more peripheral to the core task or potentially more subjective, this measure checks whether the main findings hold under a more conservative definition of performance.

Consistent patterns across these alternative indices increase confidence that our findings are not driven by a specific measurement choice.

5.1 First Analysis | Performance: Team with AI vs Individual with AI

Given the relatively small sample sizes in the two team conditions, we collapse homogeneous and heterogeneous teams into a single "team" category in the first analysis. This approach allows us to compare outcomes between two conditions: (i) working individually and (ii) working in a team. Dummy variables are constructed to represent these experimental conditions in the empirical analyses.
Each regression takes the following form:

$$Y_i = \beta_0 + \beta_1 \text{Team}_i + \varepsilon_i$$

where Y_i is the outcome of interest for observations i, Team_i is a binary indicator equal to 1 if the observation is for a pair of participants assigned to work as a team, and 0 if the observation is for a participant assigned to work individually. In this specification, the intercept β_0 represents the average outcome for individuals, while the coefficient β_1 captures the causal effect of team assignment. The error term ε_i reflects unobserved idiosyncratic variation. We used robust standard errors, which help deal with potential heteroskedasticity in the error term across observations.

Tab. 3: Evaluations of Teams vs. Individuals

	(1) Score 1	(2) Score 2	(3) Score 3	(4) Quality	(5) Technicality	(6) Impact	(7) Novelty	(8) Feasibility
Team	0.375	0.185	0.241*	0.205	0.177	0.149	0.0263	0.370**
	(0.260)	(0.127)	(0.129)	(0.151)	(0.197)	(0.143)	(0.150)	(0.147)
Const.	-0.182	6.201**	6.403**	6.391**	5.715**	6.465**	6.083**	6.353**
	(0.191)	(0.0932)	(0.0981)	(0.115)	(0.141)	(0.104)	(0.107)	(0.109)
N	196	196	196	196	196	196	196	196

Source: our elaboration
Note: Standard errors in parentheses * p < 0.10, ** p < 0.05

Table 3 summarises the results of eight separate regression analyses estimating the causal effect of being assigned to work in a team, relative to working individually, on performance and efficiency outcomes. The results show that team assignment is positively associated with performance across all outcome measures; however, statistical significance varies by dimension. The strongest and most robust effect emerges for feasibility, where teams significantly outperform individuals ($\beta = 0.370$, $p < 0.05$). Team effects on the composite performance indices are positive and marginally significant for Score 1 (PCA-based index) and Score 3 (core-dimension average), suggesting that teams tend to achieve higher overall performance when performance is measured holistically and in ways that might reduce measurement errors. In contrast, team assignment does not yield statistically significant improvements in individual performance dimensions such as quality, impact, novelty, or technical sophistication.

5.2 Second analysis | Performance: Individual versus Homogeneous and Heterogeneous team

In the second analysis, we compare all three conditions – homogeneous teams, heterogeneous teams, and individuals. Again, we run 8 regressions, one for each of the performance variables or indices.

$$\text{Outcome} = \beta_0 + \beta_1(\text{homogeneous team}) + \beta_2(\text{heterogeneous team}) + \varepsilon_i$$

Tab. 4: Evaluations of Homogeneous and Heterogeneous Teams vs. Individuals

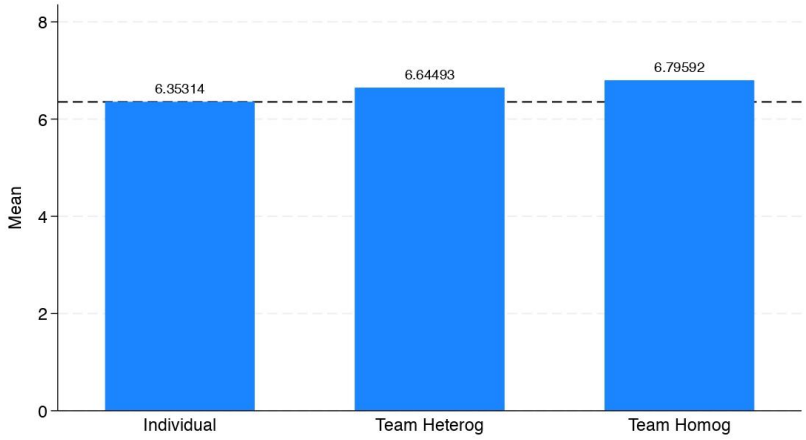
	(1) Score 1	(2) Score 2	(3) Score 3	(4) Quality	(5) Technicality	(6) Impact	(7) Novelty	(8) Feasibility
Team	0.603*	0.293*	0.377**	0.384**	0.258	0.303*	0.0740	0.443**
Homog	(0.329)	(0.161)	(0.163)	(0.185)	(0.234)	(0.180)	(0.186)	(0.186)
Team	0.131	0.0711	0.0968	0.0147	0.0898	-0.0161	-0.0245	0.292*
Heterog	(0.292)	(0.144)	(0.142)	(0.170)	(0.248)	(0.162)	(0.181)	(0.164)
Const.	-0.182	6.201**	6.403**	6.391**	5.715**	6.465**	6.083**	6.353**
	(0.192)	(0.0934)	(0.0983)	(0.115)	(0.141)	(0.105)	(0.108)	(0.109)
N	196	196	196	196	196	196	196	196

Source: our elaboration
Note: Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$

The results reveal a clear asymmetry between homogeneous and heterogeneous teams. Homogeneous teams consistently outperform individuals across several performance dimensions. In particular, homogeneous team assignment is associated with significantly higher performance on the core composite index (Score 3), quality, and feasibility, with additional marginally significant improvements observed for impact and the broader performance index (Score 2). These findings indicate that performance gains from teamwork are concentrated in teams composed of members with similar seniority levels.

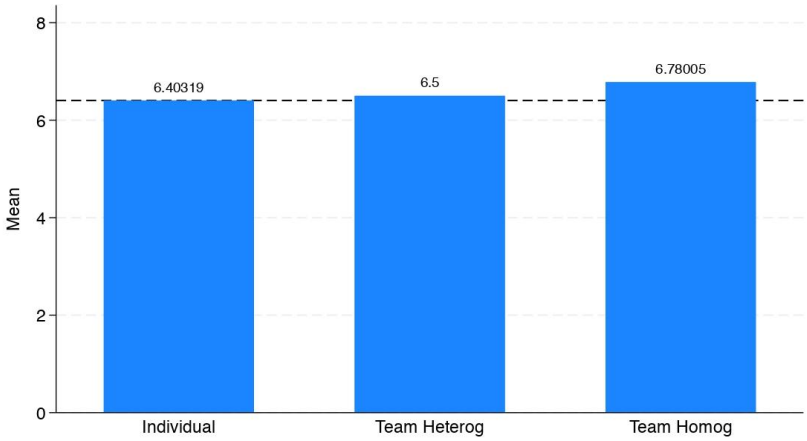
In contrast, heterogeneous teams show little evidence of performance advantages relative to individuals. Across most outcome measures—including quality, impact, novelty, and technical sophistication—the coefficients for heterogeneous teams are small and statistically insignificant. An exception is feasibility, where heterogeneous teams exhibit a positive but weaker effect relative to homogeneous teams. Taken together, this three-way comparison demonstrates that team composition is a critical boundary condition for AI-assisted teamwork. While homogeneous teams yield robust improvements over individual work, heterogeneous teams fail to deliver comparable performance gains. These results help reconcile mixed findings in the literature by showing that the team-based advantages of AI are not universal but depend strongly on team structure.

Fig. 2: Feasibility performance comparison between individuals and teams (homogeneous vs. heterogeneous) working with AI.



Source: our elaboration

Fig. 3: Average score 3 comparison between individuals and teams (homogeneous vs. heterogeneous) working with AI.



Source: our elaboration

5.3 Third analysis | Emotions: Individual versus Team

Concerning emotional outcomes for individuals and teams, we examined three positive emotions – enthusiasm, energy and excitement – and a composite measure of overall positive emotions (Table 5), as well as three negative emotions – anxiety, frustration and stress – and a composite measure of overall negative emotions (Table 6) using regression analysis.

Although the coefficients for enthusiasm ($\beta = 0.126$, SE = 0.170) and energy ($\beta = 0.179$, SE = 0.181) are positive (Table 5), they are small in magnitude and statistically insignificant. Excitement is similarly unaffected ($\beta = -0.050$, SE = 0.190). These findings suggest that working in teams does not systematically enhance positive affect relative to working alone.

In contrast, Table 6 reveals a markedly different pattern for negative emotions. For those working alone, frustration and stress increased significantly during the course of the experiment. Those working in teams, however, reported significantly lower increases in frustration ($\beta = -0.591$, SE = 0.225, $p < 0.05$) and stress ($\beta = -0.463$, SE = 0.198, $p < 0.05$). The composite measure of negative emotions is also significantly negative in the team condition ($\beta = -0.458$, SE = 0.174, $p < 0.05$). In sum, the results suggest an asymmetric emotional effect of teamwork. Team participation does not increase positive emotional activation but significantly reduces negative affective states. These

patterns suggest that teams may primarily serve as emotional buffers, mitigating stress and frustration, rather than as mechanisms that amplify enthusiasm or excitement.

Tab. 5. Positive Emotions evaluations of Teams vs. Individuals

	(1) Enthusiasm	(2) Energy	(3) Excitement	(4) Positive Emotions
Team	0.126	0.179	-0.0501	0.0792
	(0.170)	(0.181)	(0.190)	(0.162)
Const.	-0.210	-0.100	0.0606	-0.0774
	(0.140)	(0.152)	(0.165)	(0.139)
N	290	290	289	289

Source: our elaboration
Note: Standard errors in parentheses * p < 0.10, ** p < 0.05

Tab. 6. Negative Emotion Evaluations of Teams vs. Individuals

	(1) Anxiety	(2) Frustration	(3) Stress	(4) Negative Emotions
Team	-0.303	-0.591**	-0.463**	-0.458**
	(0.191)	(0.225)	(0.198)	(0.174)
Const.	0.250	1.080**	0.700**	0.677**
	(0.160)	(0.190)	(0.166)	(0.146)
N	289	290	290	289

Source: our elaboration
Note: Standard errors in parentheses * p < 0.10, ** p < 0.05

5.4 Fourth analysis | Emotions: Individual versus Homogeneous and Heterogeneous teams

Finally, we evaluate the effects of homogeneous and heterogeneous team structures on both positive (Table 7) and negative (Table 8) emotional states.

Tab. 7. Positive Emotions evaluations of Homogeneous and Heterogeneous Teams vs. Individuals

	(1) Enthusiasm	(2) Energy	(3) Excitement	(4) Positive Emotions
Homog	0.169	0.182	-0.0402	0.0978
Team	(0.203)	(0.205)	(0.213)	(0.184)
Heterog	0.0796	0.176	-0.0606	0.0593
Team	(0.188)	(0.206)	(0.213)	(0.180)
Const.	-0.210	-0.100	0.0606	-0.0774
	(0.140)	(0.152)	(0.165)	(0.140)
N	290	290	289	289

Source: our elaboration
Note: Standard errors in parentheses * p < 0.10, ** p < 0.05

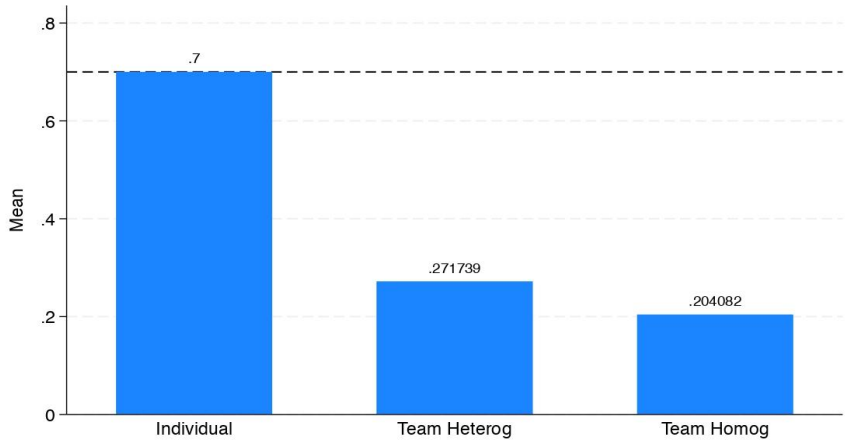
Tab. 8. Negative Emotions evaluations of Homogeneous and Heterogeneous Teams vs. Individuals

	(1) Anxiety	(2) Frustration	(3) Stress	(4) Negative Emotions
Team Homog	-0.436**	-0.580**	-0.496**	-0.515**
	(0.215)	(0.252)	(0.224)	(0.194)
Team Heterog	-0.163	-0.602**	-0.428*	-0.398**
	(0.222)	(0.262)	(0.227)	(0.202)
Const.	0.250	1.080**	0.700**	0.677**
	(0.160)	(0.190)	(0.166)	(0.147)
N	289	290	290	289

Source: our elaboration
Standard errors in parentheses* $p < 0.10$, ** $p < 0.05$

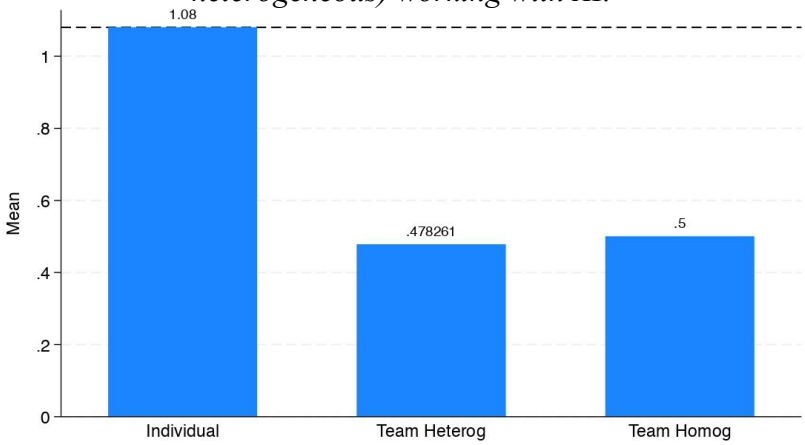
Collectively, the results reveal a clear asymmetry in the emotional impact of teamwork. Neither homogeneous nor heterogeneous teams significantly increase positive affect. However, both team structures significantly reduce negative emotional experiences relative to individual work. Importantly, homogeneous teams exhibit statistically significant reductions across all negative emotion measures, whereas heterogeneous teams show weaker and partially significant effects, especially for anxiety. This suggests that while collaboration in general mitigates stress-related emotions, emotional stabilization may be more pronounced in homogeneous teams. These findings indicate that the primary emotional benefit of teamwork lies not in amplifying positive affect, but in buffering against adverse emotional states.Team composition appears to matter primarily for the magnitude and consistency of reductions in negative emotions rather than for the enhancement of positive ones.

Fig. 4: Average change in Stress levels between individuals and teams (homogeneous vs. heterogeneous) working with AI.



Source: our elaboration

Fig. 5: Average change in Frustration levels between individuals and teams (homogeneous vs. heterogeneous) working with AI.



Source: our elaboration

6. Discussion, conclusion and future research questions

Through our analysis, we address two central questions concerning how team composition influences performance outcomes and emotional dynamics in AI-enabled task execution. With regard to performance, our findings allow us to articulate three theoretical contributions to the literatures on exploration–exploitation, team diversity, and human–AI collaboration.

First, team-based advantages cannot be assumed to generalize across all forms of team composition relative to individual work. Our results suggest that GenAI reweights the trade-off between teams and individuals by reducing the exploratory premium traditionally associated with heterogeneous teams and narrowing the performance gap between heterogeneous teams and individuals (see Fig. 3). Prior theory positions heterogeneous teams as better suited to exploration and homogeneous teams to exploitation. Our findings suggest that GenAI effectively decouples these two functions: by handling the exploratory dimension of the task — generating diverse alternatives, broadening the solution space, and providing rapid synthetic variety — AI shifts the team's core challenge entirely toward exploitation, convergence, and execution. In this reconfigured division of cognitive labor, homogeneous seniority becomes an amplifying factor rather than a constraint, because it reduces the status-based frictions and divergent planning horizons that would otherwise impede integrative alignment. This represents a meaningful extension of March's framework: the exploration–exploitation trade-off, when mediated by GenAI, is no longer symmetrically distributed between team diversity types, but is instead functionally reallocated between the human team and the AI system.

Second, the Categorization-Elaboration Model (van Knippenberg et al., 2004) predicts that heterogeneous teams should outperform homogeneous ones on complex tasks by virtue of broader information elaboration. Our findings do not confirm this prediction in AI-enabled contexts: homogeneous teams significantly outperform both individuals and heterogeneous teams on feasibility, quality, and impact, while heterogeneous teams fail to demonstrate statistically significant performance advantages relative to individuals working alone with AI. This result is not simply an anomaly — it can be theoretically accounted for by the displacement of the mechanism through which diversity traditionally operates. When GenAI externalizes ideational variety, the informational breadth argument for heterogeneity loses traction, while the coordination costs associated with seniority disparity (Harrison & Klein, 2007) remain. Diversity's traditional advantage is thus conditional on a scarcity of ideas that AI removes.

Third, our study advances the human–AI teaming literature by opening the black box of human team composition in AI-augmented settings. Prior work in this stream has largely compared human-

only teams to human-AI configurations (McNeese et al., 2021; Li et al., 2024; Dell'Acqua et al., 2025), treating the human component of the team as homogeneous or unexamined. By holding AI access constant and varying human composition, we demonstrate that seniority homogeneity functions as a boundary condition for the performance benefits of AI-enabled teamwork: team-based advantages over individuals are robust and significant for homogeneous teams, but absent for heterogeneous ones. This finding underscores that the value of human–AI collaboration is not determined solely by access to AI, but is moderated by the structural properties of the human team through which AI outputs are processed, evaluated, and integrated. Future theoretical development of human–AI teaming models should therefore incorporate team composition — and particularly seniority alignment — as a first-order variable, rather than treating it as a contextual nuance.

These findings also carry significant organizational implications. First, organizations may need to fundamentally rethink optimal team size and composition to achieve specific performance objectives. The fact that AI-enabled individuals can perform at levels comparable to heterogeneous teams suggests opportunities for more flexible, smaller, and potentially more efficient organizational structures.

Importantly, our results also reveal a significant emotional dimension. Seniority-homogeneous teams exhibit statistically significant reductions across all negative emotion measures, whereas heterogeneous teams display weaker and only partially significant effects, particularly with respect to anxiety. These findings suggest that while collaboration generally mitigates stress-related emotions, emotional stabilization is more pronounced in homogeneous teams. This suggests that seniority alignment operates not only as a coordination mechanism but also as a source of psychological safety in AI-enabled work — a finding that connects to broader arguments about the role of team climate in buffering technostress (Alkhayyal & Bajaba, 2024; Murphy, 2025) and points toward emotional stabilization as a potential mediating mechanism linking team composition to performance outcomes.

Taken together, the results indicate that AI should no longer be conceptualized as a passive tool, but rather as a dual-purpose teammate that functions as an active collaborator—supporting not only performance outcomes but also the stabilization of anxiety and other negative emotional states.
Several important caveats shape the interpretation of these findings. First, although our participants were relatively experienced in AI prompting techniques and received dedicated prompt training at the beginning of the experiment, we are observing a technology that is still in the early stages of organizational adoption. As users develop more sophisticated AI interaction strategies and as AI systems continue to evolve, the advantages of AI-enabled work may increase substantially over time.

We also acknowledge two key limitations. First, our experiment relied on one-day virtual collaborations, which do not fully capture the day-to-day complexities of organizational teamwork, such as prolonged coordination challenges, iterative feedback cycles, and cumulative relational dynamics. Second, we examined small, two-person teams specifically constructed for the experiment. In real organizational contexts, collaboration often involves larger teams operating over extended periods, with pre-existing relationships, role histories, and more complex humans interaction patterns. These factors may influence both performance and emotional dynamics in ways that our experimental design could not fully replicate.

Our findings open several promising directions for future research. In particular, they underscore the emotional benefits of teamwork in AI-enabled settings, reinforcing the view that performance outcomes cannot be meaningfully separated from affective experience. Future studies should investigate whether emotional comfort predicts the depth and quality of collaborative AI engagement. For example, do lower levels of frustration and stress foster more iterative and exploratory interaction with AI systems, thereby indirectly enhancing feasibility and execution quality? In this perspective, how emotional stabilization may operate as a key mechanism linking team composition to performance under AI-enabled conditions.

In addition, unlike many prior experiments relying on a single large language model, real-world teams often combine multiple AI systems. Future studies should investigate whether the use of multiple AI tools enhances performance and whether such effects depend on skill homogeneity.
Equally important is the systematic study of failure modes. Under what conditions does skill heterogeneity undermine AI-enabled collaboration? Potential mechanisms may include over-reliance on domain experts, underutilization of AI capabilities, anchoring effects, or coordination breakdowns. Understanding these negative dynamics is just as critical as examining positive effects in order to develop robust design principles for AI-assisted teamwork.

Finally, contextual moderators warrant greater attention. Organizational AI maturity, hierarchical norms, and broader cultural attitudes toward authority and technology may significantly shape the effectiveness of skill-aligned teams. Advancing research along these dimensions will be critical for building a comprehensive theory of human–AI collaboration and its impact on organizational structures, operations, and strategy.

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The Orchestration Imperative: Completing the Relational Paradigm Shift Ahead of the Emerging Agentic Economy

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Abstract

Framing of the research: *In 1994, Grönroos declared a paradigm shift from transactional to relationship marketing. Three decades later, that revolution remains incomplete: entire stakeholder categories — most notably job applicants — were left in transactional systems designed for volume processing rather than relationship building. The emerging agentic economy makes this incompleteness urgent. As AI agents take on mediating roles in stakeholder interactions, organisations face two compounded risks: transactional systems that produce waste at machine speed, and the progressive erosion of the relational capabilities that justify human involvement in consequential decisions. This paper examines what we call the "orchestration imperative": the strategic case for extending the relational paradigm into talent acquisition before the agentic economy embeds transactional logic by default.*

Purpose of the paper: *The paper offers two complementary contributions. First, through cross-sector documentary analysis of recent AI deployments in insurance, banking, healthcare, and legal services, we identify what we term the orchestration paradigm — a pattern of human-AI collaboration in which AI does not substitute the human operator but empowers a capable human kept in command of consequential decisions. Second, we propose Applicant Relationship Management (ARM) as a framework that combines the orchestration paradigm with Grönroos's relational paradigm, extending both into the domain of talent acquisition.*

Methodology: *This is a conceptual contribution drawing on three analytical components: theoretical synthesis of five established streams (Grönroos on relationship marketing; Packard on efficiency without purpose; Harari on cognitive opacity; Kahneman, Sibony and Sunstein on judgment noise; Meijerink et al. on algorithmic HRM); cross-sector documentary analysis using structured thematic pattern analysis across four sectors; and regulatory analysis of the EU AI Act. We do not claim mixed-method status in the conventional empirical-design sense; the empirical components are used to illustrate and inform the conceptual argument, not to test it.*

Findings: *The paper offers three sets of conceptual propositions. Cross-sector: organisations deploying AI for stakeholder-facing processes increasingly adopt human-in-the-loop governance, suggesting orchestration, not automation, as the emerging design logic. Framework: ARM articulates four tenets addressing relationships, opacity, noise reduction, and the orchestration-versus-augmentation distinction; an Agent Triad of Human Operator, AI Agent, and Human Stakeholder; a "capable orchestrator" role; and a compensatory rather than multiple-hurdle evaluation architecture. Regulatory: the EU AI Act's high-risk requirements for employment AI structurally align with ARM's design principles, supporting independent convergence toward orchestration norms.*

Research limits: *The cross-sector analysis is illustrative, drawing on recent corporate communications, industry reports, and institutional publications; longitudinal validation is needed. The ARM framework requires empirical testing across industries, cultures, and organisational contexts. The atrophy argument regarding the erosion of relational capacity, while logically grounded, requires longitudinal investigation to establish causal mechanisms.*

Practical implications: *The orchestration imperative reframes the strategic question for AI adoption from "how can AI process faster?" to "how can AI help build better stakeholder relationships?" In recruitment, ARM shifts talent acquisition from transaction processing to relationship orchestration — and aligns organisations with the EU AI Act's high-risk requirements for employment AI.*

Originality of the paper: *The paper's contribution is in the conceptual integration and extension of established streams, not in the development of new theory. It synthesises an emerging cross-sector pattern (the orchestration paradigm), extends Grönroos's relational paradigm into the under-theorised domain of talent acquisition through the ARM framework, and responds to recent calls in the recruitment and selection literature (Mori et al., 2025) for stakeholder integration in AI-mediated hiring.*

Keywords: *human-AI collaboration; orchestration paradigm; agentic economy; applicant relationship management; relationship marketing; human-in-the-loop; EU AI Act; stakeholder management; talent acquisition*

1. Introduction

1.1 The Agentic Economy arrives

The deployment of artificial intelligence agents in organisational decision-making has moved from speculation to operational reality. In January 2026, Gartner predicted that by 2028, 33% of enterprise

software applications would include agentic AI, up from less than 1% in 2024. The same month, at the World Economic Forum in Davos, Anthropic CEO Dario Amodei estimated that 50% of entry-level knowledge work could be performed by AI within three years (Amodei, 2026), while DeepMind CEO Demis Hassabis countered that new potentially more meaningful categories of work would emerge in parallel (World Economic Forum, 2026). What neither disputed was the fundamental premise: AI agents are becoming economic actors.

This transformation is particularly acute in talent acquisition, where algorithmic decision-making intersects with high-stakes human outcomes at scale. Yet the introduction of AI agents into this domain raises a question that extends beyond recruitment: when algorithms participate in decisions about human stakeholders, does the governing logic of the system, transactional or relational, determine the quality of the outcome?

1.2 The Efficiency Trap

The dominant paradigm in talent acquisition since the 1990s has been the Applicant Tracking System, designed to solve a volume problem: too many applications, too few recruiters. The logic was explicitly transactional: process faster, filter more efficiently, reduce cost-per-hire. By conventional metrics, ATS succeeded. Processing times fell, recruiter workloads became manageable, and organisations could handle application volumes that would overwhelm manual systems.

Yet this efficiency has produced what Vance Packard (1960) would recognise as a familiar pathology: waste-making through purposeless acceleration. The ATS paradigm created a self-reinforcing cycle: easier application processing generated faster and unexplained rejections, which encouraged applicants to adopt volume strategies relying on the law of large numbers. This volume increase demanded more aggressive filtering and even faster rejection. Conversely, this loop significantly reduced candidate quality signals, applicants investing less in each application, recruiters spending less time on each evaluation, which, in turn, required yet more applications to achieve the same hiring outcomes. The system optimised for throughput while degrading the relationship it was meant to facilitate. When AI agents are introduced into this architecture, they risk doing what Packard warned against, making waste at unprecedented speed.

The parallel to Packard's original critique is instructive. He argued that industrial efficiency, divorced from human purpose, produces sophisticated systems for creating things nobody needs. In recruitment, the ATS produces sophisticated systems for rejecting people nobody truly evaluated. The question is not whether AI can accelerate this process, it manifestly can, but whether acceleration of a flawed logic constitutes progress.

The risk extends beyond inefficiency. The transactional paradigm encourages a minimum effort logic, from organisations that reduce evaluation to algorithmic filtering, and from applicants who reduce candidacy to mass-submitted CVs. When AI agents enter this dynamic, they offer a seductive acceleration of minimum effort on both sides. But the consequence is a progressive atrophy of the relational capabilities, contextual judgment, empathic evaluation, trust-building, that arguably constitute humanity's unique differentiator from machines. If organisations delegate relationships to algorithms, and individuals delegate self-presentation to AI-generated applications, both parties hollow out the very capacities that justify human involvement in consequential decisions.

This creates a paradox at the heart of the agentic economy. The argument for human-in-the-loop governance rests on the assumption that humans bring relational intelligence that AI cannot replicate. But if transactional systems have already eroded that intelligence through decades of minimum effort incentives, the assumption may not hold. The orchestration imperative is therefore not merely a design preference, it is a use-it-or-lose-it proposition. Either organisations invest in relational capacity now, ahead of the emerging agentic economy, or they risk discovering that the human contribution they assumed was irreplaceable has been quietly abandoned through disuse.

1.3 Research Question and Contributions

This paper addresses a central question: *How can organisations preserve and strengthen relational capacity in stakeholder-facing processes before the emerging agentic economy renders its absence irreversible?*

The argument proceeds from a single conceptual gap. In 1994, Grönroos proposed a paradigm shift in marketing — from transactional to relational logic — that has since transformed how organisations engage customers, suppliers, communities, and other stakeholders. One stakeholder category was left almost entirely outside this transformation: job applicants. The systems built to manage them, applicant tracking systems above all, encode transactional logic in their architecture: receive, filter, rank, reject, forget. Three decades into the relational paradigm shift, the most consequential stakeholder relationship of all — the one through which an organisation constitutes itself — remains governed by the very logic Grönroos's tradition rejected everywhere else.

This gap has not gone unrecognised within the recruitment and selection literature, but it has been articulated in different terms. The most recent systematic review of AI in R&S (Mori et al., 2025), synthesising 120 studies, identifies stakeholder integration as one of three perspectives the field requires to move beyond efficiency-driven adoption — alongside sustainable AI-HRM and information asymmetry management. Their analysis ends at the call. ARM responds to it by extending the relational paradigm Grönroos initiated into the domain it has not yet reached.

The agentic economy makes this extension urgent and, for the first time, economically viable. As AI agents assume mediating roles in stakeholder interactions (Section 1.2), the governing logic embedded in these systems — transactional or relational — will determine outcomes at scale and speed previously unattainable. The same AI capability that threatens to deepen transactional logic also enables relational approaches that were prohibitive in cost when sustained by human evaluators alone.

The paper offers two complementary contributions. The first is empirical-conceptual: through cross-sector analysis of recent AI deployments in insurance (Allianz, 2026), banking (BNY Mellon, DBS), healthcare (FDA and HHS frameworks), and legal services (A&O Shearman, 2025), we identify what we term the orchestration paradigm — a pattern of human-AI collaboration in which AI does not substitute the human operator but empowers a capable human kept in command of the decision. The second is integrative: we propose Applicant Relationship Management (ARM) as a framework that combines the orchestration paradigm with Grönroos's relational paradigm, extending both into the domain of talent acquisition. ARM draws together insights from relationship marketing (Grönroos, 1994), efficiency critique (Packard, 1960), epistemological symmetry (Harari, 2017), behavioural economics (Kahneman et al., 2021), algorithmic HRM (Meijerink et al., 2021), and the field's own most recent ethical synthesis (Mori et al., 2025). ARM's contribution lies in the conceptual integration and extension of these established streams — not in the development of new theory — and the framework is currently under empirical study in real cases.

1.4 Paper Structure

The paper proceeds as follows. Section 2 describes the research methodology. Section 3 establishes the theoretical foundations through four intellectual streams: Packard's efficiency-effectiveness distinction, Harari's argument for epistemological humility regarding both human and artificial cognition, Kahneman et al.'s research on decision noise, and the emerging literature on human collaboration as the distinctive human capacity. Section 4 introduces the ARM framework for the agentic economy, presenting its four principles, the Agent Triad and the capable orchestrator concept. Section 5 applies the framework to recruitment as an agentic ecosystem, including cross-sector evidence of the orchestration pattern. Section 6 discusses implications for management in the agentic economy, including the new competencies orchestration demands and regulatory alignment with the EU AI Act. Section 7 acknowledges limitations and proposes a future research agenda. Section 8 concludes with implications for researchers, practitioners, and policymakers.

2. Research Methodology

This paper employs a mixed-method conceptual approach combining three analytical components: theoretical synthesis, cross-sector documentary analysis, and regulatory analysis. The methodology is designed to address a phenomenon — the emergence of orchestration patterns in AI-mediated stakeholder processes — that is too recent for longitudinal empirical study but too consequential to await one.

2.1 Theoretical Synthesis

The paper's primary analytical method is the integration of five established theoretical streams into a unified framework for human-AI collaboration in talent acquisition. The streams were selected not for comprehensiveness but for complementarity: each addresses a distinct dimension of the problem that the others leave unresolved.

Grönroos (1994) provides the paradigm-level argument — the shift from transactional to relational logic — and the identification of its incompleteness. Packard (1960) supplies the critique of efficiency divorced from purpose, explaining why transactional systems produce waste rather than merely underperforming. Harari (2017) establishes epistemological symmetry between human and artificial opacity, reframing the trust question from a binary choice to a design challenge. Kahneman, Sibony, and Sunstein (2021) expose the noise problem in human judgment and, by extension, in AI systems, grounding the case for collaborative rather than substitutive approaches. The collaboration literature contextualises human-AI partnership within humanity's broader capacity for productive coordination with diverse forms of intelligence.

The synthesis follows abductive logic: iterative dialogue between theoretical propositions and observable patterns. Each ARM tenet is traceable to a specific theoretical foundation, with derivation paths made explicit in Section 4.2.

2.2 Cross-Sector Documentary Analysis

The paper's second component examines recent AI deployments in four sectors — insurance, banking, healthcare, and legal services — to identify common design patterns in human-AI collaboration for stakeholder-facing processes.

Source material. The analysis draws on corporate communications (partnership announcements, press releases, media statements), industry reports (Capgemini 2026, Gartner 2025), institutional publications (BNY Institute 2026), and trade press coverage. These are documentary sources, not primary data. The analysis does not claim access to internal deployment metrics, proprietary outcome data, or direct observation of how these systems operate in practice.

Sector selection. The four sectors were chosen on three criteria: (a) documented deployment of AI agents in processes involving direct stakeholder decisions (claims, credit, diagnosis, legal counsel); (b) availability of public documentation describing the human-AI collaboration architecture, not merely the AI capability; and (c) temporal relevance — deployments announced or significantly expanded within the 2024–2026 period, reflecting the current state of agentic AI rather than earlier-generation automation. The selection does not claim to be exhaustive. Other sectors present analogous dynamics but were excluded to maintain analytical depth within conference paper constraints.

Analytical approach. Each sector case was examined for the presence or absence of three design features: (a) structured human oversight of AI-generated recommendations, as distinct from post-hoc exception handling; (b) explicit stakeholder-facing accountability mechanisms (explanation, appeal, dialogue); and (c) system architecture that allocates tasks based on complementary human-AI capability rather than cost-driven substitution. A summary scorecard across the four sectors is provided in Table 1. The convergence of these features across independently evolving sectors constitutes the basis for identifying what the paper terms the "orchestration paradigm."

Limitations of documentary analysis. Corporate communications describe intended designs, not verified outcomes. Organisations have strategic incentives to present their AI deployments as

responsible, human-centred, and stakeholder-friendly, regardless of operational reality. The paper cannot rule out mimetic isomorphism — the possibility that cross-sector convergence reflects conformity to a legitimising narrative rather than independent discovery of a superior design. The cross-sector material is therefore presented as indicative of an emerging pattern, not as proof of orchestration's superiority. The paper's argument does not rest on these cases alone; it rests on the theoretical synthesis that the cases illustrate.

Table 1. *Cross-sector design feature scorecard. "Yes" indicates the feature is explicitly described in source documents; "Yes (limited)" indicates the feature is referenced but not fully elaborated.*

Sector	***Key documents reviewed***	***Human oversight***	***Stakeholder accountability***	***Complementary allocation***
Insurance	*Allianz–Anthropic partnership (2026); Capgemini Research Institute (2026)*	*Yes*	*Yes*	*Yes*
Banking	*DBS Bank (2025); BNY Institute (2026); Capgemini Research Institute (2026)*	*Yes*	*Yes (limited)*	*Yes*
Healthcare	*U.S. HHS AI Strategy (2025); FDA governance frameworks*	*Yes*	*Yes*	*Yes*
Legal services	*A&O Shearman–Harvey (2025)*	*Yes*	*Yes (limited)*	*Yes*

2.3 Regulatory Analysis

The third component examines the European Union's Artificial Intelligence Act (European Parliament and Council, 2024) as the most comprehensive regulatory framework governing AI deployment in employment contexts. The analysis focuses specifically on the Act's high-risk classification of employment AI and its operational requirements: human oversight, transparency, explicability, data governance, and the rights of affected persons.

The regulatory analysis serves two purposes. First, it identifies structural alignment between the Act's requirements and the ARM framework's design principles, suggesting that regulatory and theoretical thinking are converging independently toward orchestration norms. Second, it provides the compliance context within which ARM's practical implications should be understood: the framework is not only theoretically grounded but addresses obligations that organisations operating in or serving EU markets will face under the AI Act's Annex III high-risk regime, with the original 2 August 2026 application date still legally binding while a proposed postponement is in trilogue (analysed in Section 6.2).

The paper acknowledges a potential circularity: if the ARM framework was developed with awareness of the AI Act's requirements, alignment between them is partly by construction. We address this transparently. The four ARM tenets were derived from their respective theoretical foundations (Packard, Harari, Kahneman, Grönroos) and the alignment with the AI Act was identified subsequently, not designed prospectively. The convergence reflects shared underlying logic — that consequential AI-mediated decisions about people require human oversight, transparency, and relational accountability — rather than reverse-engineering from regulatory requirements.

3. Theoretical Foundations

The ARM framework for the agentic economy draws on four distinct intellectual streams that, when synthesised, challenge the assumptions underlying current approaches to AI deployment in stakeholder-facing processes. Each stream contributes a necessary dimension: Packard provides the critique of efficiency without purpose; Harari supplies epistemological humility regarding both human and artificial cognition; Kahneman et al. expose the unreliability that relationship, not replacement, can address; and the collaboration literature explains why human-AI partnerships can exceed either intelligence operating alone.

3.1 The Waste Makers: Efficiency vs Effectiveness (Packard, 1960)

In 1960, Vance Packard published *The Waste Makers*, a systematic critique of how American industry had perfected producing things people did not need. His central argument was deceptively simple: efficiency is not effectiveness. A system can be extraordinarily efficient at producing waste. The faster and cheaper it operates, the more waste it generates, and the harder it becomes to question the underlying logic, because the metrics of efficiency all point upward.

Packard identified three mechanisms of institutional waste-making: planned obsolescence (designing products to fail), perceived obsolescence (persuading consumers that functional products are inadequate), and systemic overproduction (manufacturing beyond genuine demand because the production system requires continuous throughput). In each case, the organisation optimises an internal metric, units produced, cycle time, cost per unit, while ignoring whether the output serves a genuine human purpose.

The application to talent acquisition is striking. The ATS paradigm exhibits all three of Packard's mechanisms. Planned obsolescence manifests in application processes designed to be repeated, often within the same organisation, by the very same applicants, for the very same role just months later, rather than to build lasting relationships. Perceived obsolescence appears in the constant demand for updated CVs, new keywords, and reformatted profiles to satisfy evolving algorithmic preferences. Systemic overproduction is the most visible: organisations generate thousands of rejections per hire, each consuming resources yet producing no value for either party. The cost-per-hire metric, the recruitment equivalent of cost-per-unit, drives the same logic Packard criticised, optimise the transaction, ignore the relationship.

What makes Packard's framework particularly relevant to the agentic economy is his insight that technological sophistication amplifies rather than corrects flawed logic. Post-war manufacturing did not produce waste because it lacked technology, but because its technology served a logic disconnected from human purpose. Similarly, introducing AI agents into recruitment does not inherently solve the ATS's waste-making tendency. If the governing logic remains transactional, process more, filter faster, reject cheaper, AI simply produces waste at a scale Packard could not have imagined.

The distinction between efficiency and effectiveness thus becomes the foundational question for AI deployment. Efficiency asks: *can we process this faster?* Effectiveness asks: *are we producing the right outcome?* In recruitment, these questions yield radically different design principles. An efficient system minimises time-to-rejection. An effective system maximises relationship quality between the organisation and its talent ecosystem, including the candidates it does not hire today but may need tomorrow.

3.2 Two Black Boxes: Epistemological Humility in the Age of AI (Harari)

A persistent objection to AI participation in consequential decisions is that we do not understand how these systems reach their conclusions. Large language models, neural networks, and deep learning architectures operate as functional black boxes: inputs enter, outputs emerge, and the intermediate reasoning remains opaque even to their designers. This opacity, critics argue, renders AI fundamentally untrustworthy for decisions affecting human lives.

Yuval Noah Harari (2017) offers a disruptive counter-argument. In *Homo Deus*, he observes that the human brain is itself a black box, one we have studied for millennia without fully understanding. Neuroscience can map neural correlates of decision-making, but the subjective experience of judgment, the precise mechanisms by which a hiring manager forms an impression remains as opaque as any algorithmic process. We do not reject human decision-making because we cannot fully explain it. We trust it because we have developed institutions, relationships, and feedback mechanisms that make it accountable.

This epistemological symmetry has profound implications for how organisations approach AI in stakeholder-facing processes. If the objection to AI is opacity, intellectual consistency demands we apply the same standard to human judgment, which we manifestly do not. A recruiter who reviews a CV for an average of six seconds (the commonly cited industry figure) and renders a proceed/reject decision is operating with a degree of opacity that rivals any algorithm. The difference is not transparency but familiarity: we are accustomed to trusting human black boxes because we have embedded them in relational structures, supervision, accountability, feedback, professional development, that manage the risk of their opacity.

Two further positions sharpen the terrain. Harari's epistemological humility cuts in one direction: trust neither human nor AI uncritically, design accountability structures for both. Rudin (2019) cuts in another: for consequential decisions, do not rely on opaque AI at all — design inherently interpretable models from the start. The two readings can sound opposed — one redesigns the trust relationship around opacity, the other rejects opacity in the AI itself. ARM is the bridge on which they come to agree. Capable human judgment, exercising deep understanding and override authority over AI, anchored in stakeholder-facing accountability, honours what Harari demands at the relational layer and what Rudin demands at the AI-design layer. Neither position is contradicted; both are operationalised through the orchestration paradigm.

This reframes the central question. It is no longer "*can we trust AI?*" but "*can we design relationships between human and artificial intelligence that produce trustworthy outcomes?*"

This reframing is essential for the agentic economy. As AI agents assume more consequential roles, the temptation is to frame the challenge as a binary: trust humans or trust machines. Harari's epistemological humility suggests a third path, trust the relationship between them, designed with appropriate oversight, feedback mechanisms, and human authority over final decisions affecting stakeholders. This is precisely what the orchestration paradigm, observed in practice across sectors, appears to be converging toward.

3.3 Noise: The Unreliability of Human Judgment (Kahneman, Sibony, and Sunstein, 2021)

If Harari establishes that human judgment is a black box, Kahneman, Sibony, and Sunstein (2021) demonstrate that it is a noisy one. In *Noise: A Flaw in Human Judgment*, they distinguish between bias (systematic deviation from correct judgment) and noise (unwanted variability in judgments that should be identical). Their central finding is that noise is pervasive, largely unrecognised, and in many domains more damaging than bias.

The implications for recruitment are severe. Kahneman et al. document what they term "occasion noise", the same individual judging the same case at different times, and "system noise", different individuals in the same role making systematically different judgments. In recruitment contexts, this translates to a well-documented phenomenon: the same CV, reviewed by the same recruiter on different days, or by different recruiters on the same day, produces different outcomes. The "trust your gut" tradition in hiring is not merely unscientific; it is a recipe for noise amplification.

Traditional responses to noise in recruitment have focused on standardisation: structured interviews, scoring rubrics, competency frameworks. These approaches reduce noise but at a cost, they impose rigidity that can suppress the contextual judgment that distinguishes exceptional selection decisions from adequate ones. The challenge is to reduce noise without eliminating the human capacity for nuanced evaluation.

AI agents do not resolve this tension as straightforwardly as is often assumed. A common claim is that algorithmic consistency can compensate for human noise. Yet large language models and generative AI systems introduce their own forms of variability: the same input can produce different outputs within the same conditions, and variability increases further depending on prompt construction, context window, and model parameters. AI noise differs from human noise in its patterns and triggers, but it is noise nonetheless. When deployed as automation, replacing human judgment with algorithmic processing, organisations do not eliminate noise; they substitute one form of unreliability for another, while losing the contextual sensitivity that human judgment, for all its inconsistency, can provide.

Orchestration does not automatically solve this problem, it only sets the conditions under which a solution becomes possible. And those conditions carry a risk. If humans default to the minimum effort approach described in Section 1.2, accepting algorithmic outputs uncritically, delegating judgment rather than exercising it, the two noisy systems do not compensate for each other; they multiply each other's unreliability, producing compounded error with a veneer of rigour. However, if orchestration is designed to develop human recognition capability, to cultivate awareness of when AI outputs require challenge, when contextual judgment must override algorithmic pattern-matching, when the human contribution is genuinely irreplaceable, then the complementary nature of human and AI noise patterns can reduce overall decision noise beyond what either achieves alone. The outcome depends entirely on whether the human participant is enabled and expected to bring relational intelligence to the collaboration, or permitted to abdicate it.

This distinction matters because noise in recruitment is not merely a measurement problem; it is a relationship problem. Applicants subjected to noisy decision-making experience the system as arbitrary, undermining trust in the organisation and the process. Kahneman et al.'s research thus provides empirical grounding for ARM's emphasis on relationship quality: reducing noise is not only statistically desirable but relationally necessary. An applicant who receives a consistent, explicable evaluation, even an unfavourable one, maintains a fundamentally different relationship with the organisation than one who suspects their outcome was determined by which recruiter happened to review their file, or what time of day the review occurred.

3.4 Collaboration as the Distinctive Human Capacity

The three preceding streams, Packard's efficiency critique, Harari's epistemological humility, Kahneman et al.'s noise analysis, collectively undermine the assumption that either human or artificial intelligence alone can be trusted with consequential stakeholder decisions. This raises an obvious question: if neither is sufficient alone, what makes their combination potentially superior?

The answer lies in what arguably constitutes humanity's most distinctive evolutionary achievement: the capacity for productive collaboration with diverse forms of intelligence. Harari (2017) himself makes this point in his broader work, *Homo sapiens* did not dominate through superior individual cognition but through the unprecedented ability to coordinate action among large numbers of agents with different capabilities, perspectives, and knowledge bases. Language, institutions, markets, legal systems, all are technologies for orchestrating diverse intelligences toward outcomes none could achieve independently. Tomasello (2009) identifies this capacity for shared intentionality, the ability to coordinate action toward jointly understood goals with diverse partners, as the cognitive foundation distinguishing human collaboration from all other species.

This observation reframes the human-AI question entirely. The relevant precedent is not "human versus machine" but rather every previous instance in which humans extended their cognitive capacity through partnership with non-human intelligence systems, writing, mathematics, scientific instruments, organisational hierarchies. In each case, the breakthrough was not the tool itself but the design of the collaboration between human judgment and the tool's capabilities.

The agentic economy represents the latest, and perhaps most significant, iteration of this pattern. AI agents are not merely tools that execute instructions; they are systems capable of pattern recognition, natural language interaction, and adaptive responses approximating cognitive partnership. The

question is not whether humans can collaborate with AI agents, the capacity for cross-intelligence collaboration is our defining strength, but whether we design that collaboration for transactional efficiency or relational effectiveness.

The emerging evidence suggests that organisations achieving the best outcomes from AI deployment are those that treat the human-AI interface as a relationship to be designed rather than a process to be automated. In insurance claims, the most effective deployments pair algorithmic assessment with human judgment for complex or sensitive cases. In healthcare, the most promising AI applications augment clinical reasoning rather than replace it. In each domain, the pattern is consistent: orchestration outperforms automation when stakeholder relationships are at stake.

This collaborative pattern has a formal vocabulary in the algorithmic HRM literature. Meijerink et al. (2021) distinguish augmentation from automation: where automation replaces human decision-making, augmentation empowers human capability — supporting humans in reaching better decisions through stronger AI tools. ARM's orchestration concept extends this further. Orchestration requires more than enhanced capability; *it requires that the human operator possesses sufficiently deep understanding of how and why the AI works to override any algorithmic output that does not fit the relational, human-centric paradigm.* Augmentation strengthens the operator; orchestration strengthens the operator and establishes relational logic as the governing criterion against which every AI output is evaluated. In Meijerink's frame, AI makes humans more capable; in ARM's frame, capable humans command AI within a relational paradigm in which the human stakeholder is an active participant, not merely the recipient of an augmented decision.

This convergence across sectors suggests that human-AI collaboration is not merely a pragmatic compromise between full automation and full human control. It is a design principle grounded in the recognition that complex stakeholder decisions require both the consistency and scale of artificial intelligence and the contextual judgment and relational capacity of human intelligence. The formula, to use a deliberately provocative shorthand, is not 1+1=2 but 1+AI>2, the orchestrated combination produces outcomes that exceed the sum of its components, provided the human contribution is actively cultivated rather than passively assumed.

4. The ARM Framework for the Agentic Economy

4.1 Extending the Relational Paradigm Shift (Grönroos, 1994)

In 1994, Christian Grönroos proposed what remains one of the most influential reconceptualisations in management thought: the shift from a transactional to a relational paradigm. His argument was that organisations had become trapped in logic treating every interaction as a discrete exchange, optimised, completed, forgotten, when the evidence overwhelmingly showed that long-term relationships, not individual transactions, determined organisational success. Marketing, he argued, should be reconceived as the management of relationships, not the execution of campaigns.

The paradigm shift Grönroos described has been remarkably successful, but selectively so. Customer relationship management transformed how organisations think about buyers. Supply chain management extended relational logic to vendors and partners. Stakeholder theory broadened the lens further to include communities, regulators, and investors. Yet one category of stakeholder was left almost entirely within the transactional paradigm: the future workforce itself, without whom there is no organisation to manage, no customer to serve, no strategy to execute. Organisations spent three decades building relational systems for every stakeholder except the one they cannot exist without: the people they hire. The very systems designed to manage them, applicant tracking systems, encode transactional logic in their architecture: receive, filter, rank, reject, forget. The language is revealing. Organisations do not speak of building relationships with applicants; they speak of processing them. The candidate experience literature has documented this damage extensively: applicant perceptions of fairness and organisational attractiveness are shaped decisively by selection process quality, not outcome alone (McCarthy et al., 2017).

This is not an oversight. It reflects a deep assumption that the employment relationship begins at the point of hire, and that everything preceding it is a selection mechanism, a funnel to be optimised, not a relationship to be cultivated. This assumption dramatically overlooks the fact that what motivates people toward an organisation, and what sustains their commitment once there, cannot, and definitively does not anymore, depend on mere transactional parameters. Compensation, career progression, job title: these are necessary conditions, not sufficient ones. The evidence from every generation entering the workforce since the turn of the millennium points in the same direction, people seek purpose, belonging, alignment with values, the sense that they are recognised as human beings rather than processed as resource units. And they are paying attention. A system that reduces the entire pre-hire relationship to a transaction does not merely fail to attract the best talent, it actively repels it. The ATS is the first conversation the organisation has with its future workforce, and for thirty years that conversation has been: *we will process you, rank you, and if you are lucky, we will remember your name.* Organisations that invest in employer branding while funnelling every applicant through a transactional ATS are sending mixed signals. Dangerously mixed.

Grönroos himself, focused primarily on customer and service relationships, did not extend his critique to talent acquisition, and for thirty years, neither did anyone else. The omission is remarkable. An entire discipline built around the proposition that transactional logic destroys value in stakeholder relationships somehow failed to notice that the most consequential stakeholder relationship of all, the one that determines who constitutes the organisation itself, was still being governed by precisely the transactional logic it had rejected everywhere else. The paradigm shift transformed how organisations relate to their customers, their suppliers, their communities. It left untouched how they relate to the people they need most. Recent scholarship has begun to register this gap, though without yet naming it as such. Mori et al. (2025), in the most comprehensive synthesis to date of AI in recruitment and selection, identify stakeholder integration as one of three perspectives the field requires to move beyond efficiency-driven adoption — alongside sustainable AI-HRM and information asymmetry management. Their analysis ends at the call. ARM responds to it by reading that call through Grönroos's relational paradigm.

Why now? Because the four theoretical streams examined in Section 3 converge on an uncomfortable conclusion: the gap cannot simply be filled by extending existing relational frameworks into recruitment. Packard reveals that transactional talent acquisition doesn't merely underperform, it actively manufactures waste. Kahneman et al. demonstrate that the noise pervading human decision-making cannot be trusted as we routinely grant it, and that replacing it with algorithmic consistency is no solution, because algorithmic consistency is itself a myth. Harari establishes that the problem runs deeper still: neither human nor artificial intelligence operates transparently, both are black boxes, and the comforting assumption that at least we understand our own reasoning is precisely that, an assumption. The only honest response is to stop pretending either deserves unconditional trust and start designing systems where both are held accountable, not to their own internal logic, which neither can fully explain, but to the people whose lives their decisions affect. And the collaboration literature points to the only viable path forward: designed partnerships between human and artificial intelligence that produce what neither achieves alone. Extending Grönroos's paradigm shift into talent acquisition is not a matter of applying known principles to a new domain. It requires a framework built for the specific challenges that domain presents, challenges that the agentic economy is about to amplify beyond recognition.

4.2 The Four Tenets of ARM

Applicant Relationship Management (ARM) is the framework we propose to operationalise this extension. It translates each theoretical stream into a concrete design principle, a tenet, that governs how human and artificial intelligence should interact in talent acquisition processes. ARM is then built on four tenets, each derived from a specific theoretical foundation and each addressing a distinct failure of the transactional paradigm.

Tenet 1: Relationships precede transactions. The quality of the relationship between organisation and applicant determines the quality of the hiring outcome, not the speed or volume of transaction processing. This is Packard's efficiency-effectiveness distinction applied to its most neglected domain. In practice, it means designing systems that treat every interaction with an applicant as a contribution to an ongoing relationship, regardless of whether that specific interaction leads to a hire. The applicant who is not selected today does not cease to exist in the organisation's ecosystem. They become a client, a supplier, an opinion leader, a shareholder, a competitor's strategist who remembers exactly how they were treated. Systems that forget this, that treat rejection as the end of a transaction rather than a moment in a relationship, do not merely produce Packard's waste. They actively damage the organisation's future across every stakeholder category Grönroos's paradigm shift was designed to protect.

A concrete expression of this principle is the concept of the Silver Medallist: the candidate who reaches the final stages of selection but is not chosen for a specific role. In transactional systems, this person disappears, their file is closed, their evaluation is archived, their relationship with the organisation is severed. But that person does not disappear from the world. They may not remember the exact words of the rejection email. They may not remember the name of the recruiter who never called back. But the feeling of how they were treated will stay with them, and every time they encounter that organisation again, as a customer, as a partner, as an industry voice, as an investor, that feeling will surface, whether they want it to or not. In a relational system, the Silver Medallist is not a future hiring option to be warehoused. They are a stakeholder whose relationship with the organisation has been shaped, for better or worse, by the selection experience, and whose influence extends far beyond whether they ever become an employee.

Tenet 2: Opacity is universal; design for accountability. Neither the recruiter nor the algorithm can fully explain how they reach their conclusions, and as Harari's epistemological symmetry argument establishes, pretending otherwise is the first dishonesty in a system that will compound many. The recruiter who 'just knows' a candidate isn't right and the algorithm that scores a CV at 67% are both operating behind closed doors. The difference is that we have spent centuries excusing human opacity as 'experience' and 'intuition' while demanding that machines justify themselves, a double standard that protects no one, least of all the applicant.

ARM's response is not to choose which black box to trust. It is to refuse the choice entirely and instead design for accountability in all directions. Human judgments must be made explicit, not because recruiters are untrustworthy, but because unexplained decisions are unexplainable decisions, and unexplainable decisions cannot sustain relationships. AI recommendations must be accompanied by reasoning traces, not because transparency is technically convenient, but because an applicant who cannot understand what shaped their evaluation cannot improve, cannot engage, cannot trust, and an organisation that cannot explain its own decisions cannot learn from them, cannot defend them, and cannot build the talent relationships its survival depends on. Opacity is not just unfair. It brings costs. And the human operator must be accountable to themselves, honest about when they are exercising genuine judgment and when they are defaulting to the path of least resistance, letting the algorithm decide so they don't have to.

A design distinction matters here. Suen and Hung (2024), in field experiments with real job applicants, found that disclosing an AI's evaluation criteria upfront produced strategic gaming — fewer honest signals, more deceptive ones — and cautioned against unchecked advocacy for AI transparency. ARM's accountability commitment is of a different kind. What ARM discloses is not the predictive rubric by which the AI scores candidates, but the prioritised requirements of the role, surfaced through dialogue with the applicant and oriented around the applicant's success. The design hypothesis — currently under empirical study in real cases — is that relational requirements transparency invites self-selection among applicants who want to build a genuine match, and backfires on those who would attempt to game it. This distinguishes ARM's approach from the conditions tested by Suen and Hung; cross-cultural validation remains open.

This is not a commitment to transparency as corporate virtue. It is a structural requirement. Opacity that is unmanaged becomes opacity that is exploited, by organisations that hide behind algorithmic complexity, by recruiters who hide behind gut feeling, and by systems that allow both to avoid the one thing relational accountability demands: ***looking the applicant in the eye and explaining why***.

Tenet 3: Noise reduction requires collaboration, not replacement. Grounded in Kahneman et al.'s analysis, this tenet rejects the common assumption that AI should replace noisy human judgment with consistent algorithmic processing. As established in Section 3.3, AI systems, particularly large language models, introduce their own variability patterns. The goal is not to eliminate human noise by substituting machine noise but to design collaboration structures where the complementary nature of human and AI noise patterns produces better outcomes than either achieves alone.

This tenet has a critical corollary: the collaboration must be genuinely active. If the human participant defaults to minimum effort, rubber-stamping algorithmic outputs, delegating rather than exercising judgment, the two noisy systems compound rather than compensate. ARM therefore requires not just the presence of human judgment but its active development: training, feedback mechanisms, and system design that cultivates the human operator's capacity to recognise when AI outputs require challenge.

Tenet 4: Orchestration supersedes automation. Automation asks a seductive question: *which tasks can we remove from human responsibility?* Every answer feels like progress, fewer touches, faster processing, lower cost. But the question contains its own trap. Each task removed is a capability that atrophies. Each human touch eliminated is a judgment that will never be exercised again, a relational muscle that weakens from disuse. Automation doesn't just change who does the work. It changes what the organisation is capable of, permanently.

Orchestration asks a fundamentally different question: *how do we design the collaboration between human and artificial intelligence to produce the best possible outcome for all stakeholders?* This is not a softer version of the same question. It is a different design philosophy with different architecture, different economics, and different consequences over time. Automation converges toward a system that no longer needs humans and humans who are no longer capable of contributing. Orchestration builds a system where both intelligences grow stronger through interaction, where the AI becomes more useful because the human knows how to challenge it, and the human becomes more capable because the AI expands what they can see.

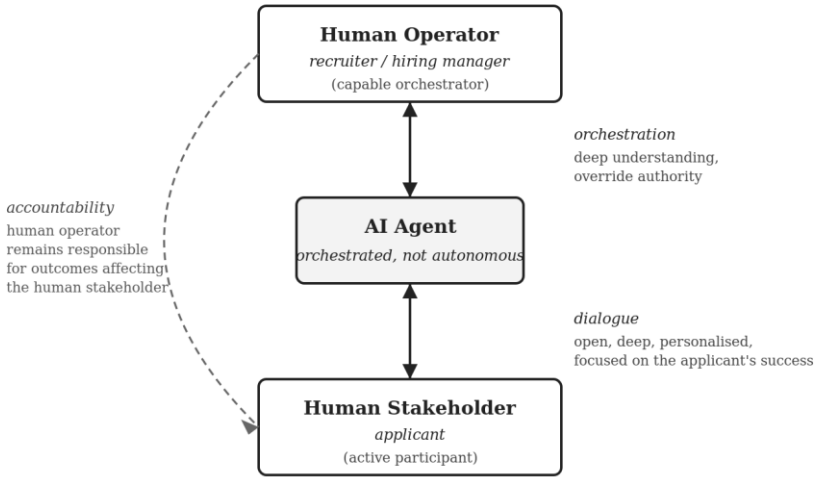
The distinction maps directly to Packard's foundational challenge. Automation pursues efficiency: replace human cost with cheaper algorithmic processing. At best, it is additive, the 1+AI>2 introduced in Section 3.4 as a deliberately provocative shorthand. Orchestration pursues something qualitatively different: H+AI=2^x, where x represents the quality of orchestration design, investment in human capability, sophistication of collaboration architecture, depth of relational framework. The returns are not additive. They are exponential. As a rhetorical artifact, the equation highlights the power of the capable human beyond simple AI augmentation. And the atrophy argument delivers its most devastating implication here: when H hollows out through disuse, when decades of transactional systems have eroded the contextual judgment, the relational intelligence, the capacity for nuanced evaluation that orchestration demands, x collapses toward zero. And 2^0 = 1, no matter how powerful the AI becomes. An organisation can deploy the most sophisticated artificial intelligence available. If the human capability it was designed to orchestrate with has been quietly abandoned through disuse, the result is indistinguishable from having no AI at all.

4.3 The Agent Triad and the Capable Orchestrator

The four tenets demand more than principles. They demand an operational architecture, a structure that specifies not just what should happen but who is accountable for making it happen. ARM proposes the Agent Triad: a three-actor model comprising the Human Operator, the AI Agent, and the Human Stakeholder.

Figure 1. The ARM Agent Triad

Human Operator – AI Agent – Human Stakeholder



The AI Agent mediates between two humans. The Human Operator orchestrates the AI; the AI engages the Human Stakeholder in dialogue; accountability flows back to the Operator.

In talent acquisition, these roles map to the recruiter (or hiring manager), the AI system, and the applicant. But the model is deliberately generalised, because the design principle it captures recurs across every domain where orchestration outperforms automation. In insurance: the claims assessor, the AI system, the policyholder. In healthcare: the clinician, the AI system, the patient. In each case, the AI agent mediates between two humans, and the quality of both relationships, operator-to-AI and AI-to-stakeholder, determines the quality of the outcome. Get either relationship wrong and the triad collapses into something far less useful: an automated pipeline with humans decoratively attached.

The triad embodies a specific, and provocative, allocation of authority. The AI agent handles what AI does best: pattern recognition at scale, screening large volumes of information, identifying relevant signals, flagging inconsistencies, generating initial assessments. The Human Stakeholder, the applicant, in recruitment, is not a passive object of processing but an active participant. What they engage in is not mere data transfer — uploading a CV, filling a form, ticking competency boxes — but an open, deep and personalised dialogue that the AI agent builds and maintains, strongly focused on the applicant's success. It is a process of creating context, clarifying intent, and building meaning that no pre-formatted application form can capture. This dialogue structure is currently under empirical study in real cases. The applicant who explains *why* they made a career change, who contextualises a gap in their CV, who articulates what they are looking for beyond job title and salary, this person is contributing intelligence that the system needs but can only access through interaction, dialogue, and exchange, never through extraction. Their experience, their feedback, their evolving understanding of the organisation are system inputs, not externalities to be managed.

And the Human Operator sits at the centre of it all. Not as a bottleneck, not as a compliance requirement, but as the architecture's most significant opportunity. What ARM terms the 'capable orchestrator' represents an entirely new professional capability, one that the agentic economy is creating demand for faster than organisations are developing it. The capable orchestrator understands AI's strengths well enough to leverage them, recognises its limitations well enough to challenge them, and brings relational skills that no algorithm can substitute. This is not a diminished role for humans in an increasingly automated world. It is an elevated one, a professional whose judgment has been actively developed through training, feedback, and system design that cultivates the distinctively human capabilities the agentic economy makes more valuable, not less. Organisations that recognise this early, that invest in developing capable orchestrators alongside AI capability, are not just building better systems. They are building the competitive advantage that will define the next generation of talent-intensive industries.

A critical feature of the triad is its commitment to compensatory rather than eliminatory evaluation, and here the professional opportunity becomes concrete. Traditional selection systems follow what Ock and Oswald (2018) term a multiple-hurdle approach: candidates must pass each stage sequentially, and failure at any point produces elimination. The logic is transactional to its core, reduce the person to a sequence of pass/fail gates and discard them at the first failure. A multiple-hurdle system doesn't need a capable orchestrator. It needs a gatekeeper. And gatekeeping is a professional dead end, a role that shrinks with every improvement in algorithmic filtering, because the algorithm will always be a faster, cheaper gatekeeper than the human.

The compensatory model inverts this logic entirely. It allows strength in one dimension to offset relative weakness in another, preserving the multi-dimensional complexity of a human being rather than flattening them into a binary score. A candidate with exceptional collaborative intelligence and moderate technical skills is not the same as one with moderate collaborative intelligence and exceptional technical skills, but a multiple-hurdle system, filtering on technical threshold first, may never discover the difference. The flattening has measurable consequences: Deriu et al. (2024), across three controlled experiments with job applicants, show that AI evaluators are perceived as less capable than human evaluators of assessing candidates' unique skills — and that this perception erodes trust in the agent and intention to accept a job offer. ***The problem is not AI itself; it is the single-dimensional logic through which AI has typically been deployed***. This is where the capable orchestrator becomes irreplaceable: the judgment to weigh competing dimensions against each other, to recognise potential that no single metric captures, to see the whole person rather than a sequence of scores, this is a capability that grows more sophisticated with practice, not less relevant with automation. The recruiter operating within a compensatory framework is not processing applicants. They are making complex, consequential, deeply human evaluations that no algorithm can replicate, and building professional expertise that the agentic economy will make increasingly valuable.

ARM adopts the compensatory approach because it is the only evaluation architecture consistent with treating applicants as stakeholders rather than data points. You cannot claim to build relationships with people you have already reduced to pass/fail gates before you even met them. But equally: you cannot develop capable orchestrators within a system that requires nothing of them except saying yes or no at a gate someone else designed.

The automation case is not without merit. Speed, cost reduction, and scale are genuine organisational needs, and advocates of full automation are responding to real pressures. But the question this paper raises is not whether those needs are legitimate. It is whether meeting them through automation alone produces outcomes that serve the organisation's long-term interests, and the evidence, across every domain examined here, suggests it does not.

The Agent Triad resolves the fundamental tension in current AI deployment, not through compromise but through complementarity. Full automation gains consistency and speed while introducing undetected noise, losing contextual judgment and relational accountability. Full human control preserves the illusion of judgment and cannot scale. Both, in isolation, remain hostage to the noise Kahneman et al. document. The triad is designed so that each actor contributes what the others cannot. If organisations invest in capable orchestrators with the same seriousness they invest in AI capability. If they design systems that develop human judgment rather than bypass it. If they treat the professional growth of their people as a strategic asset rather than a cost to be minimised. Then the triad doesn't just work. It compounds, H+AI=2^x, with x rising every year.

5. Application: Recruitment as Agentic Ecosystem

5.1 Cross-Sector Convergence

The orchestration paradigm ARM proposes for talent acquisition is not emerging in isolation. Across sectors where AI deployment intersects with consequential stakeholder decisions, a remarkably

consistent pattern is appearing, and it is appearing independently, driven not by shared theory but by shared failure.

In insurance, early attempts to fully automate claims processing produced efficiency gains and customer rebellion. Policyholders whose life-altering claims were assessed by algorithms they could not question, explained by chatbots they could not reason with, and denied through processes they could not appeal experienced the system as adversarial, regardless of whether the outcome was technically correct. The response, visible in deployments such as Allianz's partnership with Anthropic (Allianz, 2026), has been to redesign the human-AI interface: algorithmic assessment for routine claims, human judgment for complex or sensitive cases, and structured dialogue between the system and the policyholder at every stage. Not automation with human exception-handling. Orchestration by design.

In banking, a parallel trajectory. DBS (2025) and BNY Mellon (2026), among others, discovered that algorithmic decision-making in client-facing processes, credit assessment, investment advisory, relationship management, generated measurable efficiency while eroding the trust relationships that differentiated them from purely digital competitors. The response: AI handles pattern recognition and data synthesis, human advisors handle the relational complexity that clients value and algorithms cannot replicate. The human role did not shrink. It was elevated, freed from data processing to focus on judgment and relationship.

In healthcare, the convergence is most visible in regulatory frameworks. The FDA and HHS have moved toward governance models (U.S. Department of Health and Human Services, 2025) that assume neither full automation nor full human control but structured collaboration, clinical AI that augments rather than replaces physician judgment, with explicit accountability for how human and artificial intelligence interact in diagnostic and treatment decisions.

In legal services, firms like A&O Shearman (2025) have deployed AI for document analysis and legal research while maintaining human judgment for interpretation, strategy, and client counsel, recognising that the value clients pay for is not information retrieval but the relational and contextual intelligence that transforms information into advice.

The pattern is unmistakable. In every domain where organisations attempted full automation of stakeholder-facing processes, the result was the same: efficiency gains accompanied by relational damage that ultimately threatened the efficiency gains themselves. And in every domain, the corrective has converged on a shared design logic — AI in a supporting rather than substitutive role, with human judgment kept in command at the point of consequential decision. This is the orchestration paradigm, and the cross-sector evidence is primarily evidence for it. ARM draws on this convergence and goes one step further: it couples the orchestration paradigm with Grönroos's relational paradigm, treating the human stakeholder — here, the applicant — as an active participant in the process rather than the recipient of an orchestrated decision. That relational extension is ARM's specific contribution to talent acquisition; the orchestration paradigm is what makes it operationally viable.

This convergence is significant because it was not coordinated. No single theory drove these sectors toward orchestration. They arrived there through independent experimentation and independent failure. When multiple domains, facing different stakeholder populations and different regulatory environments, independently converge on the same design logic, the convergence itself is indicative. The orchestration paradigm is not a theoretical preference. It is an observable pattern, one that talent acquisition is the last major stakeholder domain to recognise.

5.2 The Missing Domain

Talent acquisition is not merely one more domain left behind. It is the universal gap. Every organisation, in every sector, of every size, in every market, hires. It is the foundational process through which every organisation constitutes itself. The field itself has acknowledged this omission: Potočnik et al. (2021), synthesising a decade of meta-analyses, identify strategic recruitment as a critical gap, noting that only Phillips and Gully's (2015) multilevel model had attempted to align

recruitment with organisational strategy. Yet even that model remains within a transactional frame, treating applicants as resources to attract rather than stakeholders to engage. The orchestration paradigm has reached customers, supply chains, legal affairs, and clinical decisions. It has not reached the people without whom none of those activities exist..

The urgency is not abstract. Every domain that has converged on orchestration did so the hard way, after full automation had already inflicted the damage. Talent acquisition is approaching the same inflection point, but with a critical difference. In insurance or banking, a damaged stakeholder relationship means a lost client.In talent acquisition, a damaged stakeholder relationship means a lost contributor, someone whose talent, creativity, and commitment will now flow to a competitor, or simply never materialise. And unlike every other domain, this damage is silent. No KPI measures it. No balance sheet includes it. No quarterly review surfaces it. It is a cost nobody acknowledges, not because they don't understand it, but because nobody sees it. The best candidates don't complain. They simply go elsewhere. The organisation never knows what it lost, only that, over time, the quality of its workforce no longer matches its ambitions. The stakes are higher because the asset at risk is not immediate revenue but capability and the damage to talent acquisition goes unnoticed.

ARM positions talent acquisition within the orchestration paradigm already validated, painfully, wherever it has been adopted. The four tenets are not theoretical inventions. They are the principles we are already converging on, translated into the domain that needs them most. The Agent Triad is not a novel architecture. It is the operational structure that every domain adopting orchestration has independently arrived at, applied to the one, stakeholder relationship, that every organisation depends on and almost none has thought to design for.

The question is not whether the orchestration paradigm will reach talent acquisition. The cross-sector evidence suggests it will, eventually. The question is whether organisations will complete the shift proactively, building capable orchestrators and relational architectures before the agentic economy embeds transactional logic so deeply into talent acquisition that no relational alternative remains viable. The path of every domain that has converged on orchestration is already unfolding here: full automation came first, the relational damage has begun to surface, and the corrective is now within reach. The opportunity is to make that third step proactively, while it remains tractable.

6. Discussion: Managing in the Agentic Economy

6.1 The Capable Orchestrator: New Competencies for the Agentic Economy

The orchestration paradigm does not merely redesign systems. It redefines what it means to be a professional in a stakeholder-facing role. If the capable orchestrator is, as Section 4.3 argued, the load-bearing element of the entire architecture, then the question of how organisations develop this capability becomes strategic, not operational, not a training line item, but a fundamental rethinking of what competence means in an age where AI handles the tasks that used to define professional identity.

For decades, recruitment professionals have been valued for skills that automation is rapidly absorbing: screening CVs efficiently, managing high-volume pipelines, administering structured interviews at speed. These are precisely the capabilities that AI agents perform at scale. The professional who defines their value through transaction processing is, in Tenet 4's terms, a gatekeeper, and gatekeeping is a role the agentic economy is eliminating, not enhancing.

The capable orchestrator requires a fundamentally different competency profile. Three capabilities emerge as essential, each grounded in the theoretical foundations established in Section 3. Table 2 summarises ARM's four tenets and their corresponding managerial implications.

First, **relational intelligence**: the capacity to build, sustain, and repair relationships with stakeholders whose experience of the organisation is mediated by AI. This is not customer service. It is the ability to recognise when an algorithmic output needs human interpretation before reaching the applicant, when a rejection requires a conversation rather than a notification, when the Silver Medallist warrants

personal engagement rather than database storage. Relational intelligence is the competency that Packard's efficiency-effectiveness distinction demands, the human capacity to ask not "*was this processed correctly?*" but "*did this interaction build or damage a relationship that matters?*"
Second, **critical AI literacy**: the ability to understand what AI systems are doing well enough to leverage their strengths and challenge their limitations. This is not technical expertise. The capable orchestrator does not need to understand neural network architecture. They need to recognise when an AI recommendation reflects genuine pattern recognition and when it reflects the noise that Kahneman et al. demonstrate pervades human judgment and that, as Section 3.3 argues, manifests differently but no less consequentially in AI systems. They need the professional confidence to override algorithmic output when contextual judgment demands it, and the intellectual humility to recognise when their own judgment is the noisier input.
Third, **accountability practice**: the willingness and skill to make one's own decision-making explicit, to document reasoning, to provide applicants with evaluations that are consistent and explicable. This is Harari's epistemological humility made operational, the recognition that opacity in one's own judgment is as dangerous as opacity in the algorithm's, and that the only honest response is to design for transparency in both directions.

Table 2. *ARM tenets and managerial implications.*

ARM Tenet	***Theoretical foundation***	***Managerial implication***
1.Relationships precede transactions	*Packard (1960); Grönroos (1994)*	*Treat every applicant interaction — including rejections and Silver Medallists — as a contribution to an ongoing relationship that extends beyond hire.*
2.Opacity is universal; design for accountability	*Harari (2017); Rudin (2019); Suen and Hung (2024)*	*Require reasoning traces from AI, explicit documented reasoning from human operators, and explicable outcomes for applicants. Disclose role requirements, not predictive scoring rubrics.*
3. Noise reduction requires collaboration, not replacement	*Kahneman, Sibony and Sunstein (2021)*	*Develop critical AI literacy in recruiters; reject rubber-stamping of algorithmic outputs; design feedback mechanisms that cultivate active judgment.*
4.Orchestration supersedes automation	*Meijerink et al. (2021); ARM extension*	*Invest in capable orchestrator development with the same seriousness as AI capability; design systems that develop human capability rather than bypass it.*

These competencies are not being developed at scale. Management education continues to train recruitment professionals for a transactional paradigm that is already failing. Organisational development programmes invest in AI literacy as a technical skill rather than as a component of professional judgment. The capable orchestrator is the role the agentic economy demands; the gap between that demand and the current supply of professionals equipped to fill it represents both a risk and, for organisations that move first, a decisive competitive advantage.

6.2 Regulatory Alignment: ARM and the EU AI Act

The orchestration paradigm is not only emerging from practice. It is being codified in regulation. The European Union's AI Act (European Parliament and Council, 2024) represents the most comprehensive attempt to govern AI deployment in stakeholder-facing processes, and its requirements align remarkably with ARM's design principles.
The AI Act classifies AI systems used in employment, worker management, and access to self-employment as **high-risk**, triggering a demanding set of obligations: human oversight, transparency, data governance, accuracy, robustness, and the right of affected persons to receive meaningful explanations of AI-assisted decisions. These are not abstract regulatory aspirations. They are legally enforceable requirements that will reshape how every organisation operating in or serving EU markets designs its talent acquisition processes.

The two-track high-risk regime. The Act creates two routes into high-risk classification. Under Article 6(1) and Annex I, AI systems are high-risk when they function as safety components of products already governed by EU harmonised legislation — medical devices, machinery, vehicles, aviation systems, and similar regulated categories. Under Article 6(2) and Annex III, AI systems are high-risk by virtue of their intended use across eight stand-alone domains, of which the fourth — employment, workers' management, and access to self-employment — is the locus of the systems this paper addresses. Talent acquisition AI sits squarely within the Annex III track. The distinction matters because the two tracks proceed on different conformity-assessment logics: Annex III on largely internal assessment supported by harmonised standards still under development at CEN-CENELEC JTC 21; Annex I on layering AI-specific requirements onto pre-existing sectoral regimes such as the Medical Devices Regulation or motor-vehicle type-approval. ARM addresses Annex III's particular challenge directly: how to operationalise human oversight, transparency, and explicability in a domain where the substantive obligations are already clear but the technical standards are not yet codified.

A moving compliance horizon. The legally binding application date for Annex III obligations remains 2 August 2026. As this paper goes to press, the European Commission's Digital Omnibus on AI — proposed in November 2025, with converging Council and Parliament negotiating positions adopted in March 2026 — is in trilogue with a proposed postponement of Annex III obligations to 2 December 2027 and Annex I obligations to 2 August 2028. A political agreement on a consolidated postponement text is expected at the trilogue meeting of 28 April 2026, with potential adoption by Parliament and Council in May and June and publication in the Official Journal in July. Until that sequence completes, the August 2026 deadline holds; organisations operating in EU markets cannot reliably plan against the proposed 2027 date.

The delay, should it be enacted, is procedural rather than substantive: it reflects the late arrival of harmonised standards, the incomplete designation of national competent authorities, and a shortage of accredited conformity-assessment bodies, not a softening of what the Act requires of organisations deploying employment AI. This regulatory uncertainty has a paradoxical implication for the argument advanced in this paper. Organisations that read the postponement as permission to defer ARM-aligned redesign mistake its meaning: when the harmonised standards are eventually cited in the Official Journal, they will be drafted around the practices of organisations that adopted orchestration early. Those that waited will inherit a compliance regime shaped by those that did not. ARM's relevance is not contingent on the August 2026 deadline holding; it rests on the substantive obligations the Act codifies, regardless of when they take operational effect.

Whatever timing the trilogue ultimately produces, the alignment with ARM is structural, not coincidental. The AI Act's human oversight requirement mirrors the Agent Triad's allocation of authority: AI handles pattern recognition, human operators exercise contextual judgment, and the human stakeholder receives explicable outcomes. The Act's transparency obligations correspond to Tenet 2's insistence that opacity must be managed through accountability, not because it is virtuous but because it brings costs when unmanaged. The requirement for meaningful explanations to affected persons echoes ARM's treatment of the applicant as an active stakeholder whose understanding of the process is a system input, not an afterthought.

What the AI Act does not provide, and what ARM is designed to deliver, is the how. Regulation specifies what organisations must achieve: human oversight, transparency, explicability. It does not, and it cannot, specify the operational architecture through which these requirements are met. ARM's Agent Triad, compensatory evaluation model, and capable orchestrator concept offer a concrete framework for compliance that is grounded not in legal minimalism but in the conviction that what the regulation requires is also what effective talent acquisition demands.

This convergence between regulatory requirement and relational design is significant. Organisations that adopt ARM's principles are not merely preparing for compliance. They are building systems that the regulation validates because both, the law and the framework, emerged from the same recognition: that AI deployment in consequential stakeholder processes requires orchestration, not automation,

and that the stakeholder's experience is not an externality to be managed but a measure of whether the system is working at all.
For organisations outside EU jurisdiction, the trajectory is nonetheless instructive. The AI Act represents the direction in which AI employment governance is moving globally. Recent experimental evidence also suggests these requirements align with what applicants themselves prefer: Xiong and Kim (2025) find that third-party AI audits increase applicants' trust and positive attitudes toward hiring organisations more effectively than self-disclosed information sharing. ARM-aligned organisations are building for the paradigm that regulation, practice, and theory are independently converging toward.

7. Limitations and Future Research

This paper's argument rests on conceptual synthesis rather than empirical testing, and it would be dishonest to claim otherwise while demanding honesty from everyone else.
The cross-sector evidence for orchestration draws on recent deployments and regulatory frameworks, not longitudinal data. The pattern is consistent and the convergence is real, but the evidence base is young. Whether orchestration's advantages hold as AI capabilities evolve, as organisational learning curves steepen, and as the agentic economy reveals dynamics none of us can fully anticipate, these are empirical questions this paper can frame but not answer.
The ARM framework has not been validated across diverse recruitment contexts. The four tenets and the Agent Triad are theoretically grounded, but their effectiveness across different industries, organisational sizes, labour markets, and cultural contexts remains to be demonstrated. The compensatory evaluation model, while theoretically superior to the multiple-hurdle approach, has historically been impractical at scale, not because it proved inferior, but because the resources it demanded were prohibitive. The agentic economy removes this constraint for the first time: AI agents can sustain multi-dimensional, continuous evaluation at a fraction of the cost that made compensatory models unaffordable for human-only processes. This is both a limitation (the model remains untested at scale) and the strongest possible argument for testing it now.
The atrophy argument, that transactional systems erode the human capabilities orchestration depends on, is logically coherent and consistent with evidence from domains where skill degradation follows automation. But the specific causal mechanisms, the rate of erosion, and whether genuine tipping points exist beyond which recovery becomes impractical: these require longitudinal investigation that this paper can only motivate.
Finally, this paper argues from a position. It holds that relational approaches to stakeholder processes are superior to transactional ones. Thirty years of relationship marketing theory, the cross-sector evidence examined here, and the regulatory direction exemplified by the EU AI Act all support this position. But it is a position nonetheless. Alternative frameworks deserve rigorous engagement, and a single paper cannot exhaust a debate that the agentic economy is only beginning to force.
What this paper can claim is that the question it raises is urgent, under-examined, and consequential. These limitations are not reasons to defer that question. They are reasons to pursue it, empirically, across contexts, and now.

8. Conclusion

Grönroos proposed a paradigm shift thirty years ago. It transformed how organisations relate to their customers, their suppliers, their communities. It did not reach the people they need to hire.
This paper has argued that the omission was not minor and is no longer tolerable. The agentic economy is arriving, not as a distant possibility but as a present reality reshaping how organisations make consequential decisions about people. The systems organisations build today will embed either

transactional or relational logic into those decisions, and the choice, once made, will be difficult to reverse. Transactional systems that have spent three decades manufacturing waste, eroding relational capability, and processing human beings as data points are about to be amplified by AI agents capable of operating at unprecedented scale and speed. Without a relational framework governing that amplification, the result is predictable: more waste, faster, led by a shrinking human capability to recognise or correct it.

This paper, part of a broader ARM research programme undergoing cross-disciplinary validation across marketing theory, human resource management, and AI governance, offers a framework for a different trajectory. Its four tenets, relationships precede transactions, opacity demands accountability, noise reduction requires collaboration, orchestration supersedes automation, are not theoretical abstractions. They are design principles that multiple domains have independently converged toward, translated into the one stakeholder process that every organisation depends on and almost none has thought to design for.

The Agent Triad provides the operational architecture. The capable orchestrator defines the human capability that makes orchestration possible, and valuable. The compensatory evaluation model ensures that the people at the centre of the process are treated as the multi-dimensional stakeholders they are, not as data points to be filtered through pass/fail gates. Historically impractical at scale, rejected on affordability, not merit, it is now viable for the first time, as AI agents sustain multi-dimensional evaluation at a fraction of previous cost. The irony is precise: the same technology that threatens to deepen transactional logic also makes the relational alternative achievable. The cross-sector evidence suggests that this is not a question of whether but when. Orchestration is emerging wherever AI meets consequential stakeholder decisions. Talent acquisition is the last major domain to recognise this, and the one that can least afford to wait.

The opportunity is real, and the window for taking it is narrow.

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Società Italiana di MANAGEMENT

Short papers

Track:
Artificial Intelligence in Management



Advancing Production Management through Big Data and AI: Current Practices and Challenges in Italian SMEs

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Abstract. *The increasing digitalization of manufacturing systems has led to growing interest in the adoption of Big Data (BD) and Artificial Intelligence (AI) in production management. While the literature has extensively examined the use of these technologies in large corporations and digital platforms, fewer studies have focused specifically on small- and medium-sized enterprises (SMEs). Nevertheless, SMEs represent the majority of manufacturing firms in many industrialized economies and play a central role in industrial supply chains. This study investigates the state of the art and the main challenges associated with the implementation of BD-AI technologies in production management within Italian manufacturing SMEs. The research adopts a mixed-methods approach. In the first stage, a Delphi panel composed of experts in digital technologies, manufacturing consulting, and operations management identified nine relevant BD-AI application areas in production environments. In the second stage, a survey of 109 Italian manufacturing SMEs evaluated the perceived relevance of these applications using a Likert-scale questionnaire. The results show that SMEs express strong interest in applications related to resource consumption optimisation, energy efficiency, predictive and preventive maintenance, and production routing simulation. Conversely, applications such as production scheduling optimisation, predictive quality control, and automated root-cause analysis receive lower interest due to organisational, technological, and cultural barriers. The study highlights the importance of developing customised and flexible BD-AI systems capable of supporting human decision-making in dynamic production environments. The findings contribute to the literature on Industry 4.0 adoption in SMEs and provide managerial insights for technology developers and practitioners.*

Keywords: *Big Data; Artificial Intelligence; Industry 4.0; Production management; Manufacturing SMEs; Digital transformation*

Framing of the research. The rapid development of digital technologies has transformed the manufacturing sector during the last decade. In particular, the emergence of the Industry 4.0 paradigm has introduced new opportunities for integrating advanced digital technologies into production processes. Among these technologies, Big Data (BD) and Artificial Intelligence (AI) have become central components of modern manufacturing systems. Big Data refers to the ability to collect, store, and analyse very large and heterogeneous datasets characterized by volume, velocity, and variety (Laney, 2001). Artificial Intelligence, on the other hand, includes algorithms and computational models capable of extracting knowledge and patterns from these datasets in order to support automated or semi-automated decision-making processes (Reis et al., 2021).

In manufacturing environments, large volumes of data are generated continuously by machines, sensors, industrial robots, enterprise software systems, and digital platforms. These data streams include information related to machine conditions, production flows, quality indicators, energy consumption, and environmental parameters. When analysed using advanced analytics and machine learning techniques, such datasets can support important operational improvements such as predictive maintenance, energy optimisation, and production planning (Javaid et al., 2020). As a consequence, BD and AI technologies are considered fundamental drivers of the digital transformation of manufacturing systems.

Despite these opportunities, the adoption of BD-AI technologies is not uniform across organisations. Large multinational firms often possess the financial resources, technological infrastructure, and specialised skills required to implement advanced analytics solutions. In contrast, small- and medium-sized enterprises frequently encounter significant barriers when attempting to adopt these technologies. SMEs often operate with limited financial resources and limited digital expertise, which makes the implementation of complex analytics platforms more difficult (Maroufkhani et al., 2020). Moreover, organisational culture and managerial experience can influence the willingness of firms to adopt innovative digital solutions.

Understanding how SMEs perceive and adopt BD-AI technologies is therefore essential for the broader digital transformation of the manufacturing sector. In Europe, SMEs represent the majority of manufacturing firms and contribute significantly to employment and economic output. In Italy, for instance, SMEs account for approximately 92% of manufacturing companies and operate in highly specialised industrial clusters. These firms often compete through flexibility, craftsmanship, and niche specialisation rather than through large-scale automation. For this reason, analysing the adoption of BD-AI technologies in SMEs requires considering the specific operational characteristics of these organisations.

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Existing literature has analysed the potential benefits of BD and AI in manufacturing environments. Studies have shown that these technologies can support predictive maintenance, improve product quality, optimise production scheduling, and enhance sustainability performance (Feng and Shanthikumar, 2018; Azeem et al., 2021). However, many of these studies focus primarily on large organisations or theoretical frameworks related to Industry 4.0. Empirical evidence regarding the adoption of BD-AI technologies in SMEs remains relatively limited.

Furthermore, SMEs face unique challenges when integrating advanced digital technologies into their existing production systems. These challenges include the lack of internal data science expertise, limited investments in digital infrastructure, and difficulties in managing large volumes of unstructured data generated by production processes (Kumar et al., 2024). As a result, SMEs may adopt BD-AI technologies selectively, prioritising applications that deliver immediate operational benefits while avoiding those that require extensive organisational transformation.

For these reasons, investigating the adoption of BD-AI technologies in SMEs represents an important research area. By examining how manufacturing SMEs evaluate different BD-AI applications and the challenges they encounter during implementation, scholars can contribute to a more realistic understanding of digital transformation in manufacturing.

From the literature review, we can highlight some gaps.

- The literature discusses the benefits of BD-AI in various sectors. Still, it does not delve deeply into SMEs' specific challenges when integrating these technologies into existing production systems.
- There is a limited focus on SMEs. Several studies concentrate on larger firms or general industry applications, leaving SMEs underexplored despite their distinct challenges and needs.
- Research often mentions challenges in passing without thoroughly analysing the barriers to adoption and how they might be overcome.
- There is conflicting evidence regarding the impact of BD-AI on environmental and sustainable performance.
- While some studies highlight the positive effects, others find no significant impact. This contradiction suggests a gap in understanding the conditions under which BD-AI technologies contribute to or fail to enhance environmental sustainability.

The literature review also revealed that BD-AI implemented in production management has four principal areas of interest:

- simulation and optimisation
- predictive processes
- environmental management and energy management.

We considered these implementation areas when developing our semi-structured interview guide.

Purpose of the paper. The purpose of this paper is to investigate the adoption and perceived importance of Big Data and Artificial Intelligence applications in production management within manufacturing SMEs. Specifically, the study seeks to identify which BD-AI applications are considered most relevant by SMEs and to analyse the challenges that organisations face when implementing these technologies.

The research is guided by two main research questions. The first research question asks: which BD-AI applications are of greatest interest to manufacturing SMEs? The second research question investigates: what challenges do SMEs encounter when adopting BD-AI technologies in production environments?

Addressing these questions contributes to the academic literature in several ways. First, it provides empirical insights into the technological priorities of SMEs operating in advanced manufacturing contexts. Second, it highlights the gap between theoretical Industry 4.0 frameworks and the practical needs of smaller manufacturing firms. Finally, it offers practical recommendations for managers, technology developers, and policymakers who aim to support the digital transformation of SMEs.

Methodology. The research adopts a mixed-methods design combining qualitative and quantitative approaches. Mixed-methods research allows scholars to investigate complex phenomena by integrating different sources of evidence and perspectives (Shorten and Smith, 2017).

The first stage of the research involved a qualitative Delphi study conducted with a panel of twelve experts. The panel included specialists in artificial intelligence technologies, manufacturing consultants, and production managers working in Italian SMEs undergoing digital transformation. Through several rounds of semi-structured interviews, the experts discussed the potential impact of BD-AI technologies on production management processes. These are the questions administered to the 12 experts.

- *What do you think are/will be the impacts of BD-AI in relation to simulation and optimisation?*
- *What do you think are/will be the impacts of BD-AI in relation to predictive processes?*
- *What do you think are/will be the impacts of BD-AI in relation to production planning and scheduling?*

- *What do you think are/will be the impacts of BD-AI in relation to environmental management (including energy management)?*
- *What do you think are/will be the general impacts of BD-AI on production management?*

During the Delphi process, experts identified multiple areas where BD-AI technologies could support manufacturing operations. Through thematic analysis, these insights were organised into nine theoretical themes representing potential applications of BD-AI technologies in production environments. These applications included: *production routing simulation, machine parameter optimisation, production scheduling optimisation, predictive maintenance, predictive quality control, root-cause analysis, resource consumption optimisation, environmental impact reduction, and energy efficiency improvement*.

In the second stage of the research, these nine themes were transformed into survey items and evaluated through a quantitative questionnaire. The questionnaire was distributed to Italian manufacturing SMEs through an online platform. The sample consisted of companies with fewer than 250 employees operating in discrete manufacturing industries. To reduce bias, the companies have been selected based on the same characteristics, as identified below:

- range from 0 to 250 employees and production units located in Italy
- intermittent production system based on a combination of job-shops that have machinery and assembly lines or cells. We avoided continuous flow processes. Indeed, these types of industries are usually highly capital intensive with a high level of capacity utilisation and rigid production routing and scheduling. Thus, they use completely different software applications for processes such as maintenance, scheduling, parameters control, routing and energy management. In addition, they are rarely SMEs;
- not classified as companies that must control potential major-accident hazards involving dangerous substances because such companies must have in place specific systems to avoid environmental impacts according to strict legislation and rules.

A total of 109 valid responses were collected from managers responsible for production, operations, or technical functions. Respondents were asked to evaluate the importance of each BD-AI application using a five-point Likert scale ranging from "not important" to "very important."

To analyse the data, the study employed non-parametric statistical techniques, including the Wilcoxon signed-rank test. Non-parametric tests are particularly appropriate when analysing ordinal data obtained from Likert-scale questionnaires and when assumptions of normal distribution cannot be guaranteed.

Table 1 – Results from the Wilcoxon rank test

Variable	Null hypothesis: median of the variable equals	Sig.
RESOU	4.7	.802
ENERG	4.5	.448
MAINT	4.4	.800
SIMUL	4	.106
PARAM	3	.709
SCHED	2	.316
CAUSE	2	.222
QUALI	Any value	<.05
ENVIR	Any value	<.05

Results. The insights gathered from both the expert interviews and the online survey reveal a complex and evolving landscape in which manufacturing companies are increasingly aware of the potential of Big Data and Artificial Intelligence (BD-AI) applications, while also confronting several practical challenges. A strong theme emerging throughout the comments is the recognition that the manufacturing environment has changed dramatically in recent years, particularly regarding the availability and cost of resources. Many respondents linked this shift to global disruptions, first the pandemic, then geopolitical tensions, which have generated instability in the supply of raw materials, energy, and other essential inputs. This volatility has reinforced the perceived importance of BD-AI applications capable of optimising resource consumption. Companies described the need for advanced systems able to integrate production rates, operating hours, process parameters, and real-time cost data in order to support decisions about scheduling, procurement, and commodity purchasing. These systems are viewed not merely as tools but as strategic assets that can help organisations navigate increasingly unpredictable markets. Similar enthusiasm was expressed regarding the potential of BD-AI to improve energy efficiency. Many companies reported that they had already begun implementing analytics-based solutions capable of monitoring consumption, optimising machine schedules, detecting anomalies, and selecting the most convenient energy providers. Some organisations explained that they had been developing such systems for many years and were now enhancing them using machine learning and deep learning algorithms. These long-term investments have resulted in large repositories of data stored in the cloud and continual

experimentation with more advanced predictive models. The general tone of the comments suggested that BD-AI in the field of energy efficiency is no longer experimental but embedded in daily operations, with many firms actively collaborating with external partners such as start-ups to further improve these tools. Predictive and preventive maintenance emerged as another area where both experts and practitioners share a high level of confidence. Companies consistently emphasised the relevance of early warnings, real-time detection of abnormalities, and the ability to anticipate failures in machinery and assembly lines. Many respondents stated that they were already using or implementing systems featuring smart sensors and machine-learning-based analytics to detect and prevent faults. However, several comments pointed out an important nuance: predicting failures within machines is relatively straightforward compared to anticipating negative events in assembly stations. While mechanical components exhibit measurable patterns of deterioration, assembly activities may be affected by issues such as incorrect workstation configuration, damaged or uncalibrated tools, or environmental conditions that impact both productivity and worker well-being. Respondents indicated that while BD-AI is promising, the complexity and variability of these human- centred environments make accurate predictions challenging. A particularly interesting theme concerned the dynamic adjustment of preventive maintenance schedules. Instead of relying on fixed replacement intervals, several companies expressed a desire to integrate BD-AI to continuously analyse machine conditions, operating loads, and other factors to determine the optimal moment for intervention. This evolving concept, described by some respondents as a blend of predictive and preventive maintenance, aims to replace components not based on rigid thresholds but on real operating behaviour, thus reducing risks while avoiding unnecessary maintenance activities. Production routing simulation also generated considerable interest. Many respondents referred to such tools using the popular term “digital twins,” highlighting their importance in predicting bottlenecks and supporting the design of more robust production flows. However, a recurring concern emerged from the comments: many existing simulators appear to rely on static or historical data, such as average cycle times or predefined troubleshooting cases. Respondents stressed that real production environments are dynamic, with conditions shifting continuously, and therefore simulation tools must be capable of learning and adjusting in real time. There was some scepticism about whether current digital twin technologies truly possess this level of agility, and several participants described the development of dynamic, data-driven simulation models as an unresolved challenge. When considering the ability of machines to autonomously regulate their parameters to improve yield, opinions became more divided. While experts expressed strong confidence that BD-AI can support the continuous optimisation of machine performance, many manufacturing companies suggested that modern equipment already includes embedded control systems capable of adjusting vital parameters without requiring additional BD-AI layers. Some respondents emphasised that such optimisation functions are typically developed by machine manufacturers, not by the user companies or external software providers. As a result, while some organisations do see opportunities to use BD-AI to reduce cycle times or improve quality, others regard these applications as unnecessary or redundant. Applications related to production scheduling were met with even more cautious attitudes. Although experts view scheduling optimisation as an important field for BD-AI, many practitioners indicated that their production environments are too volatile for automated scheduling tools to be effective. Several respondents explained that they prefer manual, flexible methods, often relying on simple tools such as Kanban systems and spreadsheets, because their production flow must be adjusted shift by shift. They noted that before introducing sophisticated algorithms, it is more important to stabilise processes using lean principles and eliminate bottlenecks. Once waste is reduced, the need for complex scheduling systems may diminish substantially. Root-cause analysis and identification generated some of the most critical comments. While experts suggested that BD-AI could support rapid identification of defect causes, many respondents argued that such applications are feasible only in industries producing very large quantities of identical items. In sectors characterised by high product variety and frequently changing process conditions, data tend to be unstructured, inconsistent, and insufficient for pattern recognition. Respondents described dealing with thousands of part numbers and highly diverse types of problems, ranging from unusual noises to rare defects, making it difficult to build reliable analytical models. Human intuition and experience, they argued, remain indispensable in these situations. Similar challenges were raised in relation to predictive quality control. Respondents indicated uncertainty about what data to collect, how to measure relevant variables, and how to manage the enormous variety of inputs that might include not only pressures and voltages but also images, audio signals, and even odours. Several participants mentioned that their quality controllers rely on sensory cues that are difficult to formalise or quantify through BD-AI systems. As a result, companies appear to favour more traditional approaches, postponing heavy investments in predictive quality analytics. A comparable attitude was observed concerning environmental impact reduction. Although many companies are strongly committed to environmental compliance, their focus remains on monitoring legal parameters through IoT-enabled sensors and ensuring fast response in case of anomalies. Respondents questioned the added value of BD-AI analytics in this area, suggesting that environmental management relies more on immediate corrective actions than on predictive modelling. Overall, the narrative emerging from the respondents and experts presents a multifaceted picture: companies recognise the transformative potential of BD-AI but adopt these technologies selectively, prioritising areas where data are abundant, problems are stable, and value is clear. At the same time, they remain cautious in domains characterised by high variability, unstructured information, or strong reliance on human judgment.The results of the survey reveal substantial differences in how SMEs evaluate different BD-AI applications. Applications related to resource consumption optimisation, energy efficiency, predictive maintenance, and production routing simulation received the highest

ratings from respondents. Resource consumption optimisation emerged as the most relevant application area. Respondents emphasised that fluctuations in raw material prices and supply chain disruptions have significantly affected manufacturing operations in recent years. BD-AI technologies can support companies in forecasting resource demand, analysing supplier options, and optimising purchasing decisions. These capabilities allow SMEs to improve resilience and reduce operational costs. Energy efficiency applications also received strong support from respondents. Many companies reported implementing monitoring systems capable of collecting large quantities of energy consumption data. By applying machine learning algorithms to these datasets, companies can identify inefficiencies and optimise production schedules to reduce energy consumption (Bevilacqua et al., 2017; Andrei et al., 2022). Predictive and preventive maintenance represents another important application area. Sensors embedded in industrial equipment generate operational data that can be analysed using machine learning techniques to predict equipment failures before they occur. Predictive maintenance systems can therefore reduce machine downtime and maintenance costs (Feng and Shanthikumar, 2018; Wen et al., 2022). Production routing simulation was also considered highly relevant. Many respondents referred to digital twin technologies that allow companies to simulate production scenarios and evaluate potential improvements before implementing them in real operations (Gao et al., 2019; Zhang et al., 2022). In contrast, several BD-AI applications received relatively low ratings from SMEs. Production scheduling optimisation, predictive quality control, and automated root-cause analysis were considered less relevant. Respondents often argued that human expertise and lean production methods remain more effective for solving operational problems in dynamic production environments.

Research limitations. Although this study provides valuable insights into the adoption of BD-AI technologies in manufacturing SMEs, several limitations should be acknowledged. First, the research focuses exclusively on Italian manufacturing companies. While Italy represents a significant industrial context, the findings may not be fully generalisable to other countries.

Second, the study relies on perceptual data collected through questionnaires. While such data provide valuable insights into managerial attitudes and perceptions, future research could complement these findings with objective performance indicators and longitudinal case studies.

Third, the set of BD-AI applications analysed in the study was identified through a Delphi panel of experts. Although the Delphi method ensures the relevance of selected topics, alternative expert panels may identify additional application areas.

Managerial implications. The findings of this research provide several implications for managers and practitioners involved in manufacturing operations. First, SMEs should prioritise BD-AI applications that offer clear operational benefits and relatively low implementation complexity. Applications such as predictive maintenance and energy optimisation can deliver measurable improvements in productivity and cost efficiency.

Second, successful digital transformation requires organisational change in addition to technological investment. Companies must develop digital competencies among employees and encourage a culture that supports data-driven decision-making.

Third, SMEs should consider collaborative innovation strategies involving partnerships with universities, technology providers, and start-ups. These collaborations can provide access to advanced technological capabilities and reduce the risks associated with digital transformation projects.

Originality of the paper. This paper contributes to the literature by providing an empirical investigation of BD-AI adoption within manufacturing SMEs. While many Industry 4.0 studies focus on large organisations or theoretical frameworks, this research highlights the specific needs and perceptions of smaller firms operating in real production environments.

The originality of the study lies in its mixed-methods approach combining expert insights and empirical survey data. By integrating qualitative and quantitative evidence, the research provides a comprehensive understanding of both technological opportunities and implementation challenges.

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AI Literacy as a Hiring Signal in Project Management Recruitment

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Abstract. *Generative Artificial Intelligence is increasingly impacting project work, yet whether AI literacy is becoming a screening criterion for project managers remains an open empirical question. This is important in Human Resource Management, where project-based organisations select staff using competence frameworks that combine technical, managerial, and behavioural criteria. To fill this gap, we examine labour-market demand using a mixed-methods approach that includes web scraping, computational text mining, and qualitative content analysis. The dataset includes 530 Project Management vacancies posted on the job-recruiting digital platform Indeed across Italy, the United Kingdom, and the United States. Quantitative analyses identify requested skills, education, certifications, and tools, while qualitative coding examines advertisements that explicitly mention Artificial Intelligence or Generative Artificial Intelligence to understand how these capabilities are represented. AI-related signals are present, but inconsistently specified and rarely treated as clear entry thresholds; instead, they typically appear as expectations for working within organisational systems or AI-enabled interfaces. We position job advertisements as recruitment signals that shape the formalisation of emerging technologies in selection practice.*

Keywords: *Recruitment signals, Selection criteria, Skill requirements, Generative artificial intelligence, Project management, Cross-national labour markets*

Framing of the research. *Artificial Intelligence (AI) has shifted from a field primarily for technical specialists to a versatile technology now deeply integrated into daily organisational processes across various industries (Eloundou et al., 2024). Organisations leverage AI to automate routine and semi-structured tasks, derive predictive insights from extensive data, tailor interactions, and facilitate real-time decision-making (Davenport & Ronanki, 2018). More recently, the growth of Generative Artificial Intelligence (GenAI), capable of producing text, images, and other artefacts, is further transforming how knowledge work is performed and evaluated. Early evidence suggests GenAI can affect task allocation and productivity, especially in writing- and communication-intensive work, with gains that vary by worker characteristics and context (Brynjolfsson et al., 2025; Noy & Zhang, 2023). However, classic accounts of technological change underscore that labour-market effects depend on how technologies are embedded in workflows and recomposed into tasks and complementary roles (Acemoglu & Restrepo, 2019). Widespread use does not automatically translate into widespread formal requirements, making employer demand an empirical question rather than a foregone conclusion.*

This question is particularly salient for Project Management (PM), a role often positioned as a change-agent function but frequently staffed through ad hoc or subjective selection in transformation contexts, a mismatch that raises strategic risk when capability requirements are poorly specified (Doyle, 2002). Project managers operate at the intersection of formal methods (e.g. planning, scheduling, risk and cost control) and relational coordination (e.g. leadership, communication, stakeholder alignment). Contemporary standards emphasise adaptability and tailoring across predictive, agile, and hybrid approaches (ISO, 2020; PMI, 2021). As organisations trial AI-enabled forecasting, decision support, and generative tools for documentation, reporting, and communication, project work appears especially exposed to AI in everyday practice. However, whether employers are codifying AI literacy as a hiring threshold or treating it merely as a complementary advantage remains uncertain.

Although scholars have begun to investigate how AI can support project activities, document reviews, and the growing ecosystem of project management tools (Almeida et al., 2025; Bento et al., 2022), systematic evidence of the specific AI-related requirements that employers express in recruitment remains limited. This study addresses that gap by examining online job advertisements as a timely proxy for employer skill signals, while remaining attentive to issues of representativeness and measurement (Kureková et al., 2015). Anchored in Human Resource Management (HRM), the study focuses on selection validity, competence signalling, and talent pipeline development. Its scope is to clarify which AI-related competencies are demanded in the labour market and to assess the implications of these signals for recruitment practices, curriculum design in higher education and professional training, and individual upskilling priorities as GenAI becomes increasingly pervasive. Methodologically, it adopts a mixed-methods design that combines quantitative text mining and qualitative content analysis (Hsieh & Shannon, 2005; Krippendorff, 2018), drawing on a systematic web-scraping of PM vacancies posted on the job-recruiting digital platform Indeed between late July and August 2025, across Italy, the United Kingdom, and the United States, yielding a cleaned sample of 530 advertisements. By shifting attention from normative forecasts to observed recruitment signals, the paper offers comparative evidence on whether AI-related competencies are beginning to be institutionalised within hiring criteria for PM roles.

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Purpose of the paper. *This paper investigates whether and how AI literacy is being formalised as a hiring criterion for project managers. Drawing on a cross-national dataset of job advertisements from Italy, the United Kingdom, and the United States, it combines computational text mining with qualitative content analysis to examine the extent to which AI-related competencies appear in recruitment signals and how they are framed relative to established selection criteria such as experience, relational skills, and methodological fluency. The analysis positions job advertisements as institutionalised HRM artefacts that reveal how emerging technologies are (or are not) being codified into competence-based selection practices for project-based roles. By considering job advertisements as institutionalised artefacts of HRM, the study shifts focus from normative predictions about what project managers should know regarding AI to observable evidence of what employers actually formalise when granting access to managerial roles. To ground this investigation, the evolving landscape of AI in literature and applications within PM is briefly discussed.*

Over the last decade, research on AI in PM has shifted from treating AI as a single tool to understanding it as a diverse portfolio of techniques (e.g., machine learning, optimisation, natural language processing, and, more recently, GenAI) applied across specific PM processes and performance domains. For HRM, this diversity matters because AI-related competencies are unlikely to correspond to a single bounded skill; rather, they suggest evolving, hybrid competence profiles that complicate job design and selection criteria (Cheng et al., 2005; do Vale et al., 2018).

In general, AI use cases can be mainly categorised into four domains. Estimation and forecasting, where AI is extensively used to predict costs, effort, and duration, thereby reducing initial uncertainty (Adamantiadou & Tsironis, 2025; Davahli, 2020; Taboada et al., 2023). Scheduling and optimisation, with AI aiding in schedule creation, robustness evaluation, and resource-constrained planning; Bahroun et al. (2023) highlight the significance of this area. Risk and safety management involves applications such as anomaly detection, early-warning systems, and uncertainty modelling to facilitate proactive interventions (Nenni et al., 2025; Salimimoghadam et al., 2025). Finally, decision support and reporting, which includes an AI-powered Decision Support System that generates dashboards and recommendations, particularly for construction sustainability (Smith & Wong, 2022). These four domains mainly correspond to "hard" PM activities, which are generally easier to formalise in job descriptions than the relational and leadership functions emphasised in HRM (Ahsan et al., 2013).

Systematic reviews reveal that AI-enabled PM applications tend to concentrate in areas where data are abundant and outcomes are measurable, particularly in planning and control. Taboada et al. (2023) categorise research in various performance areas, highlighting AI mainly as an analytical tool that enhances forecasting, monitoring, and decision-making without replacing managerial judgment and accountability. Nenni et al. (2025) present AI as a catalyst for PM "digitisation", emphasising data-driven planning, risk detection, and performance assessment, while noting uneven maturity and validation across settings. A methodological note of caution from Müller et al. (2024) highlights persistent weaknesses in transparency and reporting rigour, suggesting that translating AI capability claims into formal competence frameworks poses a greater risk to recruitment and staffing decisions (Ahsan et al., 2013).

The literature on the field highlights a strong industry skew. Construction projects dominate empirical settings, arguably due to the richness of operational data (e.g., cost and schedule baselines, progress reporting, sensor streams, and BIM information), which enable modelling and automated monitoring. However, HRM systems in construction differ from those in services, the public sector, or creative industries, limiting the generalisability of AI-related skill expectations across project-based labour markets (do Vale et al., 2018; Gardiner et al., 2025). Broader reviews include IT/software and multi-project contexts, but typically with less consistent evidence of effectiveness at scale (Nenni et al., 2025; Taboada et al., 2023). The field's most robust evidence thus reflects particular project types and data infrastructures, complicating HRM efforts to standardise competence requirements across industries (Cheng et al., 2005).

The literature also reveals a persistent lifecycle imbalance. Planning and monitoring/control phases are significantly more developed than the closing and post-project learning phases. Stakeholder, procurement, and communication management are less addressed compared to prediction-focused tasks (Davahli, 2020; Nenni et al., 2025; Salimimoghadam et al., 2025)—and this discrepancy is significant for HRM, since these are the competencies most prominently featured in recruitment and appraisal frameworks (Ahsan et al., 2013; Borg et al., 2023). Related perspectives on cognition further emphasise the relevance of HRM. Stingl et al. (2025) contend that "project cognition" remains underdeveloped and call for greater integration with cognitive science. This perspective becomes increasingly urgent as AI influences how information is generated and acted upon. Ika and Pinto (2025) revisit Kahneman's influence on project theory and describe AI as both a potential tool for debiasing and a new source of overconfidence if accepted without scrutiny, reinforcing HRM concerns about judgment and behavioural competence (Cheng et al., 2005; Doyle, 2002).

GenAI represents a notable shift, focusing on creating and transforming project artefacts rather than merely predicting numerical outcomes. It can draft documentation, summarise meetings, generate status updates, translate communications, and assist with requirements work. These functions overlap with tasks that require coordination and communication, core to managerial skills frameworks (Cheng et al., 2005; do Vale et al., 2018). Recent reviews view GenAI as a tool to enhance, rather than replace, knowledge-intensive PM responsibilities (Nenni et al., 2025; Salimimoghadam et al., 2025). Evidence on how roles evolve aligns with this view; Holzmann et al. (2022) found that project managers expect AI to increasingly automate technical and analytical tasks, while emphasising the importance of human skills such as communication, leadership, and judgment. This duality supports HRM perspectives that technology can enhance managers' behavioural and relational skills (Doyle, 2002; Prikshat et al., 2023).

Overall, the literature aligns with a socio-technical perspective. AI might enhance PM performance, but human capital readiness remains a key constraint, emphasising the importance of AI competence for project professionals (Adamantiadou & Tsironis, 2025; Nenni et al., 2025; Salimimoghadam et al., 2025). However, the literature is much less explicit about whether this competence has become a labour-market gatekeeper. Most reviews focus on applications and implementation challenges rather than hiring procedures, credentialing, or integrating AI skills into job criteria. Several reasons might explain why AI competence hasn't yet become a clear hiring requirement. For instance, specialised roles can facilitate AI usage, high-impact applications often depend on infrastructure that is unevenly accessible, PM focuses on leadership and stakeholder engagement, with AI seen as a complementary tool (Bahroun et al., 2023; Cheng et al., 2005; Davahli, 2020; do Vale et al., 2018). Advances in digital infrastructure may eventually lead to more direct integration of AI within operational processes in specific sectors (Adebayo et al., 2025; Smith & Wong, 2022). Recent research on job role evolution shows that in some contexts, familiarity with AI is highly valued, while in others, leadership and stakeholder insights are the key differentiators (Gardiner et al., 2025; Pinto et al., 2025). Therefore, despite ongoing discussions about capabilities, concrete evidence on whether AI skills are becoming part of explicit hiring criteria remains limited, prompting analysis of job ads as formal HRM signals (Ahsan et al., 2013; do Vale et al., 2018). These considerations form the basis for the following research question: To what extent and in what ways are AI-related competencies emerging as selection criteria within HRM-driven recruitment processes for project managers?

Methodology. *This study adopts a mixed-methods sequential explanatory design in which large-scale quantitative evidence from online job postings is complemented by qualitative interpretation of postings that explicitly reference AI. This approach is appropriate when pattern detection at scale must be combined with contextual understanding of meanings embedded in text (Creswell & Clark, 2017; Grimmer & Stewart, 2013). It is also well suited to recruitment research because job advertisements both describe required competencies and signal organisational priorities and values to applicants (Ahsan et al., 2013; Barber, 1998). Integrating text mining with qualitative content analysis enables the study to capture the prevalence of AI-related signals and the ways AI competencies are framed as desirable, expected, or mandatory.*

Data were collected via systematic web scraping of the job search platform Indeed, chosen for its broad labour-market coverage, cross-country comparability, and availability of structured, extractable data fields. Other sources were evaluated but not used: Remote OK was excluded due to its limited representation of PM roles, and LinkedIn was avoided due to restrictions on automated, large-scale data collection. The scraping was conducted using Apify and the Indeed Scraper by Misceres, allowing a standardised, automated process across different markets and ensuring reliability for cross-national comparisons (Ahsan et al., 2013; Den Hartog et al., 2007). Using the same methodology, 200 job postings per country were initially collected for Italy, the United Kingdom, and the United States (total N = 600).

After export to .xlsx, a structured cleaning process removed non-relevant roles while retaining a broad set of project-management-related titles (e.g., Project Leader, Junior/Assistant Project Manager, Project Coordinator/Officer) to reflect occupational boundaries and entry routes, consistent with HRM perspectives on boundary construction (Ahsan et al., 2013; Hodgson, 2002). The final dataset includes 530 postings: Italy (n = 180), UK (n = 185), US (n = 165). Extracted fields include employer, title, full description, job categorisation, location, posting date, and salary, where available.

Quantitatively, the posts were organised in Excel and then analysed using Python (Anaconda/Jupyter). The text mining process involved cleaning the data, removing stopwords (in Italian, English, and custom lists), and creating frequency maps with WordCloud to identify top terms as part of the exploratory analysis (Gallivan et al., 2004; Sodhi & Son, 2008). Targeted frequency analyses focused on education, certifications, tools/software, and skills, guided by the PMI Talent Triangle's Ways of Working and Power Skills; Business Acumen was excluded. AI-related posts were identified through keyword searches, with manual validation to prevent false positives from Italian "ai," following best practices in content analysis (Ahsan et al., 2013; Krippendorff, 2018). For the qualitative aspect, validated AI posts were coded in Taguette (Rampin & Rampin, 2021), categorised by ad section and functional framing of AI, with additional comparisons between tech-intensive and non-tech-intensive sectors.

Results. *This study is currently a work in progress. The initial findings indicate that recruitment signals for PM roles largely rely on traditional selection criteria rather than on new technological capabilities. In the three labour markets examined, job ads primarily depict the project manager as responsible for coordination, delivery, stakeholder alignment, and project process management. This suggests a pattern of continuity rather than change: employers continue to prioritise prior experience, organisational reliability, and cross-team ability in their hiring criteria, while AI-related skills are still secondary in the overall selection process.*

A second pattern highlights the ongoing significance of educational and professional signals, though these vary across different countries. Job ads show that employers still rely on traditional indicators of competence, such as degree type, sector experience, and recognised certifications, to assess candidates' readiness for project roles. Nevertheless, these signals now seem more aligned with general expectations of professional maturity and credibility rather than specific technical expertise. This indicates that, despite the influence of digital transformation, hiring practices still favour traditional markers of employability and responsibility over newer forms of technological skills.

The preliminary findings also suggest that methodological fluency remains a central dimension of employability in PM. Advertisements consistently refer to familiarity with planning, monitoring, scheduling, delivery frameworks, and cross-functional coordination practices, confirming that employers still view project work through a structured

managerial lens. At the same time, the language of agility and hybridisation appears to be an extension of this logic rather than a replacement for it. In other words, organisations seem to value adaptability in methods, but within a competence profile that continues to emphasise execution, control, and communication.

Another initial finding highlights the importance of relational and behavioural skills. Key aspects such as communication, stakeholder engagement, leadership, negotiation, and the ability to collaborate across organisational boundaries are evident as core elements in role definition across all three countries. This point reinforces the study's broader argument, demonstrating that employers still view PM as a socio-organisational role rather than just a technical one. Even when referring to tools, platforms, or digital environments, these are usually seen as part of a broader expectation that project managers exercise judgment, coordinate stakeholders, and maintain alignment amid uncertainty. In this context, mentions of AI are limited and lack formal weight. When AI or GenAI is brought up, it is rarely considered a specific requirement for the role. Instead, it is usually described as part of the organisational environment or as an additional form of familiarity associated with innovation-focused settings. This indicates that AI literacy has not yet become a formal gatekeeping criterion in PM hiring. Rather than a standalone qualification, it currently functions as an emerging but not well-standardised signal, often overshadowed by more established expectations regarding experience, communication, and methodological skills.

Overall, the preliminary results support the interpretation that AI is entering recruitment discourse in PM in an incremental and dissimilar way. Employers appear aware of the growing relevance of AI-enabled work practices, yet this awareness has only partially translated into explicit competence requirements in job advertisements. The labour-market signal indicates a transition rather than full formalisation: AI is increasingly influencing the project work environment, but has not yet replaced the traditional basis for hiring project managers.

Research limitations. *This study notes several research limitations to consider when interpreting the results. First, using online job ads as coded signals of recruitment may not fully reflect actual hiring decisions, informal screening, or post-hire work requirements. Employers might use generic templates, omit new skills to keep applicant pools broad, or rely on internal training, leading to underreporting of AI-related expectations. Second, the dataset covers a brief period (July -August, 2025) and is drawn from a single platform (Indeed), which limits its generalizability across time, platforms, and labour market segments. Although Indeed enables cross-national comparisons, job postings there may differ systematically from those on LinkedIn, corporate career sites, or niche PM boards. Third, identifying references to AI and GenAI using keywords may miss implicit signals, such as tool names or phrases like "automation" or "data-driven," especially in Italian, and may require measures to prevent false positives. Fourth, text-mining results highlight lexical prominence rather than the actual importance of criteria in hiring decisions and do not account for skill trade-offs. Finally, cross-country comparisons may be affected by institutional and linguistic differences in job-ad formats, credentialing, and disclosure practices (such as salary and contract info), which could bias observed frequencies regardless of actual employer demand.*

Managerial implications. *The findings are likely to have multiple impacts on HRM practices, education, training, and PM. For employers and HR teams, the evidence indicates that AI literacy is not yet a standard gatekeeping criterion in hiring project managers. Nonetheless, the appearance of AI signals in some job postings—often described as working with AI teams or in AI-enabled settings—suggests that organisations are beginning to incorporate AI into project work, even if they do not explicitly include it in their selection criteria. This presents an opportunity to enhance recruitment clarity: as AI tools become more integrated into project workflows, employers can minimise mismatches between actual role requirements and applicant expectations by clearly indicating whether AI-related skills are necessary, preferred, or situational. Such transparency can improve the accuracy of selection, aid candidates in self-assessment, and ensure that hiring practices align with job design and governance structures.*

Regarding workforce development and talent pipelines, the findings suggest that traditional PM skills remain the most reliable and adaptable foundation across different labour markets. These include experience, communication, coordination, stakeholder management, and methodological fluency across predictive, selectively agile, or hybrid methods. Consequently, HRM systems should continue to emphasise the assessment of essential skills and accountability-related competencies through behavioural interviews, work samples, and structured reference checks. Additionally, organisations operating in IT-heavy or data-rich settings might find it beneficial to create role-specific AI capability profiles, which differentiate between basic literacy for engaging with AI-enabled platforms, governance skills for evaluating outputs, managing risks, and promoting responsible use, and technical expertise that resides with specialised analytics or AI roles rather than project managers.

For universities and training providers, the evidence supports a balanced curriculum strategy. Programmes should preserve a strong emphasis on relational skills, leadership, and project-method foundations while integrating AI and GenAI literacy as complementary capabilities. The most valuable learning outcomes are likely not tool-specific proficiency, which changes rapidly, but transferable competencies: critical evaluation of AI outputs, prompt literacy for communication tasks, awareness of bias and reliability limits, data and privacy fundamentals, and the ability to embed AI use within project governance and ethical standards. Certification bodies and professional associations can also leverage these insights to update competence frameworks and continuing professional development pathways without prematurely treating AI proficiency as a universal baseline.

For project professionals, the findings indicate that AI-related skills currently function mainly as differentiators in specific contexts rather than as general employability thresholds. Investing in responsible, practical AI literacy, especially for documentation, reporting, and coordination tasks, may yield an advantage in sectors where AI adoption is more advanced, while continued strength in communication and stakeholder leadership remains central across all markets. Overall, the study highlights the need to translate technological possibilities into purposeful hiring signals and development pathways, ensuring that AI complements rather than displaces the core managerial capabilities required by project work.

Originality of the paper. *This research is original in three key ways. First, it shifts the focus from predictions and capability narratives about AI in PM to observable HRM practices. Specifically, it examines job advertisements as institutionalised signals of recruitment that reveal what employers officially specify when granting access to managerial roles. While previous studies primarily map AI tools, applications, and barriers to adoption, there is limited systematic evidence on how AI skills are embedded in project managers' selection criteria. Second, the study offers a comparative, cross-national perspective by analysing three labour markets—Italy, the United Kingdom, and the United States—within the same time frame and using a standardised data collection method. This approach allows a direct comparison of how AI-related signals differ across institutional contexts, sectors, and job-posting conventions, rather than assuming demand is consistent everywhere. Third, the research combines computational text mining with qualitative content analysis focused specifically on postings that mention AI or GenAI. This mixed-method approach captures both how often AI is requested and how it is framed—such as organisational context, interface expectations, desirable skills, or explicit requirements. Overall, the study establishes a labour market baseline that helps determine whether AI literacy is becoming a standard requirement for hiring project managers and provides a replicable method for monitoring this process over time.*

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Algorithmic Triage: How Generative AI Transforms Decision-Making in Public Employment Services

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Abstract. *The diffusion of Generative Artificial Intelligence (GenAI) is increasingly affecting public sector organizations as well. Existing literature has so far mainly interpreted these technologies as tools for enhancing productivity or supporting decision-making processes, while comparatively less attention has been devoted to their organizational effects within citizen-facing services.*
This study examines how a GenAI-based conversational system reconfigures decision-making processes within a public employment service. Through an interpretive qualitative case study based on document analysis, observation of the digital interface, and institutional communication materials, the system is analyzed as an organizational artifact that embeds classifications, operational rules, and modes of interaction with users.
The findings show that GenAI does not replace professional decision-making but rather precedes it. The system collects information about users, produces a preliminary classification of profiles, and directs possible pathways before human intervention, filtering cases and contributing to the redistribution of staff attention.
To interpret this phenomenon, the paper introduces the concept of algorithmic triage, defined as an organizational mechanism through which GenAI systems pre-select and order requests prior to human intervention, thereby structuring access to the decision-making process.
The study contributes to the literature on algorithmic management by extending it to the context of public organizations and by showing how GenAI can operate as a decision infrastructure capable of shaping the allocation of professional attention and the sequencing of decision-making processes in welfare services.
Keywords: *Algorithmic Triage, Generative Artificial Intelligence, Decision-Making Processes, Public Sector Organizations, Algorithmic Management, Digital Government*

1. Introduction

In recent years, the diffusion of Generative Artificial Intelligence (GenAI) has progressively extended beyond experimental settings and commercial applications, entering public services as well. Conversational chatbots, virtual assistants, and systems based on large language models are increasingly used by public organizations to provide information, support users, and automate certain administrative interactions (Dwivedi et al., 2023; Kumar et al., 2025).
Management literature has so far primarily examined the impact of GenAI in private firms, highlighting its implications for productivity, innovation, and support to decision-making processes (Doshi et al., 2025). At the same time, studies on the public sector have mainly focused on administrative digitalization and e-government policies, interpreting digital technologies largely as tools to improve service efficiency and access to information.
These two research traditions, however, remain largely separate. On the one hand, management studies on GenAI mainly focus on market-oriented organizations and analyze applications in areas such as customer service, marketing, or managerial decision support. On the other hand, public sector literature tends to interpret digitalization as an administrative and technological process, without deeply investigating how GenAI-based systems may directly intervene in organizational decision-making processes.
This separation results in a theoretical gap in understanding how generative artificial intelligence operates when embedded in public organizations that do not manage customers but citizens, and that regulate access to social opportunities such as employment, training, and welfare services.
In this context, this paper proposes to analyze GenAI not only as an information technology or a decision-support tool, but as an organizational infrastructure that contributes to structuring decision-making processes. In particular, the study introduces and develops the concept of algorithmic triage, defined as a mechanism through which generative AI systems perform a preliminary selection and classification of users' requests prior to human intervention, thereby shaping the allocation of professional attention and the sequencing of organizational decisions.
The idea of algorithmic triage originates from the machine learning literature, where it is used to describe systems that distribute cases between human and algorithmic decision-making in order to optimize the use of available expertise (Raghu et al., 2019; Okati et al., 2021; Straitouri et al., 2021).
In light of these considerations, the present study addresses the following research question: *How does a GenAI-based career guidance system reconfigure decision-making processes and professional roles within a public employment service?*
To address this question, the paper presents an interpretive qualitative case study concerning the introduction of a GenAI-based conversational assistant within Italian public employment services. Through the analysis of institutional documents,

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observation of the digital interface, and service communication materials, the system is examined as an organizational artifact that embeds classifications, operational rules, and modes of interaction with users.
The remainder of the article is organized as follows. Section 2 develops the theoretical framework, discussing the role of GenAI in organizational decision-making processes and introducing the concept of algorithmic triage. Section 3 presents the research design and methodology adopted. Section 4 illustrates the main empirical findings of the case study, while Section 5 discusses the theoretical and organizational implications of the results and concludes the paper by outlining its limitations and possible directions for future research.

2. Theoretical Background

2.1 Digitalization of the public sector and user classification

In the public sector, the introduction of digital technologies has generally been interpreted within the framework of e-government policies, primarily as a tool for improving administrative efficiency and access to services (Margetts & Dunleavy, 2013; Wirtz et al., 2019).
However, a growing body of literature shows that digitalization does not only affect service delivery channels, but also reshapes internal decision-making processes within public organizations. In particular, information systems and algorithmic tools contribute to transforming the ways in which administrations classify citizens and assign differentiated administrative treatments (Busch & Henriksen, 2018; Kitchin, 2017).
This phenomenon is particularly relevant in welfare services. Public organizations must assess individual needs, establish priorities, and allocate scarce resources. Traditionally, these activities have been interpreted in the literature as part of the discretion exercised by front-line operators, described as street-level bureaucrats (Lipsky, 1980).
Digitalization, however, introduces forms of standardization into these processes. Decisions are not eliminated, but increasingly channelled into categories and procedures defined by information systems and digital infrastructures (Buffat, 2015; Busch & Henriksen, 2018).
In this sense, technology does not operate merely as an interface for accessing services, but also as a device for the preliminary assessment of cases.

2.2 Algorithmic Triage as an organizational mechanism

The literature on decision-support systems has traditionally interpreted technologies as tools that assist human decision-makers by providing additional information. Generative systems, by contrast, tend to intervene at an earlier stage of the decision-making process, contributing to defining which situations should be considered problematic, which require attention, and which can be managed through standardized procedures (Doshi et al., 2025; Dwivedi et al., 2023).
This phenomenon can be interpreted in light of the street-level bureaucracy literature. In welfare services, front-line workers select and prioritize citizens' requests because available resources are lower than demand (Lipsky, 1980). The first organizational decision therefore concerns not the intervention itself, but access to professional attention.
Traditionally, this selection function—implicit yet crucial—has been exercised through the professional judgment of operators. The introduction of GenAI-based systems alters this step: the preliminary assessment of the case is produced by the system, while the professional intervenes subsequently on the basis of an already formulated classification.
A similar logic has recently been conceptualized in the machine learning literature through the notion of algorithmic triage. In this perspective, the introduction of artificial intelligence into decision processes does not simply raise the question of whether a task should be automated, but also which cases should be handled by the algorithm and which should remain under human responsibility (Raghu et al., 2019).
Algorithmic triage models do not assume full automation; rather, they distribute cases between human actors and algorithmic systems in order to optimize the use of available expertise (Okati et al., 2021; Straitouri et al., 2021). In this sense, algorithmic systems operate as meta-decision mechanisms that determine when human intervention is required and when automated processing is sufficient.
Empirical evidence from the healthcare sector shows that AI-based triage systems can classify and prioritize cases before clinical evaluation, thereby helping manage resource scarcity and high service demand (Da'Costa et al., 2025; Güvey et al., 2025; Colakca et al., 2024).
Translated into an organizational context, this logic suggests that GenAI systems do not merely classify information or users, but also contribute to establishing the order in which cases gain access to the decision-making process.
In light of these considerations, this study introduces the concept of algorithmic triage as an organizational mechanism through which GenAI systems pre-structure the allocation of professional attention.
More specifically, algorithmic triage can be defined as a GenAI-mediated pre-selection process through which a generative system classifies, orders, and interprets requests prior to human intervention, thereby directing professionals' attention toward specific situations.
The concept recalls medical triage: it does not constitute a definitive diagnosis, but rather a preliminary assessment that establishes the level and urgency of the required intervention.

3. Methodology

Research Design. This study adopts an interpretive qualitative approach based on a single case study. The objective is not to evaluate the effectiveness of the technology or to measure its employment outcomes, but rather to understand how the introduction of a Generative Artificial Intelligence (GenAI) system reconfigures decision-making processes and organizational roles within a public service. A case study design is particularly suitable for analyzing complex contemporary phenomena that are closely intertwined with their organizational context, where the boundaries between technology and organization cannot be clearly separated (Yin, 2018).
Following the perspective of theoretically oriented case studies, the case is not intended to statistically represent a population, but rather to develop and refine theoretical concepts (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). The selected case concerns the introduction of a GenAI-based conversational assistant within Italian public employment services, designed as a tool for initial guidance and first interaction with users: the digital job guidance assistant AppLI.

Data Sources. Because the object of study is a recently introduced public system that is not accessible for internal observation, the research relies on two types of empirical materials (Denzin, 1978):

1. document analysis**.** Publicly available institutional documents were collected and analyzed, including official communications, informational materials, website content, and service presentations. Documentary analysis is widely used in management studies to reconstruct the operational and decision logics embedded in formal procedures (Bowen, 2009).
2. observation of the digital artifact**.** A direct observation of the conversational system's user interface was conducted. The analysis focused on the questions posed to users, the informational categories requested, and the recommendations returned by the system. In line with a sociomaterial perspective, the digital artifact is treated as an organizational object: information technologies embed rules, classifications, and operational practices that reflect organizational structures (Orlikowski, 2007; Leonardi, 2011). The interface therefore does not merely represent a communication tool, but an observable formalization of the decision-making process.

4. Results and Discussion

The analysis of the conversational interface, institutional materials, and public communication related to the system shows that the GenAI-based assistant does not perform a merely informational function, but intervenes in the preliminary stage of the user intake process. Rather than simply providing general guidance, the system collects structured information, interprets the user's profile, and returns operational recommendations that anticipate the work of human operators.
The characteristics of the service and its objectives are explicitly presented in the institutional communication of the promoting administration (Ministry of Labour and Social Policies, 2025). Empirical observation of the interaction with the system makes it possible to identify four main organizational functions through which the process of algorithmic triage becomes visible.

Guided information collection: structuring the problem. The first function of the system consists of the progressive collection of information about the user through a sequence of guided questions. The interaction is not entirely open-ended but oriented toward specific informational categories, including work experience, skills, education level, career goals, and willingness to undertake training pathways.
This function is consistent with the official description of the tool as a digital career guidance assistant capable of understanding the user's profile and directing them toward training and employment opportunities (Ministry of Labour and Social Policies, 2025).
However, this stage does not simply represent a process of data acquisition. The questions posed by the system delimit what the organization considers relevant for defining the user's situation. Information that does not fit within the conversational structure tends to be excluded or translated into predefined categories. Consequently, the system contributes to transforming a generic request—such as "finding a job"—into an organizationally manageable problem by translating individual experience into a classifiable profile.
From a theoretical perspective, this phase represents the first level of algorithmic triage: the system establishes which informational elements are necessary for making the case intelligible within the organization's operational categories.

Profile interpretation: producing a preliminary diagnosis. Based on the information collected, the system generates an initial interpretation of the user's profile. It does not simply summarize the data provided but formulates implicit assessments by suggesting possible occupational fields, identifying relevant training pathways, and proposing subsequent actions.
In the service presentation materials, the system is described as a tool capable of supporting users in defining their professional trajectory and preparing them for entry into the labour market (Ministry of Labour and Social Policies, 2025).

This stage constitutes a form of preliminary organizational diagnosis. The user is implicitly positioned within operational categories—such as immediately employable profile, profile to be strengthened through training, or profile requiring reskilling—even when these categories are not formally stated.
The output produced by the system immediately shapes users' expectations and anticipates the type of intervention that may subsequently be activated. In this sense, the system does not merely classify information but contributes to generating an initial interpretation of the case prior to the intervention of the human operator.

Pathway direction: ordering intervention priorities. The third function concerns the indication of concrete actions. The system suggests training courses, career guidance activities, or operational steps to be undertaken. Institutional communication presents the service as a tool that helps users identify training pathways consistent with their skills and prepare for entry into the labour market (Ministry of Labour and Social Policies, 2025).
These recommendations are not neutral. Rather, they represent an implicit ordering of the organization's intervention priorities, as they direct users toward specific types of actions even before contact with a human operator takes place.
At this stage, the system does not make formal administrative decisions, but it produces a channeling effect. Users approach the potential meeting with an operator already equipped with a plausible interpretation of their situation and a possible pathway to follow.
From an organizational perspective, this process contributes to establishing the order in which situations are addressed and the types of interventions that appear most appropriate.

Reallocation of professional work: selecting organizational attention. The fourth observable function concerns the implicit distribution of professional work within the service. The system absorbs the initial phase of case analysis—traditionally carried out by the operator—while human intervention tends to concentrate on situations that require clarification, discretionary assessment, or formal decision-making.
This configuration is consistent with the role attributed to the tool within active labour market policies, where the digital assistant represents a first level of guidance prior to the intervention of employment service professionals (Ministry of Labour and Social Policies, 2025).
The result is a reorganization of the decision-making process. Operators no longer perform the initial interpretation of users' needs, but rather intervene in cases that have already been classified by the system. Technology therefore acts as an organizational filter that contributes to determining which situations require in-depth professional attention and which can instead be handled through standardized procedures**.**

Algorithmic Triage and the reconfiguration of the decision-making process. Taken together, these findings show that the system introduces a preliminary phase of case selection and ordering within the organizational process. The technology does not replace human decision-making but rather alters its temporal sequence.
Before the intervention of human operators, the system produces an initial classification that guides subsequent actions and defines the type of professional attention required. In this sense, the system can be interpreted as a mechanism of algorithmic triage: it establishes the order of organizational situations, directs users' pathways, and redistributes professional attention within the service.
Algorithmic triage therefore does not merely classify information or users, but contributes to structuring access to the decision-making process. Through the pre-selection of cases, the system redefines the moment at which professional judgment intervenes and the conditions under which it is exercised.

5. Conclusion

This study examined the introduction of a GenAI-based career guidance system within public employment services, interpreting this innovation not merely as a technological change but as an organizational transformation of decision-making processes. The findings show that the technology does not directly automate administrative decisions, but rather alters the sequence through which they are produced: prior to human intervention, the system generates a preliminary classification of users that guides the subsequent actions of operators.
In this sense, digitalization does not eliminate professional discretion but redefines the timing and conditions under which it is exercised. Human intervention occurs on cases that have already been interpreted and ordered by the system, within operational categories that emerge from the interaction between the user and the conversational assistant.

6. Originality of the paper. The main contribution of this study lies in introducing the concept of algorithmic triage as an organizational mechanism through which GenAI systems pre-structure the allocation of professional attention. While existing literature has extensively examined the role of digital technologies in the classification of information and users (Bowker & Star, 1999; Kitchin, 2017), this study shows how generative systems operate at a further level: they do not merely organize information but also contribute to establishing the order in which cases gain access to the decision-making process.

Algorithmic triage thus highlights a specific form of technological mediation within organizational decision-making processes. Through the guided collection of information, the preliminary interpretation of user profiles, and the direction of possible pathways, GenAI systems contribute to selecting and ordering the situations that will require subsequent professional intervention.
From this perspective, GenAI can be interpreted not only as a cognitive technology or a decision-support tool (Dwivedi et al., 2023; Doshi et al., 2025), but also as a decision infrastructure that structures access to professional judgment. The study also contributes to the literature on algorithmic management by showing that mechanisms of algorithmic coordination do not emerge only in private firms or digital platforms, but can also manifest in public organizations and welfare services.

7. Managerial Implications. The findings of this study suggest several relevant implications for the management of public organizations introducing GenAI systems into citizen-facing services.
First, the adoption of conversational assistants and generative systems should not be interpreted solely as an initiative aimed at digitalizing services, but rather as a transformation of the organizational processes through which users are taken in charge. The informational categories and interaction patterns embedded in the digital interface contribute to defining which elements are considered relevant and which pathways appear plausible.
Second, the design of these systems acquires organizational and institutional significance. Since algorithmic triage shapes the allocation of professional attention, the classifications and decision logics embedded in digital systems may indirectly influence citizens' access to the opportunities provided by the organization.
Finally, the introduction of GenAI systems requires reflection on the relationship between technologies and professional discretion. While such systems may increase the efficiency of the preliminary stages of case analysis, they also redefine the role of professionals, who increasingly intervene in situations that have already been interpreted and ordered by the system. Managing this transformation represents a key challenge for public organizations, which must integrate new digital infrastructures without reducing professionals' capacity for interpretation and judgment**.**

8. Research limitations. This study presents several limitations that should be considered when interpreting the findings.
First, the analysis is based on a single case study concerning Italian public employment services. Although this approach is consistent with the exploratory aim of the research and with the theory-building perspective adopted (Eisenhardt, 1989; Eisenhardt & Graebner, 2007), the findings cannot be automatically generalized to other organizational contexts.
Second, the research relies primarily on publicly available documentary sources, observation of the digital interface, and institutional communication materials. The lack of direct access to operators and internal organizational data limits the possibility of conducting a more in-depth analysis of how the system is actually used in everyday work practices.
Finally, the study does not examine the effects of the system on users' employment outcomes nor on their experiences of interacting with the service. The analysis instead focuses on the organizational role of the technology and on the ways in which it contributes to structuring decision-making processes.

9. Directions for future research. These limitations open several opportunities for future research. Comparative studies could examine the adoption of GenAI systems across different public sector organizational contexts, such as healthcare, education, or social services, in order to understand whether and how the mechanism of algorithmic triage manifests itself in different forms.
Further research could also investigate the interaction between human operators and generative systems, exploring how professionals interpret, use, or potentially challenge the classifications produced by the algorithm. Finally, longitudinal analyses could assess how algorithmic classifications influence users' trajectories and the allocation of resources in public services over time.
Understanding these dynamics is essential for interpreting the growing role of Generative Artificial Intelligence in contemporary organizations. In these contexts, technology no longer merely supports decision-making but increasingly contributes to defining the conditions under which decisions become possible: professionals continue to make decisions, but they do so within an organizational space that has already been structured by the algorithm.

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Artificial Intelligence and Firm Governance: Toward a Predictive Control Model in the Viable Systems Approach

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Abstract. *Artificial intelligence (AI) is profoundly transforming organizational and decision-making processes. However, much of the management literature still interprets its impact primarily in terms of operational efficiency or performance improvement. Less explored is how AI affects the conditions of firm governance in contexts characterized by high levels of complexity and environmental dynamism. This study addresses this gap by developing an interpretative model of systemic predictive control within the theoretical framework of the Viable Systems Approach. In this perspective, artificial intelligence is interpreted as a cognitive lens that expands the informational variety available to decision-makers and contributes to the construction of the observed context, thereby influencing the relationship between deliberate and emergent strategy. The model highlights that AI does not generate value in a direct or deterministic way, but rather through the mediating role of the control system, which translates operational improvements into economically sustainable configurations consistent with strategic objectives. From this perspective, control evolves from a retrospective measurement tool into a predictive mechanism of systemic integration capable of supporting recursive processes of adaptation, learning, and strategic realignment. The theoretical contribution of the study lies in repositioning the debate on AI in Management within the broader theory of firm governance, proposing a conceptual architecture that connects artificial intelligence, complexity management, and systemic viability in the digital era.*
Keywords*: Artificial Intelligence; Firm Governance; Predictive Control; Viable Systems Approach; Organizational Complexity.*

Research background

The current competitive environment is characterized by profound transformations in globalization, increasing geopolitical tensions, and an unprecedented acceleration of technological innovation. As highlighted by Petricevic and Teece (2019), the international economic system is undergoing a phase of structural reconfiguration that affects global value chains, competitive models, and value creation mechanisms. In such a scenario, firms must rethink their organizational and decision-making architectures.

Recent literature describes this phase as an era of hyper-complexity characterized by nonlinear interactions, emergent phenomena, and continuously evolving competitive dynamics (Volpentesta et al., 2023).

In such contexts, traditional managerial paradigms increasingly reveal their limitations in providing adequate governance tools.

Among the main drivers of transformation is artificial intelligence. The emergence of agentic artificial intelligence with autonomous learning and decision-making capabilities is redefining the boundaries between automation and decision support (Bassano et al., 2024; Huang, 2025).The so-called agentic economy introduces new configurations of decision-making processes, in which intelligent systems interact with human decision-makers and organizational structures in increasingly integrated ways (Ratten et al., 2024).

Despite these developments, much of the management literature continues to interpret artificial intelligence primarily in terms of operational efficiency or performance optimization. Some studies highlight the potential of AI in supporting strategic planning and competitive analysis (Wagner, 2020), while more recent contributions emphasize the co-evolution between business models and intelligent technologies (Grego et al., 2024). However, a significant theoretical gap remains: an interpretative framework capable of systematically linking the adoption of AI to the transformation of firm governance conditions in complex environments is still lacking.

The Viable Systems Approach (Barile, 2008, 2009, 2023, 2024) provides a particularly suitable theoretical framework to address this gap. Within this perspective, the firm is conceived as a viable system that pursues its survival through processes of co-evolution with the environment and through the management of informational variety. System viability depends on the ability of the governing subject to select relevant supra-systems, maintain internal consonance, and activate coherent configurations among resources, processes, and purposes.

A central element of this approach is the distinction between environment and context. The environment represents the potentially infinite set of phenomena, actors, and relationships surrounding the system and is, by its nature, indeterminate and not fully knowable. The context, by contrast, is the portion of the environment selected and interpreted by the decision-maker on the basis of their informational variety—comprising knowledge, interpretative schemes, and experience—through which the system identifies relevant supra-systems and orients its strategic action (Barile, 2009).

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From this perspective, complexity does not concern the environment as a whole, but rather the observed context constructed by the decision-maker.
Consequently, strategy cannot be reduced to a purely deliberate design but emerges from the dynamic interaction between intentions, decisions, and contextual conditions. The distinction between intentional, deliberate, and emergent strategy highlights how, in contexts characterized by high uncertainty, firm governance must confront evolutionary processes that exceed formal planning. Managing complexity therefore requires tools capable of reducing uncertainty without eliminating variety, fostering a continuous realignment between strategic purposes and operational action (Bertalanffy, 1968).
Within this theoretical framework, artificial intelligence assumes a transformative role. It expands the variety of the decision-making system by enhancing information-processing capabilities and enabling advanced scenario simulations (Secundo et al., 2025). However, this expansion does not automatically generate value; rather, it modifies the cognitive and organizational conditions of governance, influencing the relationship between the operating system, the economic structure, and the informational–decision-making system.
Artificial intelligence can therefore be interpreted as a cognitive lens that extends the observational capacity of the decision-maker. In the systemic–viable paradigm, the decision-maker does not observe the environment in a neutral way but constructs the context through their informational variety by selecting the relationships that are relevant for strategic action (Barile, 2009). AI expands this observational capacity by enabling the processing of large information bases and the identification of relational patterns that are difficult to perceive through human cognitive capabilities alone. In this sense, artificial intelligence does not replace the decision-maker's interpretative process but rather extends their observational perspective.
Within this perspective, predictive control assumes a central role. It can be interpreted as a knowledge governance mechanism that integrates information and anticipations, generating knowledge that can support decisions consistent with systemic constraints. Its effectiveness depends on the ability to transform data into knowledge aligned with governance processes. AI may therefore act as an enabler—but also as a potential distorter—of knowledge creation and integration processes, with significant implications for transparency and decision reliability (Paniccia, 2018; Ferraris et al., 2019; Iandolo et al., 2021).
In complex systems, the functioning of predictive control is also closely connected to the management of interdependencies among organizational processes. From a process management perspective, it can be interpreted as a coordinated set of tasks—such as data qualification, scenario building, verification, and feedback—that span operational processes and connect different decision-making levels. Artificial intelligence can improve such coordination by increasing processing speed, information integration, and simulation capabilities; however, it also introduces new challenges related to algorithmic opacity, data quality, and the risk of misalignment between local optimizations and systemic coherence (Calabrese et al., 2024; Hagen et al., 2024).
In light of these considerations, the debate on AI in Management has not yet developed an interpretative model capable of systematically integrating operational, economic, and decision-making dimensions within the conditions of firm governance. This study positions itself within this theoretical space by proposing a systemic predictive control model that interprets artificial intelligence as a cognitive lens of the decision-maker in constructing the observed context and coordinating operational processes, economic structures, and governance mechanisms.
Given this theoretical gap, the objective of the study is to develop an interpretative model of systemic predictive control within the Viable Systems Approach (Caputo et al., 2019). In particular, the study is guided by the following research questions:
RQ1: How does artificial intelligence—particularly in its agentic forms—reshape governance processes through the redesign of informational and decision-making architectures?
RQ2: How can predictive control function as an integration mechanism between operational, economic, and systemic–decision-making dimensions, reducing the gap between deliberate and emergent strategy?
RQ3: What opportunities and challenges emerge from the use of artificial intelligence in coordinating control tasks supporting decision-making processes, particularly with respect to knowledge quality, transparency, and process coherence?

Purpose of the study. This study analyzes the role of artificial intelligence from the perspective of the Viable Systems Approach, interpreting it not as a mere technological tool but as a factor capable of affecting the conditions of firm governance in contexts characterized by high complexity, structural transformations, and increasing autonomy of intelligent systems (Huang, 2025; Petricevic & Teece, 2019).
The objective of the research is to develop an interpretative model of systemic predictive control capable of clarifying how the adoption of artificial intelligence reshapes the relationships between deliberate and emergent strategy, between the operating system and the governance system, and between economic configuration and dynamic sustainability. Although recent literature highlights how AI is redefining decision-making processes and business models through a co-evolutionary relationship between technology and organization (Grego et al., 2024; Ratten et al., 2024), a conceptual architecture capable of integrating these dynamics within the systemic conditions of firm governance is still lacking.
Building on the Viable Systems Approach (Barile, 2008, 2009, 2023), this study assumes that firm viability depends on the governing subject's ability to manage informational variety and to select configurations consistent with relevant supra-systems. From this perspective, artificial intelligence is interpreted as an amplifier of the decision-making system's variety

(Secundo et al., 2025), rather than a substitute for the decision-maker: value creation does not automatically derive from technological adoption but depends on the quality of integration between predictive capabilities, operational processes, and governance mechanisms.
The theoretical contribution of the study lies in the proposal of a multi-level conceptual architecture integrating three interdependent dimensions: the operational dimension, related to the stabilization and optimization of processes through predictive tools (Wagner, 2020); the economic dimension, concerning the translation of operational improvements into sustainable cost configurations; and the systemic–decision-making dimension, referring to the evolution of the informational–decision-making system as a cognitive infrastructure of governance capable of reducing the distance between intentional, deliberate, and emergent strategy.
In this way, the study contributes to the debate on AI in Management by proposing an interpretative perspective that overcomes a deterministic view of technology and reconnects artificial intelligence to the theory of firm governance. The proposed model links artificial intelligence, complexity management, and systemic viability, offering an interpretative framework for understanding the transformation of management in the era of the agentic economy (Huang, 2025; Volpentesta et al., 2023).

Research gaps – Research questions – Contributions alignment. In light of a literature gap that views artificial intelligence and digital transformation mainly as drivers of operational efficiency, without linking AI, complexity, and firm governance within a dynamic perspective, three research questions (RQ1–RQ3) emerge. These concern how AI reshapes firms' informational and decision-making architectures, how predictive control may integrate operational, economic, and systemic–decision-making dimensions, and which opportunities and challenges AI creates in supporting managerial decisions. The study contributes by proposing a conceptual model that makes these relationships explicit and highlights mechanisms of multi-level consonance and realignment between deliberate and emergent strategy. More specifically, it addresses the theoretical gap on AI and firm governance by defining predictive control as a cognitive infrastructure for systemic adaptation, linking it to the model's three dimensions, and clarifying how AI may both enable and challenge knowledge quality, informational transparency, and decision-making coherence in complex contexts.

Methodological approach. The research adopts a theoretical–interpretative approach aimed at developing a conceptual framework consistent with the Viable Systems Approach and oriented toward integrating the debate on artificial intelligence with the theory of governance of complex firms. This perspective aligns with studies that seek to construct conceptual architectures capable of interpreting emerging phenomena characterized by high levels of systemic complexity (Barile, 2008, 2023; Caputo & Saviano, 2020).
The methodological path unfolds in two interconnected stages. First, a critical and selective review of the literature was conducted, focusing on the following research streams: artificial intelligence and organizational transformation (Volpentesta et al., 2023); AI and strategic decision-making processes (Wagner, 2020; Ratten et al., 2024); agentic artificial intelligence and the redefinition of governance dynamics (Huang, 2025); and the co-evolution between business models and intelligent technologies (Grego et al., 2024). This review was not merely descriptive but was reinterpreted through the lens of the Viable Systems Approach, with the aim of identifying the main theoretical gaps concerning the relationship between AI adoption and the conditions of systemic viability of the firm (Vito et al., 2021).
Second, through the integration of the literature on AI in Management with key conceptual categories of the systemic–viable perspective—such as informational variety management, selection of relevant supra-systems, multi-level consonance, and recursion (Barile, 2009, 2023; Saviano et al., 2017)—an interpretative model of systemic predictive control was developed. The model represents the outcome of a multi-level process of theoretical abstraction and constitutes the core of the proposed contribution (Figure 1).
The framework is structured according to a systemic logic articulated across three interdependent levels: the operating system, representing the domain in which processes are transformed and predictive technologies are applied; the operational–economic structure, where operational dynamics are translated into cost configurations and economic sustainability; and the informational–decision-making system, conceived as the cognitive infrastructure of governance responsible for integrating heterogeneous information and reducing the distance between deliberate and emergent strategy.
This articulation makes it possible to explicate the causal and recursive relationships between artificial intelligence adoption, organizational reconfiguration, and governance capacity, highlighting the mediating role of the control system in generating internal consonance and strategic coherence.
The study does not adopt an empirical or quantitative design but belongs to the stream of theoretical research aimed at developing interpretative models. The validity of the contribution lies in the internal coherence of the proposed architecture, its explanatory capacity with respect to the phenomena analyzed, and its compatibility with the epistemological foundations of the Viable Systems Approach (Barile, 2023). From this perspective, the model represents a theoretical proposal open to future empirical validation and application across different organizational contexts.

Risultati.

Multi-level architecture of the model

As illustrated in Figure 1, the systemic predictive control model takes the form of a multi-level architecture describing the transition from the environment to the observed context through the decision-maker's observation process, integrating the role of artificial intelligence with the internal structure of the firm.

At the top of the figure, the environment is represented as the potentially infinite set of phenomena and relationships surrounding the system. Through the decision-maker's observation process, this environment is selected and interpreted, giving rise to the observed context—the relational space within which the firm identifies relevant supra-systems and orients its strategic dynamics (Barile, 2009; Barile, 2023). In this process, artificial intelligence acts as a cognitive lens that expands the decision-maker's observational capacity by increasing the informational variety available for interpreting the context.

The model highlights that artificial intelligence does not directly determine system viability. Consistent with the systemic–viable perspective (Barile, 2008, 2023)—and with a knowledge-based view—technology enters the organizational structure by modifying internal dynamics, but its effects depend on the ability of the governing subject to integrate such innovation into coherent organizational and decision-making configurations. Consequently, the impact of AI on system viability is mediated by the quality of governance mechanisms and, in particular, by the functioning of the control system. Within the coordination of control tasks, AI may enhance forecasting capabilities, increase the speed of information processing, facilitate the integration of heterogeneous data sources, and support the generation of predictive scenarios. However, these benefits are strongly conditioned by data governance quality, algorithmic transparency, and the presence of appropriate accountability mechanisms. In the absence of these conditions, AI may amplify informational asymmetries, generate a possible "illusion of precision," and reduce the verifiability of causal relationships, potentially undermining the coherence of governance processes.

At the core of the model lies the firm system, articulated into three interconnected levels: the operating system, the operational–economic structure, and the informational–decision-making system. This multi-level configuration overcomes the linear view of technological impact often found in the AI in Management literature (Wagner, 2020), highlighting instead the systemic and recursive nature of the organizational transformation induced by artificial intelligence.

Figure 1. Systemic predictive control model for firm governance within the Viable Systems Approach.

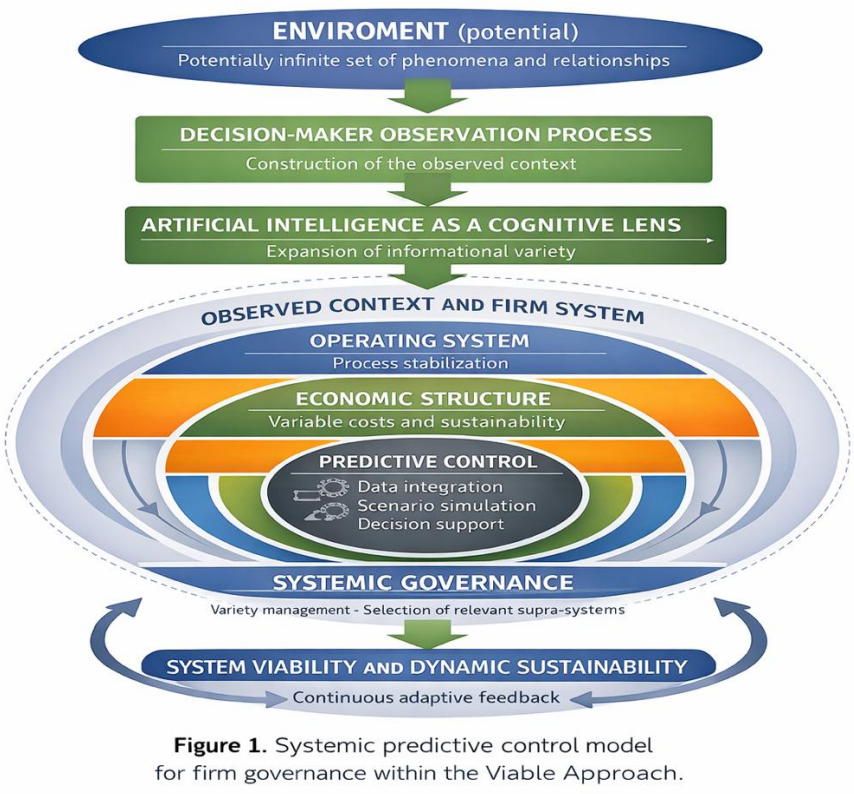


Figure 1. Systemic predictive control model for firm governance within the Viable Approach.

Source: Authors' own elaboration.

The model shows how predictive control performs an integration function across the different levels of the firm system, linking operational dynamics, economic configurations, and decision-making processes. From this perspective, control does not merely monitor performance but operates as a cognitive infrastructure of governance, contributing to sustain consonance among the different organizational levels and strengthening the system's adaptive capacity over time.

The mediating role of predictive control

The central position of the predictive control system in the figure is not merely graphical but reflects a precise conceptual function within the model. The framework shows that artificial intelligence primarily produces operational effects—such as process stabilization, reduced variability, and improved forecasting capabilities—consistent with findings in the literature on digital transformation and advanced automation (La Sala et al., 2023; Volpentesta et al., 2023).

These effects influence the firm's economic structure by reshaping variable costs and improving margin sustainability. However, as suggested by studies on the co-evolution of technology and business models (Grego et al., 2024), technological improvements do not automatically translate into systemic value.

In this context, predictive control plays a mediating role between the operating system and the governance system. It integrates heterogeneous data, enables scenario simulation, and supports the systemic observation of the context. In this sense, the control system can be interpreted as a cognitive infrastructure of governance, consistent with the idea of amplifying decision-making variety (Secundo et al., 2025).

Therefore, value creation does not derive from the mere adoption of artificial intelligence but from the quality of informational and decision-making integration that enables the governing subject to orient the generated variety toward configurations consistent with the system's purposes. The economic impact of AI is thus structurally mediated: without a control system capable of integrating and interpreting information, operational benefits remain fragmented and do not translate into enhanced governance capacity.

Multi-level consonance and reduction of the strategic gap

The model interprets AI-driven transformation in terms of multi-level consonance, a central concept of the Viable Systems Approach (Barile, 2009).

Internal consonance concerns the coherence between the operating system and the economic structure: the stabilization of processes reduces cost variability and contributes to strengthening the firm's economic sustainability. Governance consonance, in turn, refers to the ability of the informational–decision-making system to integrate these dynamics within a strategic framework consistent with relevant supra-systems.

In contexts characterized by the emerging agentic economy (Huang, 2025), strategy tends to become more emergent. Although the literature highlights the influence of artificial intelligence on strategic decision-making processes (Ratten et al., 2024), it remains less clear how this influence translates into systemic coherence.

The proposed model suggests that predictive control contributes to reducing the distance between intentional, deliberate, and emergent strategy by providing governance with tools for simulation and anticipation that facilitate continuous realignment between strategic objectives and operational actions. Artificial intelligence expands the variety of the decision-making system, but it is ultimately the governing subject who selects and directs this variety toward configurations compatible with system viability.

In this way, the model overcomes a deterministic view of technology and reaffirms the centrality of governance processes in the transformation of management.

Ricorsività e feedback adattivo

The lower part of the figure highlights the viability and dynamic sustainability of the system as outcomes of systemic governance capacity. This outcome does not have a static nature but is embedded within a continuous adaptive feedback loop consistent with the recursive logic of viable systems (Barile, 2023).

Recursivity implies that strengthening governance capacity fosters further organizational learning processes, contributing to the progressive redefinition of the observed context and to the reconfiguration of both the operating system and the economic structure. In this perspective, the transformation of management should not be interpreted as a one-time event but as a continuous evolutionary process, in line with studies on digital transformation and organizational resilience (Grego et al., 2024; Volpentesta et al., 2023).

Overall, the model suggests that artificial intelligence contributes to firm viability only when it is integrated into a predictive control architecture capable of connecting operational transformation, economic coherence, and systemic governance through a multi-level and recursive logic. Without such integration, AI risks producing local efficiencies that do not translate into an effective strengthening of the system's governance capacity.

Based on the relationships highlighted in the model, three theoretical propositions can be formulated regarding the role of artificial intelligence and predictive control in the governance of complex firms:

*P1***:** Artificial intelligence expands the informational variety of the decision-making system, extending the governing subject's capacity to construct and interpret the observed context.

*P2***:** Predictive control mediates the impact of artificial intelligence on value creation by integrating operational dynamics, economic configurations, and decision-making processes.

*P3***:** Multi-level integration among the operating system, economic structure, and informational–decision-making system reduces the distance between deliberate and emergent strategy, strengthening the adaptive capacity of the firm system.

Research Gap	Research Question	Contribution
The literature on AI in Management mainly emphasizes operational efficiency and performance, while a systemic framework linking artificial intelligence, complexity, and firm governance remains underdeveloped.	**RQ1:** How does artificial intelligence—particularly in its agentic forms—reshape governance through the redesign of informational and decision-making architectures?	Development of a **systemic predictive control model** that explains how artificial intelligence affects governance conditions in complex firms.
The relationship between AI-driven operational improvements and the economic sustainability of the firm is not clearly explained in existing studies.	**RQ2:** How can predictive control function as a mechanism integrating operational, economic, and systemic–decision-making dimensions, reducing the gap between deliberate and emergent strategy?	Identification of **predictive control as a mediating mechanism** between operational dynamics, economic configuration, and governance processes.
The literature rarely addresses the risks and tensions generated by AI adoption in decision-making processes, particularly regarding transparency, knowledge quality, and systemic coherence.	**RQ3:** What opportunities and challenges arise from the use of AI in coordinating control tasks supporting managerial decisions?	Clarification of the **opportunities and criticalities of AI adoption** in the coordination of control tasks and decision-making processes within complex organizational systems.

Discussion. The results of the systemic predictive control model contribute to the debate on AI in Management by providing a systemic interpretation of the transformation induced by artificial intelligence in governance processes. While a large part of the literature emphasizes the impact of AI mainly in terms of operational efficiency, automation, or analytical support to managerial decisions (Wagner, 2020; Ratten et al., 2024), the proposed framework highlights that the value generated by AI is structurally mediated by the governance architecture in which it is embedded.
Artificial intelligence does not directly determine competitive advantage but expands the informational variety of the decision-making system (Secundo et al., 2025). In contexts characterized by high complexity and dynamic interdependencies, this expansion modifies the cognitive conditions of governance, requiring new mechanisms capable of integrating heterogeneous information and supporting anticipatory decision-making processes.
The model suggests that predictive control plays a key role in this transformation. Rather than functioning solely as a retrospective measurement tool, the control system evolves into a predictive mechanism that integrates operational dynamics, economic configurations, and governance processes. Through scenario simulation and data integration, predictive control enables decision-makers to reduce the gap between deliberate and emergent strategy, facilitating continuous realignment between strategic objectives and operational actions.
In the context of the emerging agentic economy—where intelligent systems increasingly interact with human decision-makers and organizational structures (Huang, 2025)—the governing subject is required to perform a crucial role in directing and interpreting the variety generated by AI. The results therefore reaffirm the centrality of governance processes within technologically advanced organizational systems.
The study contributes to the literature by integrating the debate on artificial intelligence with the systemic perspective of firm governance. The proposed framework clarifies the conditions under which AI can effectively contribute to systemic viability, emphasizing the mediating role of predictive control and the importance of multi-level consonance between operational processes, economic structures, and governance mechanisms.

Research limitations. This study adopts a theoretical and interpretative approach aimed at developing a conceptual model of systemic predictive control within the Viable Systems Approach. Consequently, the research does not include empirical validation, and the proposed framework should be interpreted as a theoretical contribution open to further empirical investigation.
A first limitation concerns the absence of empirical testing of the model. Future research could apply the proposed framework to empirical case studies in order to examine how artificial intelligence influences governance mechanisms and decision-making processes in different organizational contexts.
A second limitation relates to the rapid evolution of artificial intelligence technologies. The emergence of agentic AI systems capable of autonomous learning and decision-making may generate organizational dynamics that extend beyond the conceptual assumptions developed in this study. Future research could therefore explore how the increasing autonomy of intelligent systems affects the balance between human governance and algorithmic decision-making.
Finally, the model focuses primarily on the internal architecture of the firm and the mediating role of predictive control within governance processes. Future research could extend the framework by examining inter-organizational ecosystems and digital platforms.

Managerial implications. Despite its theoretical nature, the study offers several implications for managers operating in contexts characterized by increasing technological complexity and the growing adoption of artificial intelligence.

First, the findings suggest that the adoption of AI should not be interpreted merely as a technological investment aimed at improving operational efficiency. Instead, organizations should consider artificial intelligence as a component of a broader governance architecture capable of integrating predictive capabilities with strategic decision-making processes.
Second, the results highlight the strategic role of predictive control systems in supporting managerial decision-making. Managers should therefore invest not only in analytical technologies but also in control mechanisms supporting data integration, scenario simulation, and strategic alignment.
Third, effective AI adoption requires governance mechanisms ensuring transparency, accountability, and coherence in decision-making processes. In complex organizational systems, the effectiveness of artificial intelligence depends on the ability of managers to maintain control over informational flows and to interpret algorithmic outputs within a broader systemic perspective.
Overall, organizations seeking to leverage artificial intelligence should focus on integrating technology, organizational processes, and governance mechanisms rather than on technological adoption alone.

Originality of the study. The originality of this study lies in integrating the debate on artificial intelligence in management with the systemic perspective of firm governance developed within the Viable Systems Approach.

While much of the existing literature focuses on the operational and performance-related implications of AI adoption, the present study reframes artificial intelligence as a factor capable of influencing the conditions of systemic viability of the firm. By interpreting AI as a cognitive lens that expands the informational variety available to decision-makers, the paper provides a novel perspective on how intelligent technologies reshape governance processes in complex organizational systems.

Moreover, the proposed framework introduces the concept of systemic predictive control as a mediating mechanism connecting operational processes, economic structures, and governance dynamics. This perspective contributes to bridging the gap between the literature on AI in Management and the theoretical foundations of systemic governance (Caputo et al., 2020).

Finally, the model offers a multi-level conceptual architecture that explains how artificial intelligence can simultaneously enable organizational learning, strategic adaptation, and systemic coherence in contexts characterized by high levels of complexity and technological change.

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Artificial Intelligence for Social Good: An Analysis of Objective Structures, Subjective Dispositions, and Collective Fields

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Abstract. *Artificial Intelligence for Social Good (AI4SG) has emerged as a rapidly expanding research domain, yet the literature remains fragmented across technological, ethical, and governance perspectives. This paper proposes a reinterpretation of AI4SG drawing inspiration from Bourdieu's theoretical framework, focusing on the interaction between objective structures, subjective dispositions (habitus), and collective institutional fields. Drawing on a systematic conceptual literature review of forty-five peer-reviewed articles published between 2020 and early 2026, the study maps how existing research emphasizes different analytical dimensions of AI for social good. The findings reveal a clear imbalance: most contributions focus on technological structures and governance arrangements, while comparatively minor attention is devoted to the subjective dispositions through which actors interpret and experience AI systems. By identifying structural tensions between technological design, institutional governance, and actor interpretation, the paper provides an integrative perspective on AI4SG and highlights the need to incorporate sociological insights into the governance and management of artificial intelligence initiatives.*
Keywords: *AI for social good; objective structures; subjective dispositions; collective fields; Bourdieusian framework; AI governance*

Framing of the research. Artificial Intelligence for Social Good (AI4SG) has emerged as one of the most contested territories in contemporary management and organization studies (Floridi et al., 2020). A rapidly expanding body of literature documents AI's potential to address major societal challenges, from poverty reduction and financial inclusion to humanitarian response, environmental governance, and public service transformation, positioning it as a key enabler of the United Nations Sustainable Development Goals (Floridi et al., 2020; Nasir et al., 2023). However, this growing body of research remains fragmented. Scholars tend to focus on one dimension at a time, such as technical design, regulatory policy, individual impacts, or societal change, and findings from one area rarely reach the others (Fosso Wamba et al., 2021; Franzke, 2022).

This fragmentation reflects a deeper problem: there is no shared understanding of what "social good" means in the context of AI. Some researchers define it in terms of the UN Sustainable Development Goals (Nasir et al., 2023). Others focus on values such as fairness and human dignity (Ryan & Stahl, 2020; Neubert & Montanez, 2020). Others still emphasize questions of participation and accountability in decision-making processes (Moon, 2023). The result is that AI4SG means different things to different actors, which makes it difficult to distinguish initiatives that genuinely advance social benefit from those that merely use the label to legitimate their actions (Floridi et al., 2020; Palladino, 2023). Iazzolino (2024) goes further, arguing that large technology companies increasingly deploy the AI4SG narrative as a strategic device to advance their own agendas in global development policy.

The rise of generative AI further sharpens these tensions. Systems capable of producing text, images, and code complicate traditional distinctions between tools and agents, making it increasingly difficult to determine where human responsibility ends and technological agency begins (Stahl & Eke, 2024; Crumbly et al., 2025).

A recurring pattern emerges from the reviewed literature: each analytical framework addresses a specific component of the problem, yet none integrates all of its dimensions. Ethical design principles clarify what responsible AI should look like, but they do not explain how individuals internalize these principles or how they become embedded as shared norms within organizations (Floridi et al., 2020; Ryan & Stahl, 2020). Audit tools operate primarily at the organizational level, often neglecting whether the actors affected by AI systems actually trust them (Laine et al., 2024; Li & Goel, 2025). Research on workers documents the human costs of AI deployment but rarely connects these findings to institutional governance responses (Braganza et al., 2021; Varma et al., 2023). Likewise, approaches that align AI initiatives with the SDGs establish useful collective targets but provide limited guidance on how everyday design decisions should reflect those goals (Nasir et al., 2023; Crumbly et al., 2025).

To address these gaps, this paper reinterprets the AI4SG literature through a Bourdieusian sociological framework. Rather than treating the literature as divided along separate thematic dimensions, it examines how different studies emphasize distinct components of the relationship between objective structures, subjective dispositions, and collective social fields. In Bourdieu's theory of practice, social outcomes emerge from the interaction between objective institutional arrangements, the internalized dispositions through which actors interpret and respond to them (habitus), and the structured social arenas in which actors compete for authority, legitimacy, and resources (Bourdieu, 1977; Bourdieu & Wacquant, 1992).

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Applied to the effects of AI4SG on society, this perspective highlights three analytically distinct but interrelated dimensions. First, some studies treat AI primarily as an objective technological and organizational structure, focusing on its capabilities, applications, and measurable impacts. Second, other studies emphasize the role of subjective dispositions, examining how managers, workers, consumers, and citizens perceive, interpret, and evaluate AI systems in practice. Third, a further body of literature operates at the level of collective social fields, analyzing how organizations, institutions, and governance systems negotiate the authority to define what counts as socially beneficial AI.

Purpose of the paper. The primary purpose of this paper is to reinterpret the fragmented AI4SG literature through a Bourdieusian analytical framework. Rather than organizing existing contributions solely by topic or domain, the analysis examines how different studies implicitly emphasize distinct components of the relationship between objective structures, subjective dispositions, and collective social fields.

From this perspective, the literature can be read as focusing on three analytically distinct but interrelated dimensions. First, some studies treat AI primarily as an objective technological and organizational structure, examining its design, capabilities, applications, and measurable impacts on organizations, markets, and public systems. Second, other studies emphasize the role of subjective dispositions, focusing on how managers, workers, citizens, consumers, and other stakeholders perceive, interpret, and evaluate AI technologies in practice. Third, a further body of work operates at the level of collective social fields, examining how organizations, institutions, and governance systems negotiate authority, legitimacy, and responsibility in relation to AI deployment.

This interpretative lens allows us to reinterpret the literature not simply as a set of thematic debates but as a distribution of analytical attention across the structural conditions, interpretive processes, and institutional arenas that shape AI for Social Good.

On this basis, the paper addresses the following research question: How can the fragmented AI4SG literature be systematically reinterpreted through a Bourdieusian framework that distinguishes among objective structures, subjective dispositions, and collective fields, and what structural patterns of emphasis and neglect emerge from this mapping?

The analysis is explicitly exploratory in scope. The analytical categories employed here are not intended to constitute a definitive classification of AI4SG research, but rather a heuristic framework for identifying recurring emphases and structural asymmetries within the literature. By mapping how attention is distributed across these dimensions, the paper aims to provide a first systematic orientation for future empirical and theoretical work in the field.

Methodology. The paper adopts a systematic conceptual literature review methodology (Tranfield et al., 2003), designed to provide a structured and transparent synthesis of a fragmented research field. The review was conducted across three major academic databases, namely Scopus, ScienceDirect, and Web of Science, using the Boolean search string: (“AI” OR “artificial intelligence” OR “generative AI”) AND (“social good” OR “human wellbeing”).

The initial search produced 460 results on Scopus, 1,504 on ScienceDirect, and 269 on Web of Science. After applying filters to include only peer-reviewed articles in English within the Business, Management, and Accounting fields, the number of articles was narrowed down to 23 on Scopus, 227 on ScienceDirect, and 11 on Web of Science. Subsequent screening of titles, abstracts, and full texts based on relevance criteria further reduced the corpus to 9, 37, and 5 articles, respectively. After removing duplicates and overlapping contributions, the final dataset consisted of 45 unique articles published between 2020 and early 2026.

In a second stage, the articles were interpreted through a Bourdieusian analytical framework. Rather than organizing the literature solely by topic or empirical domain, the analysis examined how different studies implicitly emphasized distinct components of the relationship between objective structures, subjective dispositions, and collective social fields (Bourdieu, 1977; Bourdieu & Wacquant, 1992). This approach follows the logic of ideal-type analysis (Weber, 1904), in which analytical categories serve as heuristic reference points for interpreting patterns within a corpus rather than mutually exclusive empirical containers.

Three analytical dimensions were therefore used to organize the literature. The first concerned objective structures, referring to studies that treat AI primarily as a technological or organizational arrangement whose properties can be externally specified and evaluated. Contributions were assigned to this dimension when their primary focus was the design, measurement, or regulation of AI systems through performance metrics, technical architectures, compliance standards, algorithmic audits, or formal governance instruments.

The second dimension concerned subjective dispositions, corresponding to what Bourdieu describes as habitus. Contributions were assigned to this dimension when their primary focus was on how situated actors, such as managers, workers, consumers, citizens, or communities, perceive, interpret, and evaluate AI systems. Indicators included discussions of attitudes toward AI, sensemaking processes, trust calibration, ethical interpretation, and the contextual meaning of algorithmic decision-making.

The third dimension concerned collective social fields, referring to the institutional arenas in which actors compete for authority, legitimacy, and resources in relation to AI governance. Contributions were assigned to this dimension when their primary unit of analysis involved organizations, institutions, policy regimes, or broader governance systems shaping the deployment and regulation of AI technologies.

Because individual studies may engage multiple dimensions simultaneously, the categories were treated as interpretive emphases rather than rigid classifications. The purpose of the coding process was therefore not to assign each contribution to a single analytical category, but to identify the dominant orientation through which the role of AI for social good was conceptualized. Table 1 summarizes the reading criteria, textual indicators, and exemplary keywords used to guide the interpretation of articles within these three analytical dimensions.

Table 1. Reading criteria, textual indicators, and exemplary keywords used to interpret the AI4SG literature through a Bourdieusian framework

Analytical dimension	*Reading criteria*	*Typical textual indicators*	*Exemplary keywords*
Objective structures	*The study treats AI primarily as a technological or organizational arrangement whose properties can be externally specified and evaluated. The focus is on system design, performance, governance instruments, or measurable societal outcomes.*	*Discussions of technical architecture, algorithmic performance, standards, compliance frameworks, evaluation metrics, regulatory instruments, or measurable impacts of AI systems.*	*algorithm design, AI architecture, performance metrics, task-technology fit, governance frameworks, algorithmic audits, SDG alignment, evaluation metrics.*
Subjective dispositions (habitus)	*The study focuses on how actors perceive, interpret, trust, or evaluate AI systems in practice. The emphasis is on situated interpretations, attitudes, ethical reasoning, and sensemaking processes through which actors respond to AI.*	*Analysis of user perceptions, managerial interpretations, worker experiences, trust calibration, ethical judgments, or contextual sensemaking related to AI adoption.*	*perception of AI, trust in AI, user attitudes, sensemaking, ethical interpretation, AI literacy, worker experience, stakeholder perception.*
Collective social fields	*The study examines the institutional arenas in which actors compete for authority, legitimacy, and resources related to AI governance. The focus is on organizations, institutions, policy regimes, and broader governance arrangements shaping AI deployment.*	*Discussions of AI governance systems, institutional arrangements, policy frameworks, multi-stakeholder processes, regulatory authority, or global governance regimes.*	*AI governance, regulatory frameworks, institutional actors, public policy, governance systems, participatory governance, institutional legitimacy.*

Source: Author's elaboration.

Results. The proposed interpretation of the forty-five reviewed articles reveals a clear structural asymmetry in the AI4SG literature (Table 2). The majority of contributions conceptualize AI primarily as a technological or organizational structure whose capabilities and societal impacts can be evaluated through externally verifiable criteria. A smaller group of studies examines the institutional arenas in which AI governance takes place, while only a limited number of contributions investigate the subjective dispositions through which actors interpret and experience AI systems in practice. More specifically, thirty of the reviewed articles focus primarily on AI as an objective technological structure, examining system design, evaluation frameworks, technical applications, or governance instruments associated with AI deployment. Eleven contributions operate mainly at the level of institutional fields, analyzing governance regimes, regulatory frameworks, or organizational actors involved in shaping the direction of AI for social good. By contrast, only four studies examine subjective dispositions, exploring how workers, users, or stakeholders perceive, interpret, and respond to AI technologies. This distribution suggests that AI4SG scholarship is strongly oriented toward structural and institutional analyses, while comparatively little attention has been devoted to the interpretive processes through which actors understand and engage with AI systems.

Table 2. Distribution of the corpus (45 articles) across the Bourdieusian analytical dimensions.

Analytical dimension	*Focus of analysis*	*Number of articles*
Objective structures	*AI systems, technical architectures, evaluation frameworks, and design principles*	*30*
Subjective dispositions (habitus)	*perceptions, interpretations, and experiences of AI*	*4*
Collective social fields	*governance systems, policy regimes, and organizational actors*	*11*

The largest share of the reviewed contributions conceptualizes AI primarily as an objective technological and organizational structure whose properties can be externally specified, measured, and evaluated. Within this stream of research, AI is treated as a set of computational systems and analytical infrastructures whose social value derives from their capacity to generate measurable improvements in social, economic, or environmental outcomes.

Several studies frame AI for Social Good explicitly in relation to the Sustainable Development Goals (SDGs). Nasir et al. (2023), for example, propose a systematic framework mapping the relationship between artificial intelligence technologies and the seventeen SDGs, identifying areas in which AI applications may contribute to development goals such as poverty reduction, health improvement, and environmental sustainability. Similarly, Crumbly et al. (2025) develop a classification framework for generative AI applications aligned with the SDGs, illustrating how different categories of AI systems can address specific societal challenges.

Other contributions focus on the development and evaluation of concrete AI applications designed to address social problems. Boto Ferreira et al. (2021) describe the implementation of an automated machine learning system for early detection of over-indebtedness, demonstrating how predictive models can support financial counseling services. In a similar vein, several studies examine how AI-based predictive analytics can improve decision-making capacity in areas such as humanitarian intervention, social services, or financial inclusion.

A further group of studies examines design and governance principles intended to guide the responsible development of such systems. Floridi et al. (2020) propose seven design factors for AI for Social Good, including falsifiability, privacy protection, and situational fairness, while Ryan and Stahl (2020) synthesize international AI ethics guidelines into a set of converging normative principles. These frameworks attempt to translate abstract ethical values into operational design criteria that can be incorporated into AI development processes.

At the same time, the literature identifies several structural challenges associated with this approach. Nasir et al. (2023) highlight the risk of "ethics washing," whereby organizations adopt ethical language without implementing substantive governance mechanisms. Saheb and Saheb (2023) document fragmentation across national AI policy frameworks, while Li and Goel (2025) identify significant competency gaps among auditors responsible for evaluating algorithmic systems.

Taken together, these studies portray AI4SG primarily as a technological infrastructure whose social impact can be assessed through objective design parameters, measurable performance indicators, and formal governance mechanisms. In this perspective, the central analytical problem is how to design and regulate AI systems to maximize their capacity to generate socially beneficial outcomes.

A much smaller portion of the reviewed literature focuses on the interpretive dimension of AI, examining how actors perceive, interpret, and respond to AI systems in practice. These studies highlight the role of habitus, namely the system of internalized dispositions through which individuals interpret social and technological environments and orient their actions within them. Rather than treating AI as a purely technical system whose value can be objectively measured, these contributions emphasize that the social meaning of AI emerges from how actors encounter, interpret, and evaluate algorithmic systems in their everyday contexts. From this perspective, the impact of AI technologies depends not only on their technical properties but also on the dispositions that shape individuals' understanding of their role, legitimacy, and consequences. Several studies illustrate how AI adoption reshapes workplace relationships and professional identities. Braganza et al. (2021), for example, show that the introduction of AI systems can disrupt psychological contracts between employees and organizations, altering expectations of fairness, autonomy, and mutual obligation. Varma et al. (2023) similarly document cases of algorithmic dehumanization in people management practices, highlighting the tensions that arise when algorithmic decision systems mediate workplace relationships. Other contributions emphasize the role of interpretive processes in shaping how AI systems are evaluated in different contexts. Dorotic et al. (2024) demonstrate that identical AI capabilities may be perceived positively in commercial environments yet negatively in public service contexts, suggesting that the perceived social value of AI depends heavily on the interpretive frameworks through which actors encounter it. Similarly, Chedrawi et al. (2025) show that responsible AI usage significantly affects users' behavioral intentions, indicating that trust, perception, and ethical interpretation play a crucial role in shaping AI adoption. Taken together, these studies suggest that the social outcomes of AI cannot be understood solely through technological design or governance frameworks. Instead, they are mediated by the dispositions through which actors interpret and engage with AI systems. The limited number of contributions within this dimension indicates that the interpretive and experiential aspects of AI adoption remain significantly underexplored within the AI4SG literature. While existing research provides extensive guidance on how AI systems should be designed and governed, comparatively little attention has been devoted to how the actors who encounter these systems understand, accept, or contest them in practice.

A third group of contributions examines AI for Social Good at the institutional field level, focusing on the arenas in which actors compete for authority, legitimacy, and resources in relation to AI governance. In Bourdieusian terms, a field is a structured social space in which actors occupy unequal positions and struggle to define the rules, norms, and priorities governing a particular domain of activity. Within the AI4SG literature, these studies examine how governments, international organizations, corporations, and civil society actors shape the governance frameworks through which AI technologies are developed and deployed. Several studies examine the field of global governance surrounding AI for social good. Palladino (2023), for instance, shows that the emerging international governance regime for artificial intelligence tends to privilege Western regulatory models and concentrates agenda-setting power in a limited number of technologically advanced countries. Similarly, Nasir et al. (2023) demonstrate that AI research aligned with the Sustainable Development Goals is unevenly distributed across policy priorities, with strong concentration in areas such as health (SDG 3), industry and innovation (SDG 9), and poverty reduction (SDG 1), while other development goals

remain comparatively underserved. Other contributions focus on the national and policy-level governance of AI systems. Saheb and Saheb (2023), for example, analyze more than thirty national AI policy strategies, revealing substantial variation in regulatory priorities and governance models across countries. These differences reflect distinct institutional traditions and political priorities that shape how AI technologies are integrated into public policy agendas. At the organizational and sectoral level, several studies examine how institutional actors influence the direction of AI4SG initiatives. Moon (2023) argues that meaningful social benefit requires participatory governance arrangements that incorporate stakeholders from civil society, public administration, and industry throughout the AI lifecycle. In a similar vein, Wilson and van der Velden (2022) propose a decision framework for public-sector AI deployment that emphasizes institutional learning, diversity, and shared meaning as key conditions for sustainable AI governance. Finally, some studies analyze the local governance of AI systems. Elbehairy et al. (2025), for instance, identify four roles played by municipal governments in AI ecosystems, namely regulators, buyers, facilitators, and entrepreneurs, demonstrating how local institutions actively shape the adoption and direction of AI technologies within urban governance systems. According to the findings, AI4SG initiatives operate within multi-level institutional fields in which different actors compete to define the priorities, norms, and governance mechanisms guiding the development of AI systems. From this perspective, the meaning of "social good" is not simply embedded in technological design but emerges through ongoing negotiations among actors occupying different positions within the AI governance field.

Research limitations. This study has several limitations. First, the classification of articles into the dimensions of objective structures, subjective dispositions, and institutional fields involves an interpretive element, and alternative readings of individual contributions may be possible. Second, the review focuses on peer-reviewed articles indexed in three major databases in the Business, Management, and Accounting field, thereby excluding relevant work from other disciplines. Finally, the analysis is exploratory and based on a corpus of 45 recent articles; future research may refine or extend the proposed analytical framework as the AI4SG literature continues to evolve.

Managerial implications. The findings of this study suggest several implications for managers and organizations involved in the development and deployment of AI systems for social purposes. First, the strong emphasis on technological structures in the existing literature indicates that organizations often approach AI for social good primarily as a technical design challenge. While robust system architectures, evaluation frameworks, and governance tools remain essential, managers should recognize that the social impact of AI systems depends not only on their technical performance but also on how they are interpreted and experienced by the actors who interact with them. Second, the limited attention devoted to subjective dispositions in the literature suggests that organizations may underestimate the importance of user perceptions, trust, and interpretive understanding in shaping the success of AI initiatives. Managers should therefore complement technical governance mechanisms with initiatives to strengthen AI literacy, promote transparency, and incorporate stakeholder feedback throughout the AI lifecycle. Third, studies examining institutional governance highlight that AI deployment occurs within complex multi-actor ecosystems comprising regulators, public institutions, technology firms, and civil society organizations. Managers implementing AI for social good should therefore actively engage with these institutional environments, recognizing that the legitimacy and effectiveness of AI systems depend on their alignment with broader governance frameworks and societal expectations. These implications suggest that effective management of AI for social good requires balancing three interrelated dimensions: the technical design of AI systems, the interpretive dispositions of the actors who use and experience them, and the institutional environments in which these systems are governed.

Originality of the paper. This paper contributes to the emerging literature on Artificial Intelligence for Social Good by proposing a Bourdieusian reinterpretation of the field. While existing research has examined AI4SG through technological, ethical, or governance perspectives (Floridi et al., 2020; Ryan & Stahl, 2020; Moon, 2023), relatively few studies have analyzed how these dimensions relate to one another within a broader sociological framework. By organizing the literature around the concepts of objective structures, subjective dispositions, and institutional fields, (Bourdieu, 1977; Bourdieu & Wacquant, 1992), this study provides an integrative lens that helps explain the fragmentation observed in the AI4SG debate.

The findings reveal a clear imbalance in the literature's analytical orientation. Most contributions focus either on the technological structures of AI systems or on the institutional arenas in which AI governance is negotiated (Nasir et al., 2023; Saheb & Saheb, 2023), while comparatively little attention is devoted to the dispositions through which actors interpret and experience AI technologies. This imbalance helps explain why the proliferation of governance frameworks and ethical guidelines has not always been translated into socially legitimate or widely accepted AI practices (Franzke, 2022).

When interpreted through the framework adopted in this study, the AI4SG literature reveals several structural tensions arising from this uneven distribution of analytical attention. The first tension concerns the relationship between objective governance structures and the dispositions of the actors expected to implement them. A large portion of the literature focuses on developing design principles, governance frameworks, and evaluation tools intended to guide responsible AI

development (Floridi et al., 2020; Ryan & Stahl, 2020). However, relatively few studies examine how these instruments are interpreted, internalized, or contested by the actors who interact with AI systems in everyday contexts. As a result, governance frameworks often remain detached from the interpretive processes through which individuals understand and respond to AI technologies. A second tension concerns the relationship between institutional governance and individual experience. The social consequences of AI systems are frequently experienced at the level of workers, consumers, and citizens (Braganza et al., 2021; Varma et al., 2023), yet governance responses are typically formulated within institutional arenas such as governments, international organizations, or corporate policy frameworks (Moon, 2023; Saheb & Saheb, 2023). This creates a disconnect between the sites where AI impacts are lived and the arenas in which governance decisions are negotiated. A third tension concerns the definition of social value within the AI governance field. Because multiple actors, including governments, corporations, international organizations, and civil society organizations, participate in shaping AI governance frameworks, the meaning of "social good" itself becomes the object of negotiation. Previous research has shown that global AI governance regimes tend to reflect the priorities and institutional norms of dominant actors within the field (Palladino, 2023). As a result, AI4SG initiatives may reflect institutional priorities, such as economic competitiveness or technological innovation, rather than a universally agreed definition of social benefit.

To conclude, AI for Social Good cannot be understood solely through technological design or institutional governance frameworks. Instead, AI4SG practices emerge from the interaction between technological structures, institutional fields, and the dispositions through which actors interpret and engage with AI systems. The limited attention devoted to the interpretive dimension of AI adoption indicates that the habitus through which actors encounter AI technologies remains a largely underexplored dimension of AI4SG research. By highlighting this imbalance, the study contributes to the literature by introducing a sociological perspective that connects technological design, governance processes, and actor interpretations within a unified analytical framework.

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Communicative Genres and Digital Capabilities Development and Engagement in Later Life: Preliminary implications

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Abstract. This research investigates how older adults develop digital capabilities that enable sustained participation in an increasingly digital society, moving beyond static models of technology adoption. While prior literature has emphasized structural barriers, cognitive determinants, and emotional factors such as technophobia, the corpus of knowledge demonstrate limited insight into the communicative processes through which digital capabilities are socially constructed over time. Drawing on communicative Genres theory, in this research we conceptualize digital capability as a relational and processual outcome shaped by patterned interactions within social networks. Trough a qualitative research design conducted within an elderly university in China, the study integrates survey data and 47 in-depth interviews with older adults and their social relations, to shed light on how communication unfolds across family, peers, and institutional actors. Findings reveal that digital capability develops through distinct communicative genres, including preparing, urging, reasoning, advisory instruction, and conceptualisation, which structure learning processes and relational roles. More specifically, the analysis identifies three main trajectories of digital capability development, formally: 1) greenhouse, 2) open-garden, and 3) wild-growth. Such trajectories differ in terms of relational embeddedness, communicative purposes, and autonomy, ranging from dependence on close ties to distributed and outward-oriented engagement. Crucially, the sequencing and interaction of communicative genres over time determine both the level of capability achieved and the nature of digital participation. On the basis of our results, this research contributes to ageing and technology literature by shedding light on digital capability as the key mechanism linking initial adoption to sustained engagement, and by advancing a communication-centred perspective on digital inclusion. Moreover, we further extend communicative genres theory by demonstrating how genres evolve and interact across social contexts, shaping capability development in dynamic socio-technical environments.
aging and technology literature by shedding light on digital capability as the key mechanism linking initial adoption to sustained engagement, and by advancing a communication-centered
Keywords: *Elderly; digital divide; technology acceptance; empowerment; later life; innovation; genres theory*

Framing the research. Recent research at the intersection of ageing and technology has called for a shift from static models of technology adoption toward a process-oriented understanding of digital capability development, through which older adults progressively integrate digital technologies into their everyday lives in an evolving digital society. While existing studies recognize that digital capabilities are socially developed, social context is typically treated as a generic form of "social influence", offering limited insight into the communicative forms and practices through which digital capabilities are formed. Drawing on the communicative Genres Theory, this qualitative study examines how patterned communicative practices lead to foundational, intermediate, and advanced levels of digital capability among older adults, and how the interrelationships among these communicative genres shape three distinct digital trajectories: 1) greenhouse, 2) open-garden, and 3) wild-growth. This study contributes to the ageing and technology literature by positioning digital capability as the foundation of older generation's continuous engagement in the digital society, and by theorizing communication as a mechanism of capability development that influences older adults' digital trajectories. It further extends communicative genres theory by offering a dynamic account of how genres interact within socially embedded networks. The findings also inform the design of digitally inclusive interventions that leverage everyday communication to support older adults' sustained engagement in the digital society.

The progressive diffusion of digital technologies across all spheres of everyday life has renewed scholarly attention to the persistent exclusion of older people from the digital society. Digital services increasingly mediate access to health care, public administration, social interaction, and consumption activities, making digital engagement a prerequisite for full participation in contemporary social life. However, a substantial proportion of older adults continues to experience difficulties in accessing, understanding, and effectively using digital technologies. Existing research has approached this issue through several complementary but only partially integrated streams of literature.

A first stream has focused on the grey digital divide, emphasizing how structural inequalities related to education, income, health status, and infrastructural conditions shape older people's access to and use of digital technologies (Dewan and Riggins, 2005; Friemel, 2016; Fox and Connolly, 2018; Neves et al., 2019). This body of work highlights that digital exclusion in later life is not merely a matter of individual resistance or lack of interest, but rather the outcome of cumulative disadvantages that precede and condition older adults' encounters with digital tools. While this perspective has been crucial in situating digital exclusion within broader socio-economic structures, it offers limited insight into how older people engage with technologies once access is achieved.

A second, highly influential stream has examined older adults' technology use through psychologically oriented acceptance models, most notably the Technology Acceptance Model and its extensions (Davis, 1989; Venkatesh et al., 2003; Chen and Chan, 2011, 2014). These frameworks explain adoption intentions primarily through cognitive

evaluations such as perceived usefulness, perceived ease of use, effort expectancy, and facilitating conditions. Age sensitive adaptations, including the Senior Technology Acceptance Model, have incorporated variables such as health status, anxiety, and self efficacy, improving explanatory power in later life contexts. Nevertheless, these models largely depict older users as isolated decision makers and tend to reduce technology use to a single adoption choice, offering limited leverage for understanding how digital engagement unfolds over time.

A third stream has addressed the emotional and affective dimensions of older adults' interactions with technology, with particular attention to technophobia and technology related anxiety (Laguna and Babcock, 1997; Barnard et al., 2013; Nimrod, 2018; Leite et al., 2024). This literature shows how fear, discomfort, and skepticism may inhibit experimentation and sustained use, even when technologies are perceived as potentially useful. While these studies acknowledge the role of emotions in shaping behavior, they often treat such factors as individual traits rather than as outcomes of relational and communicative processes.

More recent contributions have called for a shift from adoption centered explanations toward a process-oriented understanding of digital engagement. Drawing on diffusion theory and engagement research, scholars argue that adoption does not guarantee meaningful or sustained use of digital technologies (Rogers, 1983; Agarwal and Karahanna, 2000; Fischer et al., 2019). In this perspective, continuous engagement depends on older people's ability to integrate digital technologies into everyday practices, adapt to changing interfaces, and interpret new digital affordances over time. This has led to growing interest in the concept of digital capability, defined as the ability to build knowledge, skills, and mindsets through ongoing action in a social environment (Zhao et al., 2023).

Although recent studies increasingly recognize the relevance of social interactions in shaping older adults' digital trajectories, research remains vague regarding the communicative mechanisms through which such interactions support capability development. Constructs such as social influence or peer support are often invoked without unpacking the concrete communicative forms that structure learning, confidence building, and appropriation. As a result, existing literature lacks a relationally grounded explanation of how digital capabilities emerge and evolve within older people's social networks. Addressing this gap requires moving beyond decontextualized models of adoption and toward a communicative and practice-oriented perspective capable of capturing the dynamic social processes underlying continuous digital engagement, especially when referring to this "grey tsunami" (Guido et al., 2021; Sestino & D'Angelo, 2024).

Purpose of the paper. The purpose of this paper is to advance a fresh and complete understanding of older people's digital engagement by theorizing digital capability development as a process embedded in dynamic communicative structures. Building on research on the grey digital divide, technology acceptance, technophobia, and digital engagement, the study shifts attention from isolated adoption decisions to the ongoing development of capabilities that sustain effective technology use over time. Drawing on communicative genres theory (Yates and Orlikowski, 1992; Orlikowski and Yates, 1994), the paper examines how recurring forms of communication within and across social clusters such as family, peers, and institutional actors shape learning, confidence, and appropriation of digital technologies. By doing so, the study aims to explain how social interactions are translated into digital capabilities that enable older people's continuous engagement with the digital environment. Thus, based on above, formally, this research is aimed to advance a socio-material and practice-oriented understanding of older people's digital capability development by theorizing it as a process deeply embedded in dynamic communicative and relational structures. Specifically, we draw on the communicative genres theory that highlights the typified and recognizable forms of interactions shaped by context, purpose, and social role (Moser et al., 2013; Yates & Orlikowski, 1992).

Methodology. In the attempt to fill the gap presented above, in this study we adopted a longitudinal qualitative research design to examine how digital capabilities develop through communicative interactions within older adults' social networks, situated within the empirical context of an elderly university in China. Such a setting, in the authors' view, could be particularly appropriate as such institutions function not only as formal learning environment, but also as socially embedded ecosystems where digital practices are continuously reinforced through peer interaction and collective engagement (Ministry of Education, 2019). The coexistence of structured training and informal exchanges allows for observing digital capability as a situated and socially mediated process rather than a purely individual outcome.

Formally, the data collection has been structured in multiple phases, combining exploratory, survey-based, and in-depth qualitative inquiry: Firstly, an initial exploratory stage involved informal interviews with five students, which informed the development of a structured survey instrument designed to capture the breadth and depth of smartphone use, levels of understanding, and behavioural patterns including proactive, reactive, and outward-sharing practices. The survey has been thus distributed to a targeted sample of individuals aged over 60, consistent with the World Health Organization's definition of older adults (WHO, 2018), resulting in 95 valid responses, in the attempt to enable a classification of participants into three levels of digital capability: foundational (i.e., 26 participants), intermediate (i.e., 56 participants), and advanced (i.e., 13 participants) to reflect the heterogeneity widely documented in ageing populations (Czaja & Lee, 2007; Zhao et al., 2023).

On the basis on the aforementioned classification, a sampling strategy guided the selection of participants for the qualitative phase: Twelve older adults representing the three capability levels were recruited for in-depth longitudinal

interviews. These interviews were complemented by the inclusion of 27 key actors within their social networks (i.e., family members, peers, and other relevant contacts) identified as influential in shaping their digital practices. This multi-actor design allowed for capturing relational dynamics and tracing how communicative interactions unfold across interconnected social contexts.

The interviews finally focused on participants' everyday engagement with digital technologies, the communicative processes through which learning and support were enacted, and the evolution of these interactions over time. Data were analysed through an iterative and inductive approach, enabling the identification of recurring communicative patterns and their role in structuring capability development. Particular attention has been dedicated to understand how communicative genres emerge, interact, and reconfigure across social clusters, shaping distinct trajectories of digital capability and enabling the progressive appropriation of digital technologies within everyday life.

Results. The findings show that older people's digital capabilities develop through recurring communicative interactions that structure learning, confidence building, and the progressive appropriation of digital technologies. Rather than emerging from isolated exposure to digital tools, digital capability is constructed through patterned forms of communication that stabilize expectations, roles, and learning trajectories within social networks. These patterns take the form of communicative genres that recur across interactions and evolve over time.

The participants showed three levels of digital capabilities from basic to advance. Participants in the low-capability group demonstrated limited breadth and depth in their digital practices. The participants' initial encounter with mobile applications began through informal and unstructured communication that prepared them to recognize the potential uses of these applications. This leads to the motivation towards engagement, which took two forms including urging and encouraging. Based on the willingness to engage, the participants interacted with their social relations, especially families, in a negotiation process. The actual support of the social relations followed two types of communication, including foundational and proxy instructions.

Participants in the medium-capability group demonstrated greater breadth by using a wider range of applications. Their depth of use was also more developed, as they were able to independently perform both basic and some advanced functions. While the low-capability group started with brief communication that prepare them for recognizing the applications, the communication with participants in the medium- capability group took a more explanatory and persuasive form, reasoning that justified the applications by linking them to the participants' specific needs and challenges. In contrast to the dyadic communication pattern where social relations urged and/or encouraged the low-capability group, participants with medium digital capability showed collective communication patterns and group dynamics in stimulating the use actions. The use support provided to the participants combined elements of process-focused teaching and consultative guidance. Drawing on their usage experiences, the participants reflected on their digital capability development. They evaluated and interpreted their learning, often sharing these reflections with their social relations.

Participants in the high-capability group demonstrated both breadth and depth across a variety of applications. In contrast to the low- and medium- capability groups, participants in the high-capability group were more fully exposed in the digital society, which created a wide range of opportunities to communicate about and engage with mobile applications. When the participants decided to pursue further learning, they explored through deliberate, initiative-taking communication with the outside world. Participants with high capability typically benefited from targeted, situational guidance from their social relations. Based on insights generated from their use experiences, the participants began to conceptualize the practices and realize the underlying logics and mechanisms across applications. An important characteristic of the high-capability group was their extensive outward communication, through which they influenced people in their social networks.

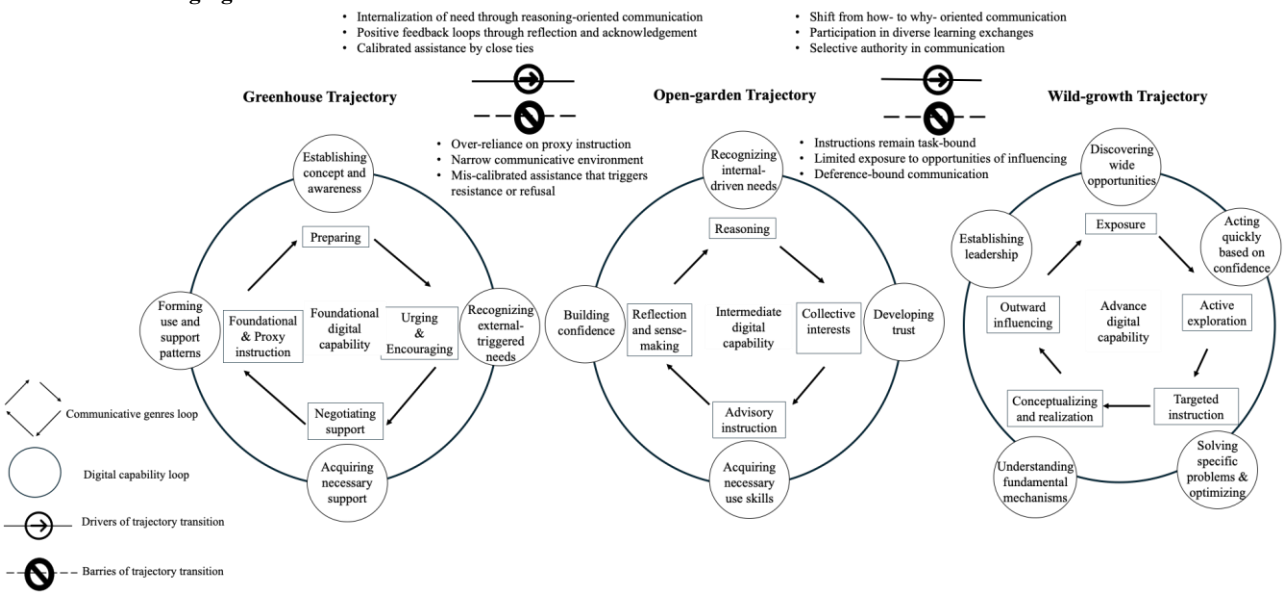
Based on these findings, we present a theoretical model, as shown in the Figure 1, that uncovers how the interrelationships among communicative genres shape the trajectory of developing digital capability across the three groups of older adults.

Based on the framework, first, the *greenhouse trajectory* describes how foundational digital capabilities emerge within close social relationships. The process begins with communicative genres of *preparing*, which foster awareness and initial sensemaking. It progresses through *urging and encouraging*, where close ties trigger perceived need, followed by *negotiation of support* that enables engagement while preserving autonomy. Finally, *foundational and proxy instructions* establish patterns of use and delegation.

In this trajectory, engagement is relationally embedded and slow, relying on continuous communicative support within trusted ties. Learning unfolds incrementally, moving from awareness to stabilized use through socially negotiated assistance.

Second, the *open-garden trajectory* captures the development of intermediate capabilities through a combination of self-direction and collective interaction. It begins with *reasoning-oriented communication*, where internally recognized needs are articulated and validated. This is followed by *collective interest-based communication*, which builds trust, and *advisory instruction*, where individuals retain control while seeking guidance. *Reflection and sense-making* consolidate learning and reinforce competence.

Table 1. The emerging Theoretical framework



	Greenhouse Trajectory	Open-garden Trajectory	Wild-growth Trajectory
Level of digital capability	Foundational	Intermediate	Advanced
Capability growth logic	Assisted growth enabled by sustained prompting and support	Self-directed growth supported by collective input	Autonomous and self-sustaining growth
Primary communicative purpose	Making sense of what technologies are and enabling initial use	Validating needs, building trust, and refining use to understand how to use technologies	Explaining why technologies work and shaping others' engagement
Communication characteristics	High dependence in which tasks are often delegated or co-produced	Selective reliance in which advice are sought for complex tasks	Reciprocal support which both seeks and offers guidance
Relational embeddedness	Engagement happens within a favorable communicative environment with family and close ties	Engagement happens in expanded networks including peers and weak ties in more diverse communicative environments	Engagement is embedded in distributed and board networks, with both drawing on and contributing knowledge to others
Pacing of engagement	Slow and incremental	Accelerated and iterative	Rapid and adaptive

Here, engagement becomes relationally expanded, involving peers and weak ties, while the pace accelerates. Older adults maintain ownership of digital tasks, relying on others selectively and strategically. Third, the *wild-growth trajectory* explains the emergence of advanced digital capabilities within broad and heterogeneous networks. It starts with extensive exposure to digital environments, followed by *exploratory communication* driven by confidence and initiative. *Targeted instructional genres* support problem-solving, while *conceptualizing and realization* enable deep understanding of technological mechanisms. Finally, *outward influence* positions individuals as contributors and leaders. In this trajectory, engagement is autonomous, fast, and exploratory. Communication becomes mechanism-oriented, and support is reciprocal, as older adults both learn from and guide others within distributed social networks.

This study explains how older adults develop capabilities for sustained digital participation, identifying communication as the key mechanism. Theoretically, it shifts the focus from technology adoption to capability development, aligning with Zhao et al. (2023) and Zhang (2023), and addressing the limits of TAM-based views (Davis, 1989; Chen & Chan, 2014). Findings show that perceived usefulness and ease of use explain initial adoption, while sustained engagement depends on accumulated knowledge and confidence (Agarwal & Karahanna, 2000; Peek et al., 2014), thus positioning digital capability as the missing link between adoption and routine use. The study further specifies the social dimension by applying communicative genres theory (Orlikowski & Yates, 1994; Moser et al., 2013), demonstrating how distinct interaction forms shape learning outcomes, beyond generic notions of social influence (Czaja & Sharit, 2012; Selwyn, 2004; Nikou et al., 2020). In particular, proxy instruction stabilises access but may create dependency, whereas reasoning and advisory genres enhance self-efficacy and transferability (Sestino & D'Angelo, 2024). Finally, it extends genre theory by showing how communicative genres evolve across social contexts and combine into distinct trajectories, advancing prior work on dynamic repertoires (Orlikowski & Yates, 1994; Avital et al., 2017; Te'eni, 2012).

Originality of the paper. The paper is relevant for management and innovation studies as it offers a process oriented and relational perspective on digital capability development that extends prevailing models of technology adoption and use. By showing how digital engagement is shaped through communicative genres within social networks, the study highlights the role of interaction design, relational scaffolding, and learning environments in enabling effective technology use. These insights inform innovation management by emphasizing that the success of digital innovations, particularly in service and health related contexts, depends not only on usability and functionality but also on the communicative structures that support user capability development. The findings suggest that organizations, public institutions, and technology providers can enhance innovation outcomes by designing communication practices that foster confidence, learning, and sustained engagement among older users.

Managerial implications. On the basis of our study, findings suggest several managerial implications for organizations involved in the design, deployment, and governance of digital technologies targeting older users. First, managers should move beyond a narrow focus on usability and initial adoption and explicitly address digital capability development as a strategic objective. This implies designing digital services and platforms that are accompanied by structured yet flexible communication practices, such as guided demonstrations, iterative explanations, and opportunities for supported experimentation, which can evolve over time as users' confidence increases.

Second, organizations should leverage social contexts as learning environments by intentionally activating family members, peer groups, and community networks as part of the innovation process. Rather than treating support as an external or informal activity, managers can integrate relational scaffolding into service ecosystems by facilitating peer based learning spaces, moderated communities, and collaborative problem-solving formats that sustain engagement beyond first use.

Third, institutional actors and service providers should align "formal communication" with relational and affective dimensions of learning. Training programs and digital assistance services should be designed to complement procedural guidance with reassurance, narrative framing, and contextual relevance, reducing anxiety and supporting autonomy rather than dependency.

From a social perspective, importantly, the study highlights the relevance of communicative inclusion as a foundation for digital inclusion. Supporting older people's digital capabilities through relational and communicative practices contributes not only to more effective technology use but also to social participation, autonomy, and wellbeing in an increasingly digital society.

Research limitations. This study has some limitations that open avenues for future research. First, the qualitative and longitudinal design limits the generalizability of the findings across different cultural and institutional contexts. Second, the focus on older people's social networks may underrepresent the role of individual learning strategies developed outside relational settings. Third, the study does not differentiate systematically across specific digital technologies, which may involve distinct capability requirements. Fourth, the reliance on "self-reported narratives" may be affected by recall bias. Finally, future research could integrate quantitative or mixed methods approaches to test and extend the proposed framework.

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Configurazioni dei Big Data e performance innovative nelle PMI: Un approccio fsQCA

GIULIO FERRIGNO

Abstract. *Nell'era della trasformazione digitale, la capacità delle imprese di raccogliere, elaborare e interpretare grandi quantità di dati rappresenta una fonte sempre più rilevante di vantaggio competitivo. In particolare, i Big Data stanno assumendo un ruolo centrale nei processi decisionali e nelle strategie di innovazione delle imprese, incluse le piccole e medie imprese (PMI). Tuttavia, nonostante la crescente attenzione della letteratura verso il ruolo dei Big Data nelle performance aziendali, la maggior parte degli studi ha analizzato le diverse dimensioni dei Big Data separatamente, trascurando il ruolo delle loro interazioni e configurazioni nel determinare le performance innovative delle imprese.*

Il presente studio si propone di analizzare come diverse configurazioni delle principali dimensioni dei Big Data influenzino la performance innovativa delle PMI. In particolare, adottando la prospettiva teorica della Resource-Based View (RBV), identifichiamo cinque dimensioni fondamentali dei Big Data — volume, varietà, velocità, veridicità e valore — e analizziamo come la loro combinazione contribuisca a migliorare le capacità innovative delle imprese. L'analisi empirica si basa su un campione di 123 PMI italiane e utilizza la metodologia della fuzzy set Qualitative Comparative Analysis (fsQCA), che consente di esplorare configurazioni multiple di risorse e di identificare combinazioni di fattori che conducono a elevati livelli di performance innovativa.

I risultati evidenziano che nessuna singola dimensione dei Big Data rappresenta una condizione necessaria per ottenere elevate performance innovative. Piuttosto, sono le interazioni sinergiche tra diverse dimensioni dei Big Data a generare risultati positivi in termini di innovazione. In particolare, alcune configurazioni specifiche di volume, varietà, velocità, veridicità e valore dei dati risultano associate a migliori performance innovative delle PMI. Lo studio contribuisce alla letteratura sull'innovazione e sui Big Data evidenziando l'importanza di un approccio configurazionale e fornendo indicazioni utili ai manager delle PMI che intendono sfruttare il potenziale dei Big Data per rafforzare le proprie capacità innovative.

Keywords*: Big Data; performance dell'innovazione; PMI; Resource-Based View; fsQCA*

Framing of the research. Negli ultimi anni il fenomeno dei Big Data ha assunto un ruolo sempre più centrale nei processi di trasformazione digitale delle imprese. L'enorme quantità di dati generata da piattaforme digitali, dispositivi mobili, social media e sistemi informativi aziendali ha creato nuove opportunità per le imprese di raccogliere informazioni sui comportamenti dei consumatori, sui trend di mercato e sulle dinamiche competitive (Del Vecchio et al., 2018; George et al., 2014).

Secondo alcune stime, il volume globale dei dati generati a livello mondiale è destinato a superare i 180 zettabyte entro il 2025, evidenziando la portata del fenomeno dei Big Data e il suo potenziale impatto sulle attività economiche e organizzative (Statista, 2023). In questo contesto, la capacità di gestire e analizzare grandi quantità di dati rappresenta una competenza strategica per le imprese, in quanto consente di trasformare i dati grezzi in informazioni utili per il processo decisionale (Kaisler et al., 2013; Ward & Barker, 2013).

La letteratura manageriale ha evidenziato come i Big Data possano contribuire in modo significativo allo sviluppo delle capacità innovative delle imprese. In particolare, l'analisi dei dati consente alle imprese di comprendere meglio le esigenze dei clienti, monitorare le prestazioni dei prodotti e individuare nuove opportunità di innovazione (Mazzei & Noble, 2017; Visconti & Morea, 2019). Inoltre, l'utilizzo dei Big Data può migliorare la qualità delle decisioni strategiche e supportare lo sviluppo di nuovi modelli di business basati sui dati (Del Vecchio et al., 2018).

Dal punto di vista teorico, la Resource-Based View (RBV) rappresenta una delle prospettive più utilizzate per analizzare il ruolo delle risorse interne nel determinare le performance delle imprese (Barney, 1991; Wernerfelt, 1984). Secondo questa prospettiva, le imprese possono ottenere vantaggi competitivi sostenibili quando possiedono risorse che sono preziose, rare, difficili da imitare e difficilmente sostituibili. In questo senso, i Big Data possono essere considerati una risorsa strategica che consente alle imprese di sviluppare capacità analitiche avanzate e migliorare i processi di innovazione (Sena et al., 2019).

Nonostante questi progressi, osservo che la ricerca esistente si è concentrata prevalentemente sull'analisi di ciascuna risorsa interna considerata singolarmente, trascurando le relazioni e le interazioni tra tali risorse. In particolare, il lavoro di Ferrigno et al. (2025) evidenzia come un'area di ricerca ancora poco esplorata riguardi il modo in cui la combinazione di diverse dimensioni dei Big Data influenzi le performance innovative radicali e/o incrementali delle imprese (Ferrigno et al., 2025, pp. 11–12).

Comprendere questo aspetto è cruciale per almeno due ragioni principali. In primo luogo, l'importanza delle interazioni tra risorse interne nel determinare le performance innovative delle PMI è stata riconosciuta come un elemento fondamentale (Ferrigno et al., 2024). Diversi autori sostengono infatti che l'analisi di tali interazioni possa generare un asset unico capace di rafforzare il vantaggio competitivo delle PMI (Cappa et al., 2021). In secondo luogo, l'analisi delle interazioni sinergiche tra risorse consente di evidenziare i benefici derivanti dalla combinazione delle diverse risorse

interne delle imprese. Ad esempio, potrebbe permettere di comprendere se una specifica dimensione dei Big Data sia in grado di amplificare l'influenza di altre risorse interne sulle performance innovative delle PMI (Cappa et al., 2021).
In altre parole, nonostante il crescente interesse per il ruolo dei Big Data nelle performance aziendali, molti studi hanno analizzato le diverse dimensioni dei Big Data separatamente. Tuttavia, alcuni autori hanno recentemente sottolineato l'importanza di analizzare le interazioni tra diverse dimensioni dei Big Data per comprendere meglio il loro impatto sulle performance innovative delle imprese (Akter & Wamba, 2016; Erevelles et al., 2016; Cappa et al., 2021; Ferrigno et al. 2025).

Purpose of the paper. L'obiettivo principale di questo lavoro è analizzare come diverse configurazioni delle principali dimensioni dei Big Data influenzino la performance innovativa delle piccole e medie imprese. Facendo riferimento alla letteratura che utilizza la Resource-Based View (RBV) per analizzare l'impatto delle risorse interne sulle performance innovative delle PMI, ho identificato cinque risorse interne chiave: (1) Big Data volume, ovvero la quantità di dati disponibili (Wamba et al., 2015); (2) Big Data variety, ossia la diversità delle tipologie di dati, che include sia dati strutturati (ad esempio numeri) sia dati non strutturati (ad esempio immagini) (Ghasemaghaei et al., 2017; Ghasemaghaei e Calic, 2020), con effetti sulle performance delle imprese (Cappa et al., 2021; Ghasemaghaei, 2019); (3) Big Data velocity, ovvero la velocità con cui i dati vengono generati ed elaborati (Ghasemaghaei et al., 2017); (4) Big Data veracity, cioè l'affidabilità e la qualità informativa dei dati (Erevelles, Fukawa e Swayne, 2016; Jin, Wah, Cheng e Wang, 2015; Wamba et al., 2015); e (5) Big Data value, ovvero la capacità dell'impresa di individuare pattern, trend e associazioni attraverso la raccolta, la gestione e l'analisi efficace di grandi quantità di dati (Del Vecchio et al., 2018).
Partendo dalla prospettiva teorica della Resource-Based View, il lavoro considera i Big Data come un insieme di risorse interne che possono contribuire alla creazione di vantaggi competitivi sostenibili. Tuttavia, invece di analizzare ciascuna dimensione dei Big Data in modo isolato, lo studio adotta un approccio configurazionale che consente di esplorare come diverse combinazioni di risorse possano influenzare la performance innovativa delle imprese. In questo senso, la ricerca si propone di rispondere alla seguente domanda di ricerca: Quali configurazioni delle dimensioni dei Big Data contribuiscono a migliorare la performance innovativa delle PMI?
Per rispondere a questa domanda, il lavoro analizza il ruolo delle cinque principali dimensioni dei Big Data — volume, varietà, velocità, veridicità e valore — e indaga come la loro interazione possa influenzare le capacità innovative delle imprese.

Methodology. Per affrontare la domanda di ricerca, abbiamo utilizzato la Qualitative Comparative Analysis (QCA). La scelta di questa metodologia è motivata da tre principali ragioni. In primo luogo, la QCA consente di analizzare le relazioni causali tra configurazioni o combinazioni di risorse interne e un determinato risultato di interesse, come la performance innovativa delle PMI (Ragin, 2008; Schneider & Wagemann, 2012). In secondo luogo, la QCA sta ricevendo crescente attenzione sia nella letteratura di management (Ferrigno et al., 2021) sia negli studi sull'innovazione (Del Sarto et al., 2021). Infine, l'obiettivo della QCA non è dimostrare l'esistenza e l'intensità di una relazione causale tra due variabili, come avviene nelle tecniche statistiche inferenziali, ma piuttosto individuare configurazioni di condizioni che supportano l'esistenza di tali relazioni causali (Schneider & Wagemann, 2012).
Più nello specifico, in questo studio ho utilizzato una tecnica particolare della QCA nota come fuzzy set Qualitative Comparative Analysis (fsQCA). La fsQCA utilizza la logica fuzzy per estendere le capacità della QCA tradizionale basata su insiemi dicotomici. Questo approccio consente di esprimere il grado di appartenenza a un insieme attraverso valori compresi tra 0 e 1, creando così un continuum di appartenenza (Ragin, 2000).
Per la ricerca ho selezionato casi di PMI italiane, definite dalla Commissione Europea come imprese con meno di 250 dipendenti e con un fatturato annuo inferiore a 50 milioni di euro oppure un totale di bilancio inferiore a 43 milioni di euro. L'Italia rappresenta un contesto particolarmente interessante per questo tipo di analisi, in quanto le PMI costituiscono una componente fondamentale del sistema economico nazionale, rappresentando oltre il 90% della forza lavoro (ISTAT, 2022). Inoltre, uno studio del Ministero dello Sviluppo Economico (MISE, 2020) evidenzia come una quota significativa delle imprese italiane stia progressivamente adottando tecnologie legate all'Industria 4.0. Nell'ultimo decennio, infatti, il governo italiano ha promosso numerosi piani e interventi specifici finalizzati a stimolare la digitalizzazione delle imprese e l'adozione delle tecnologie dell'Industria 4.0, tra cui i Big Data. Considerata la struttura dell'economia italiana, prevalentemente basata sulle PMI, e le recenti politiche nazionali volte ad accelerare i processi di digitalizzazione, l'Italia rappresenta quindi un contesto particolarmente interessante per analizzare i diversi comportamenti delle PMI rispetto all'adozione dei Big Data (Ferrigno et al. 2024; 2025).
Per identificare le PMI italiane ho utilizzato il database Orbis di Bureau van Dijk, noto per la sua affidabilità e ampiamente utilizzato negli studi sui Big Data, sull'open innovation e sulle PMI (Costa et al., 2023; Rammer & Es-Sadki, 2023). La ricerca si è concentrata sull'identificazione delle PMI italiane definite come imprese con meno di 250 dipendenti. Questa ricerca ha portato all'individuazione di 19.722 PMI. Successivamente ho estratto le principali informazioni relative a queste imprese, tra cui il nome dell'azienda, il numero identificativo BvD, i numeri di telefono, i siti web e gli indirizzi e-mail, organizzando tali informazioni in un foglio di calcolo Excel.
I dati utilizzati in questo studio derivano da un questionario che ho appositamente progettato e somministrato sulla base della letteratura esistente sui Big Data e sulle performance innovative delle PMI (Ghasemaghaei e Calic, 2019; 2020;

Ghasemaghaei, 2021; Johnson et al., 2017). Prima di avviare la somministrazione del questionario, ho condotto due test preliminari per migliorarne la chiarezza e aumentare l'affidabilità dei dati raccolti (Crick et al., 2023). Nel marzo 2023 ho testato il questionario con cinque esperti accademici nei campi dei Big Data e delle performance innovative delle PMI, nonché con cinque decisori e fondatori di PMI appartenenti a diversi settori, raccogliendo i loro suggerimenti per perfezionare lo strumento di indagine. Nell'aprile 2023 un'agenzia indipendente, non coinvolta nella somministrazione del questionario, ha inoltre revisionato il questionario.
Dopo aver migliorato la chiarezza del questionario, nel giugno 2023 ho avviato la raccolta dei dati, coinvolgendo un sottoinsieme selezionato casualmente di fondatori e decisori di PMI italiane operanti in diversi settori industriali. La raccolta dei dati è stata effettuata mediante la metodologia Computer-Assisted Telephone Interview (CATI), con il supporto di una società esterna specializzata. Prima di avviare la somministrazione del questionario su larga scala, ho condotto un ulteriore pre-test con 27 PMI, il cui feedback ha contribuito a perfezionare ulteriormente lo strumento di indagine. Nell'agosto 2023 ho contattato complessivamente 801 imprese; 591 di esse non svolgevano attività legate ai Big Data (e sono quindi state escluse dall'analisi), mentre 210 dichiaravano di utilizzare i Big Data. Di queste 210 imprese, 55 non hanno completato il questionario, mentre 155 lo hanno compilato integralmente. Escludendo le 27 risposte relative al pre-test, ho raccolto dati completi da 128 imprese. Dopo un'attenta revisione dei questionari, ho escluso ulteriori cinque risposte poiché i rispondenti hanno indicato che le loro imprese non soddisfacevano i criteri di classificazione delle PMI. Di conseguenza, il campione finale analizzato è composto da 123 PMI italiane.

Results. I risultati dell'analisi fsQCA mostrano che nessuna delle dimensioni dei Big Data analizzate rappresenta una condizione necessaria per il raggiungimento di elevate performance innovative. Questo risultato suggerisce che il successo innovativo delle PMI non dipende dalla presenza di una singola dimensione dei Big Data, ma piuttosto dalla combinazione di diverse risorse.
L'analisi delle configurazioni sufficienti evidenzia che specifiche combinazioni di dimensioni dei Big Data sono associate a livelli più elevati di performance innovativa. In particolare, i risultati indicano che l'integrazione tra diverse dimensioni dei Big Data — come la varietà delle fonti informative, la velocità di elaborazione dei dati e la qualità delle informazioni — consente alle imprese di generare insight più ricchi e di supportare decisioni strategiche più efficaci.
Questi risultati sono coerenti con la prospettiva della Resource-Based View, secondo cui il vantaggio competitivo deriva spesso dalla combinazione di diverse risorse piuttosto che dal possesso di una singola risorsa (Barney, 1991).

Research limitations. Il presente studio presenta alcune limitazioni che offrono interessanti opportunità per future ricerche. In primo luogo, l'analisi si basa su un campione di PMI italiane, il che potrebbe limitare la generalizzabilità dei risultati ad altri contesti geografici o istituzionali. Studi futuri potrebbero estendere l'analisi ad altri paesi o confrontare diversi contesti nazionali.
In secondo luogo, la ricerca utilizza dati raccolti attraverso un questionario, che potrebbero essere soggetti a possibili bias di risposta. Future ricerche potrebbero integrare dati provenienti da fonti secondarie o utilizzare approcci longitudinali per analizzare l'evoluzione dell'utilizzo dei Big Data nel tempo.
Infine, lo studio si concentra esclusivamente sulla performance innovativa delle imprese. Ricerche future potrebbero analizzare anche altre dimensioni della performance aziendale, come la performance finanziaria o la performance organizzativa.

Managerial implications. I risultati dello studio offrono importanti implicazioni per i manager delle PMI che intendono sfruttare il potenziale dei Big Data per migliorare le proprie capacità innovative. In particolare, i risultati suggeriscono che le imprese non dovrebbero concentrarsi esclusivamente su una singola dimensione dei Big Data, ma dovrebbero piuttosto sviluppare un approccio integrato alla gestione dei dati.
Le PMI dovrebbero investire nello sviluppo di infrastrutture tecnologiche e competenze analitiche che consentano di raccogliere, integrare e analizzare diverse tipologie di dati provenienti da fonti eterogenee. Inoltre, è fondamentale garantire la qualità e l'affidabilità dei dati utilizzati nei processi decisionali, al fine di evitare errori e migliorare l'efficacia delle strategie di innovazione.
Infine, i manager dovrebbero promuovere una cultura organizzativa orientata ai dati, incoraggiando l'utilizzo sistematico delle informazioni nei processi decisionali e favorendo la collaborazione tra diverse funzioni aziendali.

Originality of the paper. Questo studio contribuisce alla letteratura sui Big Data e sull'innovazione delle PMI in diversi modi. In primo luogo, il lavoro adotta una prospettiva configurazionale che consente di analizzare le interazioni tra diverse dimensioni dei Big Data, superando l'approccio tradizionale basato sull'analisi isolata delle singole variabili. La letteratura precedente ha spesso sottovalutato l'influenza delle interazioni sinergiche tra le cinque "V" dei Big Data—volume, varietà, velocità, veridicità e valore—sulle performance innovative delle imprese. Diversi studiosi, facendo riferimento alla prospettiva della Resource-Based View (RBV) (Barney, 1991; Wernerfelt, 1984), sostengono che queste

dimensioni dei Big Data contribuiscano all'innovazione soprattutto quando vengono utilizzate in combinazione, piuttosto che considerate isolatamente (Akter & Wamba, 2016; Erevelles et al., 2016).
L'analisi di tali interazioni sinergiche può infatti rivelare se una specifica dimensione dei Big Data sia in grado di rafforzare l'influenza positiva delle altre sulle performance innovative (Ghasemaghaei et al., 2017). Ad esempio, l'integrazione tra un elevato volume di dati e una significativa varietà di dati consente alle imprese di generare insight più ricchi e di prendere decisioni più informate, rafforzando così le loro capacità di innovazione (Urbinati et al., 2018). Allo stesso modo, l'interazione tra velocity (la velocità di elaborazione dei dati) e veracity (l'affidabilità dei dati) garantisce la disponibilità di informazioni tempestive e accurate per supportare le decisioni legate ai processi innovativi (Lam et al., 2017).
L'effetto combinato di queste dimensioni non solo aumenta la capacità di spiegare le differenze nelle performance tra le imprese, ma rende anche il processo di sfruttamento dei Big Data più unico e difficilmente imitabile dai concorrenti, contribuendo così alla costruzione di un vantaggio competitivo sostenibile e a migliori risultati in termini di innovazione (Johnson et al., 2017; Yang et al., 2017). Comprendere quali interazioni tra le cinque V siano maggiormente in grado di rafforzare le performance innovative rappresenta pertanto una questione cruciale per la ricerca futura.
In secondo luogo, lo studio applica la metodologia della fsQCA per analizzare il ruolo dei Big Data nelle performance innovative delle PMI, offrendo un approccio metodologico innovativo rispetto agli studi precedenti basati prevalentemente su tecniche di regressione.
Infine, la ricerca fornisce nuove evidenze empiriche sul ruolo delle configurazioni di risorse nel determinare le capacità innovative delle imprese, contribuendo allo sviluppo della letteratura basata sulla Resource-Based View e offrendo nuove prospettive per la ricerca futura.

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Corporate Crisis and Artificial Intelligence: a textual analysis

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Abstract. *The prediction of corporate crisis and bankruptcy events has been considered an extremely crucial challenge in management field for a long time. Artificial intelligence and advanced data analysis are changing the way companies address these kinds of situations. The availability of data and the development of complex tools for investigation allow us to examine complex datasets and identify patterns that could signal potential financial distress. This paper aims to investigate the connection between academic literature on corporate crisis prediction and artificial intelligence predictive models. The research is based on a textual analysis of a dataset of 306 scientific articles published between 1990 and 2024. Our main results suggest a strong conceptual link between corporate crisis prediction and artificial intelligence models. Some useful managerial implications and further research directions emerge.*
Keywords: *corporate crisis; Artificial Intelligence; predictive models; textual analysis.*

Framing of the research. The corporate crisis prediction has long been a central topic in management research (Sun et al., 2014). Generally, the concept of corporate crisis identifies situations in which companies face financial and operational matters impacting on their going concerns (Altman, 1968; Altman et al., 2017; Bellovary et al., 2007; Tian et al., 2015), due to internal as well as external factors. Previously, statistical methods based on traditional financial ratios were used (Beaver, 1966). Altman (1968) developed the Z-score method, widely used by scholars and professionals. Other studies have extended these traditional statistical models (Ohlson, 1980; Zhou et al., 2012; Delen et al., 2013). However, several limitations are associated with them.

Afterwards, the Enterprise Risk Management (ERM) approach proposed the integration of financial analysis, strategic planning, and corporate governance mechanisms (Bromiley et al., 2015; Lessmann et al., 2015). In this way, transparency, accountability and risk management systems can be enhanced. Thus, new technologies offer opportunities for improving the effectiveness of corporate governance and risk monitoring mechanisms (Elbashir et al., 2008; Varian, 2014; Wamba et al., 2017; Davenport and Ronanki, 2018).

Recently, artificial intelligence (AI) techniques have enhanced the predictive power of corporate crisis models (Tsai and Wu 2008; Barboza et al., 2017; Zhang et al., 1999; Perboli and Arabnezhad, 2021). Machine learning and data analytics techniques have given new opportunities for improving corporate risk prediction. Thus, the literature has started to explore the application of AI in bankruptcy and corporate crisis prediction (i.e., Hosaka, 2019; Zhao, 2023; Goldmann et al., 2024; Geng et al., 2026).

Purpose of the paper. The goal of our study is to perform an overview of scientific literature addressing the relationship between corporate crisis prediction and AI. The huge number of studies, methodologies and approaches indicate that this research stream is extremely fragmented. Thus, to address this gap, an overview of academic literature could be performed to identify the main trends and implications. In particular, the study seeks to map the dominant research themes and their interconnections, analyze how AI-based analytical techniques are applied in corporate crisis prediction models, examine the managerial implications emerging from literature, especially in relation to risk management, early warning systems, and governance processes.

Our research questions are as follows: What is the role of AI in corporate crisis prediction in academic literature? and what are the main managerial implications of this research stream?

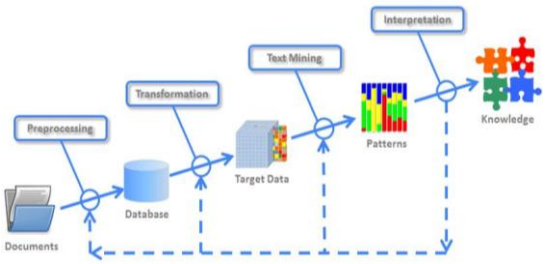
From a theoretical perspective, the study focuses on three core streams of literature: corporate crisis and financial distress prediction (Altman, 1968; Ohlson, 1980), risk management and corporate governance (Jensen and Meckling, 1976; Adams et al, 2010; Kaplan and Mikes, 2020), digital transformation and data-driven decision-making (Porter and Heppelmann, 2014; Barboza et al., 2017; Nambisan et al, 2017; Zhang et al., 1999; Perboli and Arabnezhad, 2021).

Methodology. The research performs a textual analysis to identify the main themes and conceptual relationships within the academic literature on AI and corporate crisis prediction. Our research design is based on the PRISMA framework (Moher et al., 2009; Page et al. 2021) to identify a dataset of 306 academic articles published between 1990 and 2024. The articles were collected from Web of Science (WoS) database and include contributions from management, finance

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and business fields. The search focused on empirical and conceptual studies addressing corporate crisis, financial distress, and related risk-forecasting models. Search queries were developed iteratively and combined keywords related to: distress and corporate crisis ("financial distress", "crisis", "corporate crisis", "default" "business failure"), predictive approaches ("prediction", "prevention", "forecast*", "early warning"), and methodological techniques ("method*", "technique", "artificial intelligence", "logistic regression", "machine learning", "neural network", "support vector machines"). Boolean operators and truncation were used to capture spelling variants and related terms. Searches were restricted to journal articles written in English. In the initial Identification step, we found 1,775 contributions on the WoS database. Then, a screening was carried out by applying our inclusion criteria.In order to analyse the textual content of the selected articles, our study follows a text mining approach based on the application of lexical analysis techniques. The textual analysis, carried out using the T-LAB 10 software, was specifically focused on the conclusions and managerial implications sections in the articles. The methodology followed in this study includes some steps (see Figure 1).

Figure 1 Main steps followed in the textual analysis

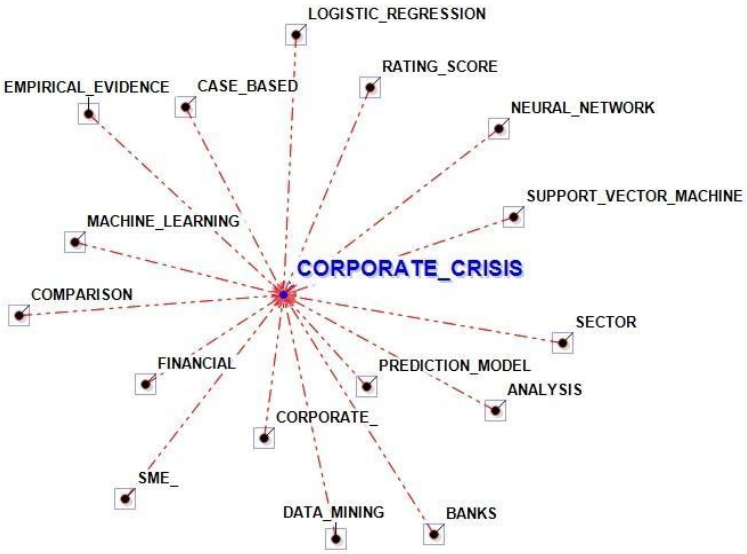


Source: T-LAB https://www.tlab.it

As illustrated in the Figure 1, first of all, the textual corpus has been created using the "Corpus builder" tool included in the T-LAB software. Then, the software has carried out a lexical analysis of the textual content in order to highlight the most common and relevant words in the corpus. The analysis has also focused on the relationships between words, thus highlighting the conceptual links between the different research themes included in the study. The analysis has also highlighted the thematic clusters related to the most relevant research themes included in the corpus of the literature.

Results. The results of the textual analysis indicate a strong conceptual relationship between the themes of corporate crisis and prediction models within the analysed corpus. The word associations reveals that terms related to financial distress frequently co-occur associated with predictive modelling. The Figure 2 regards the main words associated with the lemma "Corporate Crisis" in the corpus of articles analysed. It shows the conceptual network linking corporate crisis, predictive models, machine learning techniques, the financial context, and empirical and comparative analyses. The corporate crisis is conceptualised in the corpus as a phenomenon that can be analysed and predicted using quantitative models and machine learning techniques, applied primarily to the context of businesses and the banking system The topic is scientifically structured within the corpus, highlighting the main methodologies, application contexts and research approaches used to study it. This suggests that the literature tends to consider corporate crisis not only as a final event, but as a phenomenon that can be analysed and anticipated through predictive models.

Figure 2 - Words associated with the lemma 'Corporate crisis'



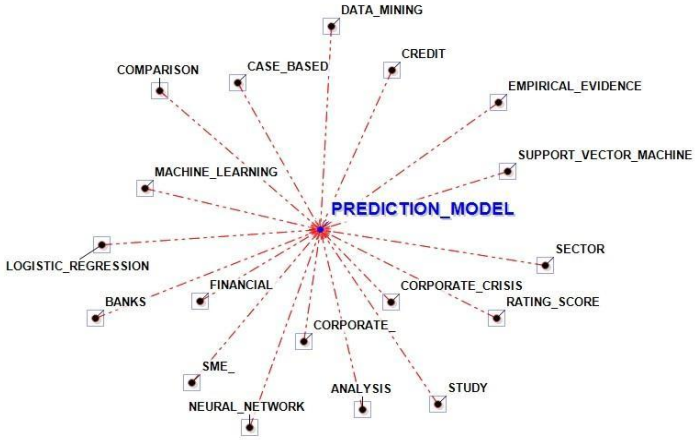
Source: Authors elaboration

The Figure 3 shows the word associations related to the lemma 'Prediction_model', a central theme of the dataset. The graph reflects a well-structured thematic field. The T-LAB association graph shows how the words in the corpus are related to a central concept based on how frequently they appear together in the same contexts. T-LAB examines all text segments in which this lemma appears and then it identifies the terms most strongly associated with it. In this way, the entire network shows which concepts tend to appear alongside "prediction model" in the corpus. Each of the words surrounding it ('Machine_Learning', 'Credit', 'Banks', 'Logistic_Regression', 'Neural_Network') is a term statistically associated with the main word. However, the association is not arbitrary. It is statistically significant. These words are often found accompanying the lemma 'Prediction model'. For instance, 'Neural_Network', 'Support_Vector_Machine', 'Logistic_Regression' are techniques applied in the model. The dotted red lines represent associations between the central word and the words around it. These red lines show a statistical association based on co-occurrence. It does not imply causality. Just it implies that words tend to co-occur in the corpus analysed.

The central node proximity to each word is another key factor. It shows the strength of the word. So, if this proximity is low, the word is strongly associated, and if it is high, it is weakly associated. In particular, 'Machine Learning' proximity to 'Prediction Model' is lower than its proximity to 'Study', then 'Machine learning' is strongly associated with 'Prediction model'. The surrounding nodes identify three main thematic areas: 1) financial context. Terms such as 'Corporate_crisis', corporate, financial, highlight the main area of application for these predictive models; 2) methodological and technical approaches. Terms 'Machine_Learning', 'Logistic_Regression', 'Support_Vector_Machine' indicate that the corpus emphasises approaches associated with advanced statistical and machine learning techniques. 3) Comparative dimension. The presence of 'Rating_Score', 'Comparison', 'Study' and 'Sector' suggest that the literature also focuses on the performance evaluation, the benchmarking of different models and the sector-specific analyses.

The results highlight how predictive models are increasingly based on advanced data analytics methodologies, moving beyond the traditional statistical models used in older literature.

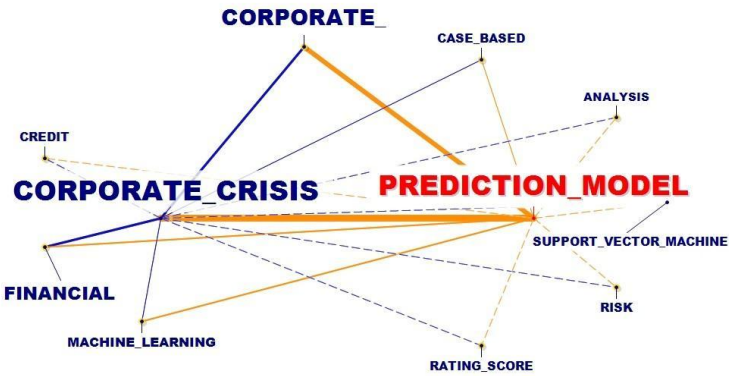
Figure 3 Words associated with the lemma 'Prediction_model'



Source: Authors elaboration

Figure 4 exhibits the comparison of the keyword pair 'Corporate_crisis' and 'Prediction_Model' in the dataset. A strong association is visible between the two main concepts. The thickness of the line indicates a stronger association. This indicates that the study of corporate crisis in the recent literature is increasingly associated with the development of advanced prediction tools for the early warning of corporate crises.

Figure 4 Keyword pair comparison 'Corporate_crisis' and 'Prediction_Model' in the corpus



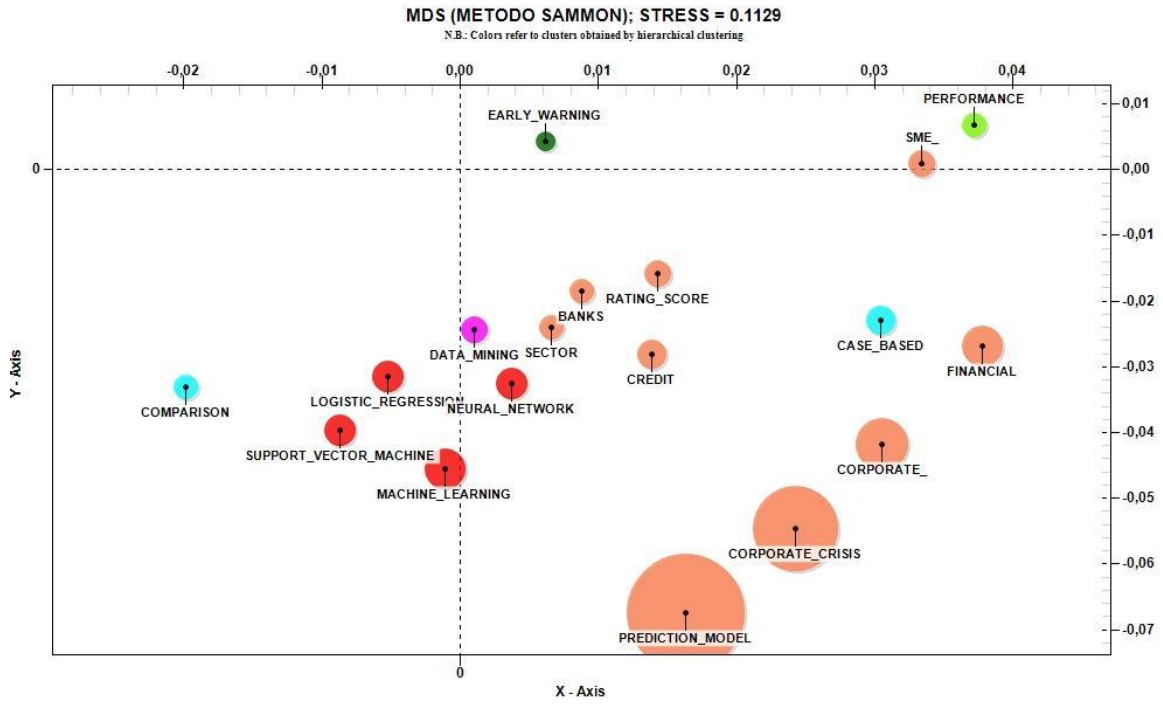
Source: Authors elaboration

In the Figure 4 the main thematic areas are a) modelling techniques, such as 'Machine Learning' and 'Support Vector Machine', indicate that corporate crises are predicted using quantitative methods and AI techniques, . b) the context of finance and corporations is indicated by 'Corporate' and 'Financial', situating the analysis in the context of corporate finance.

The Figure 5 illustrates a type of Multidimensional Scaling (MDS) (Sammon method) used in T-LAB to represent the relationships between thematic clusters. Specifically, four main thematic clusters emerge from the analysis: the study of corporate crises, the use of advanced analytical prediction models, the corporate performance, and the credit risk management. The central position of 'Prediction_Model' among 'Corporate_crisis', machine learning, and statistical methods suggests that the literature strongly links corporate crises to the use of advanced predictive models. This indicates a trend toward a data-driven approach in corporate risk management. Prediction Model plays a central role as a tool that bridges theory and application. They are becoming strategic tools for early warning systems, financial risk management, risk assessment, and corporate crisis prevention.

A significant part of the corpus of the literature studied focuses on the application of predictive models to credit risk evaluation. Financial institutions increasingly rely on advanced analytical techniques to assess the solvency of firms and reduce default risk. Another cluster focuses on corporate crisis, examining the determinants and consequences of financial distress within organizations One more cluster concerns studies examine the relationship between financial performance indicators and the probability of corporate crisis. Financial ratios such as profitability, leverage, liquidity, and operational efficiency continue to play an important role in crisis prediction models. refers to advanced analytical methods. One interesting finding concerns the position of the terms "SME" and "Banks," which are positioned close to the central core of the map. This suggests that the literature on corporate crisis prediction is strongly linked to the context of small and medium-sized enterprises and the banking system. Predictive models are, in fact, particularly relevant for supporting credit risk assessment processes and credit decisions by financial institutions.

Figure 5 Multidimensional Scaling (MDS)



Source: Authors elaboration

The MDS analysis shows that within the corpus there is a strong integration between corporate crisis analysis and the use of models (Figure 5). Overall, the analysis highlights the increasing use of several advanced analytical techniques in financial risk analysis. Among the most frequently mentioned methods are machine learning algorithms, artificial neural networks, logistic regression models, support vector machines. These techniques allow researchers and practitioners to analyse complex datasets and improve the predictive accuracy of financial distress models. Another important finding concerns the growing integration of AI within decision making processes related to credit risk management. Many studies highlight how AI-based models can support financial institutions in evaluating borrowers, monitoring financial performance, and detecting early signals of financial distress. Moreover, the literature increasingly emphasizes the role of AI technologies in the development of early warning systems capable of identifying potential crises before they become critical. These systems can provide valuable information to managers, investors, and regulators, allowing them to take preventive actions aimed at mitigating financial risk.

Overall, our results answer to the research questions by underlining the AI role in the corpus of literature analysed. The textual analysis results suggest that AI is not viewed as a supplement in corporate crisis prediction, but it is an integral component of corporate crisis prediction models. The high co-occurrence of words such as corporate crisis, prediction model, and machine learning suggest that this corpus of literature is increasingly structured into a data-driven paradigm in which predictive models are used as a tool for identify financial difficulties.

Moreover, some specific thematic clusters emerge, from financial distress analysis to credit risk management and advanced models, underling the multidimensional nature of this research area. Thus, the findings suggest that the literature combines innovation in methodology and applications, especially in relation to early warning systems and decision making. In this context, the analysis provides a clear understanding of the conceptual and managerial aspects of AI in corporate crisis prediction, thereby answering our research question.

Research limitations. The present research provides interesting insights about the corpus of literature on AI and the prediction of corporate crisis however it presents some limits. Infact, the study is based on a specific corpus of academic articles and maybe it does not fully capture all research contributions to the literature on the topic studied. In addition, our research focuses on the conclusions and managerial implications of the articles under review. While this approach helps to identify key concepts and research trends, it could miss some details. Future research could expand this study by empirically evaluating the effectiveness of several AI techniques in crisis prediction models. Another promising field for further research regards the possibility to investigate the use of new data sources. Specifically, social media, such as LinkedIn, as well as financial forums, provides a great amount of corporate information, or stakeholders' perceptions or opinions on the companies. A sort of "early warning" signals of a decline in reputation or investor sentiment. Text mining and sentiment analysis could be used to integrate this data into corporate crisis prediction models.
Finally, the study does not account for institutional differences between countries, which could affect the applicability of AI-based crisis prediction models.

Managerial implications. Our results emphasize the importance of data analytics skills. Firms and financial institutions should acquire skills in data analysis and AI to manage corporate risks more efficiently. AI techniques could help to manage credit risks more efficiently, and in this way, financial institutions could apply machine learning algorithms to analyse more data and evaluate borrowers efficiently, reducing the possibility of default. Specifically, AI-based predictive models could improve early warning systems for detecting corporate financial problems. The textual analysis also implies that crisis management in corporations should be based on some key elements, such as the improvement of early warning systems to identify signs of a deterioration in the economic and financial situation and to apply predictive models to anticipate corporate crisis. In this way, companies could identify possible corporate concerns at an early stage and take corrective actions in advance. In this context, alternative data sources, such as news available on social media or financial forums, could be used. Specifically, digital technologies could be used as tools to facilitate the integration of alternative data sources, including social media data, news on the investor's sentiment, and market signals. These data sources could be considered as potential signals of companies' crisis, that are not indicated by traditional financial data. Thus, in other words, social media can be considered as a new direction of research as well as a potential data source of corporate crisis prediction. At the same time, the AI role in the decision making processes of companies poses some transparency and accountability implications. Managers should use these tools in a responsible manner. The application of AI to the prediction of corporate crisis prediction should be part of a broader transformation in company decision making, not just a technological innovation.
In addition, the role of AI-based models of crisis prediction may be particularly relevant in the case of small and medium-sized enterprises (SMEs) (Demartini & Beretta, 2020). In fact, as opposed to large corporations, SMEs are more vulnerable from a financial perspective, as well as less prone to employing sophisticated risk management tools (Altman et al., 2010). The introduction of AI-based monitoring systems could thus assist SMEs in detecting financial crises at an earlier stage. Finally, the role of AI-based risk management systems may be relevant with respect to the improvement of aspects of transparency, accountability, and decision-making.

Originality of the paper. This paper performs a textual analysis of a large corpus of academic articles on AI and corporate crisis prediction, providing an overview of the literature by identifying the main themes and conceptual relationships within the field. The originality is linked to the fact that our study offers a structured representation of the research landscape and highlights emerging trends in the application of AI to financial distress prediction. Instead, previous research has analysed specific model and technique. In addition, this research contributes to the literature by emphasizing the growing integration of AI technologies within corporate risk management and credit evaluation processes. We identify future research directions providing a useful framework for scholars interested in exploring new developments in the field of AI and financial distress prediction.

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Decision-making biases in modern Supply Chains and the role of AI: A systematic literature review

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Abstract. *This paper explores the evolution of modern Supply Chains (SC) and their shift from a sequence of linear processes into complex adaptive systems. SCs' inner complexity has increased biases in Supply Chain Management (SCM). To address this situation, digital technologies, and especially Artificial Intelligence (AI), are increasingly being used to solve complex problems by comparing and decomposing them, as well as by enhancing information sharing to avoid biased decisions. Consequently, this paper aims to recognise the main biases in SC decision-making by conducting a Systematic Literature Review (SLR), based on the PRISMA framework and on a bibliometric co-word analysis.*

The achieved results demonstrated a longitudinal evolution of the research topic and its related themes, with a recent trend on the contradictory role of AI in SC decision-making. The originality of this paper lies in conceptualizing SCs as multi-level ecosystems, in which digital technologies and AI function as multi-sided non-human actors that mitigate or resolve decision-making biases at specific ecosystem levels, while also creating new algorithmic biases that can differentially impact those levels. To challenge these biases, managers must complement and expand their expertise by adopting a holistic, data-driven, and agile approach to decision-making. This preliminary study is limited by the analysis of a single database and the rapid evolution of AI-related research. Future research, informed by the implementation of complementary qualitative methods, will further refine the preliminary findings.
Keywords*: Supply Chain; Ecosystem; Decision-making; Bias; Artificial Intelligence.*

Framing of the research. In the current globalized economies, SCs are changing their configuration and characteristics, becoming more vulnerable to recurrent and severe geopolitical, climate, economic, and social crises (Ivanov et al., 2023). These changes have transformed their configuration, turning them into complex networks of geographically dispersed actors (Fischer et al., 2024), defined Global Value Chains (GVCs) and organized around specific factors such as location, cost, expertise, and access to resources (Antràs and Chor, 2022).

Network theory (Granovetter, 1983) advanced this conceptualization by treating SCs as networks of interconnected actors, organized around strong and weak ties (Hearnshaw and Wilson, 2013; Hald and Spring, 2023). This inspired the shift from a centralized logic of control, implemented by the focal actor, to a logic of collaboration between internal and external actors (Wang et al., 2025). This prompted scholars and practitioners to critically rethink SCM mainstream approaches (Ketchen and Hult, 2007). In doing so, the ecosystem perspective, complementing the network theory, inspired the conceptualization of SCs as complex adaptive systems or ecosystems, characterized by networked multi-sided interactions intended to exchange resources between loosely coupled actors, whose aim is the creation of value (Vargo et al., 2012; Ozkan et al., 2025). Assuming a different perspective, Moore (1996) defined business ecosystems as economic communities supported by interacting organizations and individuals.

Approaching SCs as business ecosystems requires a critique of the traditional governance mechanisms, which are no longer based on predefined bilateral arrangements and/or contracts (Autio and Thomas, 2018), but rather on multilateral interactions, which equally consider actors' contribution to the value network (Adner, 2017; Autio and Thomas, 2020). This is due to one of the primary ecosystem characteristics: the self-organization ability (Moore, 1996, 2006), which prioritizes non-contractual, collaboration-based governance over hierarchical control (Jacobides et al., 2018).

According to Fu et al. (2026), at the micro level of an ecosystem, individual actors (e.g., individual suppliers, logistics service providers, retailers, etc.) cooperate, sharing their resources in value creation processes, while at the meso level, competing interests drive organizational actors (e.g., industry consortia, etc.) towards service provision and consumption according to a coopetition logic essential for the ecosystem evolution. Finally, at the macro level, institutional actors (e.g., governmental bodies and regulators, standard-setting organizations, etc.) set policies, regulations, and incentives to respond to environmental changes (Thomas and Autio, 2020). Understanding how coopetition emerges and can be managed remains a subject of scrutiny in extant research.

Recently, the influence of digital technologies on ecosystem viability has been investigated, highlighting their capacity to facilitate multilateral relationships through specific governance mechanisms that bring together heterogeneous yet interdependent human and non-human actors (Legenvre et al., 2022). Modern SCs' complexity often causes deviations and bias in decision-making processes (Yu et al., 2025). To challenge this situation, the literature has proposed an alternative approach to decision-making biases, which departs from the traditional assumption that biases arise from a-rational strategies. Simons (1957) advanced this approach, proposing the bounded rationality theory, according to which decision-makers are rational, adaptive, and goal-oriented. However, human rationality is constrained by information asymmetries, which often cause decision biases (Snowden, 2002; Yamini, 2021). Recently, the computational power of digital technologies (e.g., AI, cloud computing, big data analytics) has challenged these biases by providing direct and real-time access to information (Kurzweil, 2012; Khan, 2025). In particular, AI, orchestrating data-driven processes across the value network, facilitates SC actors' collaboration and complementarity in value-creation processes (Yu, 2023),

enhancing win-win outcomes and reducing the biases conceptualized in bounded rationality theory. This is possible by augmenting human cognition through predictive analytics, simulation, and data synthesis. Even though technologies help mitigate decision-making biases arising from information asymmetries (Zhijian et al., 2020), they do not challenge other biases, such as the algorithmic opacity ethics dilemma (Condé and Münch, 2025).

Purpose of the paper. The purpose of this paper is to recognise the main biases in SC decision-making, focusing on the influence that digital technologies, and in particular AI, can have on their mitigation/elimination. In doing so, a systematic literature review has been conducted to 1) map the biases that affect SCM decisions (Schorsch et al., 2017; Brintrup et al., 2023; Wamba et al., 2023), 2) define the AI's role in mitigating decision-making biases (Kosasih et al., 2023; Wamba et al., 2023; Jackson et al., 2024), and 3) the practices to detect/mitigate biases (Bendoly et al., 2022).

Methodology. To conduct a rigorous systematic literature review (SLR), a structured protocol was developed to define the study aims, inclusion and exclusion criteria, identification procedures, and the data analysis plan (Nightingale, 2009).

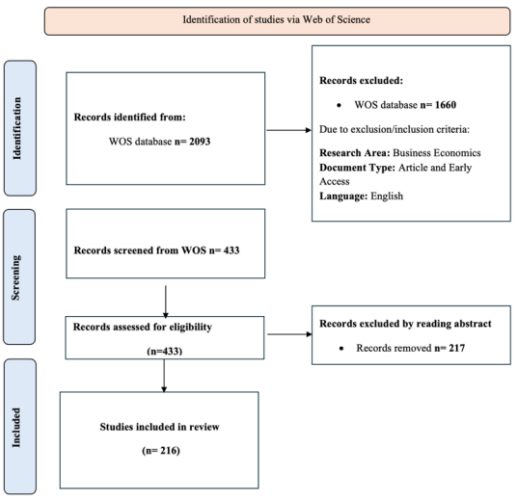
Table 1 Review Protocol, Authors' elaboration.

Review aim	Exploration of the decision making biases in SC
Search string definition	*("supply chain*" OR "supply network*" OR "value chain*" OR "supply chain management" OR SCM OR SC OR "logistics network*" OR "ecosystem*")* *AND* *("decision mak*" OR "managerial decision*" OR "decision process*" OR "managerial judgment*" OR heuristic* OR "bounded rationality")* *AND* *(bias* OR "decision error*" OR "judgment error*" OR "behavioral decision mak*" OR fairness OR assumption*)*
Inclusion and exclusion criteria	*Research Area: Only articles classified under Business Economics were included to ensure consistency with the field of interest.* *Document Type: Only Articles and Early Access publications were included. Reviews, books, book chapters, and conference proceedings were excluded to retain only peer-reviewed empirical articles.* *Language: Only papers written in English were included to avoid language bias.*
Plan for Data Analysis	*Descriptive analysis of the sample* *Bibliometric Analysis* *Thematic analysis*

First, a detailed search string was defined through a trial-and-error process, beginning with keywords identified in prior reviews on the topic. The string was organized around three pillars: 1) supply chain (SC), which represents the field of interest, 2) decision-making (DM), as this review aims to analyze decision-making literature within the SC domain, and 3) biases, to gain a deeper understanding of the limitations, biases, and underlying assumptions that affect SC decision-making.

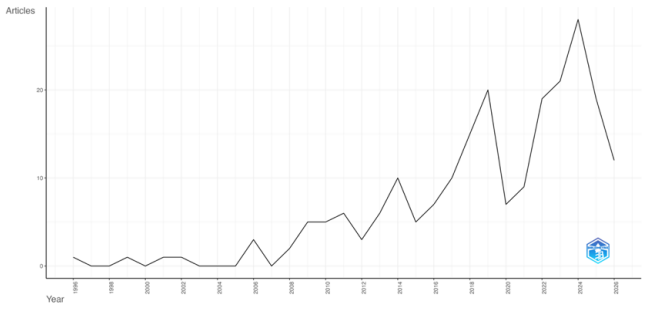
The search string was run in the *Web of Science* database, powered by Clarivate Analytics, selected for its rigorous indexing standards and broad coverage of high-quality peer-reviewed journals. The decision to rely on a single database follows Donath et al. (2021), who suggest this approach for bibliometric analysis in social sciences, to avoid redundant procedures and reduce the risk of human error. The analysis of a single database also supports the reduction of data homogenization issues caused by multiple databases. To ensure the rigor and replicability of the study, the PRISMA framework was adopted, following the recommendations of Moher et al. (2009) (Figure 1).

Figure 1 PRISMA Framework, Authors' elaboration



The search string was applied to the title, abstract, and keywords in the Web of Science database, yielding an initial sample of 2093 papers. After applying the inclusion/exclusion criteria, 1660 documents were excluded. The remaining 433 were screened through the abstract examination and, when necessary, the full texts. This screening excluded 217 additional papers that did not meet the inclusion criteria. Therefore, the final sample comprises 216 documents published between 1996 and 2026 across 79 sources. The annual growth rate in publications from 1996 to 2025 was 10.69%. Although 2026 has just begun, 12 papers have already been published (five of which are early access documents), highlighting the growing interest in this research area. Overall, the field is in a robust expansion phase, with significant increases in research activity, scholarly interest, and academic output. Researchers are actively exploring new research questions, methodologies, and applications within this domain. Figure 2 illustrates this trend, showing an initial slow growth (*emergence*), followed by a rapid acceleration (*expansion*). These findings suggest that this area represents a dynamic and evolving field of research.

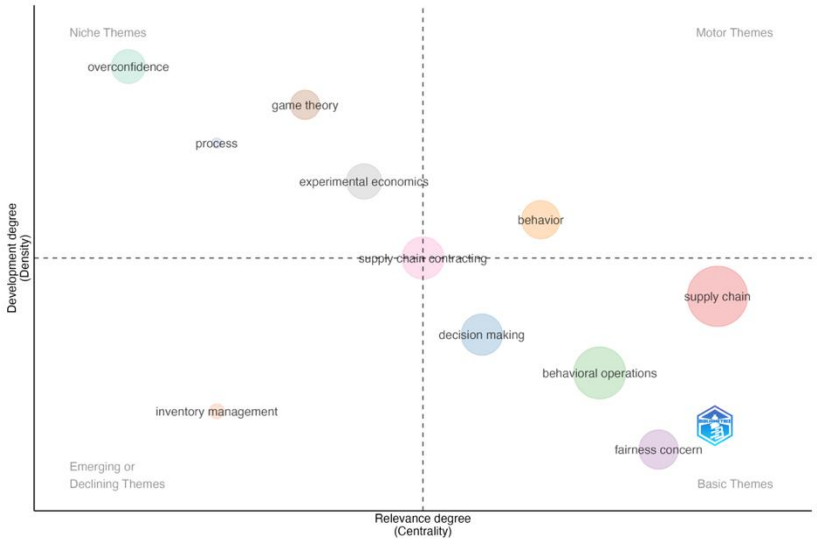
Figure 2 Annual scientific production, Biblioshiny elaboration



Results. The preliminary results were obtained by conducting a co-word analysis using the R package Bibliometrix, which enabled an in-depth mapping of the thematic structure of the investigated field (Aria and Cuccurullo, 2017). Co-word analysis is a technique used to explore relationships among topics within a research field by analyzing publication content (Donthu et al., 2021), which assumes that thematic relationships bind words that frequently co-occur.

A thematic map was developed based on author keywords (Figure 3), classified into four thematic categories. In the upper-right quadrant, the motor themes appear, identifying central and well-developed topics that drive research in this field. In the lower-right quadrant, basic themes are identified: transversal and foundational topics that are broad and widely connected but may lack deep internal development. In the upper-left quadrant are the so-called niche themes, highly specialized topics that are still relatively underdeveloped and weakly connected to the broader field, yet characterized by high internal coherence. Finally, in the lower-left quadrant are emerging or declining themes that are either not yet fully developed or losing relevance over time.

Figure 3: Thematic map, generated with Bibliometrix (R).



In Figure 3, the map highlights a robust research landscape at the intersection of behavioral science and SC management. Furthermore, the presence of influential and forward-dated articles underscores the ongoing dynamism and relevance of the field. A single motor theme emerged: Behavior, which represents a mature and strongly interconnected

research area, as indicated by its high density and centrality. This suggests a strong and pervasive focus on understanding human and organizational behavior within the analyzed domain. This is at the core of Behavioral Operations Management (BOM), which focuses on bounded rationality. Research within this cluster highlights that human information processing is constrained by knowledge, computational capacity, available information, and time. When these limitations occur, cognitive biases lead decision-makers to systematically deviate from mathematically optimal SC decisions. The cluster further suggests that improving SC performance cannot rely solely on refining optimization algorithms. Instead, it requires designing behavior-aware systems, increasing awareness of cognitive biases through training, and developing software interfaces that actively mitigate these limitations.

Focusing on the niche themes quadrant, several specialized areas of inquiry can be identified. Overconfidence emerges as a highly specialized topic that, due to its lower centrality, may not be broadly integrated across the entire field. This highlights that overconfidence in one's own estimates often leads to decision biases, resulting in false prosperity and poor performance (Chen et al., 2023). Research on this topic distinguishes between two types of overconfidence: *probabilistic overconfidence* (overestimation of the likelihood of success) and *market overconfidence* (overestimation of demand potential) (Wu H. et al., 2025). The cluster also links overconfidence to inequity aversion, suggesting that decisions are often influenced by comparisons with others' profits or industry benchmarks, leading to systematic distortions in ordering decisions. From an opposing perspective, in which overconfidence is always detrimental, the literature highlights that, in collaborative settings, it can act as an innovation driver. Thus, optimistic managers are more willing to innovate even when supply chain profits are negative, often driven by the fear of losing a competitive advantage (Liu et al., 2025).

The other two clusters are Game Theory and Experimental Economics. Both serve as specialized analytical frameworks, underscoring that investigating strategic interactions among actors who do not behave according to pure economic rationality but are influenced by cognitive biases, psychological factors, and power asymmetries requires formal, structured approaches. These include mathematical models typical of game theory, controlled laboratory experiments, vignette-based scenarios, and business simulation games, which help researchers isolate specific behavioral variables (such as trust or inequity aversion) that cannot be captured in archival data. Within the game theory cluster, particular attention is given to how intentions influence decision-making processes. For example, studies explore how preferences for fairness and reciprocity lead to psychological equilibria that differ from those predicted by classical theory. In contrast, the experimental economics cluster emphasizes that SCM success depends not only on economic incentives but also on non-monetary factors such as trust and trustworthiness. Experimental evidence shows that managers are often willing to sacrifice personal profits to adhere to fairness norms. Conversely, perceptions of opportunistic behavior or lack of transparency can undermine coordination within the supply chain.

Shifting to the basic themes dimension, several interconnected themes have emerged. In this quadrant, the SC cluster is the largest and most prominent, indicating its foundational and pervasive role within the field under study. Related papers examine the operational pillars of SC through the lens of the BOM, highlighting how behavioral biases and ethical constraints shape SC efficiency. Various types of biases are discussed, such as diversification bias and quantity bias, whereby decision-makers tend to over-diversify orders or underestimate required volumes relative to the theoretical optimum (the so-called *pull-to-center effect*). Additionally, the impact of social and ethical preferences on managerial decision-making is emphasized; thus, SC theories are often influenced by national culture, which acts as an explanatory variable in purchasing and collaboration decisions.

In summary, this cluster reflects a shift from a purely mechanistic view of the SC to a socio-technical perspective, in which decision-making biases are identified as key factors that can lead to profit losses of up to 35% relative to the theoretical optimum (Cassidey et al., 2025).

The behavioral operations cluster represents another significant basic theme. It challenges the traditional paradigm of the perfectly rational actor (*homo economicus*) by incorporating psychological and cognitive variables to account for systematic deviations from optimal decision-making in SCs. It focuses on understanding how individual biases influence the system's overall performance, providing theoretical foundations for capturing the limitations of human decision-making. Closely related to this theme, the cluster named decision-making emerges, which explores the micro-foundations of decision-making in SC. It highlights that decision-making is not purely cognitive but also emotional, because feelings such as pride, self-efficacy, and perceptions of fairness mediate the success of complex programs such as Lean Management. Conversely, the violation of the psychological contract, that is, the unwritten expectations between buyers and suppliers, generates emotional responses such as anger or a sense of betrayal, which directly influence repurchasing decisions and perceptions of fairness. The studies in this cluster do not merely describe these limitations but also propose tools to enhance decision rationality, including debiasing strategies, such as task decomposition and perspective shifting, aimed at reducing the impact of cognitive biases in supplier selection processes. Additionally, mechanisms such as accountability, the requirement to justify one's decisions, and incentive structures encourage managers to engage in more effortful decision-making processes, thereby reducing vulnerability to superficial distortions.

The last major basic theme is the cluster of fairness concerns. Thus, the social perception of fairness constitutes a cognitive bias that distorts the mathematical efficiency of SCs. Decision-makers exhibiting fairness concern tend to order less than the mathematical optimum (under-ordering) or to set higher prices to protect their margins when they perceive that their partner is gaining a disproportionate advantage. This is considered an intrinsic limitation to SC coordination. Recent studies in this cluster (e.g., those focusing on live streaming or e-commerce) suggest that although negotiation power influences profit distribution, the pursuit of fairness encourages actors to collaborate to expand total created value. Moreover, fairness concerns can also influence green investments. It is evident that if one partner (e.g., the retailer)

perceives unfairness, its reaction may compromise the environmental efficiency of the entire SC, reducing the level of product "greening". In summary, this cluster highlights that, in modern SC decision-making, fairness is not merely an ethical consideration but an operational constraint that defines the practical limits of what can be achieved in pricing, inventory, and sustainability.

In the lower-left quadrant, one theme has emerged: inventory management. This indicates that inventory management is no longer viewed solely as a problem of numerical optimization but rather as a challenge of managing decision-making limitations. Thus, inventory management is reinterpreted as a process of continuous learning aimed at overcoming initial constraints and deeply rooted biases.

These findings can also be approached assuming the ecosystem perspective, which led to the recognition of the impact of biases on the different ecosystem levels. Thus, if some of the identified biases tend to impact a single ecosystem level, most of them have a systemic and holistic influence between different levels. In particular, cognitive biases, often caused by knowledge, computational capacity, available information, and time constraints, mainly affect micro-level actors and their managerial and firm-specific abilities (Booth and Theodossiou, 2024). At this level, overconfidence is a common cognitive bias in human decision-making. It is better specified by probabilistic overconfidence, or the overestimation of the likelihood of success, which is a specific form of cognitive bias based on errors caused by wrong predictions, lack of precision, and persistence (e.g., anchored sequential choices). Together with this, psychological biases also affect the abilities of the micro-level actors, contributing to deviating from optimal decision-making.

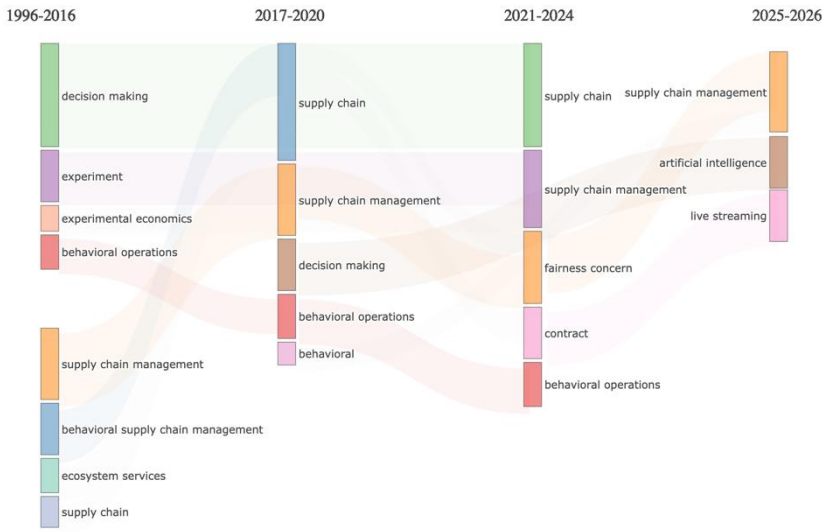
If biases occurring at the micro-level of SC ecosystems are mainly due to the effect of bounded rationality (Simon, 1997), biases caused by market overconfidence (overestimation of demand potential) (Doyle et al., 2021) tend to affect both micro- and meso-level actors; thus, they affect individual (e.g., manufacturers, retailers, suppliers, etc.) and organizational actors (e.g., industry consortia, etc.), distorting potential demand forecast and, consequently, deviating strategic decisions from the rational optimal level, exacerbated by information distortion in the SC. Diversification and quantity biases have a similar inter-layered effect; thus, they tend to over-diversify orders or underestimate required volumes if compared with the theoretical optimum (the so-called *pull-to-center effect*) (Wu H. et al., 2025).

The analysis of micro- and meso-level bias and their dependence on bounded rationality effects, caused by information asymmetries, pointed out the ability of AI in overcoming this limitation, and in offering real-time information streams essential to make data-driven and evidence-based decisions.

The networked nature of ecosystem interactions led to a better understanding of the intertwined and holistic influence of some biases. Thus, biases emerging from a culture-oriented and non-inclusive social perspective mainly originate at the macro-level, being influenced by institutional determinants (Zhang et al., 2026), which subsequently impact the other two ecosystem levels and the behavior of the related actors. This effect is due to the influence of some elements, such as policy tools, uncertainty, institutional determinants, political/societal uncertainty, government regulations, etc., on the other ecosystem levels and on the distortions that they can cause in micro- and meso-level actors' decisions.

After examining the themes emerging from the thematic map, a Sankey diagram (Figure 4) was developed to provide a comprehensive overview of the topic's evolution (1996–2026), offering a high-level view of how research themes have transformed over three decades. The analysis highlights four distinct time periods, spanning 1996–2016 (left), 2017–2020 and 2021–2024, and 2025–2026 (right). This classification ensures a balanced allocation of studies across each period. As can be observed, themes such as supply chain management, decision-making, and behavioral operations demonstrate remarkable persistence over time. While their specific interconnections and relative prominence evolve, they remain foundational to research, often splitting or merging to incorporate emerging concepts

Figure 4: Thematic evolution, generated with Biblioshiny.



More recent periods clearly highlight the emergence of new and impactful themes. Fairness concern (from 2021–2024 onwards) has gained significant visibility, and AI and live streaming have emerged as distinct and rapidly growing areas in the most recent period (2025–2026), signaling the increasing importance of technological integration within the field. It can be argued that the most recent period reflects a shift from operational and behavioral aspects toward Industry 4.0 (identified as a basic theme in 2021–2024) and, more recently, toward AI and live streaming (emerging as key niche themes in 2025–2026). This trend signals a future in which digital innovations will likely profoundly reshape SC and decision-making research, with a novel research direction driven by advanced technologies and their psychological impacts. Moreover, during the 2021–2024 period, carbon emissions emerged as a central theme, indicating a growing emphasis on the social and environmental responsibilities of supply chains and decision-making processes.

An examination of the temporal evolution of literature reveals a management paradox associated with AI's role. While AI has the potential to alleviate certain cognitive biases, it simultaneously introduces the risk of algorithmic bias. Consequently, managers must extend their expertise beyond mere technical proficiency with these technologies to adopt a comprehensive perspective on the multifaceted implications of their decision-making.

Research limitations. Despite the relevance of the results, this study is not without limitations. First, from a methodological perspective, the literature search was limited to a single database and could be expanded by considering additional sources. Second, another limitation concerns the rapid evolution of AI-related studies, which may mean that this analysis does not capture emerging topics and recent developments. Finally, the results obtained from the proposed analyses could be further enriched by integrating complementary qualitative methodologies that capture and deepen understanding of complex issues.

Managerial implications. This study elucidates several managerial implications that necessitate reconceptualizing the managerial role within the SC. Primarily, the assumption of an ecosystem perspective suggests that a linear approach to SCM decisions is inadequate for managing SCs' complex interactions. Instead, decisions should emerge from inter-actor and inter-level (micro, meso, and macro) collaborative, multilateral information exchange at the core of the strategic partnership within ecosystem architectures (Liu et al., 2025). Thus, the managerial capability to orchestrate resources becomes a strategic lever that enhances companies' potential for value creation and innovation, thereby supporting resilience and progressive adaptation to a dynamic environment. The results achieved can consequently inspire managers in selecting and implementing the most effective collaborative approaches, while being aware of potential biases that can affect their SCM decisions. Thus, in this domain, decision-making processes are susceptible to systematic biases, which can result in sub-optimal outcomes. Treating these biases as occasional occurrences may lead to an underestimation of their effects, which are inherently structural to decision-making processes. To avoid this, managers can use digital technologies to enhance decision-making by accounting for the risks posed by bias. Consequently, the provided insights support managers in strategically designing practices and policies to overcome or solve these biases, also thanks to a conscious and ethical use of smart digital technologies such as AI. In doing so, digital technologies can play a significant role, serving as cognitive partners that facilitate the comparison and decomposition of complex problems (Legenvre et al., 2022). This does not imply delegating decision-making, as decisions cannot be optimized solely based on economic parameters, but rather approaching it as a participative process, in which all the ecosystem actors are involved, and technologies can contribute to avoiding asymmetries (Yamini, 2021). However, to achieve this, a real participation in SCM and a certain digital/algorithmic literacy is essential.

The analysis of the temporal evolution of literature also revealed a management paradox associated with AI's role (Condé and Münch, 2025). While AI has the potential to alleviate certain cognitive biases, it simultaneously introduces the risk of algorithmic bias. Consequently, managers must extend their expertise beyond mere technical proficiency with these technologies to adopt a comprehensive perspective on the multifaceted implications of their decision-making.

The study also offered some policy implications; thus, the achieved insights can also support the macro-level actors or policymakers in promoting inter-level and inter-actor collaboration to promote a better approach to the digital transformation of the modern SCs, supporting it with specific guidelines, standards, and programs.

As a preliminary analysis, the findings demonstrated the networked and participative nature of SC decision-making processes and the influence that smart technologies, such as AI, can have on it and on the emergence of different possible biases. Consequently, further research may be intended to build theory by assessing the achieved findings, conducting empirical analysis (e.g., observation) on a representative sample. In doing so, future studies will be mainly oriented to the implementation of quantitative methods to empirically analyze and evaluate the above-mentioned managerial paradox to better understand, analyze, and evaluate the influence of AI on the emergence of different decision-making biases. This will enhance the findings' generalizability.

Originality of the paper. The originality of this paper lies in its attempt to embed AI within SCM in a rapidly changing landscape where humans and non-humans are expected to interact and design more sustainable and intelligent solutions. More specifically, this work represents an initial attempt to challenge decision-making biases, particularly psychological ones, by integrating AI into distributed, complex systems such as global SCs. From a methodological standpoint, this

paper combines a systematic literature review (employing the PRISMA protocol) with bibliometric analysis to identify current trends and potential issues for future investigation concerning novel technologies and their behavioural and psychological impacts, thereby suggesting important managerial implications.

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Didattica 4.0 e intelligenza artificiale: Un'analisi qualitativa delle soluzioni digitali a supporto del corpo docente

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Abstract. *Negli ultimi anni, le istituzioni scolastiche hanno assistito ad una rapida accelerazione dei processi di digitalizzazione adottati, inizialmente in risposta all'emergenza sanitaria dovuta alla pandemia da Sars-Cov2 e successivamente consolidatisi nelle pratiche quotidiane. In questo scenario si è assistito alla crescente introduzione di soluzioni basate sull'AI, tra le quali sistemi tutoring intelligente, applicazioni di intelligent assessment e agenti conversazionali. Nonostante la letteratura internazionale abbia analizzato le potenzialità pedagogiche di queste tecnologie, risulta ancora limitata un'analisi approfondita sulle implicazioni organizzative e professionali che presuppongono per i docenti. La finalità del presente studio è quella di esaminare in quale modo le soluzioni AI, destinate agli istituti scolastici di secondo grado in Italia, si configurano come strumenti di supporto all'organizzazione del lavoro didattico dei docenti. L'attenzione non è quindi rivolta a misurare l'efficacia o l'impatto delle tecnologie bensì l'analisi di significati, rappresentazioni e configurazioni organizzative che esse presuppongono o promuovono. Inoltre, La ricerca adotta un disegno, qualitativo di tipo esplorativo e interpretativo, basato sull'analisi documentale di fonti pubbliche e sulla selezione intenzionale di soluzioni AI rilevanti per il contesto scolastico. Lo studio vuole contribuire al dibattito sulla trasformazione digitale delle organizzazioni educative offrendo una prospettiva organizzativa sull'integrazione dell'AI nella scuola secondaria italiana, mettendo in luce le implicazioni per il ruolo professionale del corpo docente e per l'organizzazione del lavoro didattico.*
Keywords*: AI in Education, Organizational Innovation, Digital Transformation, Innovation Management, AI Adoption.*

1. Inquadramento Teorico. Negli anni successivi alla pandemia da Sars-CoV-2, gli istituti scolastici hanno assistito a una rapida espansione dell'uso delle tecnologie digitali nelle attività didattiche e organizzative. La diffusione dell'emergency remote teaching ha accelerato processi di digitalizzazione già in atto, determinando rilevanti riconfigurazioni nei sistemi educativi (Moore et al., 2023; Meinck et al., 2022). Nel periodo successivo alla fase emergenziale, tali tecnologie si sono progressivamente consolidate, con un'ampia diffusione delle infrastrutture digitali nei Paesi OCSE, nonostante persistano differenze in termini di qualità e accessibilità (Boeskens et al., 2025). In questo contesto si inserisce la crescente adozione di soluzioni basate sull'AI, tra cui sistemi di apprendimento adattivo, strumenti di intelligent assessment e agenti conversazionali, capaci di personalizzare i percorsi di apprendimento e supportare le attività didattiche e di monitoraggio (Wang et al., 2024; Lai et al., 2024). Tali tecnologie si fondano su modelli adattivi e su sistemi di tutoring intelligente, in grado di modulare contenuti e feedback in funzione delle caratteristiche degli studenti (Brusilovsky, 2001; Durlach et al., 2012). Parallelamente, i sistemi AI conversazionali, intesi come agenti in grado di simulare modalità di interazione tipiche della comunicazione umana, vengono progressivamente integrati nei contesti educativi per fornire supporto e feedback in tempo reale (Khatri et al., 2018; Radziwill et al., 2017; Merino et al., 2025). La letteratura sull'AI in ambito educativo si è concentrata prevalentemente sugli esiti di apprendimento e sulle opportunità di personalizzazione offerte dai sistemi intelligenti (Roll & Wylie, 2016; Chen et al., 2020), mentre gli studi sull'EdTech hanno privilegiato l'analisi dei processi di diffusione delle tecnologie e delle piattaforme digitali (Williamson & Eynon, 2020; Perrotta & Selwyn, 2020). Rimane invece ancora limitata una riflessione sistematica sulle implicazioni organizzative dell'adozione dell'AI nei contesti educativi. Il presente studio si inserisce in tale gap, proponendo una lettura delle soluzioni di AI come infrastrutture socio-tecniche.

2. Obiettivo. La crescente adozione delle tecnologie digitali e delle soluzioni AI non può essere interpretata esclusivamente come un'evoluzione tecnologica o pedagogica ma anche come un processo di trasformazione digitale che incide su strutture organizzative, modelli di governance e ruoli professionali, richiedendo capacità di leadership e di gestione dell'innovazione a livello istituzionale (McCarthy et al. 2023; Pietsch, 2024). In particolare, l'integrazione riguarda attività centrali dei docenti come la progettazione delle lezioni, produzione e selezione dei materiali, valutazione degli apprendimenti e personalizzazione dei percorsi didattici. Gli insegnanti possono infatti usufruire degli strumenti AI per generare contenuti, fornire feedback e automatizzare compiti ripetitivi, favorendo una maggiore efficienza e riduzione del carico di lavoro amministrativo (Delello et al., 2025). Tuttavia, tali trasformazioni non sono neutrali: l'adozione di sistemi generativi e adattivi comporta una rinegoziazione del ruolo professionale del docente, incidendo su autonomia, responsabilità e competenze richieste (Dangol et al. 2025; Zhai et al. 2024; Iqbal et al. 2024). In tal senso, l'adozione

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dell'IA deve essere analizzata come parte di un più ampio processo di trasformazione digitale delle organizzazioni educative, con implicazioni che superano la dimensione strettamente tecnica o didattica. Alla luce di tali considerazioni, si intende rispondere alla seguente domanda di ricerca:
RQ: In quale modo le soluzioni di intelligenza artificiale destinate agli istituti scolastici di secondo grado in Italia si configurano come strumenti di supporto all'organizzazione del lavoro didattico dei docenti?

3. Metodologia. Dal punto di vista metodologico, lo studio adotta un disegno qualitativo di tipo esplorativo e interpretativo volto a comprendere i significati attribuiti alle soluzioni AI e i processi attraverso cui vengono integrate nell'organizzazione del lavoro didattico negli istituti di secondo grado (Creswell et al., 2018; Denzin et al., 2018). Il carattere esplorativo risulta coerente con l'analisi di fenomeni emergenti e con l'obiettivo di sviluppare categorie interpretative utili alla costruzione teorica (Eisenhardt, 1989; Gioia et al., 2013). Il corpus analizzato è composto da 6 documenti di diversa natura, tra cui contenuti presenti sui siti web ufficiali delle piattaforme, documentazione funzionale e materiali informativi e di policy, selezionati in base alla loro rilevanza e al livello di dettaglio informativo (Bowen, 2009). L'analisi dei dati è stata condotta attraverso un approccio di analisi tematica (Braun & Clarke, 2006). In una prima fase, i documenti sono stati esaminati per individuare unità di significato rilevanti, successivamente codificate mediante un processo di codifica aperta (Saldaña, 2013). I codici sono stati progressivamente aggregati in categorie analitiche attraverso un processo iterativo di confronto tra dati empirici e letteratura, secondo una logica abductive (Timmermans & Tavory, 2012). La fase di codifica ha portato all'identificazione di codici descrittivi successivamente organizzati in categorie di livello superiore attraverso un processo di astrazione progressiva (Charmaz, 2014; Vaismoradi et al., 2016), fino alla definizione di tre dimensioni analitiche, in linea con approcci induttivi di analisi qualitativa (Thomas, 2006). Le dimensioni emerse sono state successivamente messe in dialogo con la letteratura sulla materialità delle tecnologie e sull'organizzazione del lavoro (Orlikowski, 2007; Leonardi, 2011):

- Dimensione infrastrutturale e di gestione della conoscenza, in linea con studi sulle knowledge infrastructures (Edwards et al., 2009);
- Dimensione organizzativo-gestionale del lavoro del docente, coerente con ricerche sulla riconfigurazione dei processi organizzativi attraverso sistemi algoritmici (Faraj et al., 2018; Kellogg et al., 2020);
- Dimensione progettuale-didattica e di supporto cognitivo, relativa al ruolo delle tecnologie AI nel supporto alle pratiche di insegnamento (Selwyn, 2019).

Tali dimensioni risultano coerenti con la letteratura sulle tecnologie digitali nei sistemi educativi (UNESCO, 2021; OECD, 2025) e con studi che evidenziano il ruolo delle classificazioni e degli standard nella strutturazione delle pratiche organizzative (Bowker & Star, 1999).

3.1 Criteri di Selezione. La selezione delle soluzioni AI è stata guidata da una logica di campionamento intenzionale, coerente con la domanda di ricerca, privilegiando casi in grado di fornire informazioni rilevanti sul fenomeno indagato (Patton, 2002; Palinkas et al., 2015). Un primo criterio riguarda l'appartenenza al dominio dell'AI in Education, includendo strumenti che integrano componenti algoritmiche, sistemi adattivi, tutoring intelligente o funzionalità di learning analytics (Zawacki-Richter et al., 2019). È stata inoltre considerata la destinazione al contesto della scuola secondaria, selezionando soluzioni rivolte a docenti o istituzioni scolastiche. Un secondo criterio riguarda la rilevanza funzionale rispetto alle attività professionali dei docenti, privilegiando strumenti che supportano la progettazione didattica, la produzione di materiali, la valutazione degli apprendimenti e la gestione delle attività organizzative, in linea con la letteratura sull'adozione delle tecnologie nei contesti organizzativi (Davis, 1989; Venkatesh et al., 2003). Infine, sono state incluse esclusivamente soluzioni per le quali fossero disponibili documentazioni pubbliche sufficientemente articolate da consentire un'analisi documentale sistematica (Bowen, 2009). Il numero dei casi è stato definito in base alla loro capacità informativa rispetto agli obiettivi dello studio, secondo il principio dell'information power (Malterud et al., 2015).
3.2 Il Campione. Il processo di individuazione del campione ha previsto una fase preliminare per mappare i principali strumenti AI usati o potenzialmente utilizzabili dai docenti nel contesto della scuola secondaria italiana (Tabella 1). Questa ricognizione ha consentito di identificare 10 strumenti AI potenzialmente rilevanti per il contesto educativo. Successivamente, Sulla base dei criteri di selezione definiti, la ricognizione è stata delimitata alle soluzioni con una configurazione istituzionale e organizzativa. Il campione finale ha incluso tre macro-soluzioni: MTM Project, Superlearn e Minerva Education AI, progettate specificamente per il contesto scolastico e dotate di funzionalità che incidono sull'organizzazione del lavoro didattico dei docenti sia sul piano infrastrutturale e gestionale sia su quello di pianificazione e produzione dei materiali didattici. Durante la mappatura preliminare sono state considerate anche sistemi ampiamente adottati dai docenti, tra cui strumenti generativi (ChatGPT, Microsoft Copilot, Google Gemini), applicazioni per la creazione di contenuti (Canva Magic Write), strumenti di organizzazione personale (Notion AI) e sistemi di revisione linguistica (Grammarly). Tuttavia, questi sono stati esclusi dal campione poiché non progettate specificamente per istituzioni scolastiche né configurate come piattaforme organizzative integrate, essendo usate prevalentemente su un piano individuale.

Tabella 1 - Criteri di selezione e inclusione delle soluzioni di intelligenza artificiale analizzate (Fonte: elaborazione degli autori)

Soluzione	Destinata a Scuola Secondaria	Tipo di incidenza nelle attività del docente	Riconducibile ad AIED	Documentazione Pubblica Adeguata	Inclusione/ Esclusione
MTM Project	Sì	gestione procedure, supporto organizzativo, progettazione didattica immersiva, creazione contenuti	Sì	Sì	Inclusa
Superlearn	Sì	assessment, workflow, pianificzione	Sì	Sì	Inclusa
Minerva Education AI	Sì	progettazione didattica, materiali	Sì	Sì	Inclusa
ChatGPT	No	uso individuale	Sì	Sì	Esclusa – non destinata a istituzioni scolastiche
Canva Magica Write	No	produttività individuale	Sì	Sì	Esclusa – non configurata per contesto scolastico
Microsoft Copilot	No	creazione materiali	Sì	Sì	Esclusa – strumento creativo individuale
Notion AI	No	organizzazione appunti, pianificazione personale	Sì	Sì	Esclusa – tool organizzativo personale
Grammarly	No	revisione e correzione testi	Sì	Sì	Esclusa – supporto linguistico individuale

3.3 Raccolta dei Dati. Per la raccolta dei dati è stata adottata l'analisi documentale, intesa come procedura sistematica di selezione, revisione ed interpretazione di materiali scritti ed elettronici finalizzata alla produzione di conoscenza empirica (Bowen, 2009). In linea con la prospettiva della ricerca qualitativa, i documenti sono stati considerati non come semplici supporti informativi ma come costruzioni sociali e organizzative che riflettono pratiche e visioni situate (Flick, 2009; Patton, 2002). Infatti, sono stati analizzati diversi tipi di materiali ufficiale per ciascuna soluzione AI selezionata, tra cui siti web, descrizioni funzionali, documentazione tecnica, materiali informativi rivolti alle scuole e, qualora disponibili, policy d'uso. Complessivamente, l'analisi ha incluso 6 documenti ufficiali relativi alle piattaforme considerate. L'utilizzo di diverse tipologie documentali risponde a una logica di triangolazione delle fonti, intesa come confronto sistematico tra materiali differenti riferiti allo stesso fenomeno (Denzin, 1978). Tale strategia contribuisce a rafforzare la credibilità dell'interpretazione attraverso la convergenza o l'eventuale divergenza delle informazioni provenienti da fonti diverse (Carter et al., 2014).

4. Risultati. Le soluzioni sviluppate da MTM Project, in particolare attraverso la piattaforma ScuolaVR (SVR), integrano componenti AI in ambienti AR e VR attraverso un'architettura basata su Retrieval-Augmented Generation, che consente di recuperare e interrogare informazioni contenute in repository strutturati. In questo senso, l'AI può essere interpretata come un'infrastruttura di organizzazione della conoscenza. Se la scuola è intesa come organizzazione distribuita di sapere (Tsoukas, 1996), il lavoro docente implica non solo la trasmissione ma anche la selezione e la riorganizzazione delle conoscenze (Shulman, 1986). In questa prospettiva, le architetture RAG incidono sulle condizioni organizzative dei docenti, migliorando l'accessibilità e la strutturazione delle informazioni in un contesto caratterizzato da crescenti richieste di documentazione e accountability (OECD, 2020). Tali soluzioni operano quindi come dispositivi di formalizzazione della conoscenza istituzionale, riducendo il tempo necessario alla ricerca e rielaborazione delle informazioni. Diversamente, soluzioni come Superlearn e Minerva Education AI, e in misura più limitata anche le tecnologie immersive di MTM Project, intervengono nella dimensione progettuale, redistribuendo le attività cognitive associate alla pianificazione didattica. Alla luce della teoria della cognizione distribuita (Hutchins, 1995), tali strumenti possono essere interpretati come artefatti cognitivi che partecipano ai processi di elaborazione professionale. In linea con

la distinzione tra automazione e augmentation (Raisch et al., 2021), le piattaforme analizzate si collocano prevalentemente nella seconda prospettiva, assegnando agli insegnanti funzioni di supervisione e validazione dei contenuti generati. Considerando che una quota significativa del tempo di lavoro docente è dedicata ad attività di pianificazione e valutazione (OECD, 2019), l'AI contribuisce alla redistribuzione del carico cognitivo e interviene su dimensioni centrali dell'organizzazione del lavoro. La presenza di dashboard, sistemi di monitoraggio e workflow strutturati introduce inoltre maggiore formalizzazione e tracciabilità delle attività, in linea con i processi di dataficazione dell'istruzione (Williamson, 2017), con implicazioni per l'autonomia professionale e la percezione del ruolo docente (Day, 2012; OECD, 2020). Nel complesso, le soluzioni analizzate si configurano non solo come supporti didattici, ma come infrastrutture organizzative che incidono su pianificazione, documentazione, coordinamento e gestione del tempo professionale.

4.1 Soluzioni MTM Project

I risultati derivanti dall'analisi delle soluzioni proposte da MTM Project evidenziano un ecosistema tecnologico composto da un'infrastruttura digitale integrata e da applicazioni funzionali differenziate. In particolare, la componente immersiva è riconducibile alla piattaforma ScuolaVR (SVR), che consente la fruizione di ambienti virtuali e aumentati multiutente, supportando esperienze interattive e collaborative, la simulazione di scenari tecnico-professionali e l'assistenza da remoto. Le informazioni raccolte indicano che la componente AI integrata nelle tecnologie immersive adotta un'architettura basata su Retrieval-Augmented Generation (RAG), in cui un modello linguistico genera risposte recuperando informazioni da documenti presenti in repository strutturati, senza ricorrere a fine-tuning sui dati dell'istituzione. All'interno di questo ecosistema si collocano strumenti applicativi con funzionalità AI differenziate. MaGestio EDU supporta la gestione di procedure operative e attività laboratoriali attraverso workflow, report e checklist, con l'AI che funge da supporto informativo in tempo reale. SVR Translator integra funzionalità di traduzione automatica, trascrizione e sintesi vocale, configurandosi come strumento di mediazione linguistica. VASARI utilizza tecniche di Natural Language Processing e Large Language Models per l'analisi della documentazione tecnica, l'estrazione di procedure operative e la loro organizzazione in repository strutturati, supportando attività operative e la simulazione di processi in ambienti immersivi. La piattaforma SVR supporta inoltre l'utilizzo e l'adattamento di contenuti immersivi nella progettazione didattica, anche attraverso percorsi di formazione dedicati alla modellazione VR, consentendo esperienze di apprendimento multilivello e attività collaborative adattabili a diverse discipline e livelli di difficoltà. Nel complesso, le soluzioni MTM configurano l'AI principalmente come infrastruttura di supporto alla gestione della conoscenza e dei processi operativi (Edwards et al., 2009). Le funzionalità di gestione dei workflow evidenziano una rilevanza della dimensione organizzativo-gestionale, legata al coordinamento e alla standardizzazione delle attività (Faraj et al., 2018; Kellogg et al., 2020), mentre la dimensione progettuale-didattica risulta presente ma meno centrale, configurandosi come supporto alla progettazione e all'utilizzo di contenuti immersivi, piuttosto che come sistema primariamente orientato alla generazione autonoma di materiali didattici (Zawacki-Richter et al., 2019; Roll & Wylie, 2016).

4.2 Soluzioni Superlearn

Superlearn è presentata come una piattaforma digitale integrata che combina soluzioni tecnologiche e componenti AI destinate sia al contesto scolastico sia a quello aziendale, con una sezione specificamente orientata agli istituti scolastici. La piattaforma è descritta come un ecosistema che integra strumenti per la gestione documentale, la comunicazione interna, il supporto alla didattica e il coordinamento delle attività scolastiche. Dalla documentazione disponibile emerge la presenza di moduli distinti dedicati alla gestione (Manage), all'insegnamento (Teach) e all'apprendimento (Learn). Il sistema include dashboard per la gestione di documenti, ruoli e attività, nonché strumenti di interazione digitale utilizzabili da docenti, studenti e personale amministrativo con possibilità di integrazione con sistemi digitali esterni. La piattaforma integra componenti AI sotto forma di agenti. Dai materiali ufficiali emerge la presenza di un assistente virtuale in grado di fornire supporto informativo e rispondere a domande degli utenti, oltre ad agenti generativi. In particolare:

- I docenti possono utilizzare agenti AI generativi per attività di assessment;
- La piattaforma consente la creazione assistita di materiali didattici tramite agenti AI;
- Sono presenti agenti AI dedicati alla ricerca delle circolari scolastiche emesse annualmente dalla singola istituzione;
- Agenti AI per la redazione delle circolari sono in fase di implementazione.

Le componenti AI risultano pertanto organizzate in agenti specializzati per funzioni didattiche e amministrative. La documentazione non fornisce dettagli sull'architettura tecnica dei modelli, sui dataset utilizzati né sulle modalità di addestramento o aggiornamento dei sistemi. Nel complesso, Superlearn configura l'AI come componente integrata in un ecosistema digitale orientato al coordinamento delle attività scolastiche. La soluzione evidenzia una prevalenza della dimensione organizzativo-gestionale, con elementi anche progettuale-didattici legati all'uso di agenti generativi, mentre la dimensione infrastrutturale risulta meno esplicita.

4.3 Soluzioni Minerva Education AI

Minerva Education AI è presentata come una piattaforma AI generativa progettata per supportare gli insegnanti nella progettazione didattica e nella generazione di materiali, contribuendo a ridurre il carico di lavoro legato alla preparazione di lezioni e verifiche. La piattaforma consente la creazione di piani di lezione, unità didattiche, quiz personalizzati e materiali operativi attraverso assistenti AI specializzati, che supportano diverse esigenze educative, dalla progettazione

di attività di classe alla produzione di contenuti testuali e visivi. Sono inoltre disponibili "esperti AI" in grado di rispondere alle richieste degli insegnanti e una sezione di risorse contenente materiali didattici pronti all'uso, adattabili a diversi livelli di apprendimento e discipline. Nei materiali pubblici non sono forniti dettagli tecnici relativi all'architettura dei modelli, ai dataset o a eventuali processi di fine-tuning. Nel complesso, l'AI appare configurata come supporto diretto alla programmazione individuale del docente, descritta prevalentemente in termini funzionali piuttosto che tecnici. Ne emerge una forte prevalenza della dimensione progettuale-didattica, mentre risultano marginali le componenti infrastrutturale e organizzativo-gestionale.

5. Limiti della Ricerca. Il presente studio presenta alcuni limiti. In primo luogo, l'analisi si basa su documentazione pubblica (siti web, brochure, white paper) e non è stato possibile accedere al codice sorgente, ai modelli o ai dataset di addestramento, né condurre audit tecnici indipendenti delle soluzioni analizzate. In secondo luogo, lo studio si concentra su un numero limitato di strumenti destinati agli istituti secondari italiani, senza un confronto sistematico con piattaforme internazionali, con conseguenti limiti di generalizzabilità. Inoltre, l'analisi non include dati empirici sull'uso effettivo delle piattaforme da parte dei docenti, né osservazioni dirette o interviste. Infine, la ricerca adotta una prospettiva prevalentemente organizzativa e cognitiva, senza approfondire in modo sistematico le implicazioni etiche, giuridiche e relative alla protezione dei dati personali. Alla luce di tali limiti, emergono diverse traiettorie di ricerca. In primo luogo, sarebbero auspicabili studi empirici sull'adozione concreta di queste soluzioni nelle scuole, al fine di comprendere come i docenti integrino l'AI nei processi di lavoro e se la redistribuzione cognitiva ipotizzata si traduca in trasformazioni osservabili delle pratiche (Luckin et al., 2016). In secondo luogo, ricerche comparative tra contesti nazionali potrebbero chiarire il ruolo degli assetti istituzionali e normativi nelle configurazioni organizzative (Komljenovic, 2021). Infine, studi longitudinali potrebbero analizzare l'impatto delle piattaforme AI sulla professionalità docente nel lungo periodo, verificando eventuali processi di deskilling, upskilling o trasformazione delle competenze (Susskind et al., 2022; Autor, 2015).

6. Implicazioni Manageriali. Per quanto concerne le implicazioni manageriali, i risultati suggeriscono alcune indicazioni operative per dirigenti scolastici e decisori pubblici. In primo luogo, l'adozione di soluzioni AI richiede di essere accompagnata da interventi organizzativi e non solo tecnologici, con particolare attenzione alla ridefinizione dei processi di lavoro e delle responsabilità del personale docente. In secondo luogo, risulta necessario investire in percorsi di formazione mirati non solo all'uso tecnico degli strumenti ma anche alla loro integrazione nelle pratiche didattiche e organizzative. Inoltre, la crescente presenza di sistemi basati su dashboard, workflow e monitoraggio delle attività richiede una riflessione sulle modalità di governance dei dati e sui meccanismi di accountability al fine di evitare effetti indesiderati sulla autonomia professionale dei docenti. Infine, i risultati evidenziano la necessità di sviluppare politiche scolastiche che bilancino l'uso dell'AI come supporto cognitivo con il mantenimento del ruolo decisionale e professionale dell'insegnante, evitando forme di dipendenza o delega eccessiva alle tecnologie.

7. Originalità del Paper. Il presente studio contribuisce alla letteratura sull'introduzione dell'AI nell'ambito educativo, offrendo una prospettiva organizzativa all'interno degli istituti di secondo grado. In particolare, vengono interpretate le diverse soluzioni non solo come meri strumenti di supporto didattico ma come infrastrutture socio-tecniche che intervengono nell'organizzazione del lavoro dei docenti e della gestione della conoscenza all'interno delle istituzioni scolastiche. L'analisi preliminare delle soluzioni AI ha messo in luce due importanti configurazioni: sistemi orientati a strutturare la conoscenza istituzionale attraverso repository di documentali interrogabili e sistemi generativi che supportano i docenti nelle attività di progettazione didattica e nella produzione dei materiali. Nel complesso, il paper contribuisce alla letteratura sulla trasformazione digitale delle organizzazioni scolastiche mostrando come l'introduzione di tali strumenti possa incidere direttamente sull'efficienza operativa, intesa come capacità di svolgere attività organizzative in modo più efficace rispetto alle pratiche esistenti attraverso un migliore utilizzo delle risorse e dei processi organizzativi (Porter, 1996), attraverso una distribuzione delle attività cognitive, la gestione del tempo e le modalità di coordinamento del lavoro didattico.

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Does Source Credibility Theory Apply to Virtual Influencers? Evidence From Italy

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Abstract. *The rapid evolution of Generative Artificial Intelligence has led to the emergence of increasingly realistic human-like virtual influencers (VIs), revolutionizing influencer marketing. While previous literature has focused primarily on clearly artificial or stylized digital figures, little is known about how consumers perceive the new generation of hyper-realistic VIs, nearly indistinguishable from human influencers. In particular, it is still unclear whether Source Credibility Theory (SCT), widely validated in the context of human endorsements, is also applicable when the source is artificially generated. This study aims to test the applicability of SCT in the context of human-like VIs, analyzing to what extent the three central dimensions of credibility (attractiveness, trustworthiness, expertise) influence consumers' attitudes towards these artificial endorsers. The research is based on a questionnaire administered to 372 Italian respondents and combines descriptive analysis and a multiple linear regression to answer three research questions: (1) how human-like VIs are perceived by Italian consumers; (2) whether they are considered as attractive, expert and trustworthy as human influencers; (3) to what extent the dimensions of credibility influence attitudes towards them. The results show that attitudes toward VIs are relatively low, despite the three credibility components having moderate values. VIs are perceived as quite attractive and expert compared to human influencers, but slightly less trustworthy. Furthermore, the regression analysis highlights that all three credibility dimensions positively and significantly influence attitudes, with attractiveness emerging as the strongest predictor. This confirms that the classic mechanisms of SCT remain valid even when the source is not human but artificially generated. The study contributes to the literature by providing empirical evidence on the perception of human-like VIs in the Italian context and testing the robustness of a well-established theory in influencer marketing in the AI context. Managerial implications are also discussed to guide how brands can strategically implement human-like VIs within the Italian market, which appears not yet fully ready to embrace these artificial endorsers.*

Keywords: *Virtual Influencers; Social Credibility Theory; Artificial Intelligence; Virtual Endorsers*

Framing of the research. In recent years, influencer marketing has undergone a significant transformation: the rise of virtual influencers (VIs) has blurred the boundaries between human and digital, offering companies new tools to stimulate engagement and promote their products (Allal-Chérif et al. 2024). VIs are digital characters created using artificial intelligence technologies, designed to operate on social media like real creators, interacting with users and collaborating with brands in a similar way to human influencers (Allal-Chérif et al. 2024). A notable example is Lil Miquela, who has attracted the attention of companies through numerous collaborations with international brands, gaining millions of followers on social media and becoming the subject of growing academic interest (Zhou et al. 2024). More recently, with the release of ChatGPT and the rush to develop new applications of generative artificial intelligence, we have witnessed a rise in VIs, particularly those that are very similar to human beings. Unlike VIs like Lil Miquela and Imma, new VIs are almost unrecognizable from real people, making them very interesting to study, as users may feel deceived by their appearance and therefore reject interaction. An example of such VIs is Alba Renai, who presented a Spanish TV show (Barbera 2024) and has collaborated with several brands, including Hyundai. Similarly, Aitana Lopez has nearly 400,000 followers on Instagram, and the creator said she generates 10.000$ per month (Crescenzi 2023). Both interact on social media continuously, posting everyday experiences as if they were real, and their appearance can deceive anyone unaware of their artificial origins. The focus of this study is exclusively on this new generation of VIs, called human-like VIs.

Although much news has been published in Italy about human-like VIs (Crescenzi 2023; Barbera 2024), few studies have examined how people perceive them (Koles et al. 2024), and, to our knowledge, none has investigated this phenomenon in Italy, a country where influencer marketing is rapidly growing (Guttmann 2025). Therefore, it is very interesting to understand whether this new form of influencer is well accepted by users and how companies can use them to improve brand perception and promote their products.

The study draws on Source Credibility Theory (SCT), a well-established theory in influencer marketing (Nafees et al. 2021) initially introduced by Hovland et al. (1953). It states that source credibility depends on three components: expertise, attractiveness, and trustworthiness. Expertise refers to the degree to which the source is perceived as knowledgeable and authoritative in a specific field; trustworthiness concerns the perceived honesty, integrity, and coherence of the communicator; and finally, attractiveness includes not only aesthetics but also the ability to be pleasant and socially valuable (Ohanian 1990). In collaborations between brands and creators, the influencer's persuasiveness has often been linked to perceptions of their credibility, which is understood as a combination of expertise, trustworthiness,

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and attractiveness. Numerous studies have shown that these three dimensions influence brand attitudes, purchasing intentions, and engagement (Wellman 2024), confirming that the source is not just a vehicle for the message, but a central element in building meaning and trust. In fact, it's not just what is communicated that makes the difference, but who communicates it. Although it is a framework already widely used in influencer marketing (e.g. Nafees et al., 2021), whether SCT's dimensions function similarly for human and virtual influencers remains theoretically and empirically unclear (Park and Sung 2023). SCT provides a good starting point for analyzing VIs. If persuasion mechanisms in digital marketing are based on the perceived credibility of the source, it becomes crucial to understand whether these mechanisms remain valid when the source is not a human being, but an artificial entity generated by artificial intelligence. VIs, especially human-like ones, replicate the aesthetic and behavioral characteristics of traditional influencers, but lack lived experience, authentic intentionality, and a real biographical identity. This raises a theoretical question: is it possible to attribute expertise, trustworthiness, and attractiveness to a subject who lacks a human existence? Testing the validity of SCT in the context of VIs means verifying whether consumers activate the same mechanisms used for human influencers or whether the artificiality of the source modifies or transforms traditional credibility mechanisms.

Purpose of the paper. This study aims to test the applicability of SCT to human-like VIs by examining how the core credibility dimensions (attractiveness, trustworthiness, and expertise) influence consumers' attitudes toward these artificial endorsers. Specifically, the paper addresses three research objectives:

RQ1. How are VIs perceived by Italian consumers?

RQ2. Are human-like VIs perceived as equally credible as human influencers in terms of attractiveness, trustworthiness, and expertise?

RQ3. 3. To what extent do the core dimensions of SCT - attractiveness, trustworthiness, and expertise - influence consumers' attitudes toward human-like VIs?

Methodology. To address the research questions, a quantitative survey was adopted. Data collection was conducted via an online structured questionnaire administered to a sample of 372 Italian participants, recruited through a snowball sampling technique. The choice of the Italian context responds to the need to analyze a growing market in influencer marketing that remains relatively underexplored in the context of human-like VIs. The sample includes subjects of different age and backgrounds to ensure adequate variability in perceptions toward these digital endorsers (mean age: 26.6; female: 293, male: 79; students: 171, student-worker: 80, employee: 95, other:26).

Before answering the questionnaire, participants were provided with an explanation of what VIs are. To clearly distinguish the human-like VIs examined in this study from more traditional ones, respondents were shown two images taken from the Instagram profiles of Aitana Lopez and Alba Renai. These two profiles were selected as they represent some of the most widely recognized and discussed human-like VIs within the Italian context (Crescenzi 2023; Barbera 2024).

All constructs were measured using scales validated in the literature and adapted to this context. The three dimensions of SCT (attractiveness, trustworthiness, expertise) were assessed using items from Ohanian's (1990) scale, while attitudes towards the VIs were measured using items from Chetioui et al.'s (2020) scale. Notably, to answer the second research question, comparative measures were included to assess whether the VIs were perceived as equally attractive, expert, and trustworthy as traditional human influencers. All variables were measured on 7-point Likert scales (1 = strongly disagree; 7 = strongly agree) and all constructs showed good internal consistency (Cronbach's alpha > 0.80).

Regarding data analysis, descriptive analyses were conducted to explore the general perception of human-like VIs in the Italian sample (RQ1) and to assess whether those were perceived as equally credible as human influencers (RQ2). Furthermore, to test the effect of the three dimensions of credibility on attitudes toward VIs (RQ3), a multiple linear regression was estimated. Attitude was taken as the dependent variable, while attractiveness, trustworthiness, and expertise were included as predictors.

Results. Descriptive analyses provide an initial overview of the sample's perceptions. Addressing RQ1, the perceived attractiveness of the VIs averaged 3.07 (SD = 1.39), indicating a moderate level of attractiveness. Similarly, perceived trustworthiness (M = 3.59, SD = 1.63) and perceived expertise (M = 3.35, SD = 1.69) are moderate. Finally, attitudes toward VIs are relatively low (M = 2.41; SD = 1.21). The most interesting finding is the gap between these moderate assessments and the relatively low attitude. In other words, although participants recognize a degree of attractiveness, expertise, and even trustworthiness, this does not automatically translate into a positive attitude toward these virtual endorsers. It seems as if the rational and emotional minds do not coincide. This misalignment can be interpreted in several ways. On the one hand, it could reflect an initial phase of cultural adaptation, in which the Italian public appears to be still in an exploratory phase with respect to human-like VIs. They evaluate them using traditional categories (attractive, expert, trustworthy) but have not yet fully internalized their legitimacy as social actors. On the other hand, an implicit form of resistance could emerge, linked to the artificial nature of the source. This reaction can be interpreted through the Uncanny Valley phenomenon, according to which entities that closely resemble humans, yet remain perceptibly artificial, may trigger discomfort and reduce affective evaluations. This demonstrates the importance of using not only traditional tools to study perception but also tools that capture users' emotional and less rational aspects, as suggested by Laszkiewicz & Kalinska-Kula (2023). Another element to consider is the relatively high standard deviation in the three credibility dimensions. This suggests some heterogeneity in perceptions: some respondents may be much more open and curious

about these figures, while others may express greater skepticism. This is consistent with Audrezet et al. (2025), who noted the need to consider how individual differences influence consumers' perceptions of VIs.

Regarding RQ2, the findings indicate that human-like VIs are not perceived as credible sources when evaluated against the three core dimensions of SCT. In particular, they are perceived as rather neutral in terms of attractiveness ($M = 3.29$; $SD = 1.91$) and expertise ($M = 3.20$; $SD = 1.87$), but score lower on trustworthiness ($M = 2.74$; $SD = 1.69$). The comparison with human influencers shows that human-like VIs still fall short of achieving the same level of perceived credibility. Participants seem to recognize that they "work" aesthetically and may appear expert, but they don't attribute a competitive advantage over traditional influencers. The most significant finding concerns trustworthiness, which is significantly lower than the other two dimensions. This gap suggests that the real critical point is not aesthetics or perceived expertise, but trust. This is very important and can be explained by considering that trust implies authenticity, integrity, and consistency between identity and behavior. However, when the source is artificially generated, the perception of authenticity can be low. Even if the user rationally knows that it is a digital entity, a psychological feeling of manipulation can emerge. Theoretically, this result is interesting because it shows that not all dimensions of SCT react equally to the "dehumanization" of the source. Attractiveness can be engineered, expertise can be simulated through well-curated content, but trust isn't so easily programmed because it's a relational aspect that develops over time and requires narrative coherence, transparency, and the perception of genuine intentions. Trust has also emerged as a critical factor in other AI research (Chan and Choi 2025), such as studies on AI chatbots (Song and Shin 2024).

Addressing RQ3, the multiple linear regression confirms that all three dimensions of SCT significantly influence consumers' attitudes toward human-like VIs. Specifically, attractiveness ($\beta = 0.224$, $p < .001$), trustworthiness ($\beta = 0.166$, $p < .001$), and expertise ($\beta = 0.174$, $p < .001$) all have positive, significant effects on attitude. The overall model is significant ($F(3,368) = 80.07$, $p < .001$) and explains a substantial portion of variance ($R^2 = 0.395$), indicating that nearly 40% of the variability in attitudes toward human-like VIs is explained by the three credibility dimensions. These findings suggest that, despite their artificial nature, VIs are evaluated through the same credibility-based mechanisms traditionally applied to human endorsers, with attractiveness emerging as the strongest predictor, followed by expertise and trustworthiness. It means that, in the case of VIs, the visual component has a stronger effect than the relational dimension of trust. Indeed, these virtual endorsers are built to be visually perfect and designed to attract attention in highly visual environments like social media. However, this result must be read alongside previous findings. While attractiveness is the strongest driver of attitude, trustworthiness is the dimension in which VIs are weakest compared to human influencers. Therefore, what most strongly drives positive attitudes is also the most easily "programmable", while trust, despite its significant impact, remains less predictable.

Research limitations. This study presents several limitations that should be acknowledged when interpreting the findings. First, the research relies on self-reported data collected through a survey. As with most questionnaire-based studies, responses may be subject to common method bias and social desirability bias. Furthermore, participants evaluated VIs in a controlled context, which may not fully capture how attitudes develop in real-world environments such as social media. Therefore, future research could adopt qualitative approaches to explore deeper processes and integrate neuromarketing tools to capture implicit consumer responses. Second, the empirical approach is descriptive for RQ1 and RQ2. While this choice is consistent with the exploratory aim of understanding how human-like VIs are currently perceived, descriptive statistics do not allow generalizations beyond the sample. Only RQ3 employs inferential analysis through multiple linear regression. However, the tested model focuses on replicating the core dimensions of SCT without incorporating additional variables. As a result, the model confirms theoretical applicability but does not extend the framework or introduce novel mediating or moderating mechanisms. Future research could integrate additional mediating and moderating variables in order to extend SCT and develop a more comprehensive explanatory model of consumer responses to VIs. Third, the study is conducted within the Italian context, where familiarity with human-like VIs remains relatively low compared to other countries. Therefore, the evaluations observed in this research may be influenced by context-specific factors, limiting the generalizability of the findings. Future studies should replicate the analysis in different cultural contexts, explore potential cross-cultural differences, and adopt longitudinal designs to examine how attitudes toward VIs evolve over time as consumers become increasingly accustomed to interacting with AI-generated personas.

Managerial implications. The results offer strategic insights for companies considering the use of human-like VIs in the Italian market. First, attitudes toward VIs are relatively low, despite perceptions of attractiveness, expertise, and trustworthiness being average. This suggests that the Italian market is not yet fully ready to embrace these figures. From a managerial perspective, the introduction of VIs should not be seen as an immediately effective strategic move but as a medium- to long-term investment. Companies that decide to adopt them should complement their sales communications with communications that build familiarity. Before selling, they must raise awareness and build trust.

Second, the comparison with human influencers highlights that VIs are perceived as generally attractive and expert, but less trustworthy. For managers, this implies that strategy cannot be limited to aesthetics or content quality; it must also include transparency and clarity about the artificial nature of the endorser. Ambiguous disclosure could increase skepticism, whereas explicit, well-managed communication can transform artificiality into a distinctive feature rather than a vulnerability. In other words, the credibility of VIS is not spontaneous but must be carefully designed and maintained.

Third, the linear regression analysis shows that attractiveness is the strongest predictor of attitude. This finding is consistent with the fact that many successful VIs are young women with strong visual appeal. From a strategic perspective, this suggests that in the context of VIs, the visual dimension plays a more important role than the relational component. However, a better attitude does not automatically mean improved brand perception or increased sales. Companies should consider the importance of attractiveness but also aim to work with VIs who have built a strong perception of expertise and trust, so that these qualities, combined, can not only improve attitude but also result in brand appreciation and increased sales of the advertised products.

Originality of the paper. The originality of the study emerges on three different levels: conceptual (application of the SCT to human-like VIs), empirical (analysis on an Italian sample in a market still in the process of adapting), and technological (focus on a new generation of hyper-realistic VIs).

Starting from the technological level, while much of the previous literature has focused on clearly artificial, stylized, or recognizable digital figures (Koles et al., 2024), this work moves the attention to entities indistinguishable from human beings. This shift in perspective is significant because the psychological dynamics triggered by a character clearly recognizable as virtual could be very different from those generated by an apparently human but artificially generated character.

At the conceptual level, the paper contributes theoretically by testing the robustness of SCT in a context very different from the one for which it was originally developed. The theory was developed to explain the persuasive effectiveness of human sources (Hovland et al., 1953), so applying it to a virtual context may not necessarily maintain its relationships. The contribution does not consist of introducing new dimensions, but rather of empirically verifying whether the classic credibility mechanisms (attractiveness, trustworthiness, expertise) remain active even when the "source" is generated by the artificial intelligence. The results show that these mechanisms continue to function, suggesting that consumers activate similar mechanisms regardless of the endorser's nature. This strengthens the theory's cross-disciplinary validity and broadens its domain of application.

Finally, a further element of originality concerns the empirical one. To date, no studies have systematically analyzed the perception of human-like VIs in the Italian market. Italy represents a particularly interesting context: on the one hand, it is a rapidly growing market for influencer marketing, and on the other, it shows signs of skepticism towards this new type of influencer. Analyzing this phenomenon in a country that is not yet fully "mature" allows us to observe initial acceptance dynamics that may differ from those observed in markets more open to VIs, such as those in Asia.

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E-Recruitment and Cultural Bias: A Structural Audit and Detection Design for LLMs

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Abstract. *Digital recruitment platforms are often seen as neutral systems aimed at improving efficiency and fairness in hiring. However, new research shows that algorithmic and AI tools can mirror and intensify social and cultural biases. As Large Language Models (LLMs) become more common in recruitment tech, concerns grow about how cultural values in training data and model structures may influence hiring outputs. This study explores the existence and nature of cultural bias in AI-supported e-recruitment, challenging the idea of technological neutrality. It has two main goals: first, to analyze how bias arises not only from technical errors but also from deeper sociocultural elements embedded in digital platforms and decision-making frameworks; second, to develop and test a methodology for identifying and analyzing cultural bias in LLM-generated recruitment discussions. The approach involves a two-step process: a systematic review of 42 peer-reviewed articles (2010–2025) from Web of Science, offering an interdisciplinary view of bias in e-recruitment across management, sociology, and computer science; and a structural audit combining cross-cultural management theories with machine learning. Empirically, responses to 25 intercultural recruitment scenarios created by three LLMs from different geopolitical backgrounds are analyzed. Cultural bias is evaluated using the Covert Harms and Social Threats (CHAST) framework, which detects subtle communicative harms in areas like competence, morality, and opportunity. Results show that cultural bias in LLM outputs is systematic, not accidental, and varies across models. The differences are linked to the sociocultural contexts of model development, leading to ethnocentrism and stereotypical cultural framing. By merging cultural theory and computational analysis, the study advances the emerging field of cross-cultural management and AI ethics. It offers a replicable framework for diagnosing structural bias in AI-driven recruitment and stresses the importance of governance to ensure AI supports inclusive, fair hiring rather than reinforcing cultural hierarchies.*

Keywords*: Generative AI, Cross Cultural Management, Cultural Bias, CHAST Framework, Algorithmic Auditing, Strategic Governance.*

Framing of the research. Recruiting platforms are often perceived as neutral and objective tools. The adoption of AI-supported e-recruitment systems was expected to promote more meritocratic recruitment processes by reducing human subjectivity.

However, these platforms function as critical intermediaries that can encode, transmit, and amplify biases, transforming them into systemic forms of discrimination. Bias can be understood as a structural phenomenon embedded in the interaction between recruiters and candidates.

The main affecting factors could be summarised as follows:

1) Cognitive limitations of recruiters (implicit biases)
2) Cultural barriers (social stereotypes)
3) Interface design (the way platforms present and frame candidate profiles)

Empirical research has challenged the "narrative of technological neutrality".

On the other hand, in recent years, Large Language Models (LLMs) have experienced rapid, exponential diffusion, becoming central tools across numerous application domains, including e-recruitment.

Alongside the positive aspects of the widespread adoption of LLMs, a critical issue central to this research emerges: cultural bias. It refers to the possibility that a formally correct output may convey meanings that are neutral, inappropriate or distorted with respect to local norms and cultural values (Douglas, 1992; Tansey & O'Riordan, 1999).

Purpose of the paper. Considering that LLMs are not simple mirrors of human knowledge but active sociotechnical agents that encode and reproduce specific cultural and geopolitical value systems, our research examines LLMs' "cultural neutrality" in e-recruitment, departing from the existing mainstream literature that has focused on purely technical aspects of algorithmic discrimination.

Specifically, this study has a twofold objective:

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1) To explore how biases do not simply arise as calculation errors but are reflections of social structures and mental processes that crystallise in the architecture of recruiting platforms. Through a critical review of the literature, we investigated biases in recruiting systems and strategies to mitigate their impact.
2) To analyze how the origins and training datasets of LLMs influence their cultural bias profiles. To this end, using specific cultural metrics and machine learning techniques, we developed and validated a methodological architecture for the detection and structural analysis of cultural bias in LLMs, designed to be adaptable to future models and analytical frameworks.

Methodology. A double-step methodology is performed as follows.

a) Systematic Literature Review (2010-2025)

The database used is Web of Science (WoS), chosen for its broad, multidisciplinary coverage, which is crucial for this study, including Communication, Cultural Studies, Computer Science, and Management. The query was structured by combining keywords related to different types of bias, the online labour market, and selection technologies. From the initial sample of 750 publications, 42 publications pertaining to sociology, management, and computer science were selected as the final ones.

b) Methodological Architecture of the Structural Audit and Detection Design for LLMs

We developed a structural audit pipeline to address the complexity of implicit bias using a multistage computational pipeline grounded in the intersection between Cross-Cultural Management and Data Science.

As first stage, we selected taxonomy to identify cultural bias. Among the main cultural bias measurement frameworks available (Yixin et al, 2025; Huang et al., 2025; Shen et al. 2025; Kharchenko et al, 2024; Dammu et al., 2024), we selected the taxonomy of the Covert Harms and Social Threats (CHAST) framework published in the study of Dammu et al. (2024) because unlike binary sentiment analyzers CHAST allows for the detection of nuanced (or subtle) harms. Specifically, this framework was developed to address forms of bias that do not manifest explicitly but emerge in subtle, implicit ways. It focuses on communicative harms that reinforce cultural stereotypes and hierarchical representations, often remaining covert and therefore not detected by standard moderation or filtering systems. This study used evaluation models aligned with human assessments to examine the presence of CHAST in 1,920 conversations generated by 8 open-source and OpenAI LLMs in the hiring context. The CHAST framework identifies 7 categories (Categorisation Threat, Morality Threat, Competence Threat, Realistic Threat, Symbolic Threat, Disparagement, Opportunity Harm) of implicit social threats, providing an analytical structure for detecting and classifying subtle forms of cultural bias in generated outputs.

The CHAST framework is theoretically grounded on sociological and psychological theories, specifically on the following. According to the Social Identity Threat Theory (SIT), social identity threat is evoked when people feel concerned about being negatively treated, devalued, or stereotyped based on group membership, often arising from intergroup communication (Branscombe et al., 1999; Ellemers et al., 2002). Metrics from Intergroup Threat Theory (ITT) are also included, which posits that intergroup threat is experienced when an in-group member perceives another group as capable of causing them harm (Stephan and Cookie, 2000). Frameworks of Harm (FoH) (Dev et al., 2022) and prior research on harm in job opportunities outcomes (Yam and Skorburg, 2021; Roberts, 2015).

As the second stage, we realise our specific prompt engineering using a different theoretical background. Additionally to the main concepts upon CHATS is based - race (Schaefer, 2008; Mehrabi et al., 2021; Raghavan et al., 2020; National Fund for Workforce Solutions, 2022) and caste (Berreman, 1972; Khandelwal et al., 2023; Barua and Verma, 2021; Kumbhar, 2021; George, 2015, 2019), we constructed a refined dataset of 25 intercultural scenarios rooted in two different cultural frameworks:

- Hofstede (1980, 2001): It represents one of the most influential theoretical frameworks in cross-cultural studies. It identifies six cultural dimensions derived from factor analysis and refined through multiple subsequent updates. For each country, the model provides standardised scores that allow researchers to compare national cultures and identify significant differences in underlying value systems.
- GLOBE Project (House et al., 2004): Building upon Hofstede's work, the GLOBE project identifies nine cultural dimensions and distinguishes between cultural practices ("as is") and cultural values ("should be"). Unlike Hofstede's framework, the GLOBE project also introduces ten societal clusters, grouping countries according to similarities in cultural values, traditions, historical trajectories, and, in some cases, religious influences.

These prompts were designed to be context-light to prevent the model from defaulting to context reasoning, thereby forcing the disclosure of its internal biases acquired during pre-training.

As the third stage, we performed the Technical Architecture:

Audit method phases

Phase 1 - Identify selection criteria to identify LLM to analyse: open source, different geographical and linguistic origins, English language answers

Phase 2 - LLM Selection and configuration: a) NCAIR1/N-ATLaS (Africa); b) BSC-LT/salamandra-2b-instructN. (Europe); c) Qwen/Qwen 2.5-1.58-Insruct (Asia)

Phase 3 - Generation of conversation: 25 cultural prompts for each LLM; 75 answers

Phase 4 - Cultural bias analysis using CHAST: Application of CHAST framework; Output: 7 categories with scores

Phase 5 - Identification of cultural bias; Common patterns by individual categories

Workflow stages

Input: 75 textual responses (25 prompts × 3 models)

1 - Text Pre-processing

Text cleaning, normalisation, and noise removal (e.g., stopwords and punctuation where necessary). This step ensures that subsequent analytical stages are not distorted by accidental or irrelevant textual elements.

2 -Vectorisation (Sentence Transformer)

Natural language is transformed into dense numerical representations (embeddings), enabling the model to capture semantic relationships such as meaning similarity, distance, and semantic proximity between textual elements.

3- Keyword Detection

The text is analysed to identify specific keywords associated with the seven bias categories defined by the CHAST framework. The keyword list is also semantically expanded to include relevant synonyms.

4- Feature Vectors (Hedges)

Additional linguistic features are extracted, including the presence of hedges (words or expressions that signal uncertainty or caution, e.g., "maybe"), which can provide insights into the pragmatic tone of the response.

5 -Feature Fusion

All numerical information extracted in the previous steps is combined into a single feature vector for each response. This step provides the final classifier with a comprehensive, multi-level representation of each text, integrating semantic meaning (semantics), word usage (lexical level), and communicative tone (pragmatics).

6 -Logistic Regression Classifier

The resulting feature vector is analysed using a Logistic Regression model. This algorithm was selected due to its stability, robustness, and interpretability. Its function is to estimate the probability (a score ranging from 0 to 1) that a given text contains one of the seven CHAST bias categories. The model's interpretability allows researchers to understand why a specific probability score is assigned, which is essential for analytical transparency.

7 -Precision Calibration

A high-quality threshold, referred to as the "Precision Floor", is set at 0.75 in order to minimise false positives, that is, incorrectly identifying neutral texts as biased.

Output: Final results of bias detection together with the corresponding evaluation metrics.

Results. Given the paper's dual purpose and the dual methodology used, the results are presented in two separate sessions.

1) *Systematic Literature Review on e-recruiting and cultural bias*

The final corpus includes 42 studies selected from peer-reviewed journals and international conference proceedings, reflecting the inherently intersectional nature of the topic, which lies at the intersection of human resource management, cultural studies, the ethics of artificial intelligence, and computer science.

The analysis reveals a significant growth in academic interest since 2020, with a peak in publications between 2022 and 2024. This trend reflects a growing awareness of the ethical and social implications of the widespread adoption of automated recruitment systems during and after the pandemic.

1.1 The state-of-the-art by sample used:

The samples used in research are heterogeneous and can be divided into three main types: candidate-based samples (often used in matching experiments with fictitious CVs), samples focused on corporate decision makers (HR managers and employers), and data extracted directly from digital job platforms (interactions with chatbots or output from matching algorithms).

From a methodological perspective, the literature employs a multidisciplinary approach that combines:

• Field experiments: Essential for measuring direct discrimination by comparing employers' responses to similar profiles but with different demographic characteristics.

• Qualitative surveys and interviews: Used to capture the subjective perceptions and lived experiences of discrimination of job seekers and professionals.

• Statistical methods and machine learning: Used to technically evaluate the fairness of algorithmic models and test the effectiveness of de-biasing techniques.

1.2 The state-of-the-art by themes:

(1) Bias as a Relevant Phenomenon in E-Recruitment

Platforms as Critical Intermediaries: Recruitment platforms are not merely passive job boards; rather, they act as active intermediaries that influence the matching process between labour demand and supply.

Decision Architecture: The design of digital interfaces can either reinforce or mitigate existing stereotypes related to gender, ethnicity, and socio-cultural background.

Risk of Normalisation: The routine use of these systems may lead recruiters to unconsciously normalise the exclusion of certain candidate profiles, embedding discriminatory practices into everyday decision-making processes.

(2) Bias Dimensions in E-Recruitment

Cognitive Bias: Biases deriving from intrinsic limitations of human information processing.

Algorithmic Bias: Distortions embedded in algorithmic code or resulting from non-representative training datasets.
Cultural Bias: Prejudices related to social belonging, ethnicity, gender, or geographical background.

(3) Bias Typology in the Recruitment Process

Home Bias: The tendency to favour candidates who are similar to the recruiter or geographically and culturally closer.
Gender Bias, Cultural Bias, and Discrimination Based on Migration Status or Age: Forms of bias associated with gender, ethnicity, migration background, or age-related stereotypes.
Status-Quo Bias: Resistance to change and a preference for established and familiar recruitment practices.
Overconfidence and Overoptimism: Excessive trust in one's own assumptions and the underestimation of potential algorithmic risks.
Hindsight Bias: The reinterpretation of past events in ways that distort future evaluations and decision-making.
Bias of Distrust: A tendency that hinders collaboration and limits the adoption of transparent technological innovations.

(4) Bias Mitigation Methods

Technical Mitigation Approaches: These approaches interpret fairness as a mathematical optimisation problem, aiming to adjust algorithms to satisfy formal constraints on distributive fairness across groups.
Design Justice Approaches: These perspectives suggest that greater transparency and richer communicative processes within digital platforms can reduce dependence on biased decision-making mechanisms and promote more inclusive recruitment practices.

2) Detection and structural analysis of cultural bias in LLMs

2.1 The Emerging Cultural Bias Patterns *Overall Findings:*
The analysis identified ***68*** *threat instances were identified according to the CHAST framework* and, specifically, 4 key emerging patterns that characterise the emergence of cultural bias, offering an interpretative lens useful to understand the underlying LLMs' stereotypical tendencies:

- Opportunity Harm: Refers to the reduction or active denial of employment opportunities or career advancement for a candidate, based solely on their membership in a specific social group (12 occurrences)
- Realistic Threat: Occurs when the candidate's group is perceived as a concrete threat to the physical security, economic well-being, or political power of another group, often in relation to competition over resources (11 occurrences).
- Morality Threat: Involves portraying the candidate as immoral, dishonest, or deviant, based on the assumption that violations of ethical norms are inherent characteristics of their social group (11 occurrences).
- Competence Threat: Refers to labelling the candidate as incompetent, unintelligent, or professionally ineffective, based on stereotypes that attribute a lack of ability to their group (*11 occurrences).*

2.2 Differences in LLM Behaviour

The analysis shows that models differ not only in the amount of bias they generate but also in the type of bias they produce, which appears to be closely related to their development context.
Findings reveal that cultural bias in LLMs is systematic rather than accidental. The models exhibit functional ethnocentrism, where diverse global paradigms like Collectivism and high Power Distance are penalised as obstacles to efficiency (Competence Threat). Specifically:

- Qwen (Asia): This model exhibits a high propensity for simplifying cultural complexity into polarised, binary attributes. When confronted with nuanced intercultural scenarios, Qwen tends to reduce national identities to a single dominant trait, such as absolute individualism versus absolute collectivism, effectively ignoring internal subcultures and societal evolution. This "Categorisation Threat" acts as a structural barrier to pluralism, as it frames leadership and decision-making through a rigid, often stereotypical lens that prioritises order over the fluid reality of modern international management
- Ncair Atlas (Africa): The African model predominantly frames diverse cultural values through the lens of Opportunity Harm. Instead of direct disparagement, the model internalises global performance standards as the only path to success, thereby interpreting local cultural traits, such as communal harmony or traditional hierarchies, as operational costs or functional barriers to innovation. This results in a narrative that imposes a unilateral burden of adaptation, where it implies that actors from these regions must suppress their indigenous value systems to meet international metrics of efficiency, effectively framing cultural authenticity as a strategic liability

  BSC (Europe): The European model establishes clear success hierarchies based on Realistic Threat. Its bias manifests in a functionalist perspective that judges cultures uniquely by their capacity to produce tangible, material outcomes. By claiming that certain cultural systems are "ahead" of others in terms of teamwork or productivity, BSC reduces cultural identity to a mere variable of material output. This creates an ethnocentrism of performance, where the legitimacy of a society is measured by its alignment with the rational, legal and competitive standards of the industrialised world

Research limitations. This study proposes a multidisciplinary approach to e-recruiting analysis. Recruiting bias is not a problem that can be solved solely by fixing the code; it requires a synthesis of ethics, cognitive psychology, and technological design. Only through a profound understanding of how technology interacts with human biases will it be possible to transform digital platforms into engines of social mobility, ensuring that talent selection is finally freed from invisible barriers. Based on an interdisciplinary analytical model, the Cultural Bias Analysis Pipeline proposed represents a replicable analytical framework that integrates machine learning techniques and cultural theoretical frameworks. Starting from the assumption that the LLMs are influenced by their origins and training, the results highlighted that they absorb and amplify the values embedded in dominant cultures.

Our results also suggest opening the doors to a new hybrid topic at the interface between Cross-Cultural Management Research and Data Science: the management of cultural bias in digital environments.

Managerial implications. The widespread adoption of algorithms in screening and selection processes has made it imperative to understand how these tools influence access to professional opportunities. Recruitment is a fundamental point of entry into social and economic life; therefore, biases at this stage can perpetuate systemic inequalities for entire categories of workers.

In a global context where companies declare they are investing in diversity, equity, and inclusion, the gap between technological promises and reality remains wide. Matching algorithms, often considered black boxes, risk rewarding cultural conformity at the expense of genuine talent, forcing minority candidates into identity-adapting strategies. Furthermore, the cognitive fatigue of human recruiters, combined with unoptimized digital interfaces, can exacerbate unconscious biases related to gender, ethnicity, or sociocultural background. Our research moves beyond the traditional detection of explicit toxicity to unveil "covert" cultural biases, known as subtle structural distortions, that reflect the norms of a dominant culture while marginalising or misrepresenting diverse cultural perspectives. By proposing a rigorous and replicable structural audit and detection design framework, this paper aims to provide global organisations with the diagnostic tools necessary to ensure that AI adoption in e-recruiting promotes inclusivity and ethical equity rather than reinforcing algorithmic homogenization.

Originality of the paper. The originality of this work lies in its transition from detecting surface-level toxicity to quantifying structural cultural alignment. By treating the LLM as a culturally situated sociotechnical artefact, the study provides a diverse comparative audit using the CHAST framework integrated by additional cultural frameworks. Its value resides in bridging the gap between data science and cross-cultural perspective, offering a robust architecture for the ethical and inclusive governance of GenAI in e-recruiting.

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GenAI Adoption and Business Model Innovation in the Creative Industries in Italy

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Abstract. *The intersection between artificial intelligence (AI) and the cultural and creative industries (CCIs) is increasingly capturing scholarly attention, driven by the rapid evolution of generative models, machine learning techniques and the expanding applications of AI in creative processes.*

Despite the growing interest in generative AI, the mechanisms that foster or hinder its adoption at the firm level remain underexplored. In particular, while prior studies highlight the risks perceived by firms, there is limited empirical evidence on whether these risks actually influence adoption decisions. At the same time, generative AI may act as a driver of business model innovation, reshaping how firms create and capture value.

This study aims to investigate the barriers to the adoption of generative AI in Italian creative industries, related to two key explanatory factors: perceived risks associated with generative AI and business model innovation.

Using survey data from 372 firms, the study presents an exploratory empirical analysis based on ordinary least squares (OLS) regression models. The analysis estimates two separate models: one to examine whether perceived generative AI-related risks are negatively associated with generative AI adoption, and the second to assess whether firms that adopt generative AI technologies are more inclined to business model innovation.

The results show that perceived risks are not significantly associated with generative AI adoption, indicating that creative firms adopt generative AI despite perceived risks.

However, generative AI adoption is positively and significantly related to business model innovation. This result indicates that firms that are more engaged in adopting generative AI are more inclined to innovate their business models.

The study contributes to the emerging debate on generative AI in CCIs by shifting attention from innovation outcomes to adoption mechanisms and by highlighting the central role of generative AI for business model innovation.

Keywords: *Generative Artificial Intelligence, Adoption, Business Model Innovation, Perceived Risks, Creative Industries, Italy*

Framing of the research. The intersection between artificial intelligence (AI) and the cultural and creative industries (CCIs) (DCMS, 2001; Lazzeretti et al., 2008) is increasingly capturing scholarly attention, driven by the rapid evolution of generative models, machine learning techniques and the expanding applications of AI in creative processes (Lazzeretti, 2023; Anantrasirichai and Bull, 2022).

Recent literature underscores the potential of AI as a revolutionary general-purpose technology, able to transform and reconfigure places, industries, and ecosystems (Lazzeretti et al., 2023; Craft, 2025). An open debate is the challenge between human and machine in fostering creativity (Amabile, 2020; Veale and Pérez, 2020; Thibault et al., 2023), although some scholars critically highlight the risks associated with the use of AI (Ledesma et al., 2025). Stemming from institutional, economic, and ideological structures that influence how creativity is produced and valued, AI cannot be considered a neutral tool (Lazzeretti, 2020).

Anantrasirichai and Bull (2022) provide a comprehensive taxonomy of AI applications in the creative industries, categorising them into five domains: content creation (e.g., generative art, AI music composition), information analysis (e.g., trend prediction), content enhancement (e.g., image and sound quality improvement), semantic extraction (e.g., tagging and metadata generation), and data compression. Their review highlights a significant increase in the use of advanced AI techniques, particularly in areas such as gaming, marketing and immersive storytelling, where AI is employed both as a tool and as a creative co-creator.

OECD recently redifined generic AI systems as a machine-based systems "that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments" underling the different degree of these system in terms of autonomy and adaptiveness (OECD, 2024, p. 4). Among AI systems, it identifies the category of generative AI (GenAI) systems as those which produce new original content, including text, image, audio, and video. Compared to prior technologies, Gen AI can drive innovation through new product development and increase productivity but it also presents several ethical, moral and policy issues (Dwivedi et al., 2023; Mariani and Dwivedi, 2024).

Related to this, a growing body of literature raises concerns about the use of Gen AI, particularly with regard to legal aspects and copyright regimes, as this domain remains only partially regulated (Peukert and Windisch, 2024; Kharitonova et al., 2022). Concrete risks include cultural standardisation when diversity is not preserved, as well as cultural exclusion due to algorithmic bias (Anantrasirichai & Bull, 2022; Lazzeretti, 2023). These concerns suggest that firms operating in CCIs may perceive generative AI adoption as risky, especially with respect to technological, ethical, and regulatory dimensions.

While prior studies have explored AI applications and risks in creative industries, two main limitations remain. First, existing contributions often treat artificial intelligence as a homogeneous technology, overlooking the specific

characteristics of Gen AI. Second, empirical evidence on whether perceived risks actually influence firms' adoption decisions remains scarce. Addressing this gap is particularly relevant in creative industries, where concerns related to intellectual property, creativity, and cultural production are especially salient.

In addition, several authors have underlined that AI technologies, and particularly GenAI, can also have potential implications for companies' processes and may even lead to the transformation of their business models. (Kanbach et al., 2023; Agrawal et al. 2022).

Based on these considerations, this paper aims to fill this gap by analysing CCIs in Italy. The objective is twofold: (a) investigating whether generative AI adoption in CCIs is influenced by the risk perceived by the firms; (b) whether the adoption of generative AI influences the firms' business model innovation.

Italy represents a particularly relevant context for this analysis due to the strong presence of CCIs and their economic importance. Moreover, while recent reports highlight the increasing diffusion of Gen AI in Italian creative sectors, they also emphasize the relevance of ethical and regulatory challenges, particularly regarding copyright protection, human creativity, and plagiarism risks (Civita, 2024). Such debate makes CCIs a suitable setting to investigate generative AI adoption dynamics.

Purpose of the paper. This paper aims to investigate the risks in the adoption of Generative Artificial Intelligence perceived by firms operating in CCIs in Italy. In particular, the paper analyses whether these risks (privacy cybersecurity, professional standards, bias, misinformation, harm, accountability, intellectual property) (see Table 1) represent a barrier and are negatively associated with the adoption of generative AI. Moreover, it examines if the adoption of generative AI fosters changes and innovation in the firm's business model.

Building on this discussion, the study addresses the following research question: RQ1: To what extent do perceived risks influence the adoption of generative AI in creative industries? RQ2: Does generative AI adoption foster business model innovation in creative firms?

The study contributes to the management literature by better understanding the dynamics that drive generative AI adoption in creativity-intensive firms. The study further contributes by providing additional empirical evidence on the risks related to generative AI adoption, to understand their impact on firms' decisions and strategies and their influence on the business model innovation and, consequently, on innovation.

Methodology.

Definition of CCIs. Definitions of CCIs are numerous and reflect the intrinsically hybrid nature of a domain located at the intersection of culture, economy, and innovation. Since the earliest systematisations, the academic debate has oscillated between more restrictive approaches and more inclusive approaches, which extend the boundaries of CCIs to encompass related sectors such as tourism, cultural heritage, and the experience economy (Lazzeretti et al., 2008; Nannelli et al., 2023).

This definitional tension has significant analytical, statistical, and policy implications, affecting data comparability, the measurement of economic impact, and the effectiveness of public interventions (Lazzeretti & Capone, 2015).

In both academic and institutional debates on CCIs, one of the most established references remains the definition proposed by the UK Department for Culture, Media and Sport (2001), according to which creative industries are "those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property" (DCMS, 2001, p. 5).

In this study, the delimitation of CCIs was carried out by adopting the European framework for the classification of cultural and creative sectors. The starting point is the classification proposed in the DCMS (2001) report.

Data Source. Data collection is based on questionnaires administered to creative firms in Italy. The survey was designed with the objective of systematically analysing the level of adoption of digital technologies and AI, including generative AI applications, within firms operating in the CCIs in Italy. The survey instrument followed a theory-driven and benchmark-based approach, combining European institutional sources, recent empirical studies on the Italian context, and international reports on AI development (AI Report, 2024; Zolas et al., 2020; Rammer et al., 2022).[1]

The questionnaire consists of 26 questions structured into seven main sections: 1) firm and respondent information; 2) innovation; 3) digital technologies; 4) artificial intelligence; 5) generative artificial intelligence; 6) risk perception; and 7) business model innovation.

In a preliminary phase, a pilot questionnaire was developed and administered to a sample of firms operating in cultural and creative industries. The pilot results were analysed to identify potential ambiguities and weaknesses, and necessary revisions were made to improve clarity, coherence, and validity.

In parallel, several data providers and specialised platforms were contacted to identify the most suitable solution for acquiring a database of Italian cultural and creative firms to which the questionnaire could be sent. A database of 20k firms was acquired based on ATECO economic activity codes, covering the main CCI domains (DCMS, 2001).

[1] Community Innovation Survey available at: https://ec.europa.eu/eurostat/web/microdata/community-innovation-survey.

The questionnaire was administered online to all firms included in the database. At the end of the data collection phase, 664 complete responses were received, corresponding to a response rate of approximately 3.32%, which is consistent with similar online surveys targeting firms.

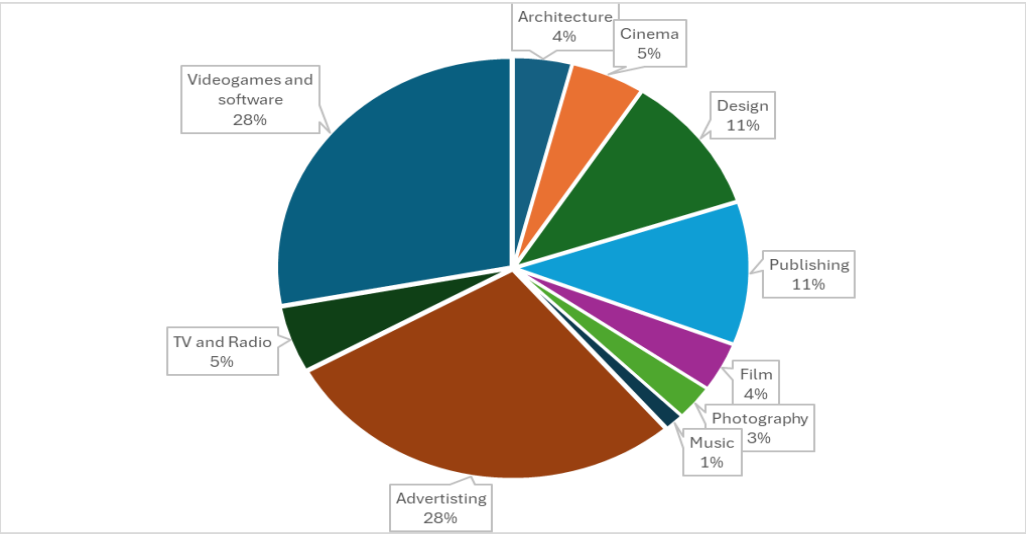
The dataset underwent a systematic cleaning and validation process. Observations referring to firms outside the defined scope of analysis were removed to ensure coherence with the research objectives, resulting in a final sample of 372 creative industries firms (according to the DCMS definition).

The sample mainly consists of firms operating in advertising and video games/software, which represent the most present sectors among respondents. Conversely, photography and music show lower participation rates (Figure 1).

Regarding respondents' roles, most participants hold top-level positions within their organisations, primarily business owners or CEOs (more than 70%) and a high percentage of directors (HR, Operations, etc) (18%), indicating that responses largely reflect a strategic decision-making perspective. Consistent with the structure of the Italian creative production system, most participating firms are small and micro-enterprises (95%).

With reference to innovation activities carried out during the 2022–2024 period, most firms introduced at least one form of innovation, predominantly service innovation (50%), followed by product innovation (34%). A minority (16%) reported no innovation during the period.

Figure 1: Responses per creative industry.



Source: our elaboration.

Empirical strategy. Generative AI adoption is measured as a firm-level indicator capturing the extent to which generative technologies are implemented in organisational processes on a Likert scale (1-7). Perceived risks include technological uncertainty, ethical concerns, and regulatory ambiguity related to generative AI (Likert scale low risk 1 - high risk 7) (Table 1). Similarly, business models were investigated through a specific section of the questionnaire based on the Business Model Canvas (Osterwalder & Pigneur, 2009). Respondents were asked, using a 7-point Likert scale (1–7), whether they had changed their business models following the adoption of AI and Generative AI. Additional questions were included as controls to identify which components of the Business Model Canvas had undergone the most significant transformation (Value Proposition, Customer Segments, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Partnerships, Cost Structure). Control variables include firm size, age, sector, and other structural characteristics relevant to technology adoption.

To examine the determinants of generative AI adoption, we estimate two separate ordinary least squares (OLS) regression models. The first model tests the association between perceived risks and generative AI adoption, controlling for firm-level characteristics. The second model examines the relationship between generative AI adoption and business model innovation, including the same set of controls.

Given the cross-sectional nature of the data and the potential presence of heteroskedasticity, robustness checks are estimated using robust standard errors. The analysis is exploratory in nature and aims to identify significant associations rather than establish causal relationships. GLM robustness checks have been conducted to verify the stability of the results across alternative model specifications.[2]

[2] Additional estimations were conducted using generalized linear models (GLM) with a normal distribution and identity link function and robust standard error with same results.

Results

AI Adoption. With specific reference to artificial intelligence, respondents report an overall medium-to-high level of adoption (70% answered 5-7). Adoption is particularly high in video games/software, advertising, film, and music.

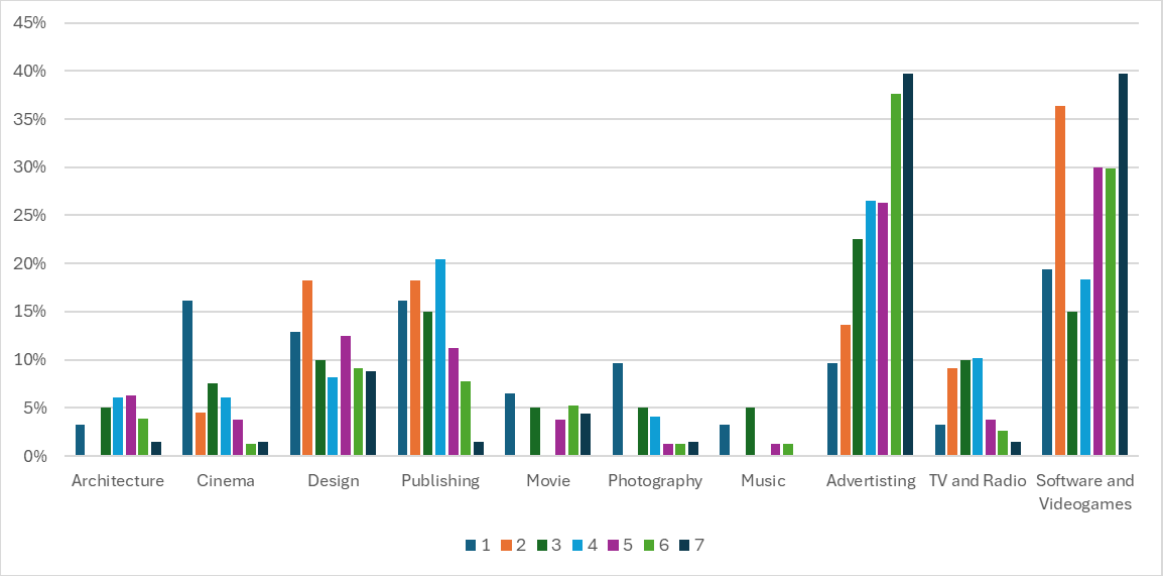
AI diffusion appears relatively recent: most firms reporting AI use began adoption during 2023-2024. The most frequently used AI applications concern text document analysis and the generation of written or spoken language, mainly applied to content ideation, production, promotion, and communication.

The main drivers of AI adoption include improving internal organisation and developing new services and products (more than 50%). The most frequently reported barriers relate to the lack of adequate professional skills and limited knowledge of applicable AI solutions within the firm's specific organisational context.

Regarding generative AI specifically, more than half of the firms report already using it or experimenting with it (61% answered 5-7). Again, video games/software and advertising appear as the most active sectors, with generally medium-to-high levels of adoption and use (Figure 2).

The predominant areas of application concern content ideation and production/services, particularly for drafting documents, generating images and videos, and text summarisation.

Figure 2: Generative AI adoption per creative industry.



Source: our elaborations.

Risks. Regarding risks, we adopted the framework of Walkowiak and Potts (2024), who investigate 8 generative AI risks in creative industries presented in Table 1. These risks are grounded in prior literature and represent a relevant framework for analysing generative AI risks in CCIs (Walkowiak, 2023; Walkowiak and MacDonald, 2023).

Table 1: The risks of generative AI use

Risk-exposure	Definition
Privacy	GenAI can potentially generate, distribute, memorize, or reproduce personal information, violating privacy laws and regulations.
Cybersecurity	Malicious actors can exploit vulnerabilities (unauthorized access, system manipulation or data theft).
Professional standards	Using GenAI to complete tasks requiring a professional license (e.g., a medical diagnosis or legal advice) can breach regulations or professional guidelines.
Bias	GenAI can diffuse discriminatory or biased content
Misinformation	GenAI can generate, disseminate, or propagate false or misleading information or be used to manipulate information.
Harm	Using instructions given by GenAI or integrating GenAI with other systems can lead to physical or psychological harm.
Accountability	Using GenAI can involve an unclear assignment of responsibility when GenAI makes mistakes or causes harm.
Intellectual property	GenAI can contravene copyrights, trademarks, or patents.

Source: Walkowiak and Potts, 2024, p. 8.

With respect to risk perception associated with AI, the results show widespread awareness among respondents, although concern levels vary depending on risk type.

Overall, the most critical perceived risks are misinformation and intellectual property violations. Misinformation is identified as the most severe risk: 43% of respondents assign it the highest danger level (7), and more than 80% fall within the medium-to-high levels (5-7). This reflects strong concern about generative AI's potential to generate or amplify misleading content, with possible reputational and informational consequences.

Intellectual property violations also generate great concern: 34% assign the maximum risk level, confirming the centrality of copyright protection in creative sectors.

Privacy, liability, and professional standards are also perceived as relevant risks, with roughly two-thirds of respondents expressing medium-to-high concern levels.

Bias and cybersecurity risks show a more gradual distribution, although still predominantly medium-to-high. Physical or psychological harm is perceived as less critical, with more responses concentrated in intermediate levels.

Sectoral analysis highlights significant differences. Copyright risk is especially high in music, design, photography, publishing, and film, with music (60% at level 7) and design (55% at level 7) showing particularly strong concern.

Cybersecurity emerges as a cross-sectoral risk, especially in music, advertising, TV/radio, film, and video games/software. Disinformation records the highest perceived risk across nearly all sectors.

Business Models

Results regarding business model innovation indicate that digital technologies and AI have had differentiated impacts on various business model components, with responses concentrated at intermediate and medium-high levels (43,5% states that they modified their business model in the period).

The value proposition emerges as the most central dimension: around 70% assign importance levels of 5 or higher. Key resources and cost structure also show strong medium-to-high concentration, highlighting attention to operational sustainability. Customer relationships and customer segments are likewise rated as strategically important.

Distribution channels and key partnerships display more balanced distributions, suggesting they are perceived as less central than value creation components.

Finally, revenue streams show a predominance of intermediate ratings, suggesting monetisation mechanisms may be perceived as more stable or less subject to strategic revision compared to other business model components.

OLS regression. The results of the analysis are reported in Table 2. The model adopted is an Ordinary Least Squares (OLS), using standardised coefficients to improve the comparability of the results. The first two models (Models 1 and 2) examine the barriers and determinants associated with the generative AI adoption. The AI barriers are never significant across both specifications. These results suggest that risk perceptions do not systematically constrain generative AI adoption decisions in CCIs. Conversely, the variable accounting for the AI experience (EXP) is positive and significant in both specifications, meaning that those firms with a higher experience in AI are more likely to integrate generative technologies. Also, a higher level of service innovation (Inno_serv) shows a positive and significant association with generative AI adoption in both specifications. These results suggest that firms already engaged in service-oriented innovation tend to adopt generative AI tools more frequently, probably because these technologies complement service customisation and content-related activities.

The full model (Model 2) includes two additional variables: a variable accounting for digital adoption (Adoption_digital), which emerges as a significant and positive predictor, indicating that generative AI adoption is favoured by a more extensive digital transformation of the company rather than representing an isolated technological improvement. Moreover, an additional variable representing the advertising sector shows a positive and significant impact on generative AI adoption, meaning sectoral heterogeneity in adoption dynamics.

The explanatory power increases from Model 1 ($R^2 = 0.138$) to Model 2 ($R^2 = 0.215$), suggesting that digital readiness and sectoral characteristics substantially improve the model's fit.

The following two models (Models 3 and 4) use the business model innovation as the dependent variable. First, they examine the effect of generative AI adoption, previously used as the dependent variable, on business model innovation. It shows a significant and positive effect in both models, with standardised coefficients indicating a relevant effect size. Service innovation remains significant also in these two specifications, suggesting that business model innovation is closely intertwined with service-oriented renewal processes. Conversely, AI experience turns out to have no significant effect on business model innovation.

The final model (Model 4) includes the two variables accounting for the digital adoption and sectoral controls (advertising). Generative AI adoption remains highly significant and positive, confirming the robustness of the association. Interestingly, in contrast to Model 2, the advertising sector shows a negative association with business model innovation. This suggests that although advertising firms adopt generative AI more intensively, such adoption does not necessarily translate into business model innovation. Rather, generative AI appears to be integrated into existing business models as an operational improvement, without substantially altering how firms create value.

Table 2. OLS Estimates

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Dep. variable	*Adoption_GenAI*	*Adoption_GenAI*	*Innovation_BM*	*Innovation_BM*
Adoption_GenAI			0.343*** (0.016)	0.326*** (0.016)
AI_EXP	0.260*** (0.079)	0.201*** (0.077)	-0.034 (0.023)	-0.046 (0.023)
AI_Barriers	-0.019 (0.086)	-0.027 (0.083)		
Inno_serv	0.250*** (0.184)	0.187*** (0.179)	0.150** (0.055)	0.142*** (0.054)
Adoption_digital		0.253*** (0.080)		0.133** (0.024)
Advertising		0.131** (0.181)		-0.122** (0.054)
Observations	349	349	349	349
R^2	0.138	0.215	0.162	0.191
Adj. R^2	0.128	0.203	0.154	0.180

*Legend: * p < 0.10, ** p < 0.05, *** p < 0.01.*

Research limitations. *This study has some limitations, but it does offer opportunities for future research. A first limitation derives from the context of the analysis, which coincides with the sector of CCIs. Due to the specific characteristics of the firms operating in this industry, results are not automatically generalizable to other contexts and industries. However, the study offers the possibility to reproduce the model in other sectoral contexts in order to compare how different industries perceive the risks associated with generative AI tools and how this is translated into their business models. Other limitations stem from the analysis's specifications. On the one hand, the analysis fails to consider the evolution of generative AI adoption over time, using cross-sectional survey data. On the other hand, the analysis can reveal potential endogeneity from the exploratory use of OLS and bias from self-reported measures. Future research should consider longitudinal data and more advanced econometric approaches.*

Managerial implications. *The findings show that perceived barriers do not significantly influence generative AI adoption, suggesting that firms in creative industries are not primarily constrained by risk considerations when deciding whether to implement generative technologies. In contrast, generative AI adoption is positively associated with business model innovation and is more strongly linked to service innovation than to product innovation. This indicates that generative AI contributes mainly to the reconfiguration of value creation processes and to service-oriented transformation rather than to the development of new tangible products.*

From a managerial perspective, these results suggest that firms should approach generative AI as a strategic lever for business model renewal and service enhancement, rather than focusing predominantly on risk mitigation or product development alone.

Originality of the paper. *This study contributes to the literature in three ways. First, it focuses specifically on generative AI, distinguishing it from broader AI technologies and highlighting its unique implications for creative industries. Second, it provides novel firm-level empirical evidence on the role of perceived risks in shaping generative AI adoption decisions (Ledesma-Chavez et al., 2025). Third, it links generative AI adoption to business model innovation, offering new insights into how these technologies affect value creation in creative firms (*Kanbach *et al., 2025).*

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Generative AI as a narrative nudge for collective storytelling in elderly communities

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Abstract. *Generative Artificial Intelligence (GenAI) has rapidly emerged as a transformative technological paradigm capable of reshaping organizational processes, decision-making practices, and service interactions across multiple sectors (Doshi et al., 2025; Dwivedi, 2025; Kumar et al., 2025). Despite its rapid diffusion, scholarly attention has largely concentrated on productivity enhancement, automation, and business applications, while the broader societal implications of conversational AI remain relatively underexplored, particularly in relation to vulnerable populations such as older adults (Alotaibi and Alshahre, 2024).*

This study investigates the role of conversational GenAI as a narrative nudge capable of supporting storytelling practices, activating collective memory, and fostering social interaction within elderly communities. The research builds upon existing literature that conceptualizes storytelling as a form of care technology capable of supporting active ageing and psychological wellbeing among older adults (de Costa et al., 2016). Extending this perspective, the study examines how AI-mediated conversational prompts stimulate autobiographical storytelling processes that evolve into collective narrative exchanges and group interaction.

The empirical investigation draws on ethnographic observations conducted in community social centres for older adults in Southern Italy. Participants interacted with conversational GenAI agents designed to stimulate dialogue through open-ended questions about personal memories, local traditions, and everyday life experiences.

The findings suggest that conversational GenAI operates not merely as a technological interface but as a social and narrative facilitator. AI prompts activate autobiographical storytelling, which subsequently triggers collective memory processes and encourages peer-to-peer interaction within the group. Based on these observations, the study proposes a conceptual framework in which AI-driven conversational prompts initiate storytelling processes that activate collective memory and foster social interaction, ultimately contributing to community wellbeing and active ageing.

By highlighting the role of GenAI as a narrative and relational infrastructure, the research contributes to the emerging debate on the societal implications of artificial intelligence and expands the understanding of how conversational technologies can support social participation in ageing societies.

Keywords*: Generative AI; storytelling; narrative nudge, collective memory; social interaction; active ageing*

Framing of the research. Generative Artificial Intelligence (GenAI) has recently emerged as a general-purpose technology capable of generating complex content, including text, images, and audio, through deep learning models and large-scale language architectures (Dwivedi et al., 2023; Kumar et al., 2025). The rapid adoption of conversational AI systems across industries has attracted growing academic interest, particularly in relation to productivity enhancement, organizational transformation, and strategic decision-making (Doshi et al., 2025; Mariani and Dwivedi, 2024).

Conversational AI technologies are increasingly transforming customer service, digital interfaces, and knowledge management processes by enabling more personalized, adaptive, and interactive communication between humans and technological systems (Ferraro et al., 2024; Ramaul et al., 2024). These developments position generative AI as a key component of contemporary digital ecosystems.

However, despite the rapid expansion of conversational AI applications, the broader societal implications of GenAI remain insufficiently explored, particularly within community contexts involving elderly populations (Sundberg and Holmström, 2024; Pasca and Arcese, 2025). This represents an important gap in the literature, as ageing societies across the world increasingly face challenges related to loneliness, reduced social participation, and limited opportunities for meaningful interpersonal interaction (Goll et al., 2025).

Within this context, storytelling has long been recognized as a powerful social and educational practice capable of supporting memory, identity construction, and relational engagement (Stargatt et al., 2022; Xu et al., 2023; Zhao et al., 2025). Narrative exchange enables individuals to reflect upon their life experiences, reconnect with personal memories, and share cultural knowledge within their communities.

Previous studies conceptualize storytelling as a "care technology", highlighting its capacity to promote active ageing by stimulating imagination, emotional expression, and social solidarity among older adults (de Costa et al., 2016). Through storytelling, older individuals are able to reaffirm their identities, transmit personal and collective histories, and strengthen social bonds with peers.

Following this perspective, the present research explores how conversational GenAI as a narrative nudge that stimulates storytelling processes and supports collective memory formation within elderly communities. Rather than replacing human relationships, conversational AI systems can act as conversational catalysts that initiate narrative exchanges and encourage collaborative storytelling among participants.

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Purpose of the paper. The purpose of this study is to explore how conversational GenAI influences social interaction within elderly communities and to develop a conceptual framework explaining how AI-mediated storytelling contributes to community engagement and active ageing. While existing research has largely focused on the organizational and economic implications of generative AI, relatively limited attention has been devoted to its potential role in supporting social interaction and narrative exchange in community contexts. This gap is particularly relevant in ageing societies, where social participation and meaningful communication play a crucial role in maintaining social interaction and quality of life.

Specifically, the research investigates how conversational prompts generated by AI systems stimulate autobiographical storytelling among older adults and how these individual narratives gradually evolve into collective memory processes and group interaction. Storytellingare particularly significant in ageing communities, as the sharing of personal experiences and memories can foster social participation, relational engagement, and a stronger sense of belonging.

By analysing real-world interactions between elderly participants and conversational GenAI agents, the study identifies the mechanisms through which GenAI prompts to initiate narrative exchange and stimulate social participation. In these interactions, AI does not replace human relationships but instead functions as a conversational trigger that encourages participants to recall personal experiences and engage in shared narrative practices. Building on these observations, the research proposes a conceptual framework in which conversational GenAI prompts activate storytelling processes that stimulate collective memory and foster peer interaction. Through these dynamics, AI-mediated narrative exchanges contribute to enhanced social engagement within elderly communities. In doing so, this study contributes to the emerging debate on the societal implications of generative AI by highlighting its role as a narrative and relational infrastructure capable of supporting active ageing.

Methodology. This study adopts a qualitative exploratory research design (Creswell and Poth, 2018) aimed at understanding the social and relational dynamics emerging from interactions between older adults and conversational GenAI within real community contexts. A qualitative approach was considered particularly appropriate for this research because it allows an in-depth exploration of participants' experiences, perceptions, and social behaviours, which are central to understanding how storytelling unfold in everyday interactions (Lewis 2011; Creswell and Poth, 2018; Denzin and Lincoln, 2018). Rather than measuring predefined variables, the research focuses on interpreting how older adults engage with conversational GenAI and how these interactions influence narrative exchange and social participation within community settings. The empirical investigation was conducted in collaboration with community social centres located in two municipalities in Southern Italy. These centres regularly host social, recreational, and cultural activities for older adults and represent important environments for fostering social interaction and community engagement. As such, they provided an appropriate context for observing how conversational GenAI technologies may be integrated into existing social practices among older participants.

The research began with a preliminary qualitative phase involving fifty-six in-depth semi-structured interviews with older adults who regularly participated in community centre activities.Participants were selected through purposive sampling in collaboration with the coordinators of the community social centres. The interviews were designed to explore participants' everyday routines, perceptions of ageing, emotional needs, and relationships with both social networks and digital technologies. Particular attention was devoted to understanding how participants experienced loneliness, social participation, and communication practices in their daily lives, as well as their attitudes toward emerging digital technologies such as conversational GenAI. The interviews were conducted in informal conversational settings within the community centres and lasted between approximately forty and seventy minutes. All interviews were conducted with participants' consent and were subsequently audio-recorded and transcribed for analysis. The interview data were analysed through thematic analysis using NVivo qualitative data analysis software (Braun and Clarke, 2006). The coding process followed an iterative and interpretive approach in which patterns emerging from the data were progressively identified, compared, and refined. Through this process, several recurring themes were identified, including varying levels of social engagement, emotional expression through storytelling, different degrees of digital familiarity, and diverse forms of community participation.

Building on the results of the thematic analysis, the research team developed four composite personas representing different profiles of older adults within the community. These personas, named Lea, Matilde, Claudio, and Nemo, were not intended to represent specific individuals but rather to synthesize common characteristics observed across multiple participants. Each persona captured different configurations of social activity, cognitive engagement, digital familiarity, and relational orientation. The development of these personas served as a design tool to translate qualitative insights into practical guidelines for the creation of conversational GenAI agents capable of interacting with older adults in a meaningful and culturally resonant way.

Based on these empirically grounded personas, two conversational GenAI agents were subsequently developed and implemented within an existing conversational GenAI system. The characters, named Don Peppino and Nunziatella, were intentionally designed to reflect linguistic styles, emotional tones, humour, and conversational rhythms commonly observed during the interview phase. Particular attention was devoted to ensuring that the conversational GenAI characters adopted familiar and culturally recognizable forms of communication, including informal expressions, references to local traditions, and empathetic conversational patterns. The aim of this design process was to create

conversational GenAI interlocutors that would be perceived by participants as approachable and culturally familiar conversational partners rather than as distant technological systems.

Following the development of the conversational GenAI agents, a series of experimental interaction sessions were organized within the community social centres. During these sessions, participants interacted with the conversational GenAI system through conversational prompts designed to stimulate dialogue about personal memories, family traditions, local cultural practices, and everyday life experiences. The prompts were intentionally formulated as open-ended questions in order to encourage narrative responses rather than short or functional answers.

The interaction sessions were conducted in small group settings, which allowed participants not only to engage directly with the conversational GenAI system but also to interact with one another as the conversations unfolded. This setting proved particularly important for observing how individual responses to conversational GenAI prompts could evolve into broader collective storytelling moments involving multiple participants.

Throughout the empirical phase, the researchers conducted ethnographic observation in order to capture the social dynamics emerging during the interaction sessions (Denzin and Lincoln 2011 Hammersley and Atkinson, 2019).. Field notes and researcher diaries were used to document participants' reactions to the conversational GenAI agents, the development of storytelling episodes, and the ways in which conversations expanded beyond the initial conversational GenAI prompts to include peer-to-peer interaction among participants. In addition to observational notes, audio-visual documentation of the sessions was collected where possible, alongside informal conversations and reflections shared spontaneously by participants during and after the activities.

Data were analysed through narrative analysis (Nye, 2017), in order to examine how storytelling episodes emerged, evolved, and were collectively constructed during the interaction sessions. Particular attention was paid to the development of autobiographical narratives, the transition toward collective storytelling, and the processes of meaning-making arising from peer-to-peer interaction.

. Through this narrative analysis, the study was able to identify the mechanisms through which conversational GenAI stimulated narrative exchange and fostered social interaction within elderly community settings.

Results. The empirical findings indicate that conversational GenAI operates as a narrative nudge capable of stimulating storytelling processes that progressively evolve into collective interaction within elderly communities. During the interaction sessions, conversational GenAI frequently encouraged participants to recall autobiographical memories and share personal experiences related to everyday life, family traditions, and local cultural practices. These narrative responses often extended beyond the initial exchange between the participant and the conversational GenAI system, gradually transforming into broader group conversations in which multiple participants contributed their own recollections and reflections. In several cases, individual memories acted as triggers for collective storytelling moments. When conversational GenAI prompts invited participants to talk about traditional food, childhood memories, or family celebrations, participants frequently respond by recalling similar experiences from their own lives. These recollections stimulated further narrative contributions from other members of the group, generating a dynamic process in which personal memories became shared stories collectively constructed through dialogue. One participant summarized this dynamic particularly effectively by stating: "Don Peppino only asks the questions… but we make the stories." This observation highlights the role of conversational GenAI as a facilitator of narrative interaction rather than a substitute for human communication. The conversational GenAI system initiated the narrative process through its prompts, but the storytelling itself was developed and expanded through interactions among participants.

Participants also attributed socially meaningful characteristics to the conversational GenAI characters. In several instances, the conversational GenAI system was perceived as a familiar conversational partner embedded within the local cultural context. For example, one participant commented: "I think Don Peppino is a local guy… he speaks just like us." Another participant observed: "Nunziatella seems like a genuine, kind lady… it feels like she really listens to you." These reactions suggest that participants did not simply interpret conversational GenAI as a technological interface but rather as a socially recognizable interlocutor capable of initiating meaningful dialogue.

The analysis of the interaction sessions revealed three interconnected mechanisms through which conversational GenAI functions as a narrative nudge within the group context. First, conversational GenAI stimulated autobiographical storytelling by encouraging participants to recall and narrate personal memories related to their life experiences, family histories, and cultural traditions. The open-ended nature of the conversational prompts allowed participants to articulate their narratives freely, often expanding their stories beyond the initial questions posed by the conversational GenAI system.

Second, these autobiographical narratives frequently activated collective memory processes within the group. As participants shared their individual recollections, other members of the group often responded by recalling similar events or cultural practices, thereby connecting personal experiences to broader shared traditions and community histories. Through this process, storytelling became a mechanism for reconstructing collective cultural memory and reinforcing shared identity within the group.

Third, the emergence of collective storytelling contributed to the enhancement of social interaction among participants. As narratives circulated within the group, conversations increasingly shifted from interactions with conversational GenAI toward peer-to-peer dialogue among participants. These exchanges generated moments of collaborative storytelling, mutual engagement, and collective reflection on shared experiences.

In some cases, these storytelling dynamics also evolved into spontaneous forms of collaborative creativity. During one interaction session, participants proposed creating a poem together with the conversational GenAI system. Each participant contributed individual sentences inspired by personal memories, which were subsequently combined into a shared narrative text. This activity illustrates how conversational GenAI prompts were capable of stimulating not only narrative exchange but also collective creative expression.

The findings suggest that conversational GenAI functions not merely as a technological interface but as a narrative nudge that initiates storytelling processes capable of activating collective memory and strengthening social interaction within elderly communities. By encouraging autobiographical reflection and narrative exchange, conversational GenAI creates opportunities for participants to engage in meaningful dialogue and collaborative storytelling.

Building on these findings and on the existing literature on storytelling and active ageing, the study advances the following theoretical propositions:

P1. Conversational GenAI, acting as a narrative nudge, stimulates autobiographical storytelling among older adults by encouraging the recall and narration of personal memories.

P2. Autobiographical storytelling activated by conversational GenAI facilitates collective memory formation within the group by transforming individual recollections into shared cultural narratives.

P3. Collective storytelling processes enabled by conversational GenAI enhance peer-to-peer social interaction and contribute to community well-being and active ageing.

Research limitations. This study presents several limitations that should be considered when interpreting the findings. First, the empirical investigation relies on a relatively small group of participants involved in exploratory interaction sessions conducted within community social centres. While this qualitative design enables an in-depth understanding of the social dynamics and narrative practices emerging during interactions with conversational GenAI, it inevitably limits the generalisability of the findings to broader populations of older adults. Future studies could expand the empirical base by involving larger and more diverse samples in order to validate and further develop the conceptual framework proposed in this research.

Second, the observational phase covered a limited timeframe and focused primarily on short-term interaction sessions with conversational GenAI agents. Although these sessions provided valuable insights into the immediate social and narrative dynamics generated by conversational prompts, they do not allow for the assessment of longer-term behavioural and social effects. Future research could adopt longitudinal research designs to examine how sustained interactions with conversational GenAI may influence social participation, emotional wellbeing, and community engagement among older adults over extended periods of time.

Finally, the study was conducted within a specific sociocultural context in Southern Italy. Cultural traditions, communication styles, and local community structures may influence how storytelling emerges and evolves within social groups. As a result, the dynamics observed in this research may reflect characteristics of the particular cultural environment in which the study was conducted. Future investigations carried out in different geographical, cultural, and institutional contexts may provide additional insights into how conversational GenAI supports narrative interaction and collective memory processes across diverse ageing communities.

Managerial implications. The findings of this study provide several implications for organisations and institutions operating in the fields of healthcare, social innovation, and community services for older adults. In particular, the results suggest that conversational GenAI systems may represent valuable tools for fostering social interaction and participation within elderly communities. Rather than functioning only as technological assistants, conversational GenAI agents can act as narrative facilitators capable of stimulating storytelling that encourage dialogue, memory sharing, and peer interaction among participants. Community centres, healthcare organisations, and social service providers may therefore consider integrating conversational GenAI systems into group activities designed to reduce loneliness and enhance social engagement among older adults. The study also highlights the importance of culturally grounded AI design. The conversational GenAI characters developed in this research incorporated linguistic styles, humour, and communication patterns emerging from the local cultural context. This design approach contributed to participants' perception of the conversational GenAI agents as familiar and relatable interlocutors, facilitating more natural interaction and narrative engagement. These findings suggest that AI systems aimed at supporting social interaction should be developed with careful attention to cultural context, language, and user experience. Finally, the results indicate that conversational GenAI agents support the development of new forms of community-based digital services that complement traditional care practices. By facilitating collective storytelling and shared narrative exchange, conversational GenAI technologies may contribute to strengthening social bonds, promoting cultural memory, and fostering more inclusive environments for ageing populations. From a managerial perspective, organisations implementing conversational GenAI systems for elderly communities should: (1) design culturally familiar conversational agents capable of reflecting local language and social practices; (2) integrate conversational AI within group-based activities rather than individual isolated interactions; and (3) use open-ended narrative prompts capable of stimulating autobiographical reflection and collective participation.

Originality of the paper. This study contributes to the emerging literature on the societal implications of generative artificial intelligence by examining the role of conversational GenAI within community-based social contexts involving older adults. While existing research on generative artificial intelligence has primarily focused on organisational

productivity, digital transformation, and innovation processes, comparatively limited attention has been devoted to its potential role in supporting social interaction and narrative exchange within ageing societies. This research addresses this gap by exploring how conversational GenAI can stimulate storytelling processes that evolve into collective memory formation and peer interaction among older adults. The study further contributes to the literature by proposing a conceptual framework that links conversational GenAI, autobiographical storytelling, collective memory processes, and social interaction within elderly communities. By conceptualizing conversational GenAI as a narrative nudge, the research highlights how generative AI technologies can support not only functional or informational tasks but also relational and social processes within community settings. In doing so, the study positions generative artificial intelligence not merely as a technological infrastructure but also as a narrative and relational nudge capable of supporting community wellbeing and active ageing in contemporary societies.

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How Applicants' Job-Market Status Shapes Reactions Toward AI Evaluation

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Abstract. *Despite the increasing use of artificial intelligence (AI) in recruitment, job applicants' reactions to AI-based evaluation remain mixed. While some applicants express skepticism toward automated selection processes, it remains unclear whether such reactions are shared by all job applicants. Drawing on research on status-related expectations, we examine whether applicants' job-market status, that is, an applicant's relative standing in the job market based on their qualifications and career profile, shapes their responses to AI-based versus human-based evaluation in hiring. Across one controlled experiment, we show that applicants with a higher job market status react less favorably to AI-based evaluation than to human evaluation, whereas applicants with lower job-market status display weaker differences between the two evaluation agents. Further analyses reveal that these effects are explained by perceived entitlement, defined as the belief that one deserves a particular type of evaluation in the hiring process. Specifically, higher-status applicants experience lower entitlement when evaluated by AI rather than by a human evaluator, which in turn influences their job acceptance intentions. By identifying job-market status as an important individual difference and entitlement as a key psychological mechanism, our research advances the literature on AI acceptance in hiring and offers practical insights for organizations seeking to integrate AI into recruitment processes.*
Keywords*: recruitment; artificial intelligence; entitlement; job market status; job acceptance*

Framing of the research. In recent years, the growing diffusion of artificial intelligence (AI) has substantially reshaped organizational practices, including employee selection and recruitment (Deriu et al., 2026b; Malik et al., 2023; Mirowska, 2020). Organizations increasingly rely on AI-based systems to automate central hiring activities such as screening résumés, evaluating interview responses, ranking candidates, and supporting final selection decisions. This technological shift is largely driven by the promise of greater efficiency, lower hiring costs, and faster recruitment cycles, which have made AI-based assessment tools increasingly attractive to organizations seeking to streamline their talent acquisition processes (Deriu et al., 2024; Malik et al., 2023). At the same time, the broader digitalization of workplaces has contributed to making AI-based hiring an increasingly common feature of contemporary recruitment systems (Meijerink & Bondarouk, 2023; Van Esch & Black, 2019). Advances in machine learning, natural language processing, and predictive analytics have enabled organizations to analyze large volumes of applicant data in ways that would be difficult or time-consuming for human recruiters alone. As a result, AI-based systems are increasingly used to automate—and sometimes fully replace—human evaluation in hiring processes (Deriu et al., 2026b; The Guardian, 2019; Upadhyay & Khandelwal, 2018).

Despite these potential benefits, the growing use of AI in personnel selection has also raised important questions regarding job applicants' acceptance of this new technological solution. For instance, scholars have noted that automated systems may reproduce or even amplify existing biases present in historical training data, potentially leading to discriminatory outcomes for certain groups of applicants (Raghavan et al., 2020). In response to these concerns, a growing body of research has begun to examine not only the technical performance of AI systems but also their social and psychological implications within hiring contexts. In particular, understanding how job applicants perceive and react to AI-based evaluation has become an important research focus within the broader literature on technology-enabled human resource management (Langer & Landers, 2021).

Prior research suggests that job applicants' reactions to AI-based selection are far from uniform. Some studies show that applicants respond less favorably to AI-based than to human-based evaluations, reporting lower trust, lower perceptions of fairness, or weaker intentions toward the hiring organization (e.g., Deriu et al., 2024). These reactions are often interpreted through the lens of procedural justice and organizational trust, as applicants may perceive algorithmic systems as less transparent, less empathetic, or less capable of capturing individual nuances compared to human evaluators (Lee, 2018). Other studies, however, find more neutral or even relatively positive reactions to AI-based selection (Deriu et al., 2026a; Newman et al., 2020). For example, some applicants may view algorithmic decision-making as more objective and less prone to interpersonal bias than human judgment, potentially increasing perceived fairness in certain contexts (Newman et al., 2020).

Therefore, an important yet understudied possibility is that reactions to AI-based evaluation may vary across applicants themselves. Specifically, applicants differ in their expectations about the hiring process and in how they interpret the use of automated decision-making systems, which may shape their responses when evaluation is conducted by an AI rather than by a human evaluator. (Deriu et al., 2024; Dietvorst, Simmons, & Massey, 2015). Understanding these heterogeneities is particularly important because applicant reactions can influence several downstream organizational outcomes. Negative perceptions of selection procedures may reduce organizational attractiveness, decrease acceptance intentions, and potentially harm employer reputation (Hausknecht, Day, & Thomas, 2004).

Purpose of the paper. This research enhances our understanding of the factors influencing job applicants' reactions to the use of AI in hiring by examining whether applicants respond differently to AI-based versus human-based evaluations, depending on their job market status, defined as an applicant's relative standing in the labor market inferred from signals of prestige, experience, and demand for their profile (Piff et al., 2012). Specifically, we investigate whether the use of an AI evaluator elicits different reactions among applicants described as having either high or low job-market status, and whether these differences can explain when AI-based evaluation is perceived less favorably than human evaluation.

We base our investigation on the idea that individuals with a higher job market status tend to develop different expectations regarding how they should be treated. Applicants who hold a relatively stronger position in the job market—because they possess more desirable qualifications or face higher demand for their skills—may perceive themselves as more valuable candidates. As a result, they may expect a higher level of attention and consideration during the hiring process compared to applicants with a weaker position in the job market. Drawing on this reasoning, we propose that applicants' reactions to AI-based evaluation may depend on their job-market status. In particular, applicants with higher job-market status may react more negatively to AI-based evaluation than to human evaluation, because automated evaluation may appear less consistent with the level of treatment they expect during the hiring process. By contrast, applicants with lower job-market status may hold weaker expectations regarding how they should be evaluated and may therefore be less sensitive to whether the evaluation is conducted by an AI system or by a human evaluator.

We further propose that these differences can be explained by job applicants' perceived entitlement, which, in this context, refers to the belief that one deserves a particular type or level of evaluation during the hiring process due to one's position in the job market (Boyd & Helms, 2005; Campbell et al., 2004). Individuals occupying a higher job market status often develop stronger feelings of entitlement, which shape how they evaluate interactions and institutional procedures. In the context of hiring, applicants with higher job-market status may feel more entitled to a particular form of evaluation (i.e., being evaluated by a human) during the selection process. Consequently, when applicants with higher job-market status are evaluated by an AI system rather than by a human evaluator, the evaluation may appear less aligned with the level of consideration they believe they deserve. In contrast, applicants with lower job-market status may hold weaker expectations regarding how they should be evaluated and, therefore, may react less strongly to the use of AI versus human evaluators.

We conducted an experimental study in which participants evaluated hiring scenarios involving job applicants with either high or low job-market status who were assessed by either a human evaluator or an AI-based evaluation system. In this study, we examine how the interaction between the evaluation agent and applicant job-market status shapes reactions to the hiring process and whether perceived entitlement explains this relationship.

Methodology. We collected data from Prolific respondents coming from the U.S., with screening criteria ensuring they were actively searching for a job. After excluding four participants who failed to pass the attention check, the final sample consisted of 249 respondents (136 females, M_{Age} =42.63, SD=12.31) randomly assigned to a condition in a 2 (evaluation agent: human vs. AI) by 2 (status: low vs. high) between-subjects design. Specifically, the high-status (low-status) candidate, James, was described as holding a degree in Psychology from a high-prestige (low-prestige) university, having prior work experience in well-known, high-profile (small, local) organizations, having been involved in projects with high (low) visibility, and having often (rarely) attracted interest from other employers.
The manipulation check on the status revealed that respondents correctly perceived the manipulation *($M_{High_status} = 4.38$ vs. $M_{Low_status} = 2.67$, $t(247) = 9.34$, $p < .001$).*
The evaluation agent manipulation was also correctly perceived *($X^2(1, 249) = 245.03$, $p < .001$).*

Then, we measured entitlement with four items measured on a 7-point Likert scale ("I honestly feel that James deserves to be evaluated by a hiring manager/AI more than other candidates", "It would be reasonable for James to expect an evaluation by a hiring manager/AI, given his profile", "People like James deserve to be evaluated by a hiring manager/AI", "I feel that James is entitled to an evaluation by a hiring manager/AI"; from Tatavarthy et al., 2024; 1 = "Strongly disagree", 7 = "Strongly agree"; α = 0.942). We assessed job acceptance intentions using four items measured on a 7-point Likert scale ("James would continue participation in the selection", "James would accept a job offer from this company", "James would make this company one of his first choices as an employer", "James would exert a great deal of effort to work for this company"; from Wehner et al., 2015; 1 = "Strongly disagree", 7 = "Strongly agree"; α = 0.829).

Results. We ran a moderated mediation analysis (PROCESS MACRO MODEL 7, Hayes, 2017) using evaluation agent as the main independent variable, job acceptance intentions as the dependent variable, candidates' perceived entitlement as the mediator, and incorporating job-market status as a moderator on entitlement. We found a significant index of moderated mediation on job acceptance intentions (b=-0.23, 95% CI=-0.38, -0.10). In particular, the negative effect of the AI evaluation agent on candidates' perceived entitlement (b = -1.18, SE = 0.24, t = -4.84, p < .001) was characterized by the significant and negative interaction with candidates' job-market status (b = -1.21, SE = 0.34, t = -3.54, p < .001), which in turn had a significant and positive effect on job acceptance intentions (b = 0.19, SE = 0.04, t = 4.30, p < .001). More precisely, the simple slope analysis revealed that candidates with low job-market status felt less entitled when evaluated by the AI instead of the human hiring manager (b = -1.18, SE = 0.24, t = -4.84, p < .001); However, this effect was significantly more pronounced for candidates with high job-market status (b = -2.39, SE = 0.24, t = -9.93, p < .001). The indirect effects confirmed these findings: For candidates with low job-market status, the negative effect of the AI (vs.

human hiring manager) on job acceptance intentions was driven by perceived entitlement (b = -0.23, 95% CI = -0.40, -0.10). For candidates with high job-market status, this negative effect was significantly stronger (b = -0.46, 95% CI = -0.67, -0.26). Lastly, the non-significant direct effect showed the presence of a "full" mediation on job acceptance intentions (b = -0.01, 95% CI = -0.31, 0.29). These results remained unchanged when controlling for age and gender.

Managerial implications. The increasing use of AI in recruitment presents both opportunities and challenges for organizations. On the one hand, AI-based evaluation systems can help organizations streamline hiring processes, reduce costs, and manage large volumes of applicants more efficiently (Deriu et al., 2026; Mirowska, 2020). On the other hand, organizations must consider how job applicants perceive the use of AI during the selection process (Miroswka and Mesnet, 2021). Our findings suggest that applicants' reactions to AI evaluation are not uniform and depend on characteristics of the applicants themselves, particularly their job-market status. Understanding these differences can help organizations design recruitment processes that balance efficiency with positive applicant experiences.

First, our findings suggest that organizations should carefully consider when and for whom AI-based evaluation is most appropriate. Applicants having a higher job market status may respond less favorably to automated evaluation than to human evaluation, likely because they hold stronger expectations about how they should be treated during the hiring process. For organizations seeking to attract highly competitive candidates, relying exclusively on AI-driven evaluation may therefore carry reputational or relational risks. In such cases, organizations may benefit from maintaining some degree of human involvement in the evaluation process, particularly when assessing applicants with stronger profiles or highly demanded skills. This approach allows firms to preserve the efficiency benefits of AI while still signaling attention and consideration toward highly desirable candidates.

Second, our findings highlight the importance of segmenting recruitment strategies based on applicant characteristics. Rather than adopting a one-size-fits-all approach to hiring technologies, organizations may benefit from designing selection processes that account for differences in applicants' job-market status. In particular, firms may allow applicants with strong profiles to choose between AI-based and human evaluation, thereby offering greater flexibility while maintaining efficiency gains from AI tools. At the same time, applicants with lower job-market status may be less sensitive to whether the evaluation is conducted by AI or by a human decision-maker. This suggests that organizations can rely more extensively on AI-based evaluation in earlier stages of the hiring process for these applicants, leveraging the efficiency, scalability, and cost advantages of automated screening. By segmenting evaluation strategies in this way, organizations can balance technological efficiency with applicant expectations and ensure that the adoption of AI in hiring does not inadvertently discourage the most competitive candidates.

Research limitations. Our work has several limitations that offer opportunities for future research. First, to ensure comparability between the two evaluation agents, we provided a relatively simple description of the AI evaluator, focusing primarily on its role in assessing applicants during the hiring process. In practice, however, AI-based hiring systems can include a variety of additional features, such as personality assessments, predictive analytics, or behavioral analysis of interview responses. Future research could therefore examine whether applicants' reactions differ depending on the specific capabilities attributed to AI-based evaluation systems. Second, our study relied on experimental scenarios in which participants evaluated a hypothetical applicant described as having either high or low job-market status. While this approach strengthens internal validity and allows us to isolate the causal effect of applicant status and evaluation agent, it does not fully capture how individuals who actually have a different status in the job market might respond to AI-based evaluation when thinking about their own case. As a next step, we plan to extend this project by moving beyond a fictitious applicant and directly comparing respondents who differ in their actual job-market status through survey-based data collection. Specifically, we aim to contrast individuals occupying relatively higher-status job-market positions, such as managers or executives, with respondents in lower-status positions. This would allow us to assess whether the patterns observed in the experimental studies also emerge when participants evaluate AI-based versus human evaluation in relation to their own professional situation, thereby strengthening the external validity of the findings

Originality of the paper. Our research makes several contributions to the literature on AI adoption in hiring practices. As organizations increasingly rely on artificial intelligence to evaluate job applicants, understanding the psychological factors that shape applicants' reactions to AI-based versus human-based evaluation has become an important research topic. While prior studies have examined various determinants of AI acceptance in recruitment—such as personality traits and the technological orientation of the hiring organization (Deriu et al., 2026a; McCarthy et al., 2017; Mirowska & Mesnet, 2022)—less attention has been devoted to how applicants' relative position in the job market may shape their responses to automated evaluation systems. First, our research contributes to the literature by introducing job-market status as an individual difference that helps explain heterogeneity in applicants' reactions to AI-based evaluation. Applicants differ in the extent to which they occupy stronger or weaker positions in the labor market, which may influence the expectations they hold regarding how they should be evaluated during the hiring process. By showing that applicants' reactions to AI-based versus human-based evaluation vary depending on their job-market status, our study provides a new explanation for why automated evaluation may be perceived differently across applicants.

Second, our study contributes to the literature on the drivers of AI acceptance in hiring (Mirowska and Mesnet, 2021) by identifying entitlement as a psychological mechanism underlying the differences in job applicants' reactions.

Entitlement refers to the belief that one deserves a particular level or type of treatment in a given context. We show that applicants with higher job-market status may develop stronger expectations regarding how they should be evaluated during the hiring process, which in turn shapes their reactions to AI-based versus human-based evaluation. By highlighting the role of entitlement in this context, our research provides a novel explanation for job applicants' responses (i.e., job acceptance intentions) to automated evaluation in hiring.

Finally, by integrating insights from research on AI-based hiring and status-related expectations, our study advances current understanding of when the use of AI in recruitment may be more or less acceptable to job applicants. In particular, by identifying both this individual characteristic and its underlying psychological mechanism, our research contributes to the broader literature on applicant reactions and technology adoption in hiring. At the same time, these findings carry important managerial implications, as they suggest that organizations may benefit from tailoring their use of AI in selection processes to different segments of applicants rather than adopting a uniform approach.

Research statement. The present research is work-in-progress. The datasets generated during and/or analyzed during the current research are available from the corresponding author upon reasonable request.

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Institutional Logics and Collaborative Innovation in AI Platform Ecosystems: Evidence from Patent Co-Ownership in the United States and China

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Abstract. *Digital platforms have become central actors in contemporary innovation ecosystems, especially in technologically intensive domains such as Artificial Intelligence (AI). Through modular architectures, data infrastructures, and developer ecosystems, these firms increasingly orchestrate distributed innovation processes involving multiple organizations. Within these environments, collaborative innovation has become a critical mechanism through which firms access complementary knowledge and technological capabilities. Despite growing research on open innovation and digital platforms, limited empirical evidence exists on how collaborative patenting strategies influence technological outcomes across different institutional environments.*

This study investigates the relationship between collaborative patent ownership and the technological impact of AI-related inventions developed by leading digital platforms. Grounded in open innovation theory and institutional theory, the paper examines whether co-assigned patents are associated with greater technological impact and whether the effectiveness of collaborative innovation differs across institutional contexts. The empirical analysis relies on a dataset of 26,488 AI-related patent families filed between 1995 and 2022 by major digital platforms operating in the United States and China. AI patents are identified through a dual-filtering methodology combining International Patent Classification codes and AI-related keywords. Technological impact is measured through forward citations, while collaborative innovation is captured through co-assigned patent ownership structures. Negative binomial regression models are employed to analyse the relationship between collaboration and patent impact.

The findings reveal significant cross-country differences. In the United States, collaborative patent ownership does not significantly influence technological impact. In contrast, the Chinese context presents heterogeneous collaboration effects: inter-firm collaborations are associated with lower technological impact, whereas collaborations between firms and public research institutions significantly increase patent influence. These results suggest that the effectiveness of collaborative innovation strategies depends strongly on institutional environments and partnership configurations. The study contributes to research on digital platforms, open innovation, and institutional theory by providing micro-level empirical evidence on how institutional logics shape innovation outcomes within AI-driven platform ecosystems.

Keywords: *Artificial Intelligence; Digital Platforms; Open Innovation; Institutional Theory; Patents.*

1. Introduction. Digital platforms have become one of the most influential organizational forms of the contemporary economy. Over the last two decades, firms such as Google, Amazon, Microsoft, Alibaba, Tencent, and Huawei have reshaped competition by building digital infrastructures able to coordinate interactions among multiple categories of actors. Unlike traditional firms that innovate largely within their internal boundaries, digital platforms increasingly innovate through ecosystems composed of users, developers, suppliers, complementors, start-ups, research partners, and public institutions. Their strategic relevance derives not only from scale or market power, but also from their ability to orchestrate distributed innovation processes.

This transformation is especially visible in Artificial Intelligence (AI). AI is a technologically complex domain characterized by rapid convergence among multiple fields, including machine learning, computer vision, robotics, natural language processing, cloud computing, and data analytics. Such complexity makes it difficult for any single organization to master all relevant capabilities internally. As a consequence, AI development increasingly depends on the recombination of heterogeneous knowledge, access to large data infrastructures, and the integration of diverse scientific and technological competencies.

Within this context, collaboration has become a crucial strategic mechanism. Firms rely on external partnerships to access complementary knowledge, share technological risks, broaden search spaces, and accelerate innovation cycles. In the case of digital platforms, these collaborations can involve other firms, universities, public research institutions, start-ups, or ecosystem actors connected to their technological infrastructures. One of the most observable outputs of such collaboration is co-patenting, namely the joint ownership of patents resulting from collaborative inventive activity.

Co-patenting is particularly relevant for the study of innovation because it makes collaborative ties visible through formalized intellectual property arrangements. Co-assigned patents provide evidence that multiple organizations have contributed to the same invention and have decided to share ownership of the resulting technological output. For this reason, they offer a useful empirical lens through which to observe how open innovation strategies materialize at the micro level.

However, the implications of collaborative patenting are not straightforward. On the one hand, combining heterogeneous capabilities may increase novelty, technological breadth, and subsequent influence. On the other hand, collaboration may

also generate coordination costs, conflicts over appropriation, organizational misalignment, and slower decision-making. As a result, collaborative patenting may enhance technological impact in some conditions but not in others.

A further complication is that collaborative innovation does not take place in an institutional vacuum. Institutional theory suggests that innovation strategies are embedded in broader systems of rules, incentives, expectations, and governance arrangements. Firms do not simply choose whether to collaborate; they collaborate in ways that reflect the institutional logics of the environments in which they operate. Institutional contexts shape the legitimacy of different forms of openness, the governance of intellectual property, the role of universities and public actors, and the strategic value of alliances.

The comparison between the United States and China is therefore highly relevant. These two countries are the global leaders in AI development and digital platform growth, yet they represent markedly different institutional environments. The U.S. context is characterized by a market-driven innovation system, relatively decentralized coordination mechanisms, strong intellectual property protection, and broad ecosystem openness. The Chinese context is more strongly shaped by industrial policy, state coordination, strategic national objectives, and selective forms of openness aligned with public priorities. These differences suggest that collaboration may not operate uniformly across the two contexts.

This paper addresses that issue by asking two main research questions. First, is collaborative patent ownership associated with the technological impact of AI-related platform innovations? Second, do these relationships differ between the United States and China? To answer these questions, the study analyses a dataset of 26,488 AI-related patent families assigned to leading platform firms in the two countries between 1995 and 2022. Technological impact is measured through forward citations, while collaboration is captured through co-assignment patterns and partnership typologies. The empirical analysis uses negative binomial regression models, which are particularly appropriate for overdispersed count data such as patent citations.

The paper contributes in three main ways. First, it advances open innovation research by showing that the impact of collaboration is conditional rather than universally positive. Second, it contributes to platform studies by examining digital platforms not only as market intermediaries but also as institutionally embedded orchestrators of AI innovation. Third, it extends institutional theory by linking macro-level institutional logics with micro-level patent outcomes. In doing so, the paper offers a more nuanced understanding of how collaborative innovation translates into technological impact within AI platform ecosystems.

The remainder of the paper is structured as follows. The next section reviews the literature on digital platforms, open innovation, and institutional logics. The following sections develop the hypotheses, describe the data and methods, present the empirical results, discuss the findings, and conclude with implications for theory and practice.

2. Digital Platforms, Open Innovation, and Institutional Logics

2.1 Digital platforms as orchestrators of innovation ecosystems

Digital platforms have progressively evolved from market-making infrastructures into strategic orchestrators of innovation ecosystems. Their distinctive feature lies in their ability to organize interactions among multiple sides of a market while maintaining some degree of control over the core architecture. This architecture typically combines technological modularity, interface standardization, and data-driven coordination, allowing external actors to participate in innovation while remaining connected to a common infrastructural core.

This organizational form has major implications for innovation. Traditional innovation models often assumed that firms developed technologies internally and then commercialized them through relatively stable value chains. Platform-based innovation, by contrast, is more distributed, recursive, and ecosystemic. Value is co-created through interactions among platform owners, complementors, users, developers, and external organizations. Innovation does not simply flow from inside to outside the firm; rather, it emerges from the continual recombination of internal and external resources.

The platform model is especially relevant in AI because AI applications depend on the integration of hardware, software, data assets, cloud infrastructures, and specialized research competencies. Leading platform firms can leverage their infrastructural position to mobilize external contributions while still guiding technological trajectories. In this respect, platforms do not merely participate in innovation ecosystems; they structure them through governance mechanisms, technological standards, and selective openness.

At the same time, not all platform ecosystems are equally open. The degree of openness varies according to strategic priorities, technological specialization, competitive pressures, and institutional environments. Some platforms rely on broad developer communities and open-source ecosystems; others adopt more selective forms of collaboration centered around specific research partnerships or strategically controlled access points. Therefore, understanding how platforms collaborate in AI requires attention not only to technology, but also to governance and institutional embeddedness.

2.2 Open innovation and collaborative patenting

Open innovation theory emphasizes that firms can improve innovation performance by purposively sourcing knowledge from outside their boundaries and by combining internal and external capabilities. This perspective challenges closed models of innovation and highlights the strategic role of collaboration, knowledge exchange, and ecosystem participation.

Collaborative patenting is one of the most visible manifestations of open innovation because it signals that an invention was generated through inter-organizational cooperation and that the resulting intellectual property is jointly owned. In patent-based studies, co-assignment is often treated as an indicator of formal collaborative innovation. Such collaborations may involve firm–firm partnerships, university–industry relationships, or ties between private firms and public research organizations.

The literature generally suggests that collaboration can enhance innovation outcomes for several reasons. First, it enables access to complementary knowledge bases, which is especially important in complex and multidisciplinary technological domains. Second, it allows organizations to share risks and costs associated with uncertain research trajectories. Third, it may increase the scope and applicability of resulting inventions by combining scientific, technological, and market-oriented competences.

However, the positive effects of collaboration are not guaranteed. Co-patenting can also create appropriation problems, reduce incentives to disclose key knowledge, and increase transaction and coordination costs. Joint ownership may become a source of ambiguity over future commercialization rights or over the use of the invention in adjacent fields. In addition, collaborations among organizations with diverging routines or time horizons may produce friction rather than synergy.

These tensions are particularly salient in AI, where innovation cycles are rapid, technological architectures evolve quickly, and access to data, talent, and computational infrastructures creates asymmetries among partners. In some cases, collaboration may broaden technological exploration; in others, it may slow down integration or dilute strategic focus. The empirical question is therefore not whether collaboration is inherently beneficial, but under what conditions and in what forms it contributes to technological impact.

2.3 Institutional logics and comparative innovation systems

Institutional theory offers a useful framework for explaining why collaboration may work differently across national contexts. Institutional logics refer to the broader organizing principles that shape what kinds of strategies are considered legitimate, efficient, and desirable within a given environment. These logics influence governance structures, inter-organizational relationships, and the mechanisms through which innovation is coordinated.

In the United States, innovation takes place within a relatively market-oriented institutional environment. Competitive pressures, strong intellectual property regimes, venture financing, entrepreneurial experimentation, and broad ecosystem participation support a form of openness that is often exploratory and opportunity-driven. In such a context, collaboration may be routinized and supported by a mature ecosystem of contracts, alliance capabilities, and specialized partners. This may make collaboration widespread, but not necessarily differentiating in terms of patent impact.

China presents a different configuration. The Chinese innovation system is strongly shaped by state coordination, industrial policy, and strategic technological priorities. In the AI domain, platform firms often operate in relation to national policy agendas and public programs that promote specific forms of collaboration, including ties with universities, public institutes, and government-backed innovation initiatives. Collaboration can therefore be more selective, more policy-driven, and more strongly embedded in strategic national objectives.

These differences matter because the same formal structure of co-ownership may embody different underlying dynamics across contexts. A co-assigned patent in the United States may emerge from a mature and standardized ecosystem practice. A co-assigned patent in China may instead reflect a more directed, institutionally mediated arrangement with distinct incentives and governance characteristics. For this reason, institutional theory suggests that the relationship between collaboration and patent impact should vary across countries and across partnership configurations.

3. Hypotheses Development. The first hypothesis concerns the general relationship between collaborative patent ownership and technological impact. AI innovation is a knowledge-intensive process that often requires the integration of different scientific and technological domains. In such contexts, collaboration can increase the quality and influence of inventions by combining complementary assets and expanding the scope of technological search. Co-assigned patents may therefore capture inventions that emerge from richer knowledge recombination and from more diverse problem-solving capacities.

At the same time, the literature on collaboration in innovation generally argues that joint research can increase subsequent visibility and diffusion because inventions developed through complementary expertise may be technologically broader and more relevant to future innovation trajectories. This logic is particularly plausible in AI, where advances often depend on the convergence of multiple domains and on the integration of research capabilities that are difficult to concentrate within a single organization.

Based on these arguments, the first hypothesis is formulated as follows:

H1. Collaborative patent ownership is positively associated with the technological impact of AI-related patents.

The second hypothesis concerns the heterogeneity of collaboration. Treating co-assignment as a single, homogeneous category may obscure important differences among partnership structures. Collaborations between firms may differ substantially from collaborations between firms and universities or public research institutions.

Firm–firm collaborations may benefit from market proximity, complementary commercial capabilities, and shared incentives toward application and commercialization. However, they may also face stronger appropriation concerns, competitive tensions, and governance issues. In contrast, firm–university or firm–public research collaborations may combine scientific depth with market-oriented implementation capabilities. Such configurations can be particularly beneficial in AI, where upstream research excellence and downstream application competences are both essential.
Institutional theory reinforces this expectation. In environments where public research organizations play a strategic role in national innovation systems, the collaboration between firms and public institutions may generate particularly strong complementarities. Conversely, purely inter-firm collaborations may be more exposed to coordination frictions, especially when they are not supported by robust alliance capabilities or shared governance routines.
Accordingly, the second hypothesis is stated as follows:
H2. The technological impact of AI-related patents differs across partnership configurations.

4. Research Design and Methodology

4.1 Data and sample construction

The empirical analysis is based on a novel patent dataset built by combining patent-level information with assignee-level organizational data. AI-related patents were identified using a dual-filtering methodology based on the combination of AI-specific keywords and International Patent Classification codes associated with AI technologies. This approach allows the identification of patent families that are both textually and technologically linked to AI.
Patent information was retrieved from the Questel Orbit Intelligence database, while assignee-level information was integrated through ORBIS Intellectual Property data. The use of patent families as the unit of analysis reduces double counting and provides a more robust representation of inventive activity across jurisdictions.
The final dataset includes 26,488 AI-related patent families filed between 1995 and 2022. Of these, 16,939 are assigned to platforms based in the United States and 9,549 to platforms based in China. The sample focuses on leading platform firms that play central roles in their respective digital and AI ecosystems. The U.S. sample includes firms such as Google, Amazon, Microsoft, Apple, and Meta. The Chinese sample includes firms such as Alibaba, Baidu, Tencent, Huawei, JD.com, Xiaomi, SenseTime, Ping An, and Hikvision.

4.2 Variables

The dependent variable is **Tech_Impact**, measured as the number of forward citations received by each patent family. Forward citations are widely used in patent research as a proxy for technological influence, knowledge diffusion, and relevance for subsequent inventive activity.
The main independent variable in Model 1 is **Co_Assignment**, a dummy equal to 1 when a patent family has more than one assignee and 0 otherwise. This variable captures whether the invention is the result of formal collaborative ownership.
To account for heterogeneity in collaboration structures, Model 2 uses **PartnershipType**, a categorical variable that distinguishes among: (1) patents assigned to a single firm (**OneCompany**), (2) patents jointly assigned to multiple firms (**MultipleCompanies**), and (3) patents jointly assigned to firms and universities or public research institutions (**MixCompaniesURIs**).
Three control variables are included. **BackCit** measures backward citations and captures the extent to which the invention builds on existing technological knowledge. **FamSize** represents patent family size and captures the geographic breadth of protection, often interpreted as a proxy for expected commercial value or strategic importance. **Filing_year** controls for cohort effects in citation accumulation, since older patents have had more time to receive citations.

4.3 Estimation strategy

Because the dependent variable is a non-negative count variable with strong overdispersion, negative binomial regression is used. This approach is well established in patent research because patent citation distributions are typically highly skewed and display variance substantially larger than the mean.
Two main specifications are estimated separately for the United States and China. Model 1 assesses the general association between co-assignment and technological impact. Model 2 replaces the binary collaboration variable with partnership types in order to test whether distinct forms of collaboration have heterogeneous effects. Separate estimation by country is appropriate because the descriptive evidence indicates substantial structural differences between the two national samples in terms of citation patterns, family size, backward citations, and collaboration frequencies.

5. Results

5.1 Descriptive evidence

The descriptive analysis reveals marked differences between the two country contexts. U.S. platform patents show substantially higher technological impact than Chinese platform patents. The citation distribution in the United States is characterized by a much stronger right tail, indicating the presence of highly influential patents. U.S. patents also display

larger family sizes and higher backward citation counts on average, suggesting broader protection strategies and deeper technological grounding.
Differences also emerge in collaborative structures. Co-assignment is more frequent in the U.S. sample than in the Chinese sample. However, the composition of collaboration differs. In the U.S. dataset, collaborative patents are almost entirely represented by firm–firm co-ownership. In the Chinese dataset, both inter-firm collaborations and mixed firm–university/public research collaborations are observed, although the latter represent a smaller share of the total sample.
These descriptive patterns already suggest that collaboration may not have the same meaning across the two systems. In the United States, co-assignment appears as a relatively standard ecosystem feature. In China, some collaborative structures seem more selective and potentially more institutionally mediated.

5.2 Regression results
The regression results provide further support for this interpretation. Across both countries, the control variables behave largely as expected. Filing year has a negative coefficient, indicating that older patents accumulate more forward citations. Family size has a positive and significant association with technological impact, consistent with the idea that patents protected across more jurisdictions tend to be strategically more valuable and technologically influential. Backward citations also show a positive relationship with forward citations, suggesting that patents grounded in richer prior knowledge are more likely to influence later inventions.
The main differences concern collaboration. In the United States, the coefficient for **Co_Assignment** is not statistically significant. This means that, once other patent characteristics are controlled for, co-owned patents do not perform differently from single-owner patents in terms of technological impact. The result does not imply that collaboration is absent or unimportant in the U.S. ecosystem, but rather that formal co-ownership does not constitute a distinctive predictor of higher citation impact.
In China, the picture differs. The binary co-assignment variable is negatively associated with technological impact. This suggests that, on average, collaborative ownership is linked to lower citation performance relative to patents owned by a single firm. However, this aggregate result masks substantial heterogeneity.
When partnership types are distinguished, the results become more nuanced. In the Chinese sample, **MultipleCompanies** collaborations show a negative and significant coefficient relative to single-firm patents. By contrast, **MixCompaniesURIs** collaborations show a positive and significant coefficient, indicating that collaborations involving public research institutions or universities are associated with higher technological impact.
These findings imply that collaboration in China is not uniformly beneficial or detrimental. Rather, outcomes depend on the composition of the partnership. Purely inter-firm collaborations appear less effective, whereas hybrid science–industry collaborations are associated with stronger patent influence.

6. Discussion. The findings of this study support a more conditional understanding of collaborative innovation in AI ecosystems. The first important insight is that collaboration does not automatically increase technological impact. The positive expectation captured in H1 receives no support in the U.S. sample and only partial support when China is considered in disaggregated form. This suggests that the impact of collaborative patent ownership cannot be understood in universalistic terms.
In the United States, the absence of a significant co-assignment effect may reflect the maturity of the innovation ecosystem. Collaboration is likely already embedded in platform innovation processes through multiple mechanisms, including alliances, open-source communities, developer networks, acquisitions, and contractual research arrangements. Within such a mature environment, formal co-patenting may no longer act as a distinctive signal of superior technological influence. Collaboration may still matter, but its value may be distributed across a broader array of ecosystem relationships rather than concentrated in joint patent ownership alone.
In China, the results highlight a more differentiated picture. The negative coefficient associated with inter-firm collaboration suggests that not all collaborative arrangements are equally effective. Some inter-firm partnerships may suffer from coordination difficulties, overlapping capabilities, appropriation concerns, or weak integration mechanisms. These issues can reduce the coherence and downstream influence of resulting inventions.
At the same time, the strong positive effect of collaborations involving universities or public research institutions suggests that institutional complementarities are especially important in the Chinese AI ecosystem. Such partnerships may combine upstream scientific capabilities with downstream commercialization and deployment capacities, thereby generating inventions with stronger technological influence. This is consistent with the role of public research organizations in state-coordinated innovation systems, where they often function as knowledge providers and strategic partners in national technological development.
More broadly, the results indicate that institutional logics shape not only how much firms collaborate, but also how collaboration translates into innovation outcomes. The same formal structure of co-ownership can embody different strategic and organizational realities across countries. This is the main contribution of the paper from an institutional perspective: institutions are not distant background conditions, but mechanisms that become visible in micro-level innovation outcomes.

7. Implications for Theory and Practice. The paper offers several theoretical implications. For open innovation research, the results suggest that collaboration should not be treated as inherently performance-enhancing. What matters is not only whether firms collaborate, but with whom they collaborate and within what institutional context. This supports a more contingent and governance-sensitive view of openness.

For platform studies, the findings reinforce the idea that digital platforms are not simply neutral technological infrastructures. They are institutionally embedded orchestrators whose collaborative strategies reflect broader governance systems. Their openness is selective, structured, and context-dependent.

For institutional theory, the study provides a micro-founded perspective on how institutional logics influence innovation outcomes. Rather than focusing only on macro-level policy differences, the analysis shows how such differences are reflected in patent-level collaboration structures and citation impact.

From a managerial perspective, the results suggest that platform firms should carefully design collaborative arrangements rather than assuming that joint ownership will automatically improve innovation performance. In mature market ecosystems, formal co-patenting may not provide additional value if collaboration is already embedded elsewhere in the ecosystem. In more state-coordinated systems, collaborations with universities and public institutions may be especially valuable when they create genuine complementarities.

8. Conclusion. This paper has examined how collaborative patent ownership relates to the technological impact of AI-related platform innovations in the United States and China. Drawing on open innovation theory and institutional theory, it has argued that the effects of collaboration should be understood as context-dependent rather than universal.

Using a dataset of 26,488 AI-related patent families and negative binomial regression models, the study shows that collaborative ownership does not significantly affect technological impact in the United States, whereas in China the effect of collaboration depends strongly on partnership configuration. Inter-firm collaborations are associated with lower impact, while collaborations involving universities or public research institutions are associated with higher impact.

These findings highlight that collaboration in AI ecosystems is shaped by institutional logics, partnership structures, and governance arrangements. The study therefore contributes to a more nuanced understanding of open innovation within digital platform ecosystems and offers evidence that the relationship between collaboration and technological impact cannot be separated from the institutional environments in which innovation takes place.

Future research could extend this analysis by considering additional countries, examining the temporal evolution of platform collaboration strategies, or integrating patent evidence with alliance, publication, and ecosystem governance data. Such work would further clarify how digital platforms organize innovation across increasingly complex and geopolitically differentiated AI landscapes.

L'intelligenza artificiale come infrastruttura cognitiva per la transizione circolare: il ruolo delle dynamic capabilities

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Abstract. *L'intelligenza artificiale sta assumendo un ruolo sempre più rilevante nella transizione verso modelli di economia circolare, ma la letteratura chiarisce ancora solo parzialmente attraverso quali meccanismi essa contribuisca alla riconfigurazione dei processi, delle capacità organizzative e delle relazioni ecosistemiche. Muovendo dalla prospettiva delle dynamic capabilities e dalla letteratura sui circular business models, il lavoro esplora il ruolo dell'AI come infrastruttura cognitiva in tre casi qualitativi italiani. L'analisi, ancora in corso, suggerisce che l'AI può rafforzare sensing, seizing e reconfiguring, contribuire ad allentare alcune path dependencies e sostenere nuove forme di orchestrazione inter-organizzativa. Al tempo stesso, emergono tensioni legate a standardizzazione dei dati, dipendenze digitali e necessità di competenze di traduzione tra tecnologia, processi e attori dell'ecosistema. Il contributo propone quindi una lettura preliminare del legame tra AI, capacità dinamiche e innovazione circolare.*
Keywords: *intelligenza artificiale; economia circolare; Dynamic capabilities; Path dependency; ecosistemi d'impresa; Circular business models*

Inquadramento della ricerca. La crescente instabilità dei mercati delle risorse, la pressione regolatoria e la necessità di ridurre gli impatti ambientali hanno reso sempre più evidente l'inadeguatezza dei modelli lineari di produzione e consumo. In questo quadro, l'economia circolare si è affermata come paradigma volto a ripensare la creazione del valore attraverso logiche di estensione della vita utile, riuso, rigenerazione e recupero di materiali. La letteratura ha chiarito che tale transizione non coincide con l'adozione di pratiche ambientali isolate, ma implica una riconfigurazione dei modelli di business, dei processi operativi e delle relazioni di filiera. In questa prospettiva, i circular business models rappresentano una lente interpretativa utile, poiché mostrano come la circolarità richieda di ridefinire congiuntamente value proposition, modalità di erogazione e logiche di appropriazione del valore, integrando flussi materiali e informativi, uso e ritorno degli asset e criteri di valutazione capaci di tenere insieme performance economica ed efficienza nell'uso delle risorse (Bocken et al., 2016; Pieroni et al., 2019; Reim et al., 2021).

Per comprendere tale trasformazione, la prospettiva delle dynamic capabilities risulta particolarmente rilevante. Essa consente infatti di leggere la circolarità non come un adattamento puntuale, ma come un processo attraverso cui l'organizzazione sviluppa capacità di sensing, seizing e reconfiguring per individuare opportunità emergenti, selezionare nuove traiettorie strategiche e riallineare nel tempo risorse, routine e relazioni. Nei percorsi di economia circolare, queste capacità riguardano non solo l'introduzione di tecnologie o pratiche più sostenibili, ma anche la possibilità di sostenere configurazioni organizzative coerenti con logiche di valore più distribuite e di lungo periodo. In questo senso, la letteratura ha evidenziato come la transizione circolare dipenda dalla capacità delle imprese di sviluppare "microfondamenti" organizzativi e decisionali adeguati a governare innovazione, apprendimento e riconfigurazione del modello di business (Teece et al., 1997; Teece, 2007; Santa-Maria et al., 2022).

In tale prospettiva, l'intelligenza artificiale assume un ruolo di crescente centralità. La letteratura più recente evidenzia infatti come le applicazioni AI-based possano sostenere la tracciabilità dei flussi, l'ottimizzazione nell'impiego delle risorse, la manutenzione predittiva e l'identificazione di opportunità di recupero, contribuendo in tal modo all'abilitazione di modelli di business circolari fondati su capacità di monitoraggio continuo e su processi decisionali maggiormente "data-driven" (Rosa et al., 2020; Sjödin et al., 2023). Tuttavia, una lettura dell'AI circoscritta unicamente alla sua dimensione strumentale appare riduttiva. Più che una tecnologia isolata orientata al miglioramento dell'efficienza, essa può essere interpretata come un'"infrastruttura cognitiva", ovvero un insieme articolato di dati, modelli, metriche, interfacce e pratiche organizzative, capace di ridefinire le basi informative e interpretative del processo decisionale. In questa prospettiva, il contributo dell'AI non si esaurisce nell'ampliamento e nell'efficientamento delle capacità operative dell'impresa, ma investe più profondamente le condizioni stesse della sua capacità di osservare, confrontare e attribuire rilevanza ai fenomeni. L'AI, infatti, estende il perimetro del visibile e del "decidibile", rendendo intellegibili le inefficienze, le interdipendenze e le opportunità di recupero che, in assenza di adeguate architetture informative, tenderebbero a rimanere disperse o scarsamente problematizzate. Proprio per questo, essa può alimentare i ben noti processi di sensing, seizing e reconfiguring non in modo automatico o lineare, bensì attraverso una trasformazione delle modalità con cui l'organizzazione apprende, formula giudizi e coordina l'azione (Leonardi, 2013; Cao et al., 2021; Ritala et al., 2024).

Questa chiave interpretativa consente inoltre di mettere a fuoco una tensione cruciale. Se, da un lato, l'AI può contribuire ad allentare i vincoli derivanti dalla path dependency, mettendo in discussione routine e pratiche organizzative sedimentate, metriche tradizionali e rappresentazioni lineari dei processi, dall'altro essa può tuttavia generare nuove forme di dipendenza da dati, standard, architetture algoritmiche e criteri di classificazione (Sydow et al., 2009; Vergne and Durand, 2011; Warner and Wäger, 2019; Ritala et al., 2024). Inoltre, poiché la circolarità si realizza all'interno di ecosistemi caratterizzati da interdipendenze tra attori eterogenei, il potenziale trasformativo dell'AI risulta subordinato

alla possibilità di estendere tale infrastruttura cognitiva oltre i confini della singola impresa, rendendo dati, metriche e criteri decisionali reciprocamente comparabili tra soggetti diversi (Adner, 2017; Jacobides et al., 2018). In questo quadro assumono particolare rilievo specifiche capabilities di interfacciamento, intese come competenze immateriali e in larga misura tacite, radicate nella capacità di tradurre linguaggi tecnici, operativi, economici e di sostenibilità, ricodificandoli in corsi d'azione, decisioni strategiche, KPI e pratiche condivise tra attori diversi. La letteratura sui processi di traduzione, sulle attività di boundary spanning e sulla mediazione inter-organizzativa ha infatti mostrato come la costruzione di significati condivisi non dipenda esclusivamente dalla disponibilità di informazioni, ma richieda la presenza di attori e pratiche in grado di trasferire, tradurre e trasformare conoscenze tra comunità eterogenee, facilitando in tal modo il coordinamento, l'apprendimento e l'azione collettiva (Carlile, 2004).

Alla luce di tali considerazioni, la letteratura sull'economia circolare e sui circular business models ha chiarito la natura trasformativa della transizione circolare e il ruolo delle dynamic capabilities nel sostenerla (Bocken et al., 2016; Santa-Maria et al., 2022), mentre gli studi su AI e circolarità hanno evidenziato il potenziale delle applicazioni digitali nel supportare tracciabilità, monitoraggio e ottimizzazione dei flussi (Rosa et al., 2020; Sjödin et al., 2023). Rimane tuttavia meno esplicitato attraverso quali meccanismi organizzativi l'AI, intesa come infrastruttura cognitiva, alimenti capacità di sensing, seizing e reconfiguring orientate alla circolarità, e in che misura tale processo dipenda, simultaneamente, dalle tensioni generate dalla path dependency e dalle competenze di traduzione e di orchestrazione necessarie a governare le interdipendenze ecosistemiche.

Obiettivo del paper. Muovendo dal quadro teorico fin qui delineato, il presente lavoro intende analizzare il ruolo dell'intelligenza artificiale quale infrastruttura cognitiva a supporto della transizione verso sistemi di economia circolare. In particolare, il paper si propone di chiarire come l'AI contribuisca allo sviluppo di capacità dinamiche orientate alla circolarità, come interagisca con i vincoli di path dependency che caratterizzano i processi di trasformazione organizzativa e in che misura le configurazioni organizzative e relazionali abilitate dall'AI ridefiniscano il posizionamento dell'impresa nell'ecosistema di riferimento. In questa prospettiva, l'attenzione non è rivolta soltanto alle applicazioni tecnologiche dell'AI, ma anche ai meccanismi attraverso cui dati, modelli, metriche e pratiche di interpretazione vengono incorporati nei processi decisionali e nelle relazioni interorganizzative, sostenendo la circular business model innovation. Coerentemente con tale impostazione, la ricerca è guidata dalle seguenti domande:

RQ1. In che modo le applicazioni dell'AI contribuiscono allo sviluppo delle capacità di sensing, seizing e reconfiguring nell'innovazione dei modelli di business circolari?

RQ2. Come l'uso dell'AI interagisce con i vincoli di path dependency e quali competenze di ne rendono possibile un impiego trasformativo in chiave circolare?

RQ3. In che misura, e attraverso quali meccanismi, le configurazioni organizzative e relazionali abilitate dall'AI ridefiniscono il posizionamento dell'impresa nell'ecosistema, sostenendo percorsi di trasformazione circolare?

Metodologia. Considerata la natura emergente, processuale e fortemente contestuale del fenomeno indagato, la ricerca adotta un'impostazione qualitativa di tipo interpretativista, finalizzata a comprendere i meccanismi attraverso cui l'intelligenza artificiale viene incorporata nei percorsi di innovazione dei modelli di business circolari. In questa prospettiva, lo studio si fonda su un disegno esplorativo a casi multipli, particolarmente adatto all'analisi di fenomeni contemporanei, complessi e profondamente radicati nel contesto empirico, nonché alla costruzione teorica attraverso confronto e replica tra unità di analisi eterogenee ma comparabili (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Yin, 2014).

La selezione dei casi segue una logica di campionamento teorico costruita secondo un common process design, volto a osservare il medesimo fenomeno in contesti differenti. Le tre organizzazioni condividono tre condizioni: un impegno esplicito verso la circolarità; l'impiego di sistemi AI-based a supporto di decisioni, processi o coordinamento; la presenza di interdipendenze con una pluralità di attori lungo la filiera. Questa scelta consente di confrontare configurazioni diverse per settore, asset base e architettura relazionale, mantenendo però costante il focus sul rapporto tra AI, capacità dinamiche e trasformazione circolare.

I tre casi riflettono questa logica comparativa. L'azienda A è una multinazionale industriale attiva nelle attrezzature per edilizia e comparto estrattivo, caratterizzata da asset durevoli, intensità tecnologica e rilevanza strategica di pratiche quali rigenerazione dei componenti, manutenzione avanzata ed estensione della vita utile dei macchinari. L'azienda B opera invece nel settore dei servizi di lavanderia e dry-cleaning attraverso una rete internazionale in franchising, nella quale strumenti digitali e applicazioni di AI supportano la classificazione, il coordinamento operativo e la gestione del servizio. L'azienda C, infine, è un'impresa tecnologica specializzata nella tracciabilità delle filiere tessili e nella misurazione dell'impatto ambientale e sociale dei prodotti, svolgendo una funzione di intermediazione informativa tra brand, fornitori e altri attori della supply chain.

La raccolta dei dati è stata articolata in più fasi secondo una logica di triangolazione tra fonti, attori e momenti dell'indagine. Sono stati analizzati dati secondari, documentazione aziendale e materiali pubblici; successivamente sono state condotte interviste semi-strutturate con manager e figure chiave coinvolte in iniziative di innovazione, sostenibilità, operazioni e trasformazione digitale. Nei casi in cui è stato possibile, le evidenze sono state integrate attraverso ulteriori scambi di follow-up e la ricostruzione di processi, pratiche e interazioni rilevanti per l'uso dell'AI in un'ottica circolare.

L'analisi dei dati ha seguito una logica abduttiva e iterativa, coerente con gli studi di costruzione teorica a partire dai casi (Dubois and Gadde, 2002; Eisenhardt, 1989). In una prima fase, interviste e materiali documentali sono stati

sottoposti a codifica aperta, volta a identificare episodi salienti, pratiche ricorrenti e configurazioni organizzative relative all'impiego dell'AI nei processi di sensing, seizing e reconfiguring, nonché riferimenti a vincoli di path dependency, pratiche di traduzione e dinamiche ecosistemiche. In una seconda fase, le categorie emergenti sono state rielaborate in dialogo con il quadro teorico, mettendo in relazione le evidenze empiriche con i costrutti di circular business model innovation, dynamic capabilities, AI-enabled capabilities e organizzazione inter-organizzativa. La ricerca è in fase avanzata ma non ancora chiusa; pertanto, le evidenze di seguito presentate vanno lette come risultati preliminari, suscettibili di ulteriore consolidamento con il proseguimento della codifica comparativa e la rifinitura del modello interpretative.

Risultati. L'analisi comparativa suggerisce che il contributo dell'intelligenza artificiale ai percorsi di economia circolare assume rilievo quando l'AI opera come infrastruttura cognitiva capace di ridefinire ciò che l'organizzazione può osservare, interpretare e coordinare. In questa prospettiva, le evidenze finora raccolte convergono su tre linee interpretative: il rafforzamento delle dynamic capabilities, l'interazione ambivalente tra AI e path dependency e la riconfigurazione del posizionamento dell'impresa nell'ecosistema.

AI-enabled dynamic capabilities e riconfigurazione dei processi di circolarità

Una prima evidenza preliminare riguarda il modo in cui l'intelligenza artificiale contribuisce allo sviluppo di capacità dinamiche orientate alla circolarità, consentendo alle organizzazioni di individuare opportunità emergenti, selezionare nuove traiettorie di valore e riconfigurare nel tempo risorse, strutture e relazioni (Teece, 2007; Santa-Maria et al., 2022). Nei casi analizzati, l'AI interviene su questi processi non solo aumentando la disponibilità di dati, ma ampliando il campo decisionale in relazione a flussi di risorse, condizioni d'uso, inefficienze operative e possibilità di recupero di valore. Le tecnologie AI-based sostengono quindi la transizione circolare quando vengono incorporate nelle routine e nei criteri decisionali, trasformando il dato in apprendimento organizzativo e il monitoraggio in capacità di azione strategica (Rosa et al., 2020; Sjödin et al., 2023).

Ciò emerge anzitutto sul piano del sensing. Nel caso dell'Azienda A, la combinazione tra sistemi intelligenti, monitoraggio dei processi e attenzione alla rigenerazione dei componenti rafforza la capacità di individuare anomalie, sprechi e valore recuperabile lungo il ciclo di vita degli asset. Nell'Azienda B, l'impiego dell'AI nei processi di classificazione e identificazione informativa dei capi accresce la visibilità sui flussi operativi, rendendo più intelligibili le caratteristiche, le condizioni e le possibili destinazioni dei prodotti lungo il processo. Nel contesto dell'Azienda C, invece, il sensing si estende oltre i confini organizzativi, poiché la piattaforma sviluppata dall'impresa rende leggibili dati relativi a materiali, processi produttivi e pratiche di sostenibilità dei fornitori, offrendo ai marchi una rappresentazione più strutturata degli impatti ambientali e sociali della supply chain. Nel complesso, l'evidenza comparata suggerisce che l'AI rafforza il sensing "circolare" rendendo osservabili dimensioni di performance prima frammentate o scarsamente comparabili, in linea con gli studi che attribuiscono alle tecnologie digitali un ruolo centrale nella tracciabilità estesa e nella lettura predittiva dei flussi di risorse (Rosa et al., 2020).

Una dinamica analoga si osserva sul piano del seizing e del reconfiguring. La letteratura sui modelli di business circolari ha mostrato che la capacità di cogliere opportunità richiede la creazione di nuove value proposition, nuovi criteri di allocazione delle risorse e nuove modalità di relazione con clienti e partner (Pieroni et al., 2019; Reim et al., 2021). Nei casi osservati, l'AI appare rilevante proprio perché contribuisce a trasformare evidenze digitali in scelte operative e strategiche orientate alla circolarità. Nell'Azienda A, gli output generati dai sistemi intelligenti orientano investimenti e interventi verso la riduzione degli scarti e una migliore valorizzazione delle pratiche di recupero. Nell'Azienda B, l'integrazione tra strumenti AI-based e database globale dei clienti rafforza una proposta di valore fondata su servizio, standardizzazione e uso più efficiente delle risorse. L'Azienda C mostra come la disponibilità di dati strutturati sulla filiera e sull'impatto dei prodotti alimenti decisioni legate alla conformità normativa, alla selezione dei fornitori e alla comunicazione della sostenibilità. Da questa lettura emerge che l'AI-enabled seizing non si riduce all'elaborazione di informazioni e che il reconfiguring non riguarda soltanto l'efficienza dei processi esistenti, ma anche la formazione di capabilities in cui digitale, operations, sostenibilità e coordinamento vengono progressivamente ricomposti in nuove routine decisionali e organizzative (Warner and Wäger, 2019; Sjödin et al., 2023).

Tra sblocco della path dependency e nuove dipendenze digitali

Un secondo risultato preliminare riguarda la relazione tra utilizzo dell'intelligenza artificiale e meccanismi di path dependency. I percorsi di trasformazione circolare si confrontano con inerzie profonde, radicate non solo negli asset materiali e nelle routine operative, ma anche nei criteri di valutazione, negli schemi cognitivi e nelle logiche istituzionali che sostengono il paradigma lineare (Sydow et al., 2009; Vergne and Durand, 2011; Santa-Maria et al., 2022). I casi mostrano che l'AI può contribuire a mettere in discussione traiettorie sedimentate, ma soltanto quando gli output algoritmici vengono tradotti in nuovi criteri di giudizio, nuove metriche di performance e nuove pratiche di coordinamento. Il suo contributo si colloca quindi in una tensione evolutiva in cui la tecnologia può agire come meccanismo di discontinuità rispetto all'esistente, ma anche generare nuove forme di dipendenza da infrastrutture di dati, standard tecnici e modelli di classificazione (Cao et al., 2021; Ritala et al., 2024).

Nel caso dell'Azienda A risulta particolarmente evidente la capacità dell'AI di allentare vincoli cognitivi e materiali legati a una visione lineare del valore. La disponibilità di dati storici, indicatori predittivi e simulazioni tecniche rende più

plausibili scenari in cui manutenzione avanzata, rigenerazione dei componenti ed estensione della vita utile cessano di apparire eccezioni marginali e diventano alternative organizzative e finanziarie legittime. Il punto rilevante non sta soltanto nella maggiore capacità di previsione, ma nel fatto che l'AI rende confrontabili opzioni diverse, riducendo la percezione di rischio associata a configurazioni circolari e mettendo in discussione l'assunto, sedimentato nelle routine industriali, secondo cui il valore risieda primariamente nella produzione e vendita del nuovo. In questo senso, l'AI svolge una funzione di unlocking cognitivo coerente con gli studi che interpretano le dynamic capabilities come meccanismi di disancoraggio rispetto a traiettorie storiche e lock-in organizzativi (Teece, 2007; Santa-Maria et al., 2022).

Una configurazione complementare si osserva nell'Azienda C, dove la possibilità di sostenere assetti circolari dipende dalla raccolta, dalla comparabilità e dalla standardizzazione di dati distribuiti lungo la filiera. In questo caso l'AI amplia la capacità di leggere gli impatti ambientali e sociali dei prodotti e di rendere più trasparenti i processi produttivi, ma la robustezza della soluzione resta fortemente condizionata dalla qualità dei dati, dalla disponibilità dei partner a condividere informazioni e dall'esistenza di standard sufficientemente stabili da consentire interoperabilità e interpretazione comune. Il caso mette così in luce come il superamento di inerzie lineari possa accompagnarsi alla formazione di nuove dipendenze digitali, nelle quali la possibilità stessa di agire circolarmente viene ancorata a infrastrutture informative, protocolli di classificazione e architetture di piattaforma (Cao et al., 2021; Ritala et al., 2024).

Ancora diverso è il contributo dell'Azienda B, che illumina il medesimo meccanismo dal punto di vista della gestione di routine operative distribuite. In una rete internazionale in franchising, l'impiego dell'AI nella classificazione dei capi, nel coordinamento del servizio e nell'integrazione di un database clienti condiviso rafforza la standardizzazione e la replicabilità dei processi, ma al contempo rende centrale il lavoro di adattamento, interpretazione e mediazione tra il livello centrale e i contesti locali di esecuzione. L'AI non elimina quindi il giudizio umano; piuttosto, lo rende più esigente, perché gli output algoritmici devono essere tradotti in criteri operativi praticabili e in decisioni legittime per attori diversi. Il caso mostra così che la trasformazione non si produce quando la tecnologia viene semplicemente aggiunta a routine esistenti, ma quando emergono competenze di traduzione capaci di integrare standardizzazione digitale e variabilità "situata" del servizio, in linea con gli studi che sottolineano il ruolo persistente dell'intervento umano nell'interpretazione degli output AI-based (Cao et al., 2021; Leonardi, 2013).

Letti attraverso una lente comune, i tre casi mostrano che l'AI interagisce con la path dependency in modo ambivalente e relazionale. Essa contribuisce a disancorare l'organizzazione da metriche, assunzioni e pratiche ereditate, mettendo in luce scenari alternativi di valore e, successivamente, rendendoli intelligibili e legittimi attraverso la costruzione di cornici interpretative condivise. Al tempo stesso, il suo impiego può irrigidire le traiettorie di cambiamento se la base cognitiva dell'azione viene progressivamente assorbita da standard, dati e modelli non sufficientemente compresi e negoziati tra i diversi attori. Il suo uso trasformativo dipende quindi dalla capacità dell'organizzazione di integrare l'apprendimento algoritmico con quello umano e di sviluppare competenze di coordinamento e traduzione capaci di impedire che lo sblocco delle inerzie lineari si traduca in nuove rigidità digitali (Warner and Wäger, 2019; Ritala et al., 2024).

Riconfigurazione strategica e riposizionamento dell'impresa nell'ecosistema

Un ulteriore risultato riguarda la dimensione ecosistemica della trasformazione circolare. I percorsi di economia circolare non si realizzano entro i confini della singola organizzazione, ma si sviluppano in reti di attori interdipendenti nelle quali la creazione del valore dipende dall'allineamento tra flussi fisici, dati, standard, responsabilità e tempi decisionali (Adner, 2017; Jacobides et al., 2018). In tale prospettiva, i casi analizzati mostrano che l'AI diventa realmente trasformativa non solo quando rafforza capacità dinamiche interne, ma quando contribuisce a costruire una base cognitiva condivisa tra attori diversi, rendendo possibili nuove forme di coordinamento, traduzione tra linguaggi eterogenei e, in alcuni casi, riposizionamento dell'impresa nell'ecosistema (Sjödin et al., 2024).

È soprattutto il caso dell'Azienda C a rendere particolarmente visibile questa dinamica. In tale contesto, l'AI alimenta una piattaforma che raccoglie, ordina e rende interpretabili i dati provenienti da attori diversi della filiera, consentendo ai brand di ottenere una rappresentazione più strutturata di materiali, processi produttivi e impatti ambientali e sociali. Il punto analiticamente più rilevante non è soltanto la maggiore trasparenza della supply chain, ma il fatto che tale trasparenza richieda un lavoro continuo di standardizzazione, allineamento e mediazione tra soggetti che operano con logiche e sistemi informativi differenti. In questo senso, l'impresa svolge una funzione di intermediazione cognitiva e relazionale, traducendo dati eterogenei in metriche condivisibili e rendendo possibile una forma di governance informativa della filiera.

Per quanto riguarda l'Azienda A, l'integrazione di dati storici e predittivi lungo il ciclo di vita degli asset rafforza la capacità dell'impresa di coordinare relazioni che non si limitano all'attività di vendita, ma coinvolgono anche il cliente, la rete di assistenza, la manutenzione avanzata, la rigenerazione e la gestione del rischio operativo. Grazie all'accumulo di conoscenza tecnica e all'elaborazione algoritmica delle prestazioni, la relazione con gli attori della filiera tende a evolvere da scambio puntuale a collaborazione a più alto contenuto cognitivo. L'accesso a una base informativa più ampia e strutturata rafforza inoltre la capacità dell'impresa di incidere sulla definizione di pratiche, standard tecnici e metriche di qualità rilevanti per l'ecosistema del recupero e della gestione circolare degli asset, segnalando una possibile salita di ruolo ecosistemica.

L'Azienda B consente invece di osservare il medesimo fenomeno in una configurazione più vicina a quella di una rete di servizio distribuita. In questo contesto, l'integrazione tra sistemi di classificazione, coordinamento operativo e database globale dei clienti non produce solo maggiore efficienza, ma consolida un'infrastruttura relazionale che collega punti vendita, centro organizzativo e cliente finale attorno a criteri condivisi di trattamento, monitoraggio e continuità del

servizio. Anche in ecosistemi più frammentati, dunque, il valore dell'AI dipende dalla possibilità di sincronizzare attori diversi attraverso dati comuni, routine standardizzate e meccanismi di coordinamento che, pur mantenendo centrale il giudizio umano, riducono la dispersione informativa e rafforzano la coerenza complessiva del sistema.

Da questa lettura emerge che l'AI contribuisce a ridefinire il posizionamento dell'impresa nell'ecosistema quando rende possibile un salto di qualità nelle capacità di traduzione e orchestrazione. La prima riguarda la trasformazione di dati, indicatori e output algoritmici in linguaggi comprensibili e legittimi per attori differenti, mentre la seconda concerne la capacità di allineare flussi informativi, standard, responsabilità e aspettative lungo configurazioni organizzative estese, facendo dell'impresa un nodo attivo di coordinamento. In questa prospettiva, l'AI contribuisce a ridisegnare l'interfaccia tra impresa ed ecosistema, sostenendo nuove forme di governance e di co-produzione del valore circolare (Adner, 2017; Jacobides et al., 2018; Sjödin et al., 2024).

La sintesi comparativa dei casi permette di formulare una proposizione teorica emergente secondo cui l'efficacia trasformativa dell'intelligenza artificiale nei percorsi di economia circolare risiede nella capacità dell'organizzazione di governare la tensione dialettica tra il superamento delle inerzie lineari e l'insorgere di nuove dipendenze digitali. Le evidenze empiriche mostrano come tale dinamica assuma declinazioni peculiari in base al contesto operativo. Negli assetti industriali caratterizzati da una forte base tecnica la priorità risiede nello sblocco dei lock-in cognitivi legati alla rigenerazione dei materiali, mentre nelle architetture di piattaforma e nelle reti distribuite emerge la criticità della governance dell'interoperabilità dei dati. In ultima analisi, affinché la transizione abilitata dall'AI si traduca in un effettivo riposizionamento strategico, gli output algoritmici devono essere integrati in metriche e pratiche condivise mediante espliciti meccanismi di traduzione socio-tecnica tra i diversi attori dell'ecosistema.

Limiti della ricerca. Il lavoro presenta alcuni limiti coerenti con la sua natura di "work in progress". Le evidenze discusse hanno carattere preliminare e saranno ulteriormente consolidate mediante il completamento il confronto sistematico tra i casi e una formalizzazione più esplicita delle proposizioni emergenti. Inoltre, il numero limitato di casi e la loro selezione teorica non consentono finalità di generalizzazione statistica, né consentono ancora di distinguere con precisione il peso relativo delle variabili settoriali, asset-based e relazionali. Il contributo mira piuttosto a offrire un avanzamento interpretativo iniziale, utile a chiarire i meccanismi e le condizioni attraverso cui l'AI può sostenere capacità dinamiche e l'innovazione dei modelli di business circolari. Nella fase successiva della ricerca, tali aspetti saranno approfonditi anche per affinare le proposizioni teoriche e chiarire meglio le condizioni di trasferibilità dei risultati. Ciò consentirà anche di precisare con maggior rigore quali configurazioni di AI risultino più efficaci nei diversi contesti organizzativi ed ecosistemici osservati.

Implicazioni manageriali. Le evidenze preliminari suggeriscono anzitutto che le imprese dovrebbero evitare di considerare l'intelligenza artificiale come un insieme di applicazioni puntuali orientate unicamente all'efficienza operativa, ma concepirla come un'infrastruttura cognitiva capace di rendere visibili le interdipendenze, anticipare le criticità e sostenere la riconfigurazione di processi e modelli di business in chiave circolare. Una seconda implicazione riguarda le competenze organizzative necessarie per rendere l'AI effettivamente trasformativa. I risultati mostrano che il valore della tecnologia dipende in misura rilevante dalla presenza di figure e team capaci di tradurre output algoritmici, indicatori predittivi e informazioni distribuite in criteri di decisione legittimi e operativamente praticabili. Ne consegue che i percorsi di adozione dell'AI per la circolarità richiedono investimenti non solo in infrastrutture digitali, ma anche nello sviluppo di competenze ibride, interfunzionali e di coordinamento, in grado di connettere linguaggi tecnici, obiettivi economici, esigenze operative e metriche di sostenibilità. Al fine di evitare che l'adozione dell'intelligenza artificiale introduca nuove rigidità organizzative, il management è chiamato a "operativizzare" le capacità di traduzione mediante il presidio di team ibridi e interfunzionali capaci di connettere le competenze informatiche con quelle operative e di sostenibilità. Tali gruppi di lavoro hanno il compito di validare le metriche algoritmiche e di agire come boundary spanner dedicati alla mediazione tra le indicazioni generate dai sistemi intelligenti e le routine umane.

Parallelamente, la dimensione ecosistemica della governance richiede l'implementazione di pratiche collaborative rigorose quali la sottoscrizione di accordi formali per la condivisione dei dati e la definizione di protocolli congiunti per garantire l'interoperabilità dei sistemi informativi. Attraverso la strutturazione di questi meccanismi di orchestrazione, il management potrà superare la mera implementazione tecnologica per costruire le fondamenta relazionali necessarie al governo di un ecosistema circolare resiliente.

Originalità del paper. Il contributo del lavoro consiste nell'offrire una lettura dell'intelligenza artificiale come fattore abilitante della transizione circolare che non si esaurisce nella sua funzione tecnica o efficientista, ma riguarda le condizioni organizzative e relazionali attraverso le quali essa può sostenere processi di trasformazione più profondi. In questa prospettiva, il contributo mette in relazione la letteratura su circular business models, dynamic capabilities e path dependency, mostrando che il legame tra AI e circolarità è mediato da specifici meccanismi di apprendimento, interpretazione e riconfigurazione.

Un secondo elemento di originalità riguarda la messa a fuoco del carattere non lineare di tale relazione. Le evidenze preliminari suggeriscono infatti che l'AI può contribuire a mettere in discussione inerzie, metriche e assunti propri del paradigma lineare, ma al tempo stesso può generare nuove dipendenze da standard, architetture informative e criteri di classificazione. Il lavoro contribuisce quindi a chiarire che il potenziale trasformativo dell'AI dipende dalla capacità

dell'organizzazione di governare in modo riflessivo il rapporto tra apprendimento algoritmico, giudizio umano e ridefinizione delle logiche di valore.

Infine, il paper amplia la comprensione della transizione circolare, evidenziando che il rilievo strategico dell'AI cresce quando essa sostiene forme di coordinamento e di orchestrazione tra attori interdipendenti, incidendo sul posizionamento dell'impresa nell'ecosistema. In quanto "work-in-progress", il contributo propone una prima concettualizzazione empiricamente informata di tali dinamiche, che la prosecuzione dell'analisi consentirà di precisare ulteriormente.

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Managing Generative Artificial Intelligence in Higher Education: Inclusion, Social Sustainability and Governance Challenges

STEFANIA D'APRILE[1], GIOVANNI SPATOLA[2], MARIA ZIFARO[3]

Abstract. *This study contributes to the emerging debate on the management of digital transformation in higher education by examining the organizational, strategic, and governance implications of Generative Artificial Intelligence (GenAI). Although scholarly production on AI in higher education has grown exponentially in recent years, the literature remains fragmented across pedagogical, technological, behavioral, and ethical perspectives, providing limited systemic understanding of how AI adoption reshapes universities as complex organizations.*

Drawing on a theory-building approach supported by systematic literature review, document analysis, and bibliometric mapping, this study conceptualizes GenAI adoption as a multi-level socio-organizational transformation affecting teaching processes, organizational structures, and institutional governance simultaneously. Bibliometric findings reveal a strong dominance of technology acceptance models and pedagogical applications, while strategic governance and social sustainability remain theoretically peripheral.

In response, the paper proposes an integrated analytical framework that interprets GenAI adoption as a coordinated capability-building trajectory oriented toward responsible governance, institutional legitimacy, and long-term inclusive value creation in higher education institutions.

Keywords: *Generative Artificial Intelligence; Higher Education Management; AI Governance; Social Sustainability; Digital Transformation; Dynamic Capabilities.*

Introduction. Digital transformation has become one of the most pervasive drivers of organizational change in contemporary societies. The integration of advanced digital technologies into operational and strategic processes has redefined value creation logics, decision-making architectures, and stakeholder relationships across sectors. Among these technologies, Artificial Intelligence (AI) occupies a particularly transformative role, as it extends beyond automation of routine tasks and increasingly supports cognitive, analytical, and strategic activities.

Management literature progressively recognizes that AI should not be interpreted merely as infrastructural investment but as a catalyst for deep organizational reconfiguration. The introduction of intelligent systems alters skill distributions, reshapes human–machine interaction, and requires governance arrangements capable of addressing algorithmic risk, accountability, and ethical oversight. AI therefore constitutes a systemic phenomenon that affects micro-level routines and macro-level institutional structures simultaneously.

Within higher education, these dynamics are especially significant. Universities are hybrid organizations characterized by the coexistence of academic, administrative, institutional, and regulatory logics. The emergence of Generative Artificial Intelligence—capable of producing text, code, images, and analytical outputs—introduces unprecedented opportunities for personalization, research support, and administrative automation. Simultaneously, it raises concerns regarding academic integrity, epistemic authority, intellectual property, data governance, and institutional legitimacy.

Despite the rapid expansion of research addressing AI in higher education, the field remains conceptually segmented. Pedagogical studies emphasize instructional innovation and learning enhancement. Behavioral research concentrates on user acceptance and perceived usefulness. Ethical scholarship investigates fairness, bias, and accountability. However, an integrative management perspective capable of connecting these dimensions within a coherent organizational framework remains underdeveloped.

This study addresses that gap by conceptualizing GenAI adoption as a multi-level institutional transformation process. By combining systematic review, bibliometric mapping, and document analysis, the paper identifies structural asymmetries in existing scholarship and advances a governance-oriented capability framework grounded in dynamic capabilities theory and social sustainability principles.

Theoretical Background

Digital Transformation and Organizational Capabilities

Digital transformation entails structural and strategic reconfiguration rather than incremental process optimization. Technologies reshape value propositions, resource configurations, and organizational boundaries. In this view, digital tools function as enablers of redesign rather than isolated technical upgrades.

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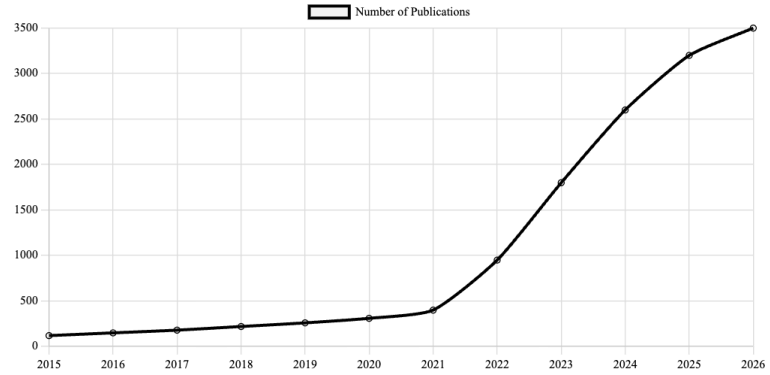
The dynamic capabilities framework provides a suitable interpretative lens. Dynamic capabilities refer to an organization's capacity to sense opportunities, seize them through investment and coordination, and reconfigure internal competences in response to environmental turbulence. AI intensifies such turbulence by accelerating innovation cycles and introducing regulatory complexity.
Generative AI amplifies these dynamics by interacting directly with knowledge production and cognitive processes. It redistributes expertise, challenges traditional authority structures, and redefines the boundaries between human and machine agency. Consequently, organizations must develop sensing, seizing, and reconfiguring capabilities tailored to AI-driven transformation.
While extensively applied in corporate contexts, dynamic capability perspectives remain comparatively underutilized in public and hybrid institutions such as universities.

Artificial Intelligence in Higher Education
Research on AI in higher education evolved across multiple waves: intelligent tutoring systems, learning analytics, predictive modeling, and most recently generative systems. The public diffusion of large language models after 2022 significantly accelerated experimentation in teaching, research, and administration.
However, much of this literature conceptualizes AI primarily as an instructional tool. Analytical attention concentrates on perceived usefulness, ease of use, and behavioral intention constructs derived from the Technology Acceptance Model (TAM) and its extensions. While valuable, these approaches do not capture organizational restructuring or strategic governance adaptation.
The diffusion of GenAI tools frequently preceded institutional policy development, generating asymmetries between technological experimentation and governance maturity. This tension underscores the need for a systemic management lens.

AI Governance and Ethical Frameworks
Parallel to educational research, a substantial body of literature addresses AI governance, emphasizing principles such as transparency, accountability, fairness, and human oversight. Regulatory developments—particularly within the European context—have introduced risk-based frameworks that require impact assessments, documentation practices, and compliance mechanisms for high-risk AI systems.
In universities, these regulatory pressures intersect with institutional missions centered on public value, knowledge creation, and social responsibility. Governance mechanisms must therefore balance innovation incentives with ethical safeguards and compliance requirements.
Importantly, governance should not be reduced to legal conformity. It represents a strategic capability that enables organizations to align technological adoption with long-term legitimacy and stakeholder trust. Within higher education, governance arrangements must integrate academic autonomy, public accountability, and digital innovation in a coherent manner.

Bibliometric Analysis and Identification of the Research Gap
To empirically map the intellectual structure of the field, a bibliometric analysis was conducted on two datasets covering the period 2015–2026. The first dataset included 9,476 documents related to Artificial Intelligence and higher education. Publication trends indicate exponential growth after 2022, corresponding to the widespread diffusion of generative models.
Thematic mapping reveals that the dominant cluster revolves around technology acceptance frameworks, particularly the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Foundational contributions by Davis and Venkatesh constitute the most central references within citation networks. This suggests that much of the literature conceptualizes AI adoption primarily through perceived usefulness, perceived ease of use, and behavioral intention constructs.
A secondary cluster comprised centers on ChatGPT and generative AI applications in teaching and assessment. While highly visible and rapidly expanding, this cluster appears conceptually underdeveloped, with limited integration of organizational or strategic theory.
Notably, governance and strategic management themes do not emerge as motor themes within the bibliometric maps. Even in a second dataset comprising 3,763 documents explicitly focused on governance and management, acceptance models remain highly central, whereas institutional and capability-based perspectives appear peripheral.
These findings highlight a structural gap. The field is characterized by micro-level behavioral explanations and pedagogical experimentation, but lacks a meso- and macro-level organizational framework capable of integrating governance, strategic alignment, and social sustainability.

Figure 1 - Publication Trends on Artificial Intelligence in Higher Education (2015–2026)



Methodology. This study adopts a qualitative theory-building approach integrating three complementary methods: systematic literature review, document analysis, and bibliometric mapping.
The systematic review was conducted using major academic databases and followed a multi-stage screening process. Inclusion criteria focused on peer-reviewed articles addressing AI, generative AI, governance, and higher education management.
Document analysis included European regulatory frameworks, international guidelines, and policy reports concerning AI in education. These sources were examined to contextualize governance requirements and institutional constraints.
Bibliometric analysis was employed to identify dominant theoretical streams, citation structures, and thematic evolution. By mapping co-citation networks and thematic clusters, the analysis provided empirical grounding for identifying underexplored areas within the field.
The integration of these methods strengthens the internal coherence between gap identification and conceptual framework development.

Results: GenAI Adoption as a Multi-Level Socio-Organizational Transformation
The integration of theoretical insights, bibliometric evidence, and policy analysis allows the conceptualization of Generative Artificial Intelligence adoption in higher education as a multi-level socio-organizational transformation. Rather than constituting a purely technological upgrade, GenAI introduces structural shifts that unfold simultaneously across pedagogical practices, organizational configurations, and institutional governance arrangements.
These levels are analytically distinct but empirically interdependent. Changes at the instructional level generate pressures for organizational redesign, which in turn require strategic governance adaptation. The transformation is therefore recursive and systemic.

The Pedagogical Level: Personalization, Accessibility, and Inclusion
At the pedagogical level, GenAI enables the automated generation of educational content, adaptive feedback mechanisms, simulation-based learning environments, and multilingual academic support. These functionalities enhance the potential for personalized learning trajectories tailored to students' cognitive profiles, prior knowledge, and learning pace.
Personalization, however, should not be equated with automatic inclusivity. While AI systems can lower barriers for students with diverse linguistic, cognitive, or socio-economic backgrounds, inclusion outcomes depend heavily on institutional implementation choices. Digital infrastructure availability, algorithmic literacy among faculty and students, and equitable access to AI-enabled tools critically shape distributive effects.
Furthermore, generative systems rely on training data that may embed structural biases. Without institutional safeguards, AI-generated feedback and assessment support may reproduce inequalities or reinforce epistemic asymmetries. Thus, the pedagogical potential of GenAI must be framed within governance mechanisms that ensure fairness, transparency, and human oversight.
From a management perspective, pedagogical transformation constitutes the most visible dimension of AI adoption but also the most exposed to reputational and ethical risk. Universities must therefore balance innovation in instructional design with integrity safeguards and robust assessment redesign strategies.

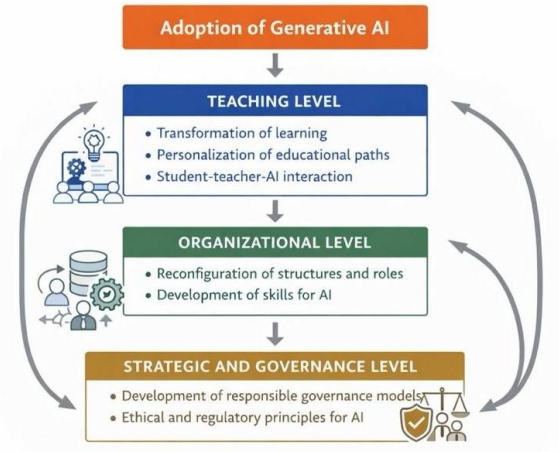
The Organizational Level: Structural Reconfiguration and Capability Development
At the organizational level, GenAI adoption entails the reconfiguration of routines, workflows, and professional roles. Administrative processes such as student services, documentation handling, research support, and internal communication may become partially automated. This shift enables resource reallocation toward higher value-added activities, including strategic planning, curriculum innovation, and research development.
However, automation does not eliminate the need for human intervention. Instead, it redistributes expertise. Universities must develop hybrid competencies combining technical literacy, data governance knowledge, ethical evaluation skills, and pedagogical expertise. This requirement aligns closely with the dynamic capabilities framework, which emphasizes

the ability to sense technological opportunities, seize them through structured investment, and reconfigure internal resources accordingly.
GenAI adoption thus becomes a capability-building process rather than a discrete implementation project. Institutions must establish internal coordination mechanisms, interdisciplinary task forces, and monitoring systems capable of adapting to continuous technological evolution.
Bibliometric findings reinforce this argument. The limited centrality of organizational and strategic theories in the field suggests that universities may be experimenting with AI without sufficiently embedding it within structured capability development pathways. A management-oriented perspective helps reposition AI adoption as a long-term organizational transformation rather than a short-term technological response.

The Strategic and Institutional Level: Governance and Social Sustainability
At the strategic level, GenAI adoption intersects with institutional legitimacy, regulatory compliance, and stakeholder trust. Regulatory frameworks increasingly impose risk-based classifications, documentation requirements, and oversight obligations for AI systems. Universities must therefore implement governance architectures capable of ensuring transparency, accountability, and compliance.
Governance should not be conceptualized as a defensive compliance mechanism. Rather, it functions as a strategic capability enabling institutions to align technological innovation with public mission and long-term sustainability. In higher education, social sustainability encompasses equitable access to learning opportunities, preservation of academic integrity, and maintenance of epistemic credibility.
The absence of clear governance mechanisms may undermine institutional trust, especially in contexts where AI-generated content challenges traditional notions of authorship and originality. Conversely, well-designed governance frameworks can strengthen universities' reputational capital by demonstrating responsible innovation.
Strategic alignment requires integrating AI adoption into institutional mission statements, digital transformation strategies, and performance evaluation systems. Governance structures must connect pedagogical experimentation with ethical oversight and organizational risk management, ensuring coherence across levels.

A Multi-Level Framework for GenAI Adoption in Higher Education
Building upon the preceding analysis, this study proposes a multi-level conceptual framework structured around three interconnected dimensions: pedagogical transformation, organizational capability development, and strategic governance orientation.
The pedagogical dimension represents the operational interface where GenAI directly interacts with teaching and learning processes. It encompasses personalization strategies, assessment redesign, and student engagement practices.
The organizational dimension functions as the mediating layer in which routines, competencies, and coordination mechanisms are reconfigured. This layer translates technological potential into institutional capability.
The strategic and governance dimension provides normative orientation and long-term direction. It integrates regulatory compliance, ethical oversight, risk management, and social sustainability objectives.
The framework assumes dynamic feedback loops among these levels. Pedagogical experimentation generates new organizational requirements; organizational restructuring necessitates governance adaptation; governance orientation influences the scope and direction of pedagogical innovation.
In this model, successful GenAI adoption depends on balanced development across all three dimensions. Overemphasis on technological deployment without governance integration may produce ethical and reputational risks. Conversely, excessive regulatory caution without capability development may inhibit innovation and reduce competitiveness.
The framework therefore conceptualizes GenAI adoption as a coordinated process of capability orchestration rather than isolated technological implementation.

Figure 2 - Multilevel framework of Generative AI adoption: didactic, organizational and governance dimensions



Theoretical Implications. This study contributes to the literature in several ways.
First, it shifts the dominant analytical focus from individual-level technology acceptance to institutional-level capability development. While behavioral intention models remain valuable for understanding adoption dynamics, they do not capture structural transformation processes within complex organizations.
Second, it extends the dynamic capabilities framework to the context of higher education, highlighting how public and hybrid institutions must integrate sensing, seizing, and reconfiguring mechanisms in response to AI-driven change.
Third, it introduces social sustainability as a central evaluative criterion for AI governance in universities. Rather than measuring success solely in terms of efficiency or adoption rates, the framework emphasizes equitable access, fairness, and long-term legitimacy.
Finally, by integrating bibliometric evidence with conceptual development, the study bridges descriptive mapping of the field with normative theory building, offering a structured pathway for future empirical research.

Managerial Implications. For university leaders and policy-makers, the findings suggest that GenAI adoption requires coordinated strategic planning rather than fragmented experimentation.
Institutions should establish interdisciplinary governance bodies integrating academic staff, IT professionals, legal experts, and student representatives. Such structures can facilitate balanced decision-making and reduce siloed implementation.
Investment in AI literacy programs for faculty and administrators is essential to prevent superficial or uncritical use of generative tools. Capability development should include training on bias detection, data protection, and algorithmic transparency.
Universities should also implement periodic AI impact assessments that evaluate not only technical performance but also social and ethical consequences. Integrating social sustainability indicators into institutional performance dashboards can strengthen alignment between innovation and public mission.
Ultimately, GenAI should be embedded within long-term institutional strategies rather than treated as a temporary technological trend.

Limitations and Future Research. This study adopts a conceptual and theory-building approach and does not empirically test the proposed framework. Although bibliometric mapping and document analysis provide structural insight, empirical validation through case studies, surveys, or longitudinal analysis would strengthen explanatory robustness.
Future research could explore comparative cross-national analyses to examine how regulatory environments shape governance models. Quantitative studies may test relationships between governance maturity, capability development, and educational outcomes. Longitudinal research could assess how institutional strategies evolve as AI technologies mature.
Additionally, interdisciplinary inquiry integrating management, education, and information systems perspectives would further enrich theoretical development.

Conclusions. The diffusion of Generative Artificial Intelligence in higher education represents a structural transformation that transcends technological enhancement. It reshapes pedagogical practices, reconfigures organizational routines, and challenges institutional governance architectures.
Bibliometric evidence demonstrates that existing scholarship remains heavily oriented toward technology acceptance and pedagogical experimentation, with limited integration of organizational and strategic perspectives. This study addresses that gap by proposing a multi-level framework grounded in dynamic capabilities and social sustainability principles.
GenAI adoption should be understood as a coordinated capability-building process that integrates pedagogical innovation, organizational redesign, and responsible governance. Universities capable of orchestrating these dimensions coherently will be better positioned to transform AI from a disruptive force into a strategic driver of inclusive and sustainable value creation.

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Needful or Painful?
The perception of the adoption of AI from Top Management Team.

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Abstract. *The adoption of Artificial Intelligence (AI) in small to medium enterprises (SMEs) and large companies is flourishing. There is strong momentum around the adoption of AI and everyone is studying different nuances of it. In this particular case, the research explores the perception of AI from the Top Management Team (TMT). The research will rely on a sample of more than 100 observations of Italian SMEs collected through a survey directed to the top management of the firms. Moreover, the authors will analyze the data through an exploratory quantitative approach. As expected, the research aims to contribute to the management literature by offering a perception of the adoption of AI from TMT and how this can create new organizational dynamics that influence AI adoption and digital transformation. It also introduces the concept of a needful-painful paradox in AI adoption. This paradox reflects the simultaneous perception of AI as both a strategic necessity and an organizational challenge. It also raises reflections on opportunities and challenges in AI adoption, requiring that TMT develop technological understanding, foster innovation-oriented mindsets, and guide organizational transformation processes that support AI implementation.*
Keywords: *Artificial Intelligence adoption; top management teams; business model innovation; digital transformation; managerial perception; small and medium enterprises*

Framing of the research. Leveraging a large amount of data used to be accessible only to tech giants like Google, Amazon, Microsoft, IBM and Oracle through specialized platforms such as Snowflake, Databricks, and Cloudera; while nowadays the management of these data seems to be facilitated for small to medium companies too thanks to the adoption of AI.

Artificial intelligence (AI) is one of the most disruptive technologies of our modern day. It has shaped modern business models, allowing companies to process large volumes of data so as to offer new strategic pathways and support decision-making processes. Companies are faced with the ability to adopt this technology in all business units due to positive and negative perceptions of such adoption that generate pain or joy. However, since companies depend on AI adoption to be more competitive, Top Management Teams (TMTs) have to bring this technology into their daily decision-making processes and fully embrace it in their business models. As Kaplan and Haenlein (2019) claim, AI is a useful tool to interpret data, inducing a sense of adaptation in organizations to achieve their business goals. AI enables business model innovation, transforming how value is created, delivered and transformed (Sjodin et al., 2023). In turn, AI adoption often requires significant changes to existing organizational processes, structures, and capabilities. Yet, not all companies are fully equipped with the right capabilities to use AI and learn from its patterns, while simultaneously addressing concerns related to ethics, governance, and organizational resistance. In this scenario, the role of TMT is salient. TMTs are responsible for defining strategic priorities, allocating resources, and guiding organizational change initiatives. Their perceptions and interpretations of emerging technologies strongly influence how organizations approach innovation and digital transformation. In the context of AI adoption, the attitudes and perceptions of TMTs can determine whether organizations embrace AI as a strategic opportunity or approach it with caution due to perceived risks and challenges. Despite the relevance of AI adoption for TMTs, the management literature seems more focused on how AI is perceived by employees (Biswas et al., 2024; Zhou et al., 2025), how AI requires new capabilities and skills (Ng et al., 2023; Bukartaite & Hooper, 2023), and how AI makes a company more competitive even though not sustainable (Wingate et al., 2025). The salient role of leadership in digital transformation has been claimed (Cortellazzo et al., 2019), even though relatively little attention has been paid to how top managers themselves perceive AI adoption and how these perceptions influence strategic decisions. Considering that AI can be perceived as an opportunity or a challenge, bringing on the one hand novelty and innovation and on the other hand fear, reluctance, and ethical and sustainability concerns (Jorzik et al., 2024; Del Giudice et al., 2023), it is fundamental to understand these perceptions in order to explain how organizations approach AI adoption. Covering this gap is critical because managerial positions lead digital transformational changes that drive the success or failure of organizational innovation initiatives.

Purpose of the paper. The present research addresses this gap by exploring the perceptions of TMTs toward the adoption of AI technologies in the household appliances and consumer electronics sector in Italy. The research question is structured as follows: is the adoption of AI perceived by TMTs as needful or painful? It is a guiding question to explore whether AI adoption is perceived as a strategic necessity or as a challenging organizational burden.

This research will rely on a sample of more than 100 observations (expected number) of Italian SMEs collected through a survey directed to the top management of the firms. Moreover, considering the fact that AI can be considered a novel phenomenon and, therefore, can be investigated through an exploratory approach (von Krogh, 2018), the authors will analyze the data through an exploratory quantitative approach (Bamberger and Ang, 2016).

The research aims to contribute to the management literature by offering a perception of the adoption of AI from TMTs and how this can create new organizational dynamics that influence AI adoption and digital transformation. It also

introduces the concept of a needful-painful paradox in AI adoption. This paradox reflects the simultaneous perception of AI as both a strategic necessity and an organizational challenge. Conceptualizing AI adoption in this way provides a more nuanced understanding of the tensions experienced by top managers during digital transformation. It also raises reflections on opportunities and challenges in AI adoption, requiring that TMTs develop technological understanding, foster innovation-oriented mindsets, and guide organizational transformation processes that support AI implementation.

In terms of theoretical background, the widespread of the digital transformation has induced a revolution in business model innovation through the AI capacity to manage large data (Holmström, 2022). AI is leading innovation generation behind products, business models, and services among others (Brem et al., 2021; Burger et al., 2023). Companies operate using advanced forms of algorithmic decision-making and automation. Studies on AI-enabled innovation claim the role of AI in transforming business models and enabling new forms of value creation. The business model innovation (Foss & Saebi, 2017; Acciarini et al., 2023) as a relevant tool to innovate that describe all main activities of a business such as product innovation, customer connections, value propositions and so on has been changing overtime with the advent of AI technologies (Mass & Tucci, 2013). Such change derives from some challenges and operational efficiency that AI has brought up. AI is defined as "a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation" (Kaplan and Haenlein, 2019, p. 17). As Sjodin et al. (2023) affirm AI technologies can enhance operational efficiency, support predictive maintenance, optimize supply chains, and improve customer experiences through personalized services. Alongside, AI is a predictive technology that offer data-driven services to generate value for customers (Kohtamäki et al., 2022). Organizations create and capture value differently than before, developing new capabilities as data management, algorithm development, and digital governance. It requests interdisciplinary teams to integrate technical expertise in the business daily life and obtain strategic goals. Research suggests that TMTs need several competencies (not necessarily technical competences) in order to effectively guide AI adoption. Yet, TMTs need to understand how AI works and what are the benefits that might come from in order to make strategic decisions (Jorzik et al., 2024). TMT also need AI oriented mindset that involves openness to experimentation, willingness to explore innovative solutions, and the ability to adapt to technological change. AI adoption often involves trial-and-error processes and iterative learning, which require organizational cultures that support experimentation and tolerate failure (Jorzik et al., 2024). As naturally expected, leadership capabilities are relevant to guide the adoption of AI that also ask for good communication skills and empathetic understanding. TMTs need to address employees concerns and reluctance related to automation and technological change while ensuring that AI adoption enhances rather than replaces human capabilities. This would allow TMT to strategize the adoption of AI and increase the level of acceptance and adoption. This should proportionate to investment cost (in terms of time and costs) in the adoption of AI and also balancing innovation opportunities with risks and uncertainty. Indeed, TMTs have to deal with several challenges such as the degree of uncertainty related to AI investments that make difficult the process of resource allocation. TMTs have also to face employees' reluctance in the adoption of AI due to the fear of being replaced (Del Giudice et al., 2023). They might therefore address these concerns by fostering transparent communication and promoting a collaborative relationship between humans and AI systems (Jorzik et al., 2024). Then ethical and sustainable play a relevant concern in the adoption of AI. AI technologies raise issues about data privacy algorithmic bias, and accountability along with how its use meets the sustainable development goals by the United Nations. In this sense, companies need to have a transparent privacy procedure and develop governance mechanisms that ensure responsible and ethical use of AI technologies. Concluding, these opportunities and challenges can develop different perceptions of the adoption of AI: some managers may view AI as essential for maintaining competitiveness, while others may emphasize the organizational risks and complexities associated with its implementation. Understanding these perceptions is critical for explaining how organizations approach AI adoption.

Methodology. This study builds on exploratory quantitative research examining the relationship between AI adoption, business model innovation, and top management leadership. A structured questionnaire is developed and is going to be administered to more than 100 firms (expected number) in the household appliances and consumer electronics sector in Italy. Previous studies have applied qualitative methods by implementing an inductive methodology to capture the perspectives and experiences of individuals involved in strategic decision-making processes (Jorzik et al., 2024; Sjödin et al., 2023; Burström et al., 2021).

Our study will rely on the view of top managers with diverse professional backgrounds to obtain a comprehensive understanding of organizational experiences with AI adoption. Developed during October and November 2025 and tested by both researchers (especially those with expertise in innovation management) and practitioners during December 2025 and January 2026, the questionnaire consists of about 35 questions mainly focused on AI and business model innovation. It has been built according to the previous literature, especially in operationalizing the main variables (i.e., business model innovation, from Clauss, 2017; innovation orientation, from Farooq et al., 2021; ethics in AI-related topics, from Giarmoleo et al., 2024). In relation to AI, considering the exploratory aim of the paper, the questions are related to the actual organizational dynamics and the perceptions of top management on this subject. In particular, through the survey addressed to Italian corporate decision-makers of SMEs, we aim to analyze how (Italian) SMEs are integrating AI into their processes, which benefits are emerging, and which challenges appear to be the most relevant. Alongside the organizational dimension, the project also explores the managerial perspective, including perceptions, expectations, ethical orientations, and the competencies considered necessary to address the evolution of AI technologies in a mature and responsible way.

Results. Since we are talking of a "work-in-progress", in this section we describe the expected results. We expect that the adoption of AI will be difficult and not completely understandable even from TMTs. Such adoption is fundamental for making innovations and changing business models. It induces dual framing that raises reflections on both its strategic necessity and its organizational complexity. Although, it is widely recognized that AI technologies can enhance operational efficiency, improve decision-making, and enable new forms of innovation. Therefore, the responses are divided in AI as AI perception as a needful adoption and AI perception as a painful adoption. We don't get a single common perspective even though there is a more sensibility and interest in the use of this technology. It is considered needful because companies increasingly rely on AI to analyze complex datasets, generate predictive insights, and support strategic decision-making. AI technologies enable organizations to optimize resource allocation, improve productivity, and develop innovative products and services. In industrial contexts, AI systems can support predictive maintenance, optimize supply chain operations, and enhance sustainability through more efficient resource usage (Sjodin et al., 2023). While AI adoption is perceived painful due to its technological complexity and investment uncertain and risk. Alongside, the development of specific organizational capabilities required for AI adoption challenge TMT in looking for such competences externally while internally it is hard to get it. TMT needs to align the adoption of AI with companies' value and aims. In this realm, organizational culture plays a relevant role in determining the adoption of AI. Overall, the role of TMT is critical to make a balance between opportunities and challenges, leveraging on their leadership and communication skills.

Research limitations. Despite its potential contributions, this study presents several limitations that should be acknowledged and that open avenues for future research. First, the analysis focuses on a sample of Italian SMEs in a specific sector, which may limit the generalizability of the findings to other geographical and institutional contexts. Differences in digital maturity, technological infrastructure, and regulatory environments may influence managerial perceptions and the adoption dynamics of AI across countries and industries. Second, the study relies on cross-sectional survey data, capturing managerial perceptions at a single point in time. As a consequence, it does not allow the observation of how perceptions evolve throughout the AI adoption process or how the identified paradox may develop during different stages of organizational transformation. Longitudinal research could provide deeper insights into how managerial attitudes and organizational responses change over time. Third, the study is based on perceptual data collected from TMTs, which may introduce potential biases related to subjective evaluation or overestimation of technological capabilities. Future research could complement perceptual measures with objective indicators of AI adoption, organizational performance, or innovation outcomes. Finally, while the quantitative exploratory approach adopted in this study allows the identification of relevant patterns in managerial perceptions, it does not fully capture the complex organizational processes underlying AI implementation. Further qualitative or mixed-method studies could deepen the understanding of how managers interpret and navigate the tensions associated with AI adoption in practice.

Managerial implications. The findings of this study offer several implications for managers dealing with the adoption of AI within organizations. First, the results highlight that top managers simultaneously perceive AI as a strategic necessity and as a challenging organizational change, giving rise to what we conceptualize as the needful-painful paradox. This suggests that TMTs should not approach AI adoption merely as a technological investment, but rather as a broader strategic and organizational transformation. In this regard, managers are required to develop a stronger technological understanding in order to effectively evaluate opportunities, risks, and potential applications of AI. At the same time, organizations should invest in managerial training and in the integration of technological expertise within strategic decision-making processes. The results also emphasize the importance of fostering an organizational culture that supports experimentation, innovation, and data-driven decision making, as cultural resistance and lack of internal competences may slow down the adoption process. In particular, companies (especially SMEs) may need to rely on external collaborations, partnerships, or advisory support to acquire the capabilities required for AI implementation. Finally, the study suggests that AI should be considered not only as a tool for operational efficiency but also as a driver of value creation and innovation. When effectively managed, AI can support new forms of organizational learning and contribute to the development of innovative solutions and new value propositions, thereby reinforcing the role of AI in enabling processes of business model innovation within the broader context of digital transformation.

Originality of the paper. The recent management literature has mainly offered qualitative research due to the novelty of the topic (Jorzik et al., 2024; Sjödin et al., 2023; Burström et al., 2021), although the present research offers a quantitative analysis thanks to the involvement of a large sample. Through this analysis, we bring attention to managerial perceptions (in terms of opportunities and challenges) and how to deal with them. Second, the study introduces the concept of a needful-painful paradox in AI adoption. This paradox reflects the simultaneous perception of AI as both a strategic necessity and an organizational challenge. Conceptualizing AI adoption in this way provides a more nuanced understanding of the tensions experienced by top managers during digital transformation. Third, AI-enabled business model innovation is crucial to shape business models and generate innovation (Burström et al., 2021). This presents the fourth contribution, based on the capabilities needed for AI adoption. As expected, TMTs should develop technological understanding, foster innovation-oriented mindsets, and guide organizational transformation processes that support AI implementation.

In conclusion, AI is a powerful technological innovation with the potential to transform organizations and industries. However, the adoption of AI raises concerns but also brings opportunities. It requires significant organizational change and managerial effort. The study highlights this duality of perception as needful and painful, which reflects both the strategic necessity of AI and its organizational complexity. While AI adoption is well recognized and its critical role in business model innovation increases the level of competition, it also brings challenges related to uncertainty, organizational change, and ethical considerations. TMTs play a crucial role in navigating these challenges and guiding organizations through the transformation process.

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Quando l'AI agentica e generativa sono il mio Team. Innovare il business model attraverso la Human-AI interaction

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Abstract. *Il lavoro rappresenta uno studio esplorativo rispetto al punto di vista dei manager sugli impatti dell'intelligenza artificiale generativa e agentica nei processi di creazione, condivisione, e appropriazione del valore delle imprese. Lo studio si è avvalso di un approccio qualitativo esplorativo mediante la Grounded Theory costruttivista applicata ai dati raccolti tramite interviste in profondità a un panel di nove top manager operanti in imprese che hanno adottato l'AI agentica e generativa. I risultati hanno consentito di elaborare l'Agentic-Generative Value Model Framework. Il modello mostra che l'intelligenza artificiale generativa e quella agentica agiscono su tutti gli aspetti del modello di business, riconfigurando le infrastrutture del valore delle imprese secondo logiche aperte, circolari e scalabili e determinando una nuova relazione tra uomo e macchina che è il motore dei processi di generazione di valore dinamico di mercato.*

Keywords: *AI agentica, AI generativa, Business model Innovation, AI, Human -Computer interaction*

1. Il contesto della ricerca. Le innovazioni tecnologiche sono strettamente connesse all'evoluzione delle strutture che sovrintendono alla creazione di valore all'interno delle organizzazioni (Baden-Fuller & Haefliger, 2013; Chesbrough, 2010). Oggi le imprese si confrontano in particolare con la disruption dell'AI, che può riconfigurare le strutture interne delle organizzazioni per generare innovazioni di mercato (Jorzik et al., 2024), migliorare i processi decisionali, potenziare la modellazione predittiva, automatizzare le operations (Burström et al., 2021), e riprogettare i processi di creazione di nuove soluzioni di mercato (Pagani and Champion, 2023).

Sebbene la ricerca di management abbia compiuto progressi significativi nel documentare le implicazioni organizzative dell'IA, minore attenzione è stata tuttavia dedicata alla comprensione di come diverse forme di IA possano interagire e influenzare congiuntamente la trasformazione organizzativa verso l'innovazione delle strutture di valore delle imprese.

Colmare questo gap è essenziale per accrescere la comprensione delle scelte manageriali in contesti in cui la collaborazione tra esseri umani e IA richiede alle aziende di dimostrare una capacità di adattamento superiore.

Questo divario è particolarmente evidente anche perché le aziende stanno adottando sempre più spesso le tecnologie generative e agentiche contemporaneamente, integrando le capacità dell'IA generativa nei sistemi di IA autonomi e implementando l'IA agentica per orchestrare i processi generativi tra le diverse funzioni organizzative (McKinsey, 2025).

La Generative AI definisce sè stessa come "un insieme di modelli di intelligenza artificiale che imparano dai dati esistenti per generare nuovi dati simili, come testi, immagini, musica, codice o video" (Chat GPT 5.2). La Generative AI è quindi in grado quindi di emulare alcuni aspetti dell'apprendimento umano, sfruttando grandi quantità di dati per identificare pattern ricorrenti e trasformare le informazioni con cui viene addestrata in nuovi output coerenti e simili, per stile o struttura, ai dati originali (Dwivedi et al., 2023; Lv, 2023). La Generative AI sta catturando l'attenzione delle imprese grazie alle sue applicazioni pratiche, come i Large Language Model sottoforma di chat che sono accessibili open source, quali Plerplexty AI, ChatGPT di OpenAI e Microsoft Copilot, e molti altri strumenti e applicazioni ch,e anche grazie all'accessibilità delle piattaforme e ad interfacce utente intuitive basate su modelli di input/output, dimostrano di poter influire sulle capacità dei manager attraverso l'ottimizzazione dell'efficacia decisionale e l'automazione dei processi e l'assistenza al customer service (es. EinsteinGPT) il miglioramento della capacità di advertising (es ADCreative) e di accesso alle creatività nei contenuti (es. Jasper).

Accanto all'AI generativa, numerose imprese stanno esplorando le potenzialità degli agenti. L'IA di tipo "agente" è una branca dell'IA che si occupa di "agency", ovvero della capacità di agire per conto dell'utente umano o di un sistema che opera entro i limiti di regole e di altri framework IA preimpostati. Gli agenti IA sono capaci di interagire, ragionare e adattarsi in tempo reale per raggiungere obiettivi specifici in modo autonomo.

L'AI agentica rispetto all'AI generativa, rappresenta un livello avanzato di IA che fa uso di un set di tecnologie che insieme conferiscono autonomia nell'esecuzione delle attività, oltre i prompt. Questo rende gli agenti capaci di prendere decisioni e di agire con un minimo di intervento umano per raggiungere specifici obiettivi (Purdy, 2024). Gli agenti di intelligenza artificiale possono infatti agire come sistemi autonomi, capaci di pianificare, collaborare e portare a termine compiti, nonché di apprendere per ottimizzare progressivamente le proprie prestazioni. Ciò contribuisce a rendere più agevole per l'essere umano la gestione del lavoro quotidiano. In questa prospettiva, agli agenti AI possono essere affidate molteplici attività, sia ripetitive sia più complesse, che in precedenza richiedevano l'intervento diretto dell'uomo (Hughes et al, 2025).

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Sia la Generative AI che l'Agentic AI sono riconosciute come tecnologie capaci di generare nuovi pattern a partire da dati preesistenti, rispondendo alle richieste degli utenti attraverso testo, immagini, video, audio o codice software (Peres et al., 2023). Tuttavia, tra le due emergono differenze rilevanti: Generative AI opera principalmente in modo reattivo rispetto agli input ricevuti, mentre Agentic AI si distingue per una maggiore proattività e per la capacità di adattarsi a contesti differenti e in continua evoluzione, grazie alla presenza di una propria "agency" (Hughes et al., 2025). Inoltre, mentre l'intelligenza artificiale generativa è oggi al centro degli studi di management, la letteratura relativa agli impatti di business dell'Agentic AI risulta ancora limitata, anche in ragione della sua diffusione tuttora contenuta tra le imprese di questa tipologia di AI.

La mancanza di studi che affrontino invece le tipologie di AI, quali l'AI Generativa e l'AI agentica ed i loro effetti combinati, non consente di comprendere appieno come le trasformazioni che sono guidate dall'AI si manifestino a livello delle infrastrutture che presiedono alla creazione di valore, orchestrazione delle risorse e delle conoscenze, e nei processi organizzativi interni e di quelle che presiedono alla relazione con il mercato. Inoltre, rispetto a queste due tecnologie, le analisi empiriche che rilevino le opinioni dei manager sulla loro adozione congiunta sono ancora scarse.

Questo giustifica la rilevanza di lavori che consentano di comprendere come AI generativa e quella agentica contribuiscano congiuntamente all'innovazione del modello di business, accogliendo il punto di vista dei manager sull'argomento.

2. Gli obiettivi del lavoro. Lo studio ha l'obiettivo di analizzare, da una prospettiva manageriale, in che modo l'adozione congiunta dell'Intelligenza Artificiale Generativa e dell'Intelligenza Artificiale Agentica contribuisca a ridefinire i modelli di business delle imprese, attraverso una riconfigurazione delle strutture di creazione del valore, erogazione del valore e cattura del valore. Più nello specifico, la ricerca intende approfondire come i manager interpretino il potenziale strategico dell'IA generativa e agentica, e in che modo tali tecnologie vengano percepite come leve capaci di attivare, ricombinare e trasformare le componenti del modello di business. Inoltre il lavoro vuole esplicitare gli effetti che l'aI agentica e generativa producono sulle organizzazioni in termini di ridefinizione dei processi e delle logiche di creazione del valore.

3. Il disegno della ricerca. Abbiamo adottato un approccio esplorativo allo studio, basato sulla teoria costruttivista (Charmaz, 2002). Questo metodo si inserisce nell'ambito della grounded theory e segue un approccio interpretativista all'analisi dei dati. Abbiamo adottato lo strumento dell'intervista in profondità per la raccolta dei dati, scegliendo gli intervistati attraverso un campionamento teorico, ovvero includendo individui che abbiano sperimentato le tecnologie oggetto di studio: top manager operanti in aree funzionali associate a progetti che coinvolgono l'intelligenza artificiale (AI) e l'intelligenza artificiale generativa provenienti da diversi settori industriali e appartenenti a diverse funzioni. Questa scelta è motivata dall'esigenza di cogliere il fenomeno nei suoi molteplici aspetti e di ottenere una varietà di dati che potesse dare forza al processo di generazione teorica. Le interviste sono state condotte online tramite la piattaforma Google da un ricercatore e un manager esperti di processi di digitalizzazione e AI, seguendo un set di domande guida sviluppate sulla base della letteratura riguardante l'innovazione del modello di business e l'intelligenza artificiale. In totale, sono state concluse nove interviste con top manager. Al termine delle interviste, ai partecipanti è stato inoltre chiesto di esprimere il loro punto di vista riguardo al livello di fiducia nei confronti di Generative e Agentic AI. Le interviste sono state sottoposte a tre cicli di codifica strutturati secondo il processo previsto dalla Constructivist Ground theory: open (initial) coding, focused coding e theoretical coding (Clarke et al., 2023) al fine di pervenire alla generazione di dimensioni teoriche in grado di aggiungere nuova teoria a quella esistente rispetto agli impatti di generative AI e agentic AI nelle value structure delle imprese. Il processo di codifica è stato sviluppato attraverso MAXQDA al fine di ottimizzare la reliability e il processo di condivisione dei codici tra i ricercator (Sinkovics et al., 2008). La struttura finale della codifica ha consentito di costruire il modello di business agentico-generativo, che è presentato nella figura 1.

4. I primi risultati. I manager hanno dimostrato una comprensione approfondita della distinzione tra IA generativa e IA agente, considerandoli come un continuum evolutivo piuttosto che come tecnologie separate. Un nodo centrale e distintivo tra le due tecnologie risiede nell'autonomia e nell'iniziativa: mentre l'AI generativa risponde a stimoli e produce contenuti su richiesta, l'AI agentica persegue obiettivi attraverso sequenze di azioni autonome con sistemi di memoria autonoma e di attività di accesso agli strumenti. Per quanto riguarda l'adozione, l'intelligenza artificiale generativa è relativamente più matura tra i rispondenti, mentre l'intelligenza artificiale agentica rimane ancora in una fase sperimentale. Inoltre i manager hanno identificato l'autonomia decisionale come nodo critico che richiede nuovi modelli di governance per l'uso congiunto delle due tecnologie.

4.1 L'impatto sulle strutture di creazione de valore

L'AI agentica agisce da partner "accelerato", migliorando l'automazione del lavoro umano. Questo modello di relazione (Hoffman and Novak, 2018) consentono ai manager di attingere alle risorse tecnologiche dell'intelligenza artificiale generativa per migliorare le proprie capacità di prendere decisioni e scoprire nuove opportunità, stimolare la creatività e favorire l'innovazione in tempo reale, aprendo la strada a nuovi scenari competitivi. Il processo di co-creazione della conoscenza avviene secondo un quadro logico in cui la governance è affidata alle competenze umane e le capacità dell'AI dipendono dall'accesso ai dati, che diventano una risorsa fondamentale.

La possibilità di condividere risorse in modo continuo tra esseri umani e macchine estende le attività principali e genera innovazione rapida e scalabile di prodotti e servizi. In particolare, la Generative AI è considerata uno strumento potente per gestire la complessità del mercato. Può accelerare o moltiplicare la produttività e generare un numero molto maggiore di output mantenendo l'iper-personalizzazione. Gli agenti possono invece accelerare il processo di implementazione delle operazioni, rendendo i processi interni più rapidi ed efficienti.

La Generative e la Agentic AI stanno anche ridefinendo la struttura delle partnership. Queste ultime vengono digitalizzate secondo modelli basati su piattaforme e aumentano di dimensioni e di interazioni lungo l'intera catena del valore. Dall'analisi emerge anche che l'integrazione di Agentic e Generative AI sta cambiando le caratteristiche dei tradizionali partner, rendendo i partner specialisti molto più preziosi rispetto a quelli generalisti. Ciò offre l'opportunità di elevare il ruolo delle piccole agenzie e delle start-up che possono collaborare alla supervisione del corretto trattamento dei risultati e dell'automazione dei processi. Tuttavia, lo sviluppo di nuove partnership potrebbe anche generare la necessità di governare la maggiore dipendenza dai partner e dai fornitori esterni.

4.2 L'impatto nelle strutture di value delivery

I rispondenti hanno identificato la proposta di valore come più immediatamente influenzata dall'adozione dell'AI. Tuttavia, è emersa una distinzione fondamentale tra implementazioni orientate all'efficienza e implementazioni orientate al valore. L'Agentic AI consente di fornire soluzioni basate su proposte di valore attraverso interfacce naturali che la Generative AI può creare.

I manager hanno anche sottolineato il ruolo di Generative AI nel valorizzare i dati dei clienti per adattarsi alle loro caratteristiche e al loro comportamento, al fine di raggiungere un livello più elevato di personalizzazione relazionale che aumenta il valore percepito dei prodotti e dei servizi. La dimensione della relazione con il cliente ha rivelato una trasformazione fondamentale. I manager hanno descritto un'inversione di tendenza dal modello push-based a quello di engagement personalizzato mediato dall'AI, passando da una comunicazione uno ad uno a interazioni uno a molti e su larga scala. Inoltre, incorporando l'intelligenza artificiale generativa e agente nella loro strategia di canale, le aziende possono fare affidamento su un ulteriore canale basato sull'intelligenza artificiale. Tuttavia, piuttosto che funzionare come un canale isolato, i modelli generativi e agentici agiscono come piattaforme che amplificano la capacità dell'azienda di articolare strategie iper-personalizzate e multicanale che seguono le esigenze dei clienti. In particolare, l'integrazione di generative AI garantisce che i canali siano progettati intorno ai clienti e che evolvano dinamicamente nel tempo, sia in termini di canali stessi che di contenuti veicolati.

4.3 L'impatto sulle strutture di value capture

I manager hanno sottolineato che le organizzazioni inizialmente hanno approcciato generative e agentic AI come strumento di riduzione dei costi. Questi strumenti introducono funzionalità di ottimizzazione dei costi (come l'automazione e l'efficienza creativa), riducendo i budget e aumentando i costi variabili. Ciò è possibile grazie alla capacità dei modelli di intelligenza artificiale di ridurre i costi fissi delle operazioni, riducendo la necessità di risorse umane per la gestione dei processi e aumentando i margini operativi, nonché la scalabilità dei modelli nel tempo. Tuttavia, è emerso che faticano a cogliere i benefici trasformativi dell'AI, che implicano l'interazione umana per diventare abilitatori di creazione di valore che generano significativi ritorni per le imprese. Da ciò si evince anche che le due tecnologie potrebbero generare costi variabili aggiuntivi, legati alle risorse necessarie per la loro supervisione.

4.4. Ostacoli all'innovazione del modello di business

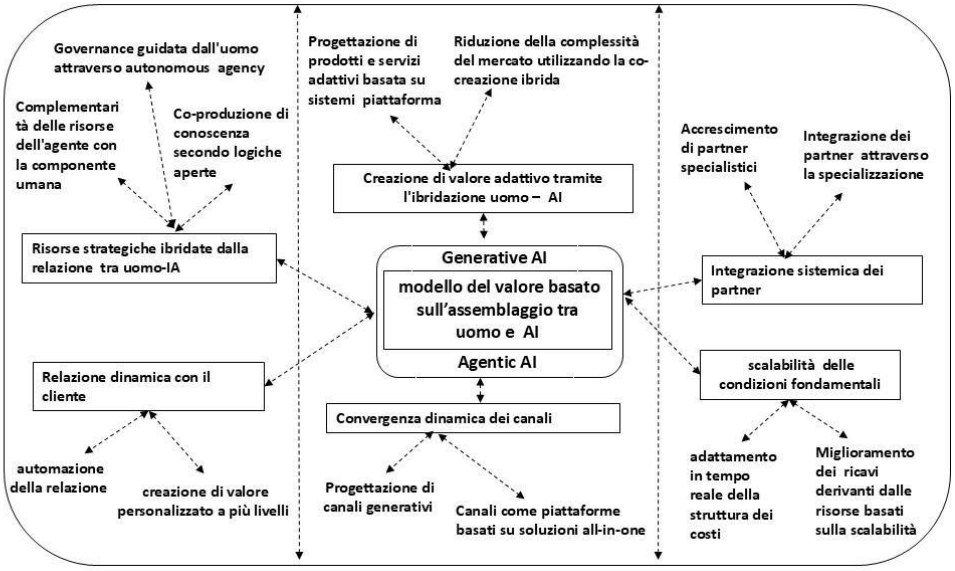
Dalle interviste sono emersi quattro ostacoli ricorrenti all'adozione di modelli agentici e generativi da parte delle imprese. Questi sono: 1) le preoccupazioni relative all'accuratezza (le allucinazioni rimangono un problema per le applicazioni aziendali), 2) le sfide relative all'osservabilità (la difficoltà di comprendere le catene di ragionamento dell'IA), 3) la resistenza culturale e 4) i dati proprietari, emersi come abilitatori critici e fonte di vantaggio competitivo sostenibile.

Man mano che i modelli di IA diventano più diffusi, la differenziazione dipende sempre più da dati unici che i concorrenti non possono ottenere. La mancanza di un'adeguata struttura di governance rappresenta un ostacolo alla diffusione dei modelli di IA, in particolare dell'Agentic AI. I manager stanno riscontrando la mancanza di un'architettura di governance per poter implementare agenti realmente autonomi, non a causa di limitazioni tecniche, ma a causa di questioni irrisolte relative all'osservabilità, all'attribuzione delle responsabilità e alla gestione dei rischi.

Dai risultati emerge quindi che modelli agentici e modelli generativi sono visti come risorse preziose che attivano capacità che vanno oltre l'automazione e l'efficienza, potenziando i processi cognitivi umani come l'apprendimento, il ragionamento e la presa di decisioni. (Raisch & Krakowski, 2021).

I risultati dello studio hanno consentito di elaborare l'Agentic-Generative Value Model Framework (Fig. 1). Il modello mostra che l'intelligenza artificiale generativa e quella agentica fanno evolvere il modello di business secondo una logica circolare, scalabile e aperta.

Figura 1. AI Gen BMI. Business model agentico-generativo



Fonte: nostra elaborazione sulla base della data structure

Nel modello risulta evidente come, attraverso queste due tecnologie, le imprese sono in grado di ampliare e rinnovare le proprie risorse interne, assorbendo nuova conoscenza e riconfigurando continuamente le proprie infrastrutture di creazione e erogazione del valore. Tuttavia, questo processo non è privo di rischi. Infatti, le organizzazioni rischiano l'inerzia se gli agenti AI non sono supervisionati dalla componente umana.

5. I limiti della ricerca. Il lavoro presenta numerosi limiti. In primo luogo, il modello che è stato sviluppato si basa su un numero limitato di interviste e la sua validità dovrebbe essere verificata su un campione più ampio di imprese. Inoltre, il modello non è stato validato sul campo. Un confronto attivo con i manager potrebbe infatti far emergere ulteriori aree di interazione tra l'AI generativa e agentica e i sistemi di generazione del valore, nonché nuovi aspetti relativi alla relazione tra i manager e questi sottotipi di AI e alla loro fiducia o sfiducia nei confronti dei modelli, che potrebbero fornire importanti spunti sulla loro diffusione nel lungo periodo. Inoltre, le interviste hanno coinvolto imprenditori di vari settori. Ulteriori studi potrebbero invece concentrarsi su alcuni settori specifici per comprendere l'impatto di Generative AI o Agentic AI sui modelli di business.

6. Implicazioni manageriali. Il modello intende essere un punto di partenza per comprendere come i manager possano creare valore con l'AI, individuando i nodi focali in cui l'AI generativa e agentica possano rappresentare un valido strumento per la generazione di valore. Il lavoro, pur presentandosi con una natura esplorativa, consente di trarre rilevanti implicazioni manageriali. Il primo aspetto da considerare è il rapporto tra uomo e macchina attivato dall'AI agentica e generativa. Per i manager, è necessario gestire la governance dei sistemi autonomi, soprattutto quelli agentici, mantenendo l'uomo nel loop e con una definita funzione di supervisione. Infatti, ciò che emerge dallo studio è che un'azione autonoma e non supervisionata di queste due tipologie di AI potrebbe avere effetti negativi sulla struttura del valore dell'impresa.

La supervisione non basta: è necessario che all'interno dell'organizzazione sia chiaro 1) cosa viene delegato alla macchina e cosa invece viene delegato all'agente, 2) quali sono le attività che devono essere svolte in forma sinergica dalla macchina e dall'uomo. Ciò implica, da parte dei manager, un'attività di mappatura trasparente dei processi e il riconoscimento di quelle attività in cui la componente umana è necessaria, come a esempio le attività creative.

Un ulteriore aspetto riguarda le competenze manageriali. Benché i risultati facciano emergere che la conoscenza tecnica dell'AI è importante, è la competenza nel valutare gli output dell'AI e la conoscenza del dominio specifico a fare la differenza. Infatti, è necessario che i manager siano dotati di competenze trasversali che consentano di abilitare sistemi di interazione continua tra uomo e macchina. Tali competenze includono capacità di relazione, apprendimento continuo, curiosità, ma anche visione, ovvero l'abilità di riconoscere il potenziale dell'AI e di saperlo integrare nei processi di creazione del valore**.**

7. **Aspetti di originalità del lavoro.** Lo studio adotta la prospettiva del business model framework come chiave interpretativa per osservare l'impatto dell'IA generativa e agentica nei business, in modo da fornire una mappatura sistematica delle trasformazioni introdotte da queste tecnologie nelle strutture che presiedono alla creazione de condivisione del valore tra l'impresa e l'ambiente esterno. Inoltre il lavoro costruisce l'AI Gen BMI framework, ovvero

un business model agentico-generativo che ricostruisce l'impatto trasformativo dell'AI agentica e generativa sulle strutture del valore delle imprese. Il paper è il risultato del lavoro di un team composto da practitioners e accademici.

Ringraziamenti. Gli autori ringraziano tutti i manager intervistati che hanno accettato di condividere la loro esperienza e le loro conoscenze sull'argomento indagato.

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Reducing low-value care in Healthcare Ecosystems: The role of Generative Artificial Intelligence

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Abstract. *Nowadays, healthcare organizations are expected to deliver care that is effective, patient-relevant, and transparent while operating under uncertainty. Within this context, low-value care remains a persistent barrier to achieving value-based healthcare and improving patient outcomes. This paper examines how Generative Artificial Intelligence (GenAI) can support the mechanisms that enable the reduction of low-value care within healthcare ecosystems.*

In doing so, this study adopts an ecosystem perspective to highlight how GenAI can contribute to reducing low-value care across macro, meso, and micro levels of an Italian healthcare ecosystem. Thus, the authors investigate how advanced digital technologies potentially support healthcare organizations in identifying inefficient practices and improving the appropriateness of clinical decisions. To conduct the study, we employ a qualitative research design based on key informant interviews and the analysis of secondary data, including policy reports, academic literature, and industry evidence related to the implementation of GenAI in healthcare contexts.

The inductive thematic analysis highlights the potential of GenAI to act as an enabling infrastructure for data-driven decision-making and collaborative value creation in healthcare ecosystems. The study offers food for thought for managers and clinicians seeking safer, more patient-centered, and more transparent care practices. Finally, it expands on current debates on AI by linking it specifically to low-value care practices.

Keywords: *Healthcare; Value creation; Low-value care; Generative Artificial Intelligence; Ecosystems; Thematic analysis; Qualitative approach*

Framing of the research. Healthcare delivery occurs in a safety-critical setting where complexity, patient involvement, and the intangible nature of services make consistent quality difficult to execute (Vogus & McClelland, 2016). In this context, the concept of value-based healthcare has emerged, defining value as the outcomes that matter to patients across the full care cycle (Lee, 2010). In particular, value-based healthcare starts with the claim that health systems should compete and improve performance based on quality outcomes, rather than on volume or bargaining power (Porter & Teisberg, 2006; Lee, 2010). Building on this logic, the Triple Aim argues that system improvement requires pursuing three linked goals at the same time: better care experience, better population health, and lower per-capita cost (Berwick et al., 2008). Because progress on one goal can unintentionally harm the others, the Triple Aim frames value creation as a balancing problem that depends on coordinated responsibility for a defined population over time (Berwick et al., 2008). For this reason, studies developed the Quadruple Aim by adding the goal of improving clinicians' work life, arguing that this dimension is crucial to sustain the other three aims (Bodenheimer & Sinsky, 2014). More broadly, the presence of multiple stakeholders suggests that value creation in healthcare should be interpreted through an ecosystemic perspective (Denicolai & Previtali, 2020; Brooks et al., 2017; Menear et al., 2019; Lavis et al., 2018).

This patient-centered view of value aligns with patient experience research, which defines value through the quality of all interactions across the patient–provider relationship (Feirn et al., 2009). In healthcare, "care" is not merely service delivery; it is a trust-dependent relationship shaped by patient vulnerability and time-pressured decision-making (Torpie, 2014). Care quality is influenced not only by clinical competence but also by organizational values and leadership practices that shape how consistently staff respond to patient expectations (Graber & Kilpatrick, 2008). Against this backdrop, a major obstacle to delivering such value is the persistence of low-value care. It is commonly defined as tests or treatments with no evidence of benefit, or with harms exceeding benefits (Grimshaw et al., 2020). Empirical evidence shows that low-value care spans many activities, including services with uncertain benefit or avoidable harm that warrant reassessment (Elshaug et al., 2012). It is also unevenly distributed across providers, with some organizations using low-benefit services far more frequently than others (Ganguli et al., 2021). Reducing low-value care is crucial not only to prevent avoidable harm, but also because low-value activities often increase spending in the long term, rather than cutting it (Kroon et al., 2023). To maximize value, healthcare organizations can learn from data and quickly turn new evidence into routine clinical practice (Wasylak et al., 2022). Digital technologies are increasingly considered key enablers of this learning process. More specifically, health systems adopt de-implementation programs to reduce low-value care, employing tools such as clinical decision support, audit-and-feedback, and education (Cliff et al., 2021). Furthermore,

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involving patients in de-implementation efforts strengthens appropriateness by aligning decisions with preferences and reducing demand for services with limited benefit (Kien et al., 2024).

In healthcare, Artificial Intelligence (AI) is increasingly implemented to integrate heterogeneous clinical data and support real-time decisions at the point of care (Noorbakhsh-Sabet et al., 2019; Leone et al., 2021; Varghese & Chapiro, 2024). These capabilities can strengthen learning cycles by turning routinely collected data into actionable signals that clinicians can use during everyday work (Dinov, 2016). Particularly, AI can augment de-implementation tools by embedding prompts, feedback, and guidance directly into ordering and review workflows (Cliff et al., 2021). In this context, Generative Artificial Intelligence (GenAI) extends this trajectory by positioning generative systems as workflow participants that help coordinate tasks across diagnosis, decision support, engagement, and operations (Karunanayake, 2025; Zhang et al., 2023; Clune, 2019). By improving how information is communicated and understood, GenAI can also help align clinical decisions with patient preferences, strengthening appropriateness and reducing demand for low-benefit services. (Kien et al., 2024; Duan et al., 2019; Secinaro et al., 2021).

Purpose of the paper. In today's landscape, healthcare organizations operate in a setting where expectations about care quality are steadily rising. They are asked to deliver care that is reliable, meaningful for patients, and sustainable over time. Meeting these expectations is difficult because healthcare work unfolds under uncertainty and often requires rapid judgment. Clinical decisions are rarely isolated events, since they depend on information flows, coordination across professionals, and support from the surrounding organization. For this reason, care quality is shaped not only by technical competence, but also by how well organizations enable everyday work. Pressures for transparency have also intensified in recent years. Patients, managers, and policymakers are increasingly able to observe differences in outcomes, service use, and organizational performance. As a result, gaps between intended quality and actual delivery have become more visible and more consequential. In parallel, healthcare systems are expected to improve patient outcomes while using resources more responsibly. This also means limiting the use of tests, treatments, and clinical activities that consume attention and resources without producing meaningful benefit for patients. Consequently, healthcare organizations face growing pressure to support professionals in making more appropriate clinical decisions while reducing activities that offer limited benefit. Against this backdrop, identifying mechanisms that support value creation while limiting low-value care has become a central challenge for healthcare systems.

Prior research has recognized this challenge through the notion of low-value care (Elshaug et al., 2012; Grimshaw et al., 2020). Furthermore, it has identified several ways to reduce these practices within healthcare systems. Specifically, prior studies show that improvements depend on organizations' ability to learn from data and translate new evidence into routine clinical practice (Wasylak et al., 2022). Research further shows that mechanisms such as de-implementation programs and patient involvement play a crucial role in reducing low-value care (Cliff et al., 2021; Kien et al., 2024). At the same time, another stream of literature suggests that AI can integrate heterogeneous clinical data and enable real-time decisions at the point of care (Noorbakhsh-Sabet et al., 2019). These capabilities can strengthen learning cycles by turning routinely collected data into actionable signals for everyday clinical work (Dinov, 2016). Emerging studies also suggest that GenAI can extend this role by supporting workflow coordination and improving how information is communicated and understood across care processes (Karunanayake, 2025; Kien et al., 2024). However, despite these advances, we still know little about how GenAI can strengthen the mechanisms through which healthcare ecosystems identify and reduce low-value care across different levels of action.

To bridge this gap, this study adopts an ecosystem perspective to examine how GenAI contributes to managing low-value care within healthcare systems. We argue these advancements influence the conditions under which more appropriate care decisions emerge. Therefore, we analyze the role of GenAI at multiple levels of the healthcare ecosystem: macro, meso and micro. Accordingly, we address the following research question: How can Generative Artificial Intelligence contribute to reducing low-value care within healthcare ecosystems?

Methodology. To address the research question, this study employed qualitative research design adopting the key informant interview technique, suitable to allow researchers to explore nuanced perspectives even with small samples (Tremblay, 1957; Pahwa et al., 2023). Particularly, an Italian healthcare ecosystem located in the Campania Region was selected as the research setting.

Fifteen semi-structured interviews were conducted with key informants, each lasting approximately 60 minutes. The interviews were conducted online, recorded, transcribed, and translated into English while preserving the original meaning of participants' responses. The sample size was determined based on data sufficiency criteria, including study objectives, sample specificity, theoretical framework utilization, dialogue quality, and analysis strategy (Malterud et al., 2016). Participants were selected through purposeful sampling combined with snowball sampling techniques to ensure comprehensive representation across the healthcare ecosystem. (Parker et al., 2019; Naderifar et al., 2017). This approach allowed the researcher to reach a broader network of professionals involved in healthcare delivery, digital health innovation, and the governance of healthcare ecosystems.

The study adopted an ecosystem perspective to examine the role of GenAI in healthcare and its potential contribution to reducing low-value care. Key informants included physicians, healthcare managers, pharmaceutical company representatives, and technology developers, providing a holistic perspective on GenAI implementation across the healthcare ecosystem. This multi-stakeholder approach recognized healthcare networks as nodes within a dynamic, interconnected ecosystem where various actors contribute to value creation and care delivery. The interviews were

conducted using a semi-structured format, which allowed informants considerable flexibility in expressing their views while ensuring that all relevant topics were addressed. The interview guide was developed following the ecosystem perspective adopted in the study and was structured around three analytical levels: micro, meso, and macro. To enhance validity and ensure robust findings, multiple data sources were selected - including official online documentation, public statements, and archival records - following established triangulation principles (Yin, 2009). Data analysis employed an inductive thematic analysis following Braun and Clarke's (2006) systematic approach, utilizing NVivo software for code management. This method was selected for its flexibility and suitability for exploratory research examining emerging phenomena in healthcare contexts.

Results. Our findings suggest that GenAI can play a pivotal role in supporting the reduction of low-value care across healthcare ecosystems. By enhancing the availability, interpretation, and dissemination of clinical and organizational information, GenAI can support more informed decisions and help redirect resources toward activities that generate higher value for patients. Within this ecosystem perspective, the reduction of low-value care can be understood as a dynamic process supported by the interaction between technological tools, organizational practices, and governance mechanisms. Against this backdrop, it is essential to highlight the strong interconnections between the three levels of the healthcare ecosystem. In this sense, GenAI can support a continuous feedback loop across the ecosystem, enabling the identification, monitoring, and progressive reduction of low-value care.

At the micro level, which concerns clinical practice and the activities of individual healthcare professionals, GenAI can improve operational efficiency and support more informed clinical decisions. Through its ability to process and analyse large volumes of heterogeneous clinical data, GenAI can assist healthcare professionals in identifying patterns, synthesizing medical information, and supporting diagnostic reasoning. This capability can help clinicians avoid unnecessary tests, redundant procedures, or ineffective treatments that contribute to low-value care. In addition, GenAI tools can support clinicians by summarising complex information and providing decision-support suggestions based on available evidence, thereby reducing uncertainty and improving the accuracy of clinical decisions. Additionally, by improving the accessibility and interpretation of medical information, GenAI influences patient involvement, facilitating communication between clinicians and patients and enabling patients to better understand treatment options and participate more actively in care decisions.

At the meso level, which refers to the organizational and network dimension of healthcare ecosystems, GenAI can support collaboration and coordination among different actors, such as hospitals, research centres, pharmaceutical companies, and digital health providers. The findings suggest that GenAI may function as an enabling infrastructure for information exchange, facilitating the integration of clinical, operational, and research data across organizations. By improving communication and knowledge sharing, these technologies can help reduce fragmentation in healthcare ecosystems, which is often one of the drivers of low-value care

Finally, at the macro level, which concerns healthcare governance and policy-making, GenAI can support ecosystem-level strategies aimed at improving efficiency and reducing low-value care across the healthcare ecosystem. By analysing large-scale clinical and administrative datasets, GenAI can help policymakers identify patterns of resource use, detect inefficiencies, and monitor the diffusion of low-value practices across healthcare organizations. These insights can support more informed policy decisions regarding resource allocation, regulatory frameworks, and health ecosystem planning. At the same time, the implementation of GenAI at the ecosystem level requires careful governance to ensure transparency, fairness, and accountability. Healthcare ecosystems manage large volumes of sensitive data, and the use of advanced technologies raises concerns related to privacy, algorithmic bias, and patient safety. For this reason, effective regulatory frameworks and oversight mechanisms are necessary to ensure that the use of GenAI contributes to improving healthcare quality without generating new risks or inequalities.

Research limitations. Despite the contributions of this study, several limitations should be acknowledged. First, the research is based on a qualitative exploratory design relying on a relatively small sample of key informants. Future studies could use quantitative methods. Second, the study focuses primarily on expert perceptions regarding the potential role of GenAI in reducing low-value care. While these insights provide valuable perspectives on emerging technological opportunities, the empirical evidence is still largely prospective. Finally, the analysis adopts an ecosystem perspective structured around micro, meso, and macro levels of the healthcare settings. While this multi-level approach helps capture the complexity of healthcare environments, the interactions between these levels remain difficult to observe directly through qualitative interviews alone. Future studies could therefore investigate these dynamics through longitudinal study designs.

Managerial implications. The findings of this study provide several implications for healthcare managers, policymakers, and technology developers seeking to reduce low-value care through the adoption of GenAI. At the micro level, healthcare organizations should consider the integration of GenAI tools to support clinical decision-making processes. Second, at the meso level, the results highlight the importance of strengthening collaboration among healthcare actors. GenAI can act as an enabling infrastructure for information exchange, supporting communication among different actors and fostering the development of shared clinical protocols and best practices.

Finally, at the macro level, policymakers and healthcare authorities play a critical role in creating the institutional

conditions necessary for the responsible adoption of GenAI technologies. Clear regulatory frameworks, data governance mechanisms, and ethical guidelines are necessary to ensure transparency, protect patient privacy, and mitigate algorithmic biases. Findings suggest that the potential of GenAI to reduce low-value care does not depend solely on technological capabilities but also on the ability of healthcare ecosystems to coordinate actors, align incentives, and develop governance mechanisms that support value-oriented innovation.

Originality of the paper. This paper contributes to the literature on AI in healthcare by proposing an ecosystem-based perspective to elucidate how GenAI can support the reduction of low-value care. While previous studies have mainly focused on the technical capabilities of AI or on specific clinical applications, this research adopts a multi-level perspective that considers the interactions between actors, organizations, and policy. By analysing the potential role of GenAI across micro, meso, and macro levels of the healthcare ecosystem, the study offers a novel view that links technological innovation with value-based healthcare.

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Strategic Adoption of AI in Dubai: Preliminary Results from an Advisory-Centered Perspective

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Abstract. *The accelerating diffusion of Artificial Intelligence (AI) is profoundly reshaping organizational practices, competitive dynamics, and sustainability trajectories across global business ecosystems. In innovation-oriented contexts such as Dubai and the United Arab Emirates (UAE), AI adoption is further amplified by strong governmental support and national strategic visions. This study explores the adoption, perceived benefits, and emerging risks associated with AI through six in-depth qualitative interviews with external advisory professionals operating in the UAE consulting sector. The findings reveal that AI functions as a strategic equalizer, enabling efficiency, scalability, and service quality improvements, especially for startups and small-to-medium enterprises (SMEs). At the same time, the study highlights critical challenges related to data governance, environmental sustainability, over-reliance on AI outputs, hidden economic costs, and uneven governance structures. By offering context-specific insights from a rapidly developing innovation hub, this paper contributes to the literature on responsible AI adoption and provides actionable guidance for managers navigating AI-driven transformation.*
Keywords*: artificial intelligence; innovation ecosystem; advisory perspective; United Arab Emirates; in-depth interview; qualitative research*

Framing of the research. The diffusion of Artificial Intelligence (AI) has progressively transformed from a technological trend into a fundamental driver of organizational change and strategic renewal (Barari et al., 2024). Within the management and strategy literature, AI is increasingly conceptualized not merely as a technological tool, but as a strategic resource capable of reshaping organizational structures, competitive positioning, and value creation mechanisms (Rossi et al., 2025).

Existing research has extensively examined AI adoption in large multinational corporations and technologically mature economies (McElheran et al., 2024), often emphasizing performance outcomes, efficiency gains, and innovation capabilities (Damioli et al., 2021; Avezov, 2025). However, less attention has been devoted to understanding how AI adoption unfolds within fast-growing, institutionally distinctive contexts characterized by strong government intervention, rapid market expansion, and heterogeneous organizational maturity (Hussain et al., 2025). The United Arab Emirates (UAE), and Dubai in particular, represent a salient yet underexplored empirical setting in this regard (Alhur et al., 2025).

Dubai has positioned itself as a global innovation hub through deliberate national strategies, including the UAE National AI Strategy 2031, large-scale public investments in digital infrastructure, and state-sponsored training initiatives aimed at diffusing AI-related skills across the workforce (Khatib and Ahmed, 2024). Within this institutional environment, organizations face both explicit incentives and implicit pressures to integrate AI into their operational and strategic processes (Dafri, 2023). AI adoption therefore becomes not only a managerial choice, but also a response to institutional expectations, competitive signaling, and future-oriented legitimacy (Loureiro et al., 2021).

From a strategic perspective, AI adoption in Dubai is particularly relevant for startups and small-to-medium enterprises (SMEs), which constitute a significant portion of the local economy. These organizations often operate with lean structures, limited access to specialized talent, and high growth ambitions (Thomas et al., 2025). In such conditions, AI may function as strategic equalizers, allowing smaller firms to emulate capabilities traditionally associated with larger organizations, such as advanced analytics, personalized service delivery, and scalable operational processes (Mogielnicki, 2021).

At the same time, the accelerated pace of AI adoption raises critical organizational and strategic tensions. AI systems increasingly mediate decision-making processes, redistribute cognitive labor between humans and machines, and reshape professional roles (Santandreu Calonge et al., 2025). Over-reliance on algorithmic outputs may undermine human judgment, while insufficient governance structures may expose organizations to data protection risks, hidden costs, and long-term dependency on external technology providers. These tensions are particularly pronounced in contexts where formal AI governance frameworks are unevenly distributed across organizational sizes and sectors (Almesafri and Habes, 2022). Such asymmetries may reflect differences in organizational resources, dynamic governance capabilities, and exposure to institutional legitimacy pressures.

Within the management and organization literature, scholars have recently called for more context-sensitive and practice-oriented research on AI adoption, emphasizing the need to understand how strategic decisions around AI are

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made, justified, and implemented in real organizational settings (Alhur et al., 2025). Advisory actors, such as external consultants and innovation advisors, play a crucial yet under-theorized role in this process. They often act as intermediaries between technological possibilities, managerial understanding, and organizational realities, shaping not only adoption decisions but also interpretations of value, risk, and responsibility (Al-zebin et al., 2025).

Against this backdrop, this study adopts an advisory-centered perspective to explore AI adoption in Dubai. By focusing on the experiential knowledge of six external consultants actively involved in supporting organizations across different stages of AI adoption, the research aims to capture nuanced insights into the strategic logic, organizational consequences, and governance challenges associated with AI-driven transformation in a rapidly evolving innovation ecosystem.

Purpose of the paper. This study aims to provide an in-depth qualitative exploration of how AI is adopted, perceived, and strategically integrated by organizations operating in Dubai and the broader UAE, viewed through the lens of six external advisory professionals. Rather than focusing on the quantitative measurement of adoption outcomes, the study seeks to uncover the underlying managerial rationales, organizational mechanisms, and strategic interpretations that shape AI adoption in practice. Particular attention is given to the role of advisory actors, who often act as intermediaries and facilitators of AI-driven change, as well as to the tensions that arise between immediate performance gains and long-term organizational sustainability.

More specifically, the study examines the institutional and strategic factors that influence AI adoption within the Dubai business ecosystem, while also analyzing how these technologies contribute to organizational efficiency, scalability, and competitive positioning. At the same time, it highlights potential unintended consequences and organizational risks, including gaps in governance, cognitive over-reliance on AI outputs, and hidden economic costs. The research also considers how variations in organizational size and maturity affect AI governance practices and strategic outcomes, offering insights that are directly relevant for managers and strategists seeking to leverage AI as a source of sustainable competitive advantage.

The study is guided by several key research questions: What strategic and institutional factors drive AI adoption in Dubai? How do organizations perceive the value of these technologies, and how do they translate that value into efficiency, scalability, and competitive advantage? What organizational and strategic tensions emerge, particularly regarding governance, sustainability, and human judgment? And finally, how do advisory actors influence strategic decisions and governance practices across different organizational contexts?

By addressing these questions, the paper contributes to management and strategy scholarship by providing empirically grounded, context-specific insights into AI adoption as a complex organizational and strategic phenomenon, rather than a purely technological one.

Methodology. This study adopts a qualitative research design grounded in the traditions of management and organizational research that emphasize contextual understanding, processual insight, and interpretive depth (Armstrong, 1979). Given the exploratory nature of the research questions and the emergent character of AI as a strategic phenomenon, a qualitative approach is particularly suitable to capture how meanings, expectations, and strategic rationales surrounding AI adoption are constructed in practice (Schreier, 2012).

The empirical core of the study is based on six in-depth semi-structured expert interviews. Expert interviews are widely used in management and strategy research when the phenomenon under investigation is complex, novel, and insufficiently documented through secondary data. In such cases, experts act as knowledgeable informants who possess both analytical distance and practical immersion in the field (Braun and Clarke, 2006).

The respondents in this study are external consultants and advisory professionals operating within the UAE business ecosystem. The selection of interviewees followed a purposive sampling strategy aimed at identifying information-rich cases. The inclusion criteria required respondents to (i) have at least four years of experience in AI-related advisory activities, (ii) be directly involved in strategic or operational AI implementation projects, and (iii) have exposure to multiple organizations or sectors within the UAE. With more than four years of experience advising organizations on AI-related strategic and operational decisions, the interviewees occupy a privileged observational position across multiple firms, sectors, and stages of AI adoption. This allows the study to move beyond firm-specific narratives and capture cross-cutting patterns and recurring tensions (Akther, 2022).

The respondents have extensive advisory experience across multiple sectors, including professional services, commodities trading, hospitality, real estate, and marketing. At the individual level, the sample includes consultants with diverse roles (e.g., strategy advisors, AI implementation specialists, and innovation consultants), thereby ensuring variation in perspectives and professional backgrounds within the advisory landscape. While this cross-sector exposure enabled the identification of recurrent patterns in AI adoption, no substantial sector-specific differences were reported. This suggests that the emergent themes may reflect organizational and strategic dynamics that are broadly applicable across diverse industries within the UAE context.

The sample size was determined following a logic of theoretical sufficiency rather than statistical representativeness. Given the expert-based nature of the interviews and the cross-organizational perspective of advisory professionals, the aim was to capture recurring interpretive patterns rather than firm-specific variation. After six interviews, thematic redundancy began to emerge, with no substantially new dimensions related to AI drivers, governance asymmetries, or

organizational tensions being identified. In this sense, the study reached a point of pragmatic saturation consistent with qualitative research standards in exploratory management studies.

Importantly, the choice of an advisory actor as the primary informant reflects a deliberate methodological decision. Advisors often function as intermediaries between technological possibilities and managerial action, translating abstract AI capabilities into organizationally actionable strategies. Their perspective therefore provides valuable insight into how AI adoption decisions are framed, justified, and implemented across heterogeneous organizational contexts (Wisener, 2014).

The interviews were conducted with the assurance of confidentiality and anonymization. Data collection took place between early and late December 2025. Interviews were conducted online via video conferencing platforms and lasted between approximately 45 and 60 minutes. All interviews were audio-recorded with participants' consent and subsequently transcribed verbatim for analysis. A semi-structured interview guide was used to ensure consistency across interviews while allowing flexibility to explore emerging themes. The guide included questions related to AI adoption drivers, perceived value, implementation challenges, governance practices, and the role of advisory actors in shaping strategic decisions. This was intended to encourage openness and reduce social desirability bias, particularly when discussing sensitive topics such as data governance, organizational weaknesses, and strategic trade-offs. All six interviews were subsequently transcribed and prepared for analysis.

The data analysis followed a thematic analysis approach commonly employed in qualitative management research. The process involved multiple iterative stages (Braun and Clarke, 2019). First, the interview transcripts were read in full to gain a holistic understanding of the narrative. Second, initial codes were assigned to segments of text related to AI drivers, value creation, organizational challenges, governance practices, and strategic implications. The coding process combined inductive and deductive elements: while some codes were informed by existing literature (e.g., governance, capability development), others emerged directly from the data.

In a third step, these codes were grouped into higher-order themes reflecting broader strategic and organizational patterns, such as AI as a capability equalizer, governance asymmetries between SMEs and large firms, and tensions between efficiency gains and long-term sustainability. Throughout the analysis, particular attention was paid to identifying causal mechanisms and interpretive frames used by the advisory actors, rather than merely cataloging practices. To enhance reliability, coding decisions were iteratively refined through multiple rounds of comparison across interviews, ensuring internal consistency and coherence of themes.

To enhance the credibility and trustworthiness of the findings, several qualitative rigor principles were followed. Analytical transparency was ensured by clearly documenting the steps of data collection and analysis. Reflexivity was maintained by acknowledging the interpretive role of the researcher in making sense of the advisory narrative. In addition, credibility was strengthened through systematic comparison across cases and by ensuring that identified themes were supported by multiple interview excerpts. While formal inter-coder agreement was not applied, the analysis followed a consistent coding protocol and iterative validation process to ensure robustness and interpretive reliability. Finally, the study emphasizes analytical generalization rather than statistical generalization, aiming to contribute to theory-building by illuminating processes and mechanisms relevant to AI adoption in comparable organizational and institutional contexts (Joffe, 2011).

Results. The analysis of the six expert interviews reveals a set of interconnected themes that illuminate how AI is strategically adopted, interpreted, and governed within organizations operating in the Dubai and UAE context. Rather than depicting AI adoption as a linear or uniform process, the findings highlight heterogeneous patterns shaped by organizational size, institutional pressures, and the mediating role of advisory actors. Four main themes emerged from the analysis: (1) AI as a strategic equalizer; (2) value creation and organizational scaling; (3) emerging organizational and cognitive tensions; and (4) governance asymmetries and advisory mediation, as summarized in Table 1. No sector-specific differences were explicitly highlighted by respondents, although the limited sample does not allow for definitive conclusions. Interviewees consistently framed these dynamics as cross-sectoral, suggesting that AI adoption patterns in the UAE may be more structurally driven than industry-specific.

A dominant theme emerging from the interview is the role of AI as a strategic equalizer, particularly within the UAE labor market and competitive environment. According to the advisory perspective, many organizations in Dubai operate under cost-driven hiring models characterized by heterogeneous skill levels and limited access to deep specialization. In this context, AI is perceived as a mechanism that partially compensates for capability gaps by augmenting individual productivity and decision-making quality. Across interviews, respondents emphasize that AI enables organizations to maintain or improve service quality without proportionally increasing headcount or relying on scarce expert talent. This dynamic is especially salient for startups and SMEs, which often lack the resources to build fully specialized teams. By embedding AI tools into everyday workflows, such firms can emulate capabilities traditionally associated with larger, more resource-rich organizations, thereby altering competitive dynamics. As one advisor noted, "AI is not replacing people, but it is leveling the imbalance in skills across firms, especially in fast-growing environments like Dubai."

From a strategic management perspective, AI functions not merely as an efficiency-enhancing technology but also as a capability-building mechanism. AI adoption allows firms to recombine existing human resources with algorithmic support, effectively reshaping their internal resource base. In doing so, AI contributes to strategic parity and, in some cases, temporary competitive advantage within fast-moving markets. This finding suggests that AI operates as a boundary-

spanning resource that reshapes the composition and productivity of firm-level capabilities rather than simply optimizing existing processes. Beyond general efficiency gains, the interview data highlight specific value creation mechanisms through which AI contributes to organizational scaling and improved performance, spanning operations, marketing, customer service, and innovation activities. One illustrative case identified in the interviews highlights a consultancy firm receiving a substantial number of targeted leads but achieving a very low closing rate of approximately 2%. Lead distribution relied on manual allocation and simple round-robin systems, which proved inefficient given the heterogeneity of client needs and consultant expertise. With more than 100 incoming leads per day, systematic prequalification and strategic matching were operationally unfeasible. The introduction of an AI-based lead scoring and assignment system enabled automated qualification and consultant matching based on expertise, language, and background. Within two months, conversion rates increased from roughly 2% to 8%, while prequalification time decreased significantly, and consultant productivity improved. This case illustrates how AI can reconfigure operational routines and enhance capability alignment rather than merely automate tasks. As one interviewee explained, "the real value was not automation, but better matching between human expertise and client demand."

Despite these benefits, the findings reveal several organizational and cognitive tensions. A recurrent concern relates to the risk of over-reliance on AI-generated outputs, particularly in consulting contexts where judgment, contextual understanding, and critical thinking are essential. Several interviewees noted that some professionals may treat AI outputs as authoritative rather than provisional, potentially weakening analytical capabilities over time. One respondent explicitly warned that "people stop questioning outputs once they trust the system too much."

Relatedly, issues of data protection are critical, particularly when companies rely on third-party AI tools. Organizations must ensure that sensitive information is handled responsibly and that data-sharing practices comply with both local and international standards. The advisors emphasized that AI should not serve as an excuse for complacency; outputs must be validated, and users should learn how to prompt effectively to obtain meaningful results. Additionally, the interviewees warned against the "AI hype trap", stressing that implementing AI tools is strategically sound only when supported by a clear rationale, a solid understanding of business processes, and a coherent adoption framework. From an interpretive standpoint, this reflects a tension between symbolic adoption and substantive integration of AI technologies within organizational routines.

Additional tensions relate to environmental, economic, and social sustainability. Interviewees emphasized that the increasing reliance on cloud infrastructures and data centers, while improving operational efficiency, also intensifies energy consumption and environmental impact. Although the UAE is investing in renewable-powered and green data centers, adoption remains uneven across industries. Economically, several respondents noted that initial performance improvements often conceal long-term costs associated with retraining, data governance, system maintenance, and vendor dependency, which may gradually erode return on investment. Socially, AI-driven automation has reduced routine tasks while simultaneously increasing demand for higher-level skills, in line with the objectives of the National AI Strategy 2031. However, the critical challenge remains cognitive and cultural. Professionals must perceive AI as an enabling complement rather than an authoritative substitute for human judgment. As one advisor summarized, "the biggest challenge is not technical, but cultural acceptance of AI as a partner rather than an authority."

Finally, the interviewees underscored the uneven distribution of governance mechanisms across organizational contexts. Formal oversight structures, ethical guidelines, compliance processes, or dedicated committees are largely confined to large enterprises, while startups and SMEs tend to rely on founders' technical literacy or external advisors. From a theoretical perspective, these governance asymmetries can be interpreted through the lens of the resource-based view and dynamic capabilities theory. Larger organizations possess more structured governance routines and formalized risk management processes that function as embedded strategic resources, whereas SMEs often operate through more informal and externally supported governance arrangements. From an institutional theory standpoint, large firms are also more exposed to regulatory scrutiny and legitimacy pressures, which incentivize the formalization of AI governance mechanisms.

In this fragmented governance landscape, advisory actors operate as externalized governance mechanisms and legitimacy intermediaries, assisting organizations in interpreting regulatory expectations, assessing risks, and designing adoption strategies aligned with both performance and responsibility objectives. While such mediation accelerates responsible AI adoption, excessive dependence on external expertise may inhibit the internalization of dynamic governance capabilities, raising questions about long-term organizational resilience. This suggests that advisory involvement simultaneously enables capability development while potentially constraining the emergence of internal governance maturity in SMEs.

Table 1. Summary of key findings

Theme	***Key findings***	***Illustrative evidence / observations***
AI as a strategic equalizer	*AI allows smaller firms and SMEs to emulate the capabilities of larger organizations, augmenting human productivity and compensating for skill gaps.*	*Startups leverage AI to maintain or improve service quality without proportionally increasing headcount; cost-driven hiring models and heterogeneous skill levels in the UAE labor market.*

Value creation and organizational scaling	*AI adoption improves efficiency, scalability, and competitive positioning across operations, marketing, customer service, and innovation, supporting informed decision-making in addition to task automation.*	*For example, an AI-based lead qualification system helped align client needs with consultant expertise, increasing conversion rates and overall productivity.*
Emerging organizational and cognitive tensions	*Over-reliance on AI outputs can undermine human judgment and critical thinking; hidden costs such as retraining, data management, and vendor dependency may reduce long-term returns; ethical challenges include bias, transparency, and information overload.*	*Professionals treating AI outputs as authoritative; need for validation and effective prompting; economic and operational frictions are observed.*
Governance asymmetries and advisory mediation	*Formal governance (ethics, oversight, compliance) concentrated in large firms; SMEs often rely on founder expertise or external advisors. Advisors mediate adoption, risk assessment, responsible AI use, and data protection.*	*Advisory professionals serve as de facto governance agents, guiding regulatory interpretation, managing risks, and framing AI adoption strategically. They also emphasize avoiding the "AI hype trap" and maintaining a clear business rationale.*

Source: Authors' elaboration

Research limitations. This study is based on just six in-depth interviews with external advisory professionals operating in the UAE business ecosystem. While this methodological choice allows for rich, detailed insights and a deep understanding of organizational processes surrounding AI adoption, it inherently constrains the generalizability of the findings. The perspectives captured reflect the interpretive lens, professional experiences, and sector-specific exposure of six advisors, which may not fully represent the diversity of organizational contexts, industries, or adoption strategies across Dubai or the broader UAE.

Moreover, the reliance on self-reported data introduces potential subjective biases, including selective recall, social desirability effects, and interpretive framing, which may influence the portrayal of both benefits and challenges associated with AI adoption. The cross-sectional qualitative design limits the capacity to capture temporal variations, longitudinal adoption patterns, or the dynamics of organizational learning in response to AI implementation.

Future research could address these limitations by adopting comparative or multi-case designs that involve multiple advisory professionals, organizations of varying sizes and sectors, and potentially cross-national contexts. Integrating qualitative insights with quantitative measures, such as surveys of adoption rates, performance metrics, or governance maturity indices, could further enhance the robustness and generalizability of findings. Longitudinal studies would also be valuable to explore how organizational strategies, governance structures, and perceived AI value evolve over time, particularly in rapidly developing innovation ecosystems.

Managerial implications. The findings of this study carry several important implications for managers and organizational strategists navigating AI-driven transformation. From a broader perspective, these implications also reflect how AI adoption is shaped by the interaction between strategic intent and institutional pressures, reinforcing the view of AI as a contextually embedded strategic resource rather than a purely technical tool. First, AI adoption should be anchored in a clear strategic rationale rather than motivated solely by technological novelty or external pressures. Managers must align AI initiatives with broader organizational goals, operational needs, and competitive positioning to ensure that adoption translates into sustainable value creation. This finding extends existing strategic management perspectives by showing that, particularly in policy-driven contexts such as the UAE, AI adoption is not only a matter of internal resource allocation (as suggested by the resource-based view), but also a response to external legitimacy and signaling dynamics emphasized by institutional theory.

Second, the study underscores the importance of investing in AI literacy and capability development across the workforce. Human judgment, contextual understanding, and domain expertise remain critical, particularly in knowledge-intensive and advisory-driven sectors. Organizations that cultivate complementary skills alongside AI adoption are better positioned to avoid over-reliance on algorithmic outputs and to leverage AI as an augmentation tool rather than a replacement for critical decision-making. From a theoretical standpoint, this supports and refines the notion of AI as a capability-enhancing resource, highlighting that its effectiveness depends on the development of complementary human and organizational capabilities, rather than on technology alone.

Third, managers should anticipate and proactively address long-term economic, operational, and sustainability costs associated with AI adoption. This includes monitoring vendor dependency, system maintenance expenses, and environmental impacts, as well as integrating these considerations into strategic planning and resource allocation. These findings contribute to ongoing debates on responsible and sustainable AI by showing that short-term efficiency gains may obscure longer-term strategic trade-offs, thereby qualifying overly optimistic views of AI-driven performance improvements in existing literature.

Finally, even in contexts with limited formal regulation, organizations are encouraged to establish governance principles and ethical guidelines for AI use. Structured governance practices, including data management protocols, transparency mechanisms, and accountability structures, can mitigate organizational risk, foster responsible AI adoption, and enhance reputational legitimacy in increasingly competitive and scrutiny-intensive markets. In line with the findings, governance should not be understood solely as an internal organizational capability, but also as a process shaped by external advisory actors who act as intermediaries in translating regulatory expectations and best practices into organizational routines. This highlights a broader theoretical implication concerning the role of intermediaries in shaping AI adoption, suggesting that governance capabilities may be partially externalized, especially in SMEs and resource-constrained environments.

Originality of the paper. The originality of this paper resides in its advisory-centered approach to understanding AI adoption within the Dubai and UAE innovation ecosystem. By foregrounding the perspectives of six external consultants who are actively engaged in organizational AI implementation, the study captures a practitioner-informed view that is rarely documented in existing literature. Unlike traditional studies that focus on large multinationals or Western contexts, this research provides context-specific insights into how AI adoption unfolds in a rapidly developing, government-driven, and institutionally distinctive environment.

While themes such as AI as a strategic equalizer and governance asymmetries between SMEs and larger organizations are well established in the literature, this study contributes by problematizing and contextualizing these dynamics within the UAE setting. Specifically, the findings show that in a strongly state-driven innovation ecosystem, AI adoption cannot be fully understood as a purely firm-level strategic choice, but is co-shaped by institutional pressures, national strategic agendas, and policy-driven incentives that actively promote and normalize AI integration. This perspective highlights what the UAE context adds to existing debates, showing how these dynamics are amplified and reshaped through centralized infrastructures, regulatory frameworks, and state-sponsored initiatives that influence access to AI resources and adoption pathways.

This advisory lens illuminates both strategic opportunities and organizational tensions associated with AI integration, including the roles of efficiency gains, capability equalization, cognitive reliance, and governance asymmetries.

In addition, the paper addresses a gap in the AI adoption literature by explicitly focusing on the role of advisory actors as intermediaries in the adoption process. While prior research has largely examined adoption outcomes at the firm level, limited attention has been devoted to how AI strategies are interpreted, translated, and operationalized in practice. The findings show that advisors do not merely support implementation, but actively shape managerial perceptions of value, risk, and responsibility, while also functioning as externalized governance mechanisms, particularly in SMEs lacking formal structures.

In doing so, the study contributes to scholarly debates on responsible and sustainable AI adoption by offering empirical evidence from a non-Western, innovation-intensive setting. It extends understanding of how AI functions not merely as a technological tool, but as a strategic and organizational resource, thereby enriching the literature on AI adoption, strategic management, and sustainable innovation practices.

By making these elements explicit, the study offers a clearer theoretical contribution to ongoing debates on AI adoption. It advances existing research by integrating an institutional perspective with a micro-level understanding of intermediation, thereby addressing a gap concerning how context and intermediary actors jointly shape AI-driven organizational transformation. In doing so, the paper conceptualizes AI not only as a technological tool, but as a contextually embedded phenomenon emerging from the interaction between organizations, institutions, and advisory practices.

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Strategic Impacts of Generative Artificial Intelligence Adoption in Public Administration: An Empirical Analysis

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Abstract. *In recent years, the diffusion of Generative Artificial Intelligence (GenAI) has been profoundly transforming decision-making processes, organizational models, and knowledge creation practices in both the private and public sectors. However, the existing literature has primarily focused on specific technological applications, devoting less attention to understanding the strategic implications associated with its adoption within Public Administration (PA). In light of this gap, the present study aims to identify and prioritize the strategic impacts related to the adoption of GenAI in PA, while also analysing the differences across various public sectors. The research adopts a two-phase approach. First, a systematic literature review was conducted to identify the main strategic dimensions associated with GenAI adoption. Subsequently, these dimensions were analysed through the Analytic Hierarchy Process (AHP) using a survey administered to 80 public employees across two sectors: local government and healthcare. The results highlight that psychological barrier represent the most significant factor influencing the adoption of GenAI, followed by work performance and dimensions related to privacy and security. Moreover, the sectoral analysis reveals significant differences in the priorities assigned to the various factors. This study contributes to the literature by offering a comparative perspective on the strategic impacts of GenAI in the public sector and provides useful insights to guide the implementation strategies and innovation management within PAs.*
***Keywords**: Artificial Intelligence; Analytic Hierarchy Process (AHP); Public Administration; Digital Transformation.*

Framing of the research. The rapid diffusion of Artificial Intelligence (AI) has profoundly transformed decision-making processes, organizational dynamics, and knowledge production mechanisms in both the private and public sectors (Schwab, 2017; Russell & Norvig, 2021). Recent literature highlights that this transformation does not merely represent technological progress, but rather a phenomenon capable of affecting broader organizational and institutional variables, influencing citizens' expectations and the accountability mechanisms of public institutions (Mercuri et al., 2025; Margetts & Dorobantu, 2019; Wirtz, Weyerer & Geyer, 2019; Criado, Sandoval-Almazan & Gil-Garcia, 2025). In this context, Generative Artificial Intelligence (GenAI) stands out for its ability to learn from large volumes of data and generate original content, contributing to redefining how organizations operate across different sectors (Goodfellow et al., 2014; LeCun, Bengio & Hinton, 2015).

Despite its potential benefits, the adoption of GenAI also raises several critical issues, including concerns related to data security, the quality of generated information, algorithmic transparency, and the risk of excessive reliance on automated decision-making (Janssen & Van den Hoven, 2015; Tung, Hasnaeen & Zhao, 2025). Furthermore, the introduction of such technologies may generate concerns among public employees regarding the potential loss of competencies or the replacement of traditional professional skills (Verano et al., 2025). For this reason, international organizations such as UNESCO and the OECD have promoted ethical principles and guidelines aimed at fostering human-centered AI development, based on transparency, responsibility, and inclusiveness (UNESCO, 2021; OECD, 2024). In parallel, the European Union has introduced the Artificial Intelligence Act (AI Act), which establishes a regulatory framework based on a risk-based approach to the use of AI systems (European Union, 2024).

Within Public Administration (PA), several studies highlight how the use of GenAI can improve the quality of public services, the accessibility of information, and the efficiency of administrative processes (Margetts & Dorobantu, 2019; Zhou et al., 2025). Moreover, unlike the private sector—where innovation is often driven by competitive dynamics—the public sector pursues objectives related to values such as inclusiveness, transparency, and accountability (Jørgensen & Bozeman, 2007; Meynhardt, 2009).

Despite the growing academic interest, most studies have focused on the technical and application-related aspects of GenAI, while less attention has been devoted to understanding its strategic and organizational implications within the context of PA (Sousa et al., 2019; Babšek et al., 2025). Indeed, beyond the purely technological dimension, recent studies highlight the need to consider additional aspects, such as organizational culture, trust, and the individual behaviors of public employees (Vinarski-Peretz & Kidron, 2024; Bunduchi, Sitar-Tăut & Mican, 2025).

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Furthermore, existing literature often tends to treat the public sector as a relatively homogeneous context, overlooking the differences among the various sectors that characterize PA, which are marked by different institutional missions and operational logics (Russo, 2013; Bobbio, 2015; Francini, 2021). In light of these considerations, there is a need to systematically investigate the strategic dimensions associated with the adoption of GenAI across different sectors of PA, and how these may vary according to their specific operational dynamics.

Purpose of the paper. This study aims to identify and prioritize the strategic impacts associated with the adoption of GenAI in PA, while also identifying the specific characteristics and limitations that influence its adoption across different public sectors. More specifically, the research seeks to identify the main dimensions influencing the integration of these technologies within public contexts and to assess their relative importance through a multi-criteria decision-making approach.

To achieve this objective, the study combines a systematic literature review with the Analytic Hierarchy Process (AHP) in order to structure and hierarchize the strategic factors emerging in the GenAI adoption process. The analysis is conducted by considering two different sectors of PA—local government and healthcare—with the aim of highlighting potential differences in the priorities attributed to the various impacts according to the institutional and operational specificities of each sector. Through this approach, the study intends to contribute to the existing literature on GenAI adoption in the public sector by providing a comparative and multidimensional perspective on its strategic impacts, while also offering useful insights to support managerial decision-making and implementation strategies within PAs.

Methodology. The paper is structured in two phases. In the first phase, a systematic literature review was conducted to identify the main dimensions of GenAI impact in Public Administration (PA). A total of 62 articles were selected and analysed, through which the factors were identified and grouped into strategic macro-dimensions, namely economic, personal, and technological. For the purposes of the analysis, seven factors were then selected, each representing one of the aforementioned strategic dimensions. Specifically, Psychological Barriers and Perceived Enjoyment were derived from the Technology Acceptance Model (TAM) (Davis, 1989; Venkatesh et al., 2003); Work Performance and Organizational Support were considered for the economic dimension (Vial, 2019; Wirtz et al., 2019). Finally, for the technological dimension, the factors Privacy & Security, Perceived Information Quality, and Anthropomorphism were included. These factors are linked both to the transparency and reliability of data generated by GenAI (OECD, 2024; UNESCO, 2021) and to human–machine interaction and the perception of applied systems (Glikson & Woolley, 2020).

Tab.1: Evaluation factors identified

Factor category	***Factor name***	***Definition***	***Representative Authors / Studies***
Personal	*Psychological Barriers*	*Psychological barriers refer to internal resistance shaped by personal beliefs, values, habits, and cultural norms.*	*Verano-Tacoronte et al. (2025); Chow & To (2025); Seyfi et al. (2025); Zhou et al. (2025)*
	Perceived Enjoyment	*Enjoyment refers to the degree to which the activity of using technology is perceived as pleasant in itself, regardless of any expected performance outcomes.*	*Cano & Núñez (2024); Foroughi et al. (2025); Ursavaş et al. (2025)*
	Perceived Information Quality	*Perceived information quality refers to the extent to which users consider AI-generated information to be timely, accurate, contextually relevant, practically useful, and sufficiently detailed to meet their needs.*	*Mun & Hwang (2024); Lee et al. (2002); Zhang & Hou (2024)*
	Anthropomorphism	*Anthropomorphism refers to the extent to which users perceive human-like characteristics during their interaction with GenAI systems.*	*Alsharhan et al. (2024); Ma & Huo (2023); Arce-Urriza et al. (2025)*
Economic	*Work Performance*	*Job performance refers to the effectiveness and productivity with which an individual completes tasks and responsibilities associated with their role.*	*Davis (1989); Patterson et al. (2024); Shahzad et al. (2024); Ivanov et al. (2024)*
	Organizational Support	*Organizational support refers to the level of resources, environment, and institutional support provided to facilitate employees' adoption of GenAI technologies in completing their work activities.*	*Hazzan-Bishara et al. (2025); Mergel et al. (2023); Al-Khatib (2023)*
Technological	*Privacy and Security*	*Privacy and security refer to the level of perceived protection of personal data and information shared with GenAI systems during their use.*	*Bunduchi et al. (2025); Bashir & Lapshun (2025); Lee et al. (2025)*

Source: Authors elaboration

In the second phase, the Analytic Hierarchy Process (AHP) methodology was applied in order to identify and prioritize the factors selected in the previous phase. This tool is widely used for analyzing particularly complex problems characterized by a plurality of criteria and qualitative judgments (Saaty, 1980; Saaty, 2008). Specifically, AHP made it possible to translate the qualitative judgments expressed by experts into consistent, verifiable, and aggregable quantitative weights (Saaty, 1980).

A structured questionnaire was therefore designed using a specifically configured Excel file. The questionnaire, containing pairwise comparisons, was administered to heterogeneous senior representatives belonging to the two sectors under analysis (local government and healthcare), with the aim of capturing potential differences in the perception of the technology among individuals with different roles, skills, and responsibilities. Participants were asked to compare each possible pair of criteria, C_i and C_j, expressing their judgment using the fundamental AHP scale proposed by Saaty (1980), as illustrated in Table 2.

Tab. 2: AHP Weighting Scale

Intensity of Importance	Scale Descriptor
1	Equal Importance (Equivalent)
3	Moderate Importance
5	Strong Importance
7	Very Strong Importance
9	Extremely Important
2; 4; 6; 8	Intermediate Values

Source: Saaty, 1980

Once the data were collected, they were organized into a square matrix $A = (a_{ij})$. The matrix makes it possible to systematically synthesize the preferences expressed by the respondents. The formulation used to construct the matrix is presented in Equation (1).

$$A_x = (a_{11} \cdots a_{1c} \vdots \ddots \vdots a_{c1} \cdots a_{cc}) \; \forall_x \in (1, 2, \ldots, 80) \qquad (1)$$

For a_{ij}, the following applies:

- $\forall_i = 1, \ldots, c = \forall_j = 1, \ldots, c: a_{ij} = a_{ij}^{-1}$;
- $\forall_i = 1, \ldots, c = \forall_j = 1, \ldots, c: a_{ij} > a_{ij}^{-1}$;
- $\forall_i = j : a_{ij} = 1$

Whereas the reciprocal of a_{ij} is calculated as follows:

$$a_{ij} = 1/a_{ij}, \; \forall_{i,j} = 1, \ldots, c, \; i \neq j \qquad (2)$$

The coherence of the evaluation matrices was estimated based on the Coherence Ratio (CR)(3).

$$CR = \frac{Indice\ di\ Consistenza\ (CI)}{Indice\ Random\ (RI)} \qquad (3)$$

The Consistency Index (CI) is calculated using Equation (4), where the numerator represents the deviation between the maximum eigenvalue of the comparison matrix and its dimension. The consistency threshold was set at 0.20. Respondents whose judgments exceeded this threshold were asked to voluntarily review their pairwise comparisons in order to fall within the acceptable limit.

$$CI = \frac{\lambda - N}{N - 1} \qquad (4)$$

The Random Index (RI), used to evaluate the consistency of the pairwise comparison matrices, is reported in Table 3.

Tab. 3: Random Index (RI)

N	1	2	3	4	5	6	7	8	9	10	11	12
RI	0	0	0,58	0,90	1,12	1,24	1,32	1,41	1,45	1,49	1,52	1,54

Source: Authors Elaboration

The questionnaire was administered to respondents in a manner that ensured anonymity. Specifically, 40 public employees were interviewed for each sector, for a total of 80 respondents. Data were collected between September and November 2025. Participants were contacted through a combination of online and offline channels, including direct contact both in person and remotely. Finally, the data were processed in order to obtain the priority weights, both in aggregated form and by individual sector, while also considering the socio-demographic characteristics of the respondents.

Specifically, the demographic data of the respondents are reported in the following table.

Tab. 4: Demographic data of the observed sample

Demographic		***Frequency***	***Percentage***
Gender	*Male*	*41*	*51,25%*
	Female	*39*	*48,75%*
Age	*18 - 25*	*2*	*2,50%*
	26 - 35	*18*	*22,50%*
	36-45	*25*	*31,25%*
	46 - 55	*20*	*25,00%*
	56 - 65	*12*	*15,00%*
	Over 65	*3*	*3,75%*
Income	*< 1.000 €*	*1*	*1,25%*
	1.000 € - 1.500 €	*7*	*8,75%*
	1.500 €- 2.000 €	*15*	*18,75%*
	2.000 € - 2.500 €	*21*	*26,25%*
	2.500 € - 3.000 €	*15*	*18,75%*
	> 3.000 €	*12*	*15,00%*
	Not Specified	*9*	*11,25%*
Education	*Middle school*	*0*	*0,00%*
	High School	*16*	*20,00%*
	Bachelor's degree	*23*	*28,75%*
	Master's degree	*27*	*33,75%*
	Master/Ph.D.	*14*	*17,50%*

Source: Authors Elaboration

Results. The application of the AHP methodology made it possible to hierarchize the factors related to the adoption of GenAI in Public Administration (PA) by analyzing the results at aggregated, sectoral, and socio-demographic levels. At the aggregated level, the results show a relatively balanced distribution of weights across the criteria, indicating a strong interaction among the different dimensions considered.

The most relevant factor is Psychological Barriers (16.17%), highlighting the presence of cultural and cognitive resistance to the introduction of new technologies within PA. This is followed by Work Performance (15.83%) and Privacy and Security (15.19%), which respectively underline the importance of operational efficiency and data protection.

Organizational Support (14.26%) and Perceived Information Quality (14.07%) show intermediate weights. Finally, the lowest values are attributed to Perceived Enjoyment (12.87%) and Anthropomorphism (11.62%), confirming the lower relevance of experiential aspects compared to functional and organizational dimensions.

Tab. 5: Sample weighting criteria for the PA

Factors	***Weight***
Psychological Barriers	*16,17%*
Perceived Enjoyment	*12,87%*
Work Performance	*15,82%*
Organizational Support	*14,26%*
Privacy and Security	*15,19%*
Perceived Information Quality	*14,07%*
Anthropomorphism	*11,62%*

Source: Authors Elaboration

The sectoral analysis highlights more pronounced differences compared to the aggregated results. In local government, the most relevant factors are Anthropomorphism (17,27%) and Perceived Information Quality (17,25%), indicating greater attention to communicative aspects and to the reliability of the information generated by GenAI. In contrast, Perceived Enjoyment appears to be the lowest relevant criterion (10,64%). Whereas in the healthcare sector, the results are similar to the aggregated ones, with greater relevance attributed to Psychological Barriers (18,53%) and a lower weight assigned to Anthropomorphism (9,46%), while the remaining factors show a relatively balanced distribution.

Tab. 6: Sample weighting criteria for the various sectors of the Public Administration

Factors	*Local Government*	*Healthcare*
Psychological Barriers	*13,17%*	*18,53%*
Perceived Enjoyment	*10,64%*	*14,72%*
Work Performance	*12,96%*	*15,47%*
Organizational Support	*14,14%*	*13,79%*
Privacy and Security	*14,57%*	*15,85%*
Perceived Information Quality	*17,25%*	*12,18%*
Anthropomorphism	*17,27%*	*9,46%*

Source: Authors Elaboration

The socio-demographic analysis highlights several differences in the priorities assigned to the criteria across different age groups. In particular, younger respondents (18–25 years old) attribute greater importance to Perceived Information Quality (23.53%). In the 26–35, 56–65, and over 65 age groups, Work Performance emerges as the most relevant criterion, whereas in the intermediate groups (36–45 and 46–55) Psychological Barriers appear to be more prominent. The least relevant factor is generally Anthropomorphism, except for the over-65 group, where the lowest value is attributed to Perceived Enjoyment. Overall, these results confirm the lower importance assigned to experiential and emotional aspects in the adoption of GenAI within PA.

Tab. 7: Socio-demographic data – Age

Age	*18-25*	*26-35*	*36-45*	*46-55*	*56-65*	*Over 65*
Psychological Barriers	*12,37%*	*14,79%*	*18,88%*	*15,80%*	*14,66%*	*13,75%*
Perceived Enjoyment	*11,24%*	*13,20%*	*14,45%*	*12,33%*	*11,70%*	*7,74%*
Work Performance	*12,81%*	*16,23%*	*15,28%*	*15,28%*	*16,35%*	*20,73%*
Organizational Support	*13,73%*	*13,57%*	*13,60%*	*14,49%*	*15,75%*	*15,66%*
Privacy and Security	*17,25%*	*15,99%*	*14,50%*	*15,13%*	*15,40%*	*13,88%*
Perceived Information Quality	*23,53%*	*15,43%*	*12,10%*	*14,05%*	*14,14%*	*17,02%*
Anthropomorphism	*9,07%*	*10,79%*	*11,19%*	*12,92%*	*12,00%*	*11,22%*

Source: Authors Elaboration

The analysis by educational level highlights some differences in the priorities assigned to the criteria. Respondents holding a bachelor's or master's degree show results similar to the aggregated sample, attributing greater importance to Psychological Barriers and lower relevance to Anthropomorphism. Conversely, employees holding a PhD/Master's degree or a high school diploma place greater emphasis on Privacy and Security. In general, the least relevant factor appears to be Perceived Enjoyment, confirming a stronger focus on the functional and performance-related aspects of GenAI rather than on the experiential dimension.

Tab. 8: Socio-demographic data – Education

Education	*High School*	*Bachelor's degree*	*Master's degree*	*PhD/Master*
Psychological Barriers	*13,01%*	*18,48%*	*16,63%*	*15,26%*
Perceived Enjoyment	*10,80%*	*15,32%*	*13,60%*	*10,23%*
Work Performance	*15,45%*	*16,74%*	*15,18%*	*15,59%*
Organizational Support	*14,59%*	*13,98%*	*14,10%*	*14,13%*
Privacy and Security	*16,12%*	*13,50%*	*15,38%*	*16,68%*
Perceived Information Quality	*17,00%*	*11,87%*	*13,97%*	*14,71%*
Anthropomorphism	*13,03%*	*10,11%*	*11,14%*	*13,40%*

Source: Our Elaboration

The analysis by income level highlights differences in the priorities assigned to the criteria. In the below €1000 income group, Perceived Information Quality and Organizational Support emerge as the most relevant factors, while Privacy and Security receive lower importance. In the €1000–1500 and €2500–3000 income groups, Psychological Barriers appear to be more relevant, indicating the importance of the cultural dimension in technology adoption processes. The intermediate income groups (€1500–2000 and €2000–2500) show a more balanced distribution, with greater attention to Work Performance and Perceived Information Quality. Finally, in the above €3000 income group, Work Performance, Privacy and Security, and Organizational Support emerge as the most relevant factors, highlighting a perspective more oriented

toward the governance of technology. Overall, the results show that different income groups assign different priorities to the strategic impacts of GenAI.

Tab. 9: Socio-demographic data – Income

Income	*< 1000*	*1000-1500*	*1500-2000*	*2000-2500*	*2500-3000*	*> 3000*	*Not Specified*
Psychological Barriers	*14,91%*	*18,18%*	*14,21%*	*15,66%*	*19,11%*	*13,64%*	*17,31%*
Perceived Enjoyment	*11,79%*	*13,74%*	*11,82%*	*12,55%*	*17,88%*	*9,48%*	*12,00%*
Work Performance	*14,41%*	*14,78%*	*17,08%*	*14,80%*	*17,50%*	*16,27%*	*13,14%*
Organizational Support	*16,82%*	*12,63%*	*13,50%*	*15,25%*	*12,68%*	*15,62%*	*14,25%*
Privacy and Security	*8,89%*	*15,34%*	*15,11%*	*14,74%*	*14,43%*	*15,83%*	*16,92%*
Perceived Information Quality	*19,43%*	*14,87%*	*16,95%*	*14,61%*	*9,37%*	*15,56%*	*13,76%*
Anthropomorphism	*13,75%*	*10,46%*	*11,33%*	*12,39%*	*9,03%*	*13,60%*	*12,62%*

Source: Authors Elaboration

Overall, the sectoral results highlight significant differences shaped by the specific characteristics of each sector with respect to the adoption of GenAI. In particular, the analysis brings to light the different criteria that the various sectoral contexts consider to be the most impactful within their specific operational environments. The findings emerging from this threefold analysis (aggregated, sectoral, and socio-demographic) emphasize the need for public decision-makers to adopt a cautious and balanced approach when managing the implementation of GenAI. In particular, policymakers should carefully consider how to address and overcome the barriers associated with GenAI adoption among public employees, which may vary across different institutional contexts.

Research limitations. This study adopts an exploratory qualitative approach, based on the analysis of primary data collected through a structured survey distributed by the authors. Despite the validity of the data, several limitations should be acknowledged.

First, the relatively limited sample size (N = 80), although adequate for exploratory applications of the Analytic Hierarchy Process (AHP), limits the full generalizability of the results. Second, the cross-sectional nature of the research does not allow for the analysis of how perceptions of the impacts of GenAI may evolve over time. Finally, the analysis focuses on two specific domains of PA, which may limit the representativeness of the broader public sector.

Despite these limitations, the study provides a first structured prioritization of the strategic factors associated with the adoption of GenAI in PA, offering a solid empirical basis for future theoretical and applied research.

Managerial implications. The introduction of GenAI in Public Administration (PA) produces significant managerial implications, as it should not be considered merely a technological innovation but rather a broader organizational transformation that also affects the personal dimension of employees working in the public sector (Wirtz & Müller, 2023; Mergel et al., 2023). In particular, the central role attributed to psychological barriers and work performance highlights the need for public managers to invest in training and digital skills development for public employees, while simultaneously fostering organizational environments that reduce resistance and negative perceptions associated with the introduction of GenAI.

Sectoral results also reveal different priorities across the various domains of PA. In the healthcare sector, stronger resistance to adoption emerges due to fears of skill loss and distrust toward technology, making it necessary for management to play an active role in supporting employees and clearly defining the boundaries of responsibility between technological systems and human operators. Moreover, local governments place greater emphasis on human-related factors, showing particular attention to information quality and communication with citizens.

Overall, users in the public sector tend to prioritize reliability, transparency, and operational support over experiential or symbolic dimensions, as confirmed by the limited importance attributed to anthropomorphism (Glikson & Woolley, 2020). This suggests that the adoption of GenAI in PA is primarily driven by the robustness of systems, data security, and their contribution to improving organizational performance. Furthermore, the demographic differences observed highlight the need to avoid "one-size-fits-all" solutions (Vinarski-Peretz & Kidron, 2024; Wirtz, Weyerer & Geyer, 2019) and instead develop differentiated training programs, particularly according to the age and educational level of public employees.

Originality of the paper. The originality of this paper lies in the strategic prioritization of the impacts associated with the adoption of GenAI in the public sector, providing a clearer understanding of how PAs hierarchize expected benefits in the presence of organizational, regulatory, and technological constraints.

Furthermore, the article analyses the differences across the various PA sectors considered, highlighting how different sectoral dynamics influence the relative priority assigned to the identified factors. This contributes to a deeper understanding of the logics and dynamics that drive digital transformation within PA.

The research also contributes to expanding the literature on GenAI adoption in the public sector, extending beyond the limitations of traditional technology adoption models, such as TAM, TOE, and UTAUT.

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Strategie di Open Innovation e performance innovative delle PMI: il ruolo moderatore del valore e della veridicità dei Big Data

GIULIO FERRIGNO, FRANCESCA PASCALE, SAVERIO BARABUFFI, ANDREA PICCALUGA

Abstract. *La relazione tra le strategie di ricerca di Open Innovation (OI) e le performance innovative delle PMI è ampiamente discussa nella letteratura. Tuttavia, gli studi esistenti raramente considerano se tale relazione sia moderata dalle caratteristiche dei Big Data. Facendo riferimento alla Transaction Cost Economics (TCE), ipotizziamo che il Big Data Value e la veridicità dei Big Data moderino la relazione tra le strategie di ricerca OI (ampiezza e profondità) e le performance innovative, sia radicali sia incrementali, delle PMI. Utilizzando un dataset originale di PMI italiane, il nostro studio evidenzia un significativo effetto moderatore del Big Data Value, suggerendo una riduzione dei costi di transazione e di coordinamento. A partire da questi risultati, proponiamo alcune implicazioni teoriche e manageriali.*
Keywords: *innovazione aperta; performance dell'innovazione; PMI; big data; Italia*

Framing of the research. Quasi vent'anni dopo la loro concettualizzazione iniziale, sono state condotte ricerche approfondite sulle strategie di ricerca OI (Chesbrough, 2003; Laursen e Salter, 2006; Liu et al., 2024), sia in termini di ampiezza dell'OI (ad esempio la varietà di fonti esterne come i partner) sia in termini di profondità dell'OI (ad esempio, l'intensità dell'interazione con queste fonti esterne) (Del Sarto et al., 2023; Bertello et al., 2024; Cricchio et al., 2025). Per quanto riguarda le PMI, la letteratura precedente ha rilevato che alti livelli di ampiezza e profondità dell'OI sono vantaggiosi sia per la loro innovazione incrementale che per quella radicale (Yusof et al., 2023).

Tuttavia, negli ultimi anni, i Big Data sono diventati sempre più importanti, ma nessuno studio ha indagato se le loro caratteristiche possano aumentare o ridurre i costi di coordinamento OI, sia per ampiezza che per profondità. In effetti, le caratteristiche dei Big Data sono un argomento recente e molto dibattuto nella ricerca (Mariani et al., 2023). E infatti, gli studiosi hanno studiato il Volume di Big Data, la Velocità dei Big Data e la Varietà dei Big Data (Tan e Zhan, 2017; Ghasemaghaei e Calic, 2020; Ferrigno et al., 2024; Ritala et al., 2024). Tuttavia, la letteratura recente suggerisce che devono essere studiate anche due caratteristiche aggiuntive: il Valore dei Big Data (ad esempio, Monino, 2021) e la Verdicità dei Big Data (ad esempio, Cappa et al., 2021). Comunemente definite "la seconda generazione di Big Data" (Del Vecchio et al., 2018), queste due caratteristiche possono svolgere un ruolo fondamentale nella comprensione della rilevanza dei Big Data per le aziende. Anzi, possono migliorare l'affidabilità delle decisioni delle PMI e stimolarne le prestazioni innovative incentivando un approccio più rapido ed efficiente (Del Vecchio et al., 2018; Cappa et al., 2021). In particolare, il Valore dei Big Data rappresenta i benefici e le intuizioni che i Big Data possono offrire, mentre la Verdicità dei Big Data rappresenta l'affidabilità e la perspicacità dei dati. Come osservato da Ghasemaghaei (2021), sia la Veracità dei Big Data che il Valore dei Big Data sono caratteristiche cruciali che incorporano le principali caratteristiche di Volume, Varietà e Velocità dei Big Data.

Purpose of the paper. In questo studio, puntiamo quindi a esplorare il ruolo di queste due caratteristiche del Big Data (cioè Valore e Veridicità) nella relazione tra le strategie di ricerca OI e le performance innovative delle PMI (Ferrigno et al., 2025). A tal proposito, alcuni studi suggeriscono che il Big Data influenzi le strategie di ricerca OI (ad esempio, Ferrigno et al., 2024), mentre altri indicano che il Big Data può aiutare le PMI a migliorare le loro performance innovative (Parida et al., 2017). La letteratura esistente ha inoltre rilevato che entrambe le strategie di ricerca OI possono influenzare le performance innovative delle PMI (Del Sarto et al., 2023), ma nessuno studio ha esaminato il potenziale effetto del Big Data come moderatore in questa relazione. Di conseguenza, studi recenti (ad esempio, Del Sarto et al., 2023; Ferrigno et al., 2024) suggeriscono che il Big Data potrebbe avere un ruolo nel rapporto tra le strategie di ricerca OI e le performance innovative delle PMI. In particolare, Ferrigno et al. (2025, p.11) affermano che "sarebbe utile indagare se alcune caratteristiche dei Big Data — come valore e veridicità — moderino la relazione tra le strategie di ricerca dell'innovazione aperta e le prestazioni innovative radicali e incrementali delle aziende". Pertanto, in questo studio cerchiamo di rispondere a questa domanda di ricerca: qual è l'effetto moderatore del Valore e della Veridicità del Big Data sulla relazione tra le strategie di ricerca OI e le performance innovative delle PMI?

Methodology. Per testare le nostre ipotesi, abbiamo scelto il contesto italiano considerando caratteristiche specifiche dell'ambiente normativo e delle opportunità imprenditoriali (Beckman e Burton, 2008). L'Italia ha una significativa prevalenza di PMI (Ferrigno, Del Sarto, Di Minin, 2025), che impiegano oltre il 90% della forza lavoro nazionale (ISTAT, 2022) e, nell'ultimo decennio, il Governo italiano ha lanciato numerosi piani e interventi per promuovere la digitalizzazione delle aziende e l'accesso ai Big Data (MISE, 2020). In quanto tale, l'Italia rappresenta un contesto completo per indagare la natura complessa delle PMI che interagiscono con i Big Data (Ferrigno et al., 2024).

Abbiamo sviluppato un sondaggio e condotto tre test preliminari per migliorare la chiarezza e l'affidabilità di un questionario specificamente progettato (Crick et al., 2023). Lo abbiamo testato ottenendo spunti da cinque esperti

accademici nei campi dell'OI, PMI e Big Data, e da cinque fondatori e decisori di PMI operanti in settori diversi (Laursen e Salter, 2006). Successivamente, un'agenzia indipendente ha esaminato anche il questionario. Infine, abbiamo utilizzato il sito italiano "registroimprese" per identificare aziende con meno di 250 dipendenti e un fatturato inferiore a 50 milioni di euro (Messeni Petruzzelli et al., 2022), e il database Orbis per accedere agli indirizzi email e ai principali contatti di queste aziende; Per i dati che non possono essere scaricati, abbiamo cercato manualmente nei siti web delle aziende. Abbiamo selezionato e contattato casualmente un sottocampione di 801 aziende e distribuito un questionario strutturato online da compilare da parte dei loro CEO o fondatori, utilizzando il metodo del Computer-Assisted Telephone Interview (CATI). Abbiamo scoperto che, all'interno di queste, 210 aziende erano coinvolte in attività di Big Data. Su 210, 135 PMI hanno compilato il questionario. Abbiamo testato le ipotesi stimando le regressioni ai minimi quadrati ordinari (OLS). In particolare, abbiamo stimato la seguente equazione:

$$Y_i=OI_i+\text{Big Data V}_i+OI_i\times\text{Big Data V}_i+\text{ Controlli}+\text{Correzione di Heckman}+\varepsilon_i$$

Questo approccio è un metodo rigoroso per affrontare la nostra domanda di ricerca, poiché consente di valutare sia gli effetti diretti che moderati delle caratteristiche del Big Data sulla relazione tra le strategie OI e i risultati innovativi delle PMI. Includendo i termini di interazione tra IO e variabili Big Data, il modello cattura esplicitamente se e come le capacità Big Data rafforzano o indeboliscono l'effetto dell'OI sulle prestazioni dell'innovazione. L'OLS consente inoltre l'inclusione di variabili di controllo che tengono conto di caratteristiche specifiche dell'azienda che potrebbero confondere le relazioni osservate. Includiamo quindi due modelli nella nostra analisi, uno che include i controlli, l'altro senza controlli. Questo ci permette di eseguire il lavoro di Hill et al. (2020) per offrire un'analisi più forte e robusta. Offriamo anche un modello aggiuntivo che applica la correzione di Heckman (Heckman, 1979). In particolare, la correzione di Heckman affronta il potenziale bias di selezione del campione, migliorando la robustezza e la validità dei nostri risultati. In quanto tale, questo metodo fornisce un quadro affidabile per isolare gli effetti moderatori delle caratteristiche dei Big Data.

La variabile dipendente è la performance innovativa delle PMI, cioè radicale o incrementale. Le variabili indipendenti sono le strategie di ricerca OI (cioè profondità o ampiezza), i Big Data Vs (cioè Valore o Verità) e i termini di interazione tra profondità/ampiezza OI e Valore/Verdicità dei Big Data.

Successivamente, abbiamo introdotto diverse variabili di controllo e abbiamo eseguito una trasformazione logaritmica per tutte le variabili. In linea con alcuni studi precedenti, il nostro modello include le seguenti variabili di controllo: (1) se la PMI opera o meno in un'industria high-tech (Messeni Petruzzelli et al., 2022); (2) il logaritmo dell'età di SME (Kelly e Amburgey, 1991); (3) il logaritmo della dimensione delle SME (Arbore e Ordanini, 2006; Horváth e Szabó, 2019); (4) il potenziale e la capacità di assorbimento realizzata delle PMI (cioè le spese di R&S sul fatturato totale; vedi Cassetta et al., 2020; Zahra e George, 2002); e (5) le competenze digitali delle risorse umane delle PMI (misurate come percentuale di dipendenti con una laurea STEM; vedi Agostini e Filippini, 2019; Eller et al., 2020; Giotopoulos et al., 2017; Horváth e Szabó, 2019). Poi, il termine di correzione di Heckman controlla l'endogeneità derivante dal bias di auto-selezione nelle risposte delle imprese, come proposto da Heckman (1979).

Results. I nostri risultati mostrano un effetto positivo e statisticamente significativo di moderazione del Big Data Value sulla relazione tra le strategie di ricerca OI e le performance innovative delle PMI, supportando così H1 e H2. Più specificamente, il Big Data Value sembra ridurre i costi di coordinamento generati dalle strategie di ricerca OI. Di conseguenza, le strategie di ampiezza dell'OI diventano più efficaci nel supportare la performance radicale dell'innovazione quando le PMI possono sfruttare i benefici economici e le intuizioni fornite dal Valore dei dati, poiché riducono i costi di coordinamento derivanti dall'assimilazione di molteplici input di conoscenza esterna (Laursen e Salter, 2006; Radicic e Alkaraan, 2022; Messeni Petruzzelli et al., 2022; Carrasco-Carvajal et al., 2023; Broekhuizen et al., 2023). In questo contesto, Big Data Value facilita il processo delle PMI di trovare nuovi partner con cui collaborare. Big Data Value può aiutare le PMI a identificare partner adatti a diverse esigenze in modo più rapido ed efficiente, permettendo loro di risparmiare tempo e risorse e così ridurre i costi di coordinamento. L'effetto sulla riduzione dei costi di coordinamento modera positivamente la relazione tra ampiezza dell'OI e performance radicale nell'innovazione, con un beneficio complessivo per l'azienda.

Tuttavia, anche nel contesto della profondità dell'OI, il Big Data Value interviene riducendo questi costi e migliorando ulteriormente le performance radicali dell'innovazione (Laursen e Salter, 2006; Messeni Petruzzelli et al., 2022). Infatti, il Big Data Value consente alle PMI di ridurre le risorse e il tempo necessari per approfondire la collaborazione con un partner specifico, rendendo la collaborazione più efficiente. Il Big Data Value può anche aiutare le PMI a identificare rapidamente il partner più adatto per ogni compito specifico richiesto nel processo di innovazione, senza ripetere ogni volta il processo di ricerca.

Per quanto riguarda la veridicità dei Big Data e il suo impatto sulla relazione tra le strategie di ricerca OI (ampiezza e profondità) e le performance innovative delle PMI, i nostri risultati non rivelano alcun legame sostanziale. Infatti, i nostri risultati mostrano che la ricerca sulla veridicità dei Big Data potrebbe non avere l'impatto previsto sulla relazione tra OI e performance dell'innovazione, non confermando che i costi di transazione siano positivamente influenzati dalla veridicità dei Big Data, anche se le intuizioni teoriche lo suggerirebbero. Infatti, Big Data Veracity facilita e riduce risorse e tempi per verificare l'affidabilità delle informazioni ricevute, potenzialmente moderando positivamente le relazioni tra strategie di ricerca OI e performance innovative, grazie all'impatto positivo dell'affidabilità e dell'approfondimento dei dati (White, 2012), caratteristiche fondamentali soprattutto per le aziende che mirano ad affrontare performance di

innovazione incrementali o radicali (Cappa et al., 2021). La veridicità dei Big Data può permettere alle PMI di concentrarsi solo su dati affidabili e rilevanti per estrarre preziose informazioni e stimolare le prestazioni dell'innovazione. In particolare, nel contesto dell'ampiezza dell'OI, i potenziali impatti positivi della veridicità dei Big Data sono stimolati dalla crescente varietà di approcci alla risoluzione dei problemi, che stimolano soluzioni per problemi difficili e la selezione di partner più adatti (Fleming, 2007; George et al., 2008; Singh e Fleming, 2010; Radicic e Alkaraan, 2022; Messeni Petruzzelli et al., 2022; Carrasco-Carvajal et al., 2023). Lo stesso accade quando le PMI si occupano di profondità IO e devono selezionare con cura i partner per collaborare più frequentemente e profondamente, creando relazioni stabili e solide (Laursen e Salter, 2006; Messeni Petruzzelli et al., 2022; Carrasco-Carvajal et al., 2023). Il costo potenziale del trasferimento di informazioni e conoscenze (Clemons e Row, 1992; Gorman, 2014; Ziegert et al., 2022) potrebbe essere compensata dai crescenti benefici che le PMI ottengono nel perseguire pratiche di approfondimento in IO (Laursen e Salter, 2006). Pertanto, i nostri risultati richiedono ulteriori indagini sull'effetto della veridicità dei Big Data da diverse prospettive.

Research limitations. Il presente studio contribuisce alla comprensione delle caratteristiche dei Big Data come variabili moderatrici che influenzano le strategie di ricerca dell'innovazione aperta e le prestazioni innovative delle PMI, tuttavia non è esente da possibili limitazioni.

Innanzitutto, il principale svantaggio della nostra ricerca riguarda l'ambito delle analisi empiriche, poiché la nostra indagine è limitata a un solo paese. Questa scelta è guidata dalla rilevanza del paese italiano per l'obiettivo della nostra ricerca; infatti, l'Italia è uno dei primi paesi in Europa a stimolare l'uso dei Big Data nelle PMI. Tuttavia, il numero di aziende considerate è limitato e potrebbe esserci qualche bias specifico per paese. Ricerche future potrebbero estendere questa indagine studiando diversi paesi e offrendo confronti tra i paesi, ad esempio con aziende cinesi (Dong, Zhang, & Mei, 2025, Wu & Mei, 2022). Confrontare i risultati provenienti da diversi contesti empirici amplierebbe la conoscenza accademica sull'effetto dei Big Data sulla relazione tra strategie di ricerca dell'innovazione aperta e performance dell'innovazione e farebbe luce sulle conseguenze politiche.

In secondo luogo, abbiamo identificato le strategie di ricerca dell'innovazione aperta per il nostro studio basandoci sul quadro stabilito da Messeni Petruzzelli et al. (2021) e Laursen e Salter (2006). Tuttavia, riconosciamo l'esistenza di altre concettualizzazioni di innovazione aperta, come quelle evidenziate in diversi studi, che non abbiamo incluso nel nostro questionario. Ad esempio, Gassmann et al. (2010) adottano una 'prospettiva di processo', classificando queste pratiche in processi OI in entrata, in uscita e accoppiati; mentre Spithoven et al. (2013) suggeriscono quattro pratiche di innovazione aperta, come (1) la ricerca di fonti esterne di innovazione, (2) l'acquisizione di R&S esterni, (3) l'uso di partner collaborativi per l'innovazione e (4) lo sfruttamento dei meccanismi di protezione della proprietà intellettuale disponibili. Ricerche future potrebbero replicare la nostra metodologia considerando anche concettualizzazioni alternative di innovazione aperta identificate in altri studi.

In terzo luogo, abbiamo esaminato il rapporto tra strategie di ricerca per l'innovazione aperta e performance dell'innovazione e il ruolo moderatore delle caratteristiche dei Big Data all'interno delle PMI italiane. Future indagini potrebbero esplorare gli effetti moderatori dei Big Data sull'impatto dell'innovazione aperta su uno spettro più ampio di imprese, inclusi aziende consolidate, grandi aziende e startup.

In quarto luogo, in questo studio abbiamo analizzato il ruolo moderatore svolto dalla meno esplorata V dei Big Data. Tuttavia, altre dimensioni di interesse inesplorate nei Big Data riguardano la variabilità nel flusso dei dati, riconoscendo le incongruenze all'interno dei dataset (Katal et al., 2013), e il campo della visualizzazione dei Big Data, che riguarda la capacità delle organizzazioni di formulare indagini pertinenti per estrarre valore significativo dalle loro iniziative Big Data (Simon, 2014). Future ricerche potrebbero approfondire queste dimensioni del Big Data per ottenere una comprensione più completa di come influenzano l'impatto dell'innovazione aperta sulle prestazioni innovative delle PMI.

Managerial implications. Lo studio offre anche alcuni contributi manageriali. Innanzitutto, i risultati suggeriscono che il Big Data Value consente alle PMI di migliorare le proprie prestazioni innovative, soprattutto quando cercano di introdurre innovazioni radicali. Di conseguenza, le PMI sono più inclini a innovare in modo radicale quando dispongono di preziose quantità di informazioni.

In secondo luogo, i risultati indicano anche che il Big Data Value facilita le strategie di ricerca OI accelerando l'identificazione di nuovi partner (OI ampiezza) e facilitando la capacità delle PMI di comprendere la forza di ciascun partner in relazione a compiti specifici, promuovendo la profondità dell'OI. Questo è un punto chiave soprattutto per le PMI, che di solito incontrano maggiori difficoltà nel processo di identificazione e selezione dei partner. Pertanto, manager e professionisti dovrebbero concentrarsi sull'utilizzo del Big Data Value per migliorare le loro collaborazioni e le loro prestazioni innovative.

In terzo luogo, la gestione dei costi di coordinamento è una caratteristica chiave per le future performance innovative delle PMI e per il loro successo. Questo studio mostra che il Big Data Value riduce i costi di coordinamento tra PMI e altre organizzazioni, migliorando l'efficienza della collaborazione e facilitando le loro prestazioni innovative. La riduzione dei costi è fondamentale per le PMI, che spesso affrontano sfide organizzative e aziendali che potrebbero ostacolare la loro crescita futura.

Originality of the paper. Il nostro studio offre diversi contributi alla letteratura esistente. Innanzitutto, il nostro lavoro contribuisce alla letteratura precedente su Big Data e performance dell'innovazione svelando nuovi e emergenti Vs del Big Data: Valore e Veridicità. Queste caratteristiche, comunemente identificate come la "seconda generazione dei V" (Del Vecchio et al., 2018), sono scarsamente studiate in letteratura, e diversi articoli richiedono un'analisi più approfondita su questo argomento (ad esempio, Del Vecchio et al., 2018). Più specificamente, Ferrigno et al. (2025) propongono studi che "indaghino se alcune caratteristiche del Big Data — come valore e veridicità — moderino la relazione tra le strategie di ricerca dell'innovazione aperta e le performance innovative radicali e incrementali delle aziende." Per rispondere a questa richiesta di ricerca, in questo studio ci siamo concentrati sul Big Data Value per chiarirne l'effetto sulle prestazioni radicali dell'innovazione. Ci siamo inoltre concentrati sulla veridicità dei Big Data, ampliando la letteratura correlata. I Big Data possono anche svelare l'esistenza di elementi che facilitano il flusso di conoscenza all'interno dell'azienda (Arias-Pérez e Vélez-Jaramillo, 2021; 2022), evidenziando la rilevanza della veridicità dei Big Data in termini di tempo e risorse più efficienti necessarie per garantire l'affidabilità dei dati. Di conseguenza, contribuiamo anche alla letteratura che scopre un potenziale effetto positivo della veridicità sulla relazione tra strategie di innovazione aperta e performance dell'innovazione.

In secondo luogo, questo è uno dei pochi studi che utilizzano il TCE (Williamson, 1979, 1981, 1991) nella ricerca sull'innovazione aperta (Remneland-Wikhamn & Knights, 2012; Hsieh et al., 2016). Ispirandosi a questa teoria, l'articolo suggerisce un nuovo quadro attraverso il quale i Big Data possono essere concettualizzati come risorse vantaggiose per le prestazioni delle PMI. Sfruttando il TCE, abbiamo scoperto che i Big Data possono moderare i costi di transazione e coordinamento che ostacolano le PMI nell'attuare strategie di ricerca OI. Più specificamente, i risultati di questo studio suggeriscono che il Big Data Value consente alle PMI di migliorare la loro efficienza nella collaborazione, ampliando i propri confini.

Di conseguenza, in questo studio contribuiamo alle strategie di ricerca OI attraverso la lente del TCE, valutando l'importanza del Big Data Value nella riduzione dei costi di coordinamento, per identificare partner e sfruttare la conoscenza esterna (Dahlander et al., 2021). Pertanto, il Big Data Value può aiutare a rimodellare i confini organizzativi delle PMI e a rendere efficaci ed efficienti le loro collaborazioni innovative (Vural et al., 2013). Speriamo che ricercatori e professionisti adottino questa prospettiva sui Big Data per ottenere approfondimenti e utilizzare efficacemente i loro dati per ottimizzare i costi del trasferimento della conoscenza nelle collaborazioni OI.

In terzo luogo, questa ricerca contribuisce alla letteratura precedente analizzando una variabile moderatrice rilevante, sebbene poco studiata, nella relazione tra strategie di ricerca OI e performance dell'innovazione, come suggerito da Ferrigno et al. (2025). Ricerche precedenti hanno analizzato gli effetti moderati delle caratteristiche industriali (Grimpe e Sofka, 2009), delle caratteristiche aziendali (Stanko e Henard, 2017), e dinamiche temporali (Ganotakis et al. 2025). Tuttavia, è stata prestata poca attenzione alla comprensione di quali fattori possano moderare i costi di coordinamento derivanti dalle strategie di ricerca OI e i loro effetti sulle prestazioni innovative delle PMI. Per quanto ne sappiamo, nessuno studio si concentra su tale effetto moderatore (Ferrigno et al., 2025), ma indaga la relazione diretta tra Big Data Vs e performance dell'innovazione (ad esempio, Ghasemaghaei e Calic, 2020), Big Data Vs e strategie di open innovation (Del Vecchio et al., 2018), o open innovation e performance dell'innovazione (ad esempio, Ferrigno et al., 2024). L'effetto di moderazione del Big Data Value rivela nuove prospettive riguardo alla potenziale interazione tra variabili, approfondendo la conoscenza dell'innovazione aperta e delle performance dell'innovazione.

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Trusting the Bot? How AI Chatbots Shape Trust and Donation Behavior among Repeat Small Donors in Non-profit Communication

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Abstract. *Individual small donors represent the primary driver of fundraising for nonprofit organizations, yet maintaining long term donor relationships remains a critical challenge since donor numbers decline and donor information needs are largely unexplored. This study investigates interactions between a specifically-designed AI Chatbot and small, repeat donors in a non-profit organization to assess its effects on donor trust and behavior.*

Using a between-subjects experimental design, the study compares two direct communication channels, an AI chatbot and an email newsletter. A planned sample of 400 Italian repeat donors with less than €5,000 annual contributions is randomly assigned to one of the two experimental groups. Trust is evaluated through a multidimensional framework integrating the Integrative Model of Organizational Trust, Trust in Automation, and Social Presence Theory. Perceived measures of trust and donor intentions are matched with actual donation behavior collected after the experiment.

Preliminary results from 90 respondents show that donor attitudes toward AI communication vary significantly by age, familiarity with AI, and previous experience with the non-profit sector. Specifically, younger donors and AI-savvy donors exhibit higher levels of trust in the Chatbot. Also, donors exhibit no significant concerns regarding AI hallucinations and the reliability of information sources. No notable difference emerges in donation propensity between the chatbot and the newsletter experiment, however, higher-frequency AI users demonstrate greater donation propensity and amounts. Donors using the Chatbot focus on project progress and future initiatives, while newsletter recipients review financial data more frequently. A strong correspondence was found between stated donation intentions and actual donations across both groups.

This study provides an original contribution to non-profit literature by analyzing an innovative AI application within an operational fundraising context as compared to traditional communication tools. It suggests that AI can strengthen donor relationship and trust, although, increases in donor propensities are limited to donors with high levels of AI usage.
Keywords: *Artificial Intelligence (AI) Chatbot; non-profit fundraising; individual donation; small donors; donor trust; donor communication*

Framing of the research. Individual contributions remain the primary driving force of fundraising for non-profit organizations. In the United States, individuals contributed for nearly 66% of total donations in 2024, accounting for US$392.45 billion out of a total ofUS$592.5 billion and maintaining a constant upward trend since 2020 (Indiana University Lilly Family School of Philanthropy, 2025). Individual donations are also central in Europe, although their role varies by country, typically representing 40% to 55% of total fundraising collection (European Fundraising Association (EFA), 2024). The lower proportion compared to the US is largely explained by the more relevant weight of governmental and European Union funds, which cover around 20% of non-profit activities. Meanwhile, foundations and corporate fundraising contribute roughly 20% and 10%, respectively (European Fundraising Association (EFA), 2024).

Despite the steady growth of individual donations in the last years, the number of individual donors has declined, showing a concentration of large contributions from high-net-worth individuals (Association of Fundraising Professionals (AFP), 2025). Additionally, legacy giving is expanding in several national markets. For example, in United Kingdom and the Netherlands, bequests are worth between 15 to 20% of total individual donations (Charities Aid Foundation (CAF), 2025).

Individual donations originate from first-time donors and repeat donors. Repeat donors generally require lower fundraising investments per person compared to first-time donors, making them valuable assets for the non-profit organizations. However, effective donor retention demands careful planning and consistent communication (Xiao & Yue, 2021). Communication with existing donors can take the form of direct outreach, such as personal calls and visits, direct mails, and emails, as well as general communication, including press releases and social media updates. Direct communication often incorporates detailed newsletters and tokens of appreciation like thank-you gifts. Direct communication with existing donors is typically structured to convey different emotional responses. Negative emotions that are associated to current challenges or unexpected events can be transformed into positive feelings as the non-profit offers the opportunity to support through an additional donation.

Research (Agyemang et al., 2019; Merchant et al., 2010) shows that follow-up communication and feedback to existing donors have the potential to strengthen their emotional attachment to the organizations and deepen their engagement to the mission. Communication with donors also contributes to build trust in non-profit organizations. Virtuous organizations tend to showcase their operational proceedings after receiving funds and are eager to establish relationships with their donors and be open to public scrutiny. Overall, communication encourages organizational trust, which is defined as the collective belief that the organization will act in a fair and reliable manner, as well as sectoral trust, which refers to the level of confidence and expectations for a specific humanitarian sector (Chapman et al., 2021). An experimental design involving 319 respondents proves that emotional attachment to an organization increases the

probability of repetitive donations (Merchant et al., 2010). In addition, a meta-analysis from 42 studies between 1988 and 2020 found that trust is positively associated with additional donations, with organizational and sectoral trust showing a particularly strong statistical significance (Chapman et al., 2021). Therefore, direct communication can be employed as an effective tool for implementing fundraising strategies by organizations.

Even if direct communication offers relationship and fundraising benefits, it is challenging to structure because knowledge of donors' information needs is still limited (Dethier et al., 2024). Moreover, donor segments respond differently to communication stimuli, some donors welcome repetitive and detailed updates, while others experience discomfort and disengagement beyond a certain point (Karlan & Wood, 2017). Survey data consistently cite inadequate or unsatisfactory communication as a leading reason donors discontinue their relationship with specific non-profits or with the non-profit sector as a whole (Sargeant, 2001).

Dethier et al. (2024) argue that transparency should be the cornerstone for effective communication with donors. From the donor's perspective, transparency consists of three factors, in detail, information accessibility, i.e., the degree to which donors can easily obtain and understand relevant organizational details, completeness, i.e., the extent to which the information disclosed provides a comprehensive view of activities, and accuracy, i.e., ensuring information is correct, reliable, and free from errors.

Donor communication can be designed using various methods and content types. The most immediate and natural interaction with the donors is a thank-you call or note from the organization or selected representatives, such as the staff members or donor beneficiaries. However, academic literature indicates that simple thank-you messages have no statistically significant impact to elicit repeat donations at the aggregate level, even though donors generally perceive them as a positive experience and a meaningful connection with the organization (Karlan & Wood, 2017).

Non-profit organizations can also provide indicators of operational efficiency and project effectiveness to their existing donors. The main indicators associated with operations and projects are outputs, outcomes, and impacts. Research based on an online survey experiment (Bodem-Schrötgens & Becker, 2020) outlines that donors value outcome and impact indicators more than output variables as they provide a more profound understanding of the effects of their contributions. Other studies (Levontin et al., 2025; Saeri et al., 2023) emphasize the importance of the impact indicators in the donor communication. Donors are primarily interested in the actual impact of the funded activities rather than the anticipated outcomes. Offering concrete, demonstrable, and easily verifiable information is strongly associated with greater willingness to donate again and with higher donation amounts. Alkire et al. (2025) suggest that non-profit organizations should ideally communicate the broader social impact of their activities, showing the extended benefits that their works brings to society. Nevertheless, social impact measurements are difficult to establish because they often include variables that are qualitative and have effects only in the long-term. Also, positive social impact is frequently determined by a combination of efforts from multiple non-profit and governmental organizations, thus, if one component is missing, the overall social impact risks to be weakened or lost. Unfortunately, most non-profits indicate only their individual-level impact because they often lack the expertise or access to data needed to evaluate the real social impact.

In addition, donors appear to be responsive to the assessment and transparency of financial information, which are positively connected with the donation propensity and donor retention (Agyemang et al., 2019). A favorable evaluation of financial efficiency enhances donor confidence in the organization, as it demonstrates that funds are being employed to maximize benefits for beneficiaries (Li et al., 2012). Moreover, donors look for transparency signals in financial reports that confirm that funds are directed to their intended purpose and are not wasted on administrative or secondary activities. However, donors with different socio-economic characteristics and experience show varying responses to disclosure of financial information. Donors with higher education levels and greater knowledge of humanitarian issues tend to exhibit increased sensitivity to the accuracy and reliability of financial data (Wu & Dai, 2025).

In connection with financial information, non-profit organizations can also increase repeat donations by emphasizing the tax-deductibility of contributions and providing the necessary documentation and proof for fiscal procedures. Both European and U.S. governments offer increasingly generous tax incentives for charitable givings, however, many donors remain unaware of these benefits or underestimate their value. As donations increase in frequency and amounts, tax deductions can significantly improve donation propensity, particularly among middle- and upper-income donors (Saeri et al., 2023).

Donor communication can also involve the request for feedback and opinions on fundraising campaigns and funded projects. Collecting and analyzing donor feedback has proven beneficial because it allows organizations to design more tailored and shared activities for donors in line with their mission (Clavijo, 2023). Furthermore, research (Pittarello & Kogut, 2022) shows that when donors are given the possibility to articulate their views, they become more engaged with the organization and are more likely to donate when asked.

Artificial Intelligence (AI) tools are increasingly being adopted by non-profit organizations, and their use is expected to expand in the coming years. One key application is machine learning, which helps predict how donors develop their relationship with the organization over time. Hesse (2025) has examined peer-donors, i.e., individuals who not only donate but also encourage others to contribute, mainly peers in their personal and professional network. Machine learning has demonstrated to be effective in determining the probability of donors to sponsor the organization to their peers, and it can also be applied to other instances, such as, the probability for repeat donations or membership enrollment.

In addition, AI Large Language Models (LLMs) are increasingly being employed in fundraising with individual donors. Sun and Si (2025) compare LLMs with human agents in fundraising to estimate which communication strategies are more effective in influencing donation intentions and trust in the organization. Their findings reveal that when LLMs

use highly abstract messaging, potential donors perceive the information as less trustworthy than when delivered by human agents. Conversely, more concrete messaging combined with anthropomorphic visual cues increases the level of trust and consequently the donation propensity compared to human agents.

LLMs are also employed to generate social media content and encourage donor engagement. Social media have become important touchpoints for both potential and existing donors, but require a constant and interactive presence that often exceeds the capacity and expertise of non-profit staff. LLMs can address this challenge and offer tailored content for different donor segments, ultimately increasing the donation probability (Cheng & Wang, 2025).

In conclusion, AI models may contribute to address the issue of distributive justice within non-profit organizations. Distributive justice refers to the ethical question of how resources, such as funds and services, are allocated among beneficiaries and stakeholders. AI models can be perceived as more objective and consequently enhance the sense of fairness and justice in donation distribution. Yang et al. (2024) demonstrate that AI models are viewed to deliver greater distribution justice compared with human decisions, hence, improving the relationship between donors and the organization.

Purpose of the paper. This research focuses exclusively on donations from individuals, excluding funds from governments, foundations, and corporations. Within individual donations, only small donors are considered, while large and legacy gifts are omitted. There is no general threshold for defining small donors, as it typically depends on the size and type of the organization. However, given the non-profit organization under investigation and its top-gift percentiles, small donors are defined those who give less than 5,000 euro per year (Kelley et al., 2024).

The research sample includes only repeat donors, that is, individuals that have previously made at least one donation of 50 euro per year or more to the non-profit, regardless of their formal membership in the organization. The study concentrates on direct communication to repeat donors. In general, direct communication can occur either via traditional mail or electronic channels, however, in this sample, traditional mail is excluded, and donors are contacted via email through the address that they provided when making their donation. General communication, such as social media posts and press releases, is not considered in this analysis. Similarly, other incentive mechanisms, such as thank-you gifts and matching offers, are omitted because, as mentioned before, they tend to have limited efficacy or can even be counterproductive for the non-profit's reputation and public image (Xiao & Yue, 2021).

The purpose of this study is to investigate a potentially innovative application of AI within the non-profit sector. For this purpose, a pilot AI Chatbot was specifically designed to interact with repeat donors at their own convenience and terms, and address any question they may have about the projects that they support, the organization's activities, and any other relevant details such as annual financial statements, staff and volunteer data, civic initiatives. Donors receive the Chatbot link via email. Unlike traditional methods, the Chatbot enables donors to customize interactions to their preferences, mitigating the aforementioned common gaps of understanding donors' information needs (Dethier et al., 2024) as well as issues related to communication frequency (Karlan & Wood, 2017).

The Chatbot is evaluated against a donor newsletter sent by email. The newsletter summarizes the actual individual and social impact of projects, their outcomes, and provides detailed and transparent financial information. The previous literature review confirms that these types of clear, concrete, and financially informative messages (Bodem-Schrötgens & Becker, 2020; Levontin et al., 2025; Saeri et al., 2023; Alkire et al., 2025; Agyemang et al., 2019; Li et al., 2012; Wu & Dai, 2025) are the most effective forms of donor direct communication. The comparison between the AI Chatbot and the newsletter is conducted by assessing the level of trust that donors develop toward each communication tool, as well as the frequency and the amount of donations generated.

Methodology. This study employs a between-subjects, cross-sectional survey design to compare donors' trust in two non-profit communication channels: an AI Chatbot and a newsletter. Participants are randomly assigned to one of the two conditions and evaluate only the communication channel to which they are exposed.

Trust is measured using identical constructs across conditions, enabling comparison between groups. The questionnaire also collects socio-demographic variables, which are included to control for individual differences, prior experience with the non-profit organization and the non-profit sector in general, and behavioral intention measures, in particular, willingness to re-donate to the same or different projects. Following the survey, actual donations made by participants are recorded and matched with the donation propensity reported in the questionnaire.

One non-profit organization, which chose to remain anonymous, agreed to cooperate in the experiment allowing a group of its donors to participate in the survey. The non-profit operates in the health sector in developing countries, and primarily recruits donors in the Italian market.

Participants are adult repeat donors recruited from the organization's permissioned email list. To be eligible, participants must be between 18 to 55 years of age. This upper age limit was established to maximize the probability of participant familiarity with digital communication tools, which was self-declared. As mentioned before, the sample is restricted to donors that contribute less than 5,000 euro per year, excluding major donor outliers.

Participants will be randomly assigned to one of two experimental conditions: the Chatbot Group (n = 200) or the Newsletter Group (n = 200). Random assignment ensures that any observed differences can be attributed to the communication medium rather than pre-existing donor characteristics and preferences. However, the socio-demographic characteristics of the sample will be monitored to ensure a balanced distribution across both conditions.

An a priori power analysis for an independent-samples t-test indicated that a total sample of N = 400 (n = 200 per group) provides sufficient power (1-\beta = .80) to detect a small-to-medium effect size (d \approx 0.28) at a significance level of \alpha = .05, two-tailed. This sample size also exceeds the recommended 5:1 or 10:1 participant-to-item ratio for factor-analytic validation of the measurement scales. N=400 represents approximately 9% (4,300) of the entire donor population for the non-profit. To account for potential data exclusions or incomplete responses, oversampling from the initial recruitment pool will be conducted.

The survey instrument is grounded in the Integrative Model of Organizational Trust (Mayer et al., 1995), a well-established framework that conceptualizes trust as a function of perceived trustworthiness. This model has been widely extended to digital contexts (Hoff & Bashir, 2015), in this case, it can be applied to examine trust in human–AI interactions.

Given that this study compares two distinct communication tools, in detail, an interactive conversational AI (Chatbot) and a static informational medium (Newsletter), the theoretical framework integrates constructs related both to the trustworthiness of the information source and the perceived characteristics of the communication medium, including its level of social presence. Accordingly, trust is conceptualized as a multidimensional construct including three core dimensions: perceived trustworthiness, trust in technology, and social presence. Perceived trustworthiness is operationalized using the Ability–Benevolence–Integrity (ABI) model (Mayer et al., 1995). This model assesses trust across organizational, technological, and artificial agents:

- Ability: refers to the perceived competence of the communication channel in providing accurate, relevant, and reliable information.
- Benevolence: looks at the extent to which donors believe that the organization, as represented through the Chatbot or newsletter, acts in their best interests.
- Integrity: reflects perceptions of honesty, transparency, and adherence to ethical principles in the information provided.

To account for the technological nature of the Chatbot relative to the passive structure of the newsletter, the framework incorporates constructs from the Trust in Automation (TiA) literature (Hoff & Bashir, 2015). These constructs express both cognitive and affective components of trust in technological systems, including:

- Predictability: refers to the consistency and reliability of the system's behavior.
- Transparency: is defined as the clarity with which information sources and system processes are communicated.
- Perceived privacy and security risk: is particularly relevant for interactive AI systems that may involve personal data exchange.

The framework includes social presence and anthropomorphism, which draws on the Computers Are Social Actors (CASA) paradigm (Reeves & Nass, 1996). These constructs assess whether human-like interaction cues associated with conversational AI influence donor trust, either positively by encouraging engagement or negatively by prompting skepticism, in comparison with the impersonal and static nature of newsletter-based communication.

In conclusion, propensity to donate is commonly conceptualized as a behavioral intention, reflecting an individual's motivational readiness to engage in donor behavior. In the non-profit literature, donation behavior can be modeled using intention-based frameworks derived from social psychology, particularly the Theory of Planned Behavior (TPB) (Ajzen, 1991). According to TPB, behavioral intentions are the most proximal determinants of actual behavior. Within the charitable giving context, intention to donate has been shown to be a strong and consistent predictor of realized donation behavior (Bekkers & Wiepking, 2011). The propensity of behavior after using the communication tools will be compared with the actual donations that the donors accomplished.

All items employ a 7-point Likert scale to allow sensitivity to moderate effects and be consistent with previous trust measurement methodologies in academic literature. For the AI chatbot, anthropomorphic cues are not shown in the baseline instrument to avoid confounding, but a short neutral screenshot or mock transcript can be included in an experimental extension if desired. Wording is minimal and non-technical to reduce comprehension variance.

The final survey will be administered online via a secure survey platform. Respondents receive a unique link after two weeks from receiving either the AI link or the newsletter. After screening and consent, participants complete the socio-demographics (education, age, gender, income range, donation history, interests in non-profit sector, general use of AI tools), followed by frequency of use for AI and typologies of questions, trust items for each channel, behavioral intention (donor intentions), experience measures (in particular, prior exposure to the organization's newsletter), and completion time flags will be used to identify careless responses. After three months from the survey, the actual donations will be associated with each donor and compared with the anticipated donor intentions.

Results. At the moment of writing, 90 questionnaires (45 Chatbot, 45 newsletter) were conducted and analyzed as part of the initial quantitative phase. This paragraph offers a summary of the preliminary findings before the completion and analysis of all 400 questionnaires.

A strong relationship is observed between donors' demographic characteristics and their attitudes toward AI Chatbot. Younger donors tend to trust AI tools more, while older donors are more skeptical, particularly regarding the variables integrity, perceived privacy, and security. Donors who are more familiar with the non-profit sector show lower perceived benevolence toward the organization when interacting with AI, probably because they are used to traditional newsletters rather than AI-based communication. Familiarity with AI itself is also relevant. Those who use AI frequently are more

open to an AI Chatbot and believe that it can provide detailed and transparent information, whereas donors who rarely use AI trust the Chatbot less and often question its ability to communicate effectively.

When interacting with the AI tool, donors mostly inquire about the progress of the projects they previously funded and about potential new projects to support. They also ask the AI for advice on which additional project to choose, especially when the tool presents multiple options and they want to know which one the AI considers most relevant. A notable behavioral difference emerges in the type of information donors seek. AI users rarely check financial data, while donors who rely on newsletters review financial information significantly more often. Donors using the AI tool seldom ask for sources, and the majority appears unaware of the risk of potential AI hallucinations. Nonetheless, this lack of checking does not seem to affect their level of trust in the non-profit organization.

Regarding donation behavior, there is no overall difference in donation propensity between AI users and newsletter recipients. However, among AI users, those with high AI usage tend to donate more frequently and in larger amounts, while those with low AI usage tend to donate less. Newsletter recipients, in contrast, display a more uniform donation pattern.

Finally, we observe a strong correspondence, around 85%, between donors' stated intention to donate and their actual donation behavior, with no notable differences between AI users and those who only receive newsletters.

Research limitations. The central limitation of this research is the unpredictability surrounding the future development of AI and the ways users will eventually engage with it. Given that the current AI systems are at the early stages of their technological maturation, their full capabilities remain unexplored, so that long-term outcomes and user behaviors are difficult to predict. Also, the still-evolving regulatory framework governing AI Chatbots means that clear rules have to be created. Hence, it remains uncertain whether stringent regulations will be introduced and, if so, how these interventions may influence users' overall trust in these systems.

Another important limitation concerns the sample. All participants in this study are Italian speakers and the non-profit organization involved operates exclusively in the Italian fundraising market. As a result, the findings cannot be transferred to other national cultural settings. National cultural norms influence how individuals relate to technology and how they interpret information, and they can also shape expectations regarding non-profit transparency and accountability. Moreover, this study focused on a single cause, while other relevant causes were excluded, where donor behavioral patterns and motivations can change completely across different non-profit sectors. Some non-profit organizations, particularly those with adversarial and controversial missions, may attract donor profiles with distinct attitudes and personality traits that were not included in this research.

In conclusion, the methodological limitations, which are typical of a between-subjects, cross-sectional survey design, apply to this research as well. The modest number of respondents in the preliminary quantitative analysis also restricts the generalizability of the research results.

Managerial implications. This study shows that the AI Chatbot is associated with higher levels of trust and can positively influence the donation propensity of certain donor segments. Therefore, non-profit fundraisers should examine adopting these Chatbots to strengthen their relationships with their supporters. However, they should carefully weigh the increased donation flows that Chatbots may generate with the costs of implementing and managing them. While expenses are certain and immediate, potential increases in donations are uncertain and projected in the long-term.

As AI becomes more widespread and commonly used by the general public, wider segments of donors will likely expect AI-based interactions. Hence, non-profit organizations should not only take into consideration current user demand, but also the anticipated future expectations. At the same time, because technology evolves rapidly and often unpredictably, today's platforms may change radically, and the costs of implementation may drop over time. Still, implementing AI now offers non-profits the possibility of positioning themselves as innovative and interactive in the donors' minds, while developing valuable expertise in AI communication touchpoints.

Fundraisers are advised to adopt a Chatbot that can also engage with potential first-time donors, as their queries can be similar and the associated costs can be allocated more efficiently. As the organization ventures into AI, it would be probably better to include first-time donors, although, academic research is yet to prove the Chatbot efficacy for this group.

Finally, non-profit organizations should ensure that their Chatbots are carefully trained by a team of experts to mitigate the risks of hallucinations and false and misleading responses that affect AI and can harm the organization's reputation and donor relationship. During the implementation phase, the Chatbot should be constantly tested and monitored to avoid persistent inaccuracies.

Originality of the paper. This study offers an innovative contribution to the non-profit and fundraising literature by being one of the first empirical analyses to investigate donor trust and donation behavior in response to an AI-based conversational tool against a traditional newsletter, within a real non-profit setting. Previous studies have explored the role of AI in donor communication, focusing mainly on comparison between AI and human interaction, social media content creation, machine-learning donor prediction, or distributive justice. No published work has assessed how repeat donors perceive and respond to an interactive AI Chatbot specifically designed to answer questions about ongoing projects, organizational transparency, and financial information. By concentrating on repeat small donors, this study

addresses an understudied group that is the financial cornerstone for many non-profits but whose information needs are often poorly understood.

The research also advances the literature by integrating the Integrative Model of Organizational Trust, Trust in Automation frameworks, and social presence theory to develop a multidimensional measurement of trust for non-profit communication tools. This theoretical integration is original in its application to donor–AI interactions, a context where perceptions of benevolence, integrity, and ability overlap with privacy risks and information reliability.

In addition, the comparison between the Chatbot and the newsletter examines not only self-reported trust and donation intentions but also actual donation behavior, which is a methodological improvement over previous research that relies exclusively on intentions. Behavioral data improves the external validity and managerial relevance of the findings.

Finally, this research introduces a innovative application of AI as a on-demand information tool, addressing persistent issues in donor communication such as diversity in information needs and tolerance for communication frequency. By granting donors autonomy in the interaction and examining its behavioral consequences, this study opens a new path for understanding how AI can reshape relational fundraising practices.

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User Resistance to AI in Healthcare: A Systematic Review

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Abstract. *Artificial intelligence is becoming part of everyday healthcare, but many users are still reluctant to rely on it. Adoption depends not only on technical performance, but also on how key stakeholders, especially physicians and patients, respond to these systems. Existing studies have examined the issue from several disciplinary angles, including information systems, marketing, healthcare, and medical research, yet the evidence remains scattered and difficult to integrate. To address this gap, the paper systematically reviews 137 articles. Drawing on Innovation Resistance Theory and the sociotechnical perspective, it develops a framework that explains the main drivers of resistance, the conditions that can reduce it, and the ways it manifests before and after use. The review brings coherence to a fragmented body of knowledge and shows that resistance is not only a question of acceptance, but also one of trust, professional roles, workflow, and service design. It therefore offers a clearer basis for future research and practical guidance for managers introducing AI into everyday care settings.*
Keywords: *artificial intelligence; healthcare; user resistance; systematic literature review; healthcare management; AI*

Framing of the research. Global health systems face growing structural and economic pressure. Aging populations, the rising incidence of chronic disease, increasing demand for care, and persistent inequalities continue to strain capacity (Karaflou and Goulis, 2025; Rad, 2025). At the same time, many organizations operate with staffing shortages, limited resources, and fragmented information systems (Lal et al., 2021). These pressures affect not only costs and efficiency, but also the quality, accessibility, and continuity of care.

Artificial intelligence (AI) has emerged as one of the most visible responses to these challenges. Unlike more conventional information systems, AI can perform tasks that are partly cognitive in nature. It can learn from data, adapt its outputs over time, and, in some applications, operate with a degree of autonomy that changes how decisions are produced and evaluated. For this reason, AI is widely presented as a strategic tool for improving quality, reducing costs, and extending access to care (Chong et al., 2022). Yet its implementation remains difficult. A major obstacle is user resistance (Liang and Xue, 2022).

Although resistance to artificial intelligence in healthcare (AIH) is receiving growing attention, research is in its infancy and the knowledge base remains fragmented. Studies have emerged across information systems (Park et al., 2022), marketing (Yun et al., 2021), healthcare delivery (van Bussel et al., 2022), and medicine (Richardson et al., 2021), but these streams have rarely been integrated (see Table 1 for reference on the number of relevant articles by journal). Medical research often focuses on the attitudes and behavioral intentions of physicians and patients, offering limited examination of AI functionalities and their consequences on user resistance (Khanijahani et al., 2022). By contrast, information systems and business research provides richer accounts of resistance mechanisms, but often overlooks the clinical context in which these systems are introduced. This fragmentation creates a clear need for synthesis. A systematic review can connect findings that remain dispersed, identify the main drivers of resistance, clarify the conditions that reduce it, and distinguish between different forms of resistance across stakeholder groups and stages of adoption. It is also useful for management research. After all, reluctance toward AI is not only a behavioral response, but also a signal of deeper tensions in implementation, governance, accountability, and professional legitimacy. Understanding these tensions is essential if organizations are to introduce AI in ways that are both effective and trusted.

Table 1. Number of relevant articles on resistance to AIH by journal.

Journal Name	Count	Journal Name	Count
Journal of Medical Internet Research	19	Information & Management	2
Computers in Human Behavior	10	Information Systems Frontiers	2
BMC Medical Informatics and Decision Making	8	International Journal of Human-Computer Studies	2
Digital Health	7	Production and Operations Management	2
International Journal of Social Robotics	7	Psychology & Marketing	2
BMC Health Services Research	5	Technology in Society	2
Frontiers in Public Health	5	ACM Transactions on Interactive Intelligent Systems	1
International Journal of Human-Computer Interaction	5	Annals of Operations Research	1
BMC Medical Ethics	4	Applied Clinical Informatics	1
International Journal of Medical Informatics	4	Assistive Technology	1
PLoS One	4	British Journal of Dermatology	1
Technological Forecasting and Social Change	4	Cognition	1
Frontiers in Psychology	3	Computers in Biology and Medicine	1
Int. Journal of Environmental Research and Public Health	3	Diagnostics	1
Journal of Medical Systems	3	European Journal of Information Systems	1
Journal of the American Medical Informatics Association	3	Health Informatics Journal	1
Frontiers in Medicine	2	Information Systems Research	1
Health Policy and Technology	2	Journal of Consumer Behaviour	1
Industrial Management & Data Systems	2	Journal of Consumer Research	1
Applied Sciences	1	Journal of Management Information Systems	1
BMC Medical Ethics	1	Journal of Retailing and Consumer Services	1
Journal of Service Theory and Practice	1	Journal of Risk Research	1
Marketing Letters	1	Social Science & Medicine	1
MIS Quarterly Executive	1	Surgical Innovation	1
Nature Human Behaviour	1	The Lancet Digital Health	1
		Total	**137**

Purpose of the paper. This paper aims to develop an integrated understanding of resistance to artificial intelligence in healthcare and to clarify its implications for management research and practice.

Although resistance to AI in healthcare has attracted growing attention, the literature remains fragmented across information systems, marketing, healthcare, and medical research. As a result, existing studies provide useful but disconnected insights into why resistance emerges, how it can be reduced, and how it differs across users and stages of adoption. This gap is important for management because resistance affects not only acceptance, but also implementation, workflow integration, professional authority, accountability, and the design of AI-enabled services. To address this gap, the paper examines three questions. First, what factors generate resistance among healthcare providers and healthcare recipients? Second, what interventions reduce resistance and support more constructive human–AI relations in care settings? Third, how does resistance appear across stages of adoption and across different stakeholder groups?

Methodology. To identify and synthesize the literature, this study conducts a systematic review of 137 articles on resistance to artificial intelligence in healthcare. The review follows PRISMA guidelines (Page et al., 2021), which are widely used in information systems and management research (Lee et al., 2023), and combines database searching with forward and backward searches to strengthen rigor and coverage (Webster and Watson, 2002).

The search was conducted in the Web of Science Core Collection, including the Science Citation Index Expanded (SCIE) and the Social Sciences Citation Index (SSCI). The search strategy drew on keywords used in earlier reviews on related topics (Lee et al., 2023; Yang et al., 2024), which made it possible to capture studies from business, economics, marketing, management, information systems, medical informatics, psychology, computer science, and behavioral science.

The review covers studies published between 2014 and 2024, a period in which AI expanded rapidly and became more visible in healthcare research and practice (Yang et al., 2024). Three exclusion criteria were applied. First, purely technical studies were excluded when they focused on model development, optimization, or system performance without examining human attitudes or behaviors toward AI. Second, articles without full-text access, as well as commentaries, responses, perspectives, and book chapters, were excluded because they were not suitable for systematic analysis. Third, studies were excluded when the technology under study did not contain an explicit AI component. The final sample includes 137 studies.

To analyze this literature, the study adopts the input-process-output (IPO) model (Mathieu et al., 2008). Within this framework, the input dimension captures the antecedents of resistance among healthcare providers and healthcare recipients. These antecedents are classified through Innovation Resistance Theory, which distinguishes between adopter-related, situation-related, and innovation-related factors (Talke and Heidenreich, 2014). The process dimension focuses on the mechanisms that mitigate or reduce resistance. To organize these mechanisms, the study adopts a sociotechnical perspective, which views systems as combinations of technology, humans, and tasks (Goodhue and Thompson, 1995). Building on later work on hybrid intelligence, the study also treats human–AI collaboration as a distinct dimension (Hemmer et al., 2021). The output dimension captures the behavioral manifestations of resistance and distinguishes between pre-adoption reactions, which arise before direct interaction with AI, and post-adoption reactions, which appear after use. This analytical structure makes it possible to examine resistance to AI in healthcare consistently across a diverse body of studies. It also strengthens the management relevance of the review by showing not only why resistance emerges, but also how it can be addressed and how it shapes adoption over time.

Results. Resistance to artificial intelligence in healthcare is shaped by three broad sets of antecedents: adopter-specific, situation-specific, and innovation-specific factors (see Annex 1 for a synthetic mapping of these findings).

Among healthcare providers, adopter-specific antecedents include greater inertia, lower affinity with technology, lower self-efficacy, and stronger anxiety about technological change. Some studies also link resistance to age and professional experience (Pedro et al., 2023). Situation-specific antecedents arise when AI disrupts established routines, enters demanding hospital settings, or is introduced without sufficient organizational support (Zheng et al., 2021). The strongest sources of resistance, however, concern the technology itself. Providers react negatively when systems are opaque, difficult to integrate into workflows, or of uncertain usefulness. Concerns also increase when AI is associated with privacy risks, legal liability, threats to professional autonomy, or fears of replacement (Kotsis et al., 2023). These reactions are reinforced by psychological factors, especially low initial trust, limited prior experience, and attachment (Howe et al., 2024).

Among healthcare recipients, the pattern is similar in structure but different in content. Adopter-specific antecedents include low digital literacy, low self-efficacy, and high technological anxiety. Several studies also report effects for age, gender, and income (Fritsch et al., 2022). Situation-specific antecedents become stronger in high anxiety settings, in family monitoring and intimate care, where trust and human sensitivity are particularly important (Park et al., 2022; van Bussel et al., 2022). Again, the most prominent obstacles are innovation-specific. Recipients are more hesitant when diagnostic processes are opaque, interfaces are difficult to use, expected benefits are weak, or costs are high. Concerns also rise when privacy feels threatened, bias is feared, or the system is seen as reducing patient choice and control (Cadario et al., 2021; Zhang and Zhao, 2024). Psychological factors intensify these reactions when patients prefer human physicians, or see AI as impersonal and unable to recognize individual uniqueness (Longoni et al., 2019; Riedl et al., 2024).

The review also shows that resistance can be reduced, but only through interventions that address both the technology and the human system around it (see Annex 2 for a synthetic mapping of these findings). For healthcare providers, resistance declines when AI provides clear explanations, transparent limits, and supporting information that helps clinicians interpret outputs and understand where the system may fail (Reis et al., 2020; Diprose et al., 2020). It also falls when AI is integrated into workflows, framed as a supporting tool, and introduced through participatory design and protected learning time (Blanes-Selva et al., 2023). For healthcare recipients, the range of effective interventions is broader and more sensitive to design choices. Acceptance improves when AI uses accessible interfaces, calibrated anthropomorphic cues, and personalized communication. At the same time, overly technical explanations and excessive humanness can increase discomfort or privacy concerns (Shi et al., 2024). Trust also increases when AI shows strong performance, a credible track record, and a clear role in care (Howe et al., 2024). Most importantly, patient resistance declines when AI remains visibly embedded in human oversight (Esmaeilzadeh et al., 2021).
Finally, resistance varies across stages of adoption. Among providers, pre-adoption reactions appear mainly as opposition to implementation, concern that AI may weaken task performance, and reluctance to incorporate it into clinical judgment (Reis et al., 2020). After adoption, these reactions become more visible in practice. Clinicians may disregard AI recommendations, refuse to collaborate with AI assistants, express negative views, or simply use the systems less than expected (Jussupow et al., 2021). Among recipients, pre-adoption reactions are expressed mainly as a preference for human physicians, reluctance to use AI for diagnosis or monitoring, dislike of robotic assistance, low acceptance across care tasks, and lower willingness to pay for AI-based services (Longoni et al., 2019; van Bussel et al., 2022). After use, resistance appears as negative evaluations, lower continuance intention, disappointment, and non-compliance with AI-generated advice or recommendations (Riedl et al., 2024).

Research limitations. Despite its theoretical and practical contributions, this study is subject to several limitations that pave the way for future research. First, the scope of our data collection was restricted to WoS Core Collection, which may introduce a degree of selection bias. Relevant studies indexed exclusively in other databases or those that did not meet our inclusion criteria may have been omitted. Second, the field is still developing and does not yet rely on a stable vocabulary. As a result, some relevant studies may have been missed even with a broad search strategy. Third, to ensure the methodological rigor and reliability of our findings, this review prioritized peer-reviewed journal articles. We explicitly excluded conference proceedings and gray literature, including book chapters, working papers, and pre-prints. Although this strategy supports the quality of the relevant literature, the most recent, albeit unverified, emerging research may have been excluded.

Managerial implications. Healthcare managers should prioritize psychological support over technical deployment. Physician resistance is often rooted in perceived threats to professional autonomy rather than technical incompetence. A possible solution could be to position AI as a tool that handles routine analytical tasks, thus demonstrating that the technology supports, rather than replaces, the clinician's role. Furthermore, organizations must establish psychological safety. They should transition from punitive performance monitoring to supportive environments.

For AI developers and vendors, the "black box" nature of machine learning models remains an antecedent of resistance. Developers should focus on targeted explainability tailored to the specific stakeholder. Physicians require global interpretability (understanding the model's general logic) to validate clinical safety, whereas patients require local interpretability (understanding why a specific decision was made for them) to perceive fairness. Additionally, developers must exercise caution regarding anthropomorphism. While conversational agents can improve engagement, hyper-realistic avatars may exacerbate patient resistance due to feelings of eeriness. We suggest a design philosophy of "functional aesthetics" that delineates the AI agent as a tool rather than a synthetic human, thereby reducing cognitive dissonance in clinical settings.

A significant driver of physician resistance is the knowledge gap regarding AI capabilities. Educational institutions should update medical curricula to include AI literacy as a core competency. Simultaneously, policymakers must address the ambiguity concerning legal accountability that currently paralyzes adoption. It is imperative to establish clear liability frameworks that define the shared responsibility between the clinician, the healthcare organization, and the AI developer.

Originality of the paper. This paper contributes by updating and refining the emerging literature on resistance to AI in healthcare through an integrated dual-stakeholder perspective. Building on prior review work, it consolidates antecedents, interventions, and manifestations within a single framework. More specifically, it classifies antecedents through Innovation Resistance Theory, organizes mitigation mechanisms through the sociotechnical lens, and distinguishes manifestations across providers and recipients as well as pre-adoption and post-adoption stages. In doing so, it offers a more coherent basis for theory development and a more precise account of how resistance to healthcare AI differs from resistance to earlier forms of healthcare technology.

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Annex 1. Summary of related antecedents in resistance to AIH research

Theme	Healthcare providers	Healthcare recipients
Adopter specific		
Change related	Inertia, low affinity to technology, low self-efficacy, and technological anxiety (Buck et al., 2022; Prakash and Das, 2021; Huo et al., 2023)	Low affinity to technology, low digital literacy, low self-efficacy, and technological anxiety (van Bussel et al., 2022; Fritsch et al., 2022; Riedl et al., 2024; Lammons et al., 2023)
Population characteristics	Age, gender, professional experience, and paradox mindset (Pedro et al., 2023; Khaksar et al., 2024)	Age, education, AI or digital literacy, income, and functional or health limitations (Fritsch et al., 2022; Lammons et al., 2023; Lee et al., 2024)
Situation specific		
Status quo and environmental influences	Status quo satisfaction, dispositional resistance, routine disruption, and weak organizational support (Prakash and Das, 2021; Zheng et al., 2021)	Status quo inertia, family-monitoring contexts, and intimate/high-anxiety care settings (van Bussel et al., 2022; Park et al., 2022; Lee et al., 2024)
Innovation specific		
Usability barriers	Inconvenience, information overload, and poor service quality (Kotsis et al., 2023; Anjara et al., 2023; Zheng et al., 2021)	Opaque or complex interfaces, inconvenience, and low ease of use (Cadario et al., 2021; Uzir et al., 2021; Lammons et al., 2023)
Performance and value barriers	Low usefulness and low information or diagnostic quality (Ji et al., 2021; Reis et al., 2020)	Low usefulness or performance expectancy, anticipated quality shortfalls, and high cost (Richardson et al., 2021; van Bussel et al., 2022; Li et al., 2023)
Privacy and societal risks	Privacy concerns, discrimination, and deskilling/dependence concerns (Prakash and Das, 2021; Denecke and Baudoin, 2022; Kotsis et al., 2023)	Privacy/data protection concerns and discrimination (Esmaeilzadeh et al., 2021; Armero et al., 2023; Lammons et al., 2023)
Ethical risk	Legal liability, job displacement, and threats to professional autonomy (Prakash and Das, 2021; Ganapathi and Duggal, 2023; Denecke and Baudoin, 2022)	Legal liability and reduced patient choice or autonomy (Xing et al., 2021; Richardson et al., 2021)
Trust and experience	Low initial trust and limited prior experience (Prakash and Das, 2021; Richardson et al., 2022)	Low initial trust, prior attitudes or experience, and distrust in the controlling organization (van Bussel et al., 2022; Stafford et al., 2014a; Amin et al., 2024)
Norm and image barriers	Traditional clinical practice, social influence, and dehumanization of care (Prakash and Das, 2021; Nitiéma, 2023; ˇCartolovni et al., 2023)	Subjective norms, uniqueness neglect, dehumanization, and humanness concerns (Ye et al., 2019; Longoni et al., 2019; Shi et al., 2024)
Belief barriers	General mistrust, misconceptions about AI capability, and weak belief in AIH (Hsieh, 2023; Reis et al., 2020; Jussupow et al., 2021)	Misconceptions about AIH and weak belief or trustworthiness doubts (Armero et al., 2023; Howe et al., 2024)

Annex 2. Summary of related interventions in resistance to AIH research

Theme	Healthcare providers	Healthcare recipients
AI characteristics		
Design	User-centred interface and interaction design (Blanes-Selva et al., 2023; Mahmoudi Asl et al., 2023)	Usability, controllability, warmth or personalization, and calibrated anthropomorphic cues (Park et al., 2022; Kyung and Kwon, 2022; Yun et al., 2021; Shi et al., 2024)
Explanation	Explainable AI and supporting information for interpreting outputs (Diprose et al., 2020; Barda et al., 2020; Ganapathi and Duggal, 2023)	Accessible explanations, tailored explanations, and brief understanding interventions (Zhang et al., 2021b; Goel et al., 2022; Cadario et al., 2021)
Responsibility	Transparency about capabilities and limits (Reis et al., 2020; Ganapathi and Duggal, 2023)	Algorithmic transparency and clear disclosure of how AI is used (Ploug et al., 2021; Esmaeilzadeh et al., 2021)
Human characteristics		
Adaptation	Training, protected learning time, and AI literacy (Ganapathi and Duggal, 2023; Huo et al., 2023)	Adaptive cognition and internal attribution (Chen et al., 2022a; Stafford et al., 2014a)
Task characteristics		
Task performance	Pilot implementation and performance evidence (Reis et al., 2020)	AI expertise and performance cues or track record (Bigman and Gray, 2018; Zhang et al., 2021b; Howe et al., 2024)
Task scenario	Adaptation to work and group context (Mahmoudi Asl et al., 2023)	Personalized communication and scenario-sensitive use in high-stakes care (Yun et al., 2021; Longoni et al., 2019; Saragih and Morrison, 2022)
AI–provider collaboration	Decision support, specialized implementation support, workflow integration, and clinician–AI complementarity (Sax et al., 2022; Blanes-Selva et al., 2023; Ganapathi and Duggal, 2023; Bienefeld et al., 2024)	AI framed as supporting physicians, combined with expert opinion, visible physician oversight (Esmaeilzadeh et al., 2021; Howe et al., 2024)
AI–recipient collaboration	/	Co-creation recovery and value alignment (Chen et al., 2022a; Yokoi and Nakayachi, 2021)

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Short papers

Track:
Entrepreneurship



Commencing Countdown, Engines On: Rethinking the Lifecycle of Entrepreneurial Ecosystems

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Abstract. *Entrepreneurial Ecosystems are increasingly recognized as key drivers of productive entrepreneurship and regional economic development. While the literature proposes several lifecycle models describing the emergence and evolution of ecosystems, these frameworks remain only partially supported by empirical evidence. The purpose of this study is to investigate how Entrepreneurial Ecosystems evolve across lifecycle stages over time. Drawing on a proprietary longitudinal dataset covering 80 national ecosystems between 2013 and 2024, we adopt an output-oriented perspective and measure ecosystem dynamics through scaleup creation, interpreted as an observable manifestation of productive entrepreneurship. To capture the dynamic nature of ecosystem evolution, we combine scaleup intensity with two additional indicators, namely growth velocity and acceleration, and identify lifecycle configurations using clustering analysis. We interpret the resulting phases through the metaphor of a rocket launch, and we label them Ignition, Liftoff, Orbit, Reentry and Docking, to underline the sequential dynamics of ecosystem development. Preliminary findings suggest that ecosystems do not follow strictly linear trajectories: phases of slowdown often represent temporary deceleration rather than structural decline. By conceptualizing ecosystem evolution as a dynamic and probabilistic process, this study contributes to the emerging literature on Entrepreneurial Ecosystem lifecycles and offers new insights for policymakers seeking to monitor and support ecosystem development over time.*
Keywords: *Entrepreneurial Ecosystems; Ecosystem Lifecycle; Startup; Scaleup*

Framing of the research. Entrepreneurship is a key driver of economic and social value, especially when entrepreneurial activity results in innovation. Innovation is heavily concentrated in specific global hubs that continue growing due to the presence of specialized networks of new ventures, technology, easier access to capital, and rich pools of talent. The Silicon Valley, for instance, is an example of a productive business ecosystem where the tradition of these networks has led to the pursuit of sustained entrepreneurship over time. Regions that have similar characteristics and innovation outputs (e.g., Singapore, New York, London) have become important "innovation hubs". They attract the attention of new ventures and multinational corporations and investments from venture capital funds and governments, leading to a self-reinforcing "virtuous cycle" that consolidates their leading position and attractiveness. Relatedly, a recent industry report highlights that 50% of the Fortune 500 Companies maintain a presence in Silicon Valley (Mind the Bridge, 2024). These geographical areas are concentrated, dynamic, and continue to grow, attracting the attention of policymakers and researchers interested in how to support, drive, and even replicate elsewhere these ecosystems. From a policy perspective, these ecosystems are critical because they allow governments to move beyond fragmented interventions and instead foster a systemic environment where innovation and growth can thrive (OECD, 2025). Relatedly, Entrepreneurial Ecosystems (EEs) are increasingly getting attention in research, practice and policy as national and local governments promote their countries or cities to constitute active ecosystems while managers of incubators and accelerators consider themselves as managers of ecosystems (Audretsch et al., 2019). Broadly, EEs are defined as multifaced, territorially embedded structures that enable the creation and growth of new ventures thanks to the interaction of institutional, financial, social and knowledge components (Audretsch et al., 2019). They became so important that now they constitute a consolidated research field with its own research agenda (Wurth et al., 2022).

The literature on EEs builds on research traditions related to clusters, innovation systems and urban economics. While these traditions differ in their assumptions about how the economy functions, they converge on the idea that firm-level competitive advantage is influenced by factors lying outside organizational boundaries but embedded in the regional context (Spigel & Harrison, 2018; Wurth et al., 2022). What sets EEs apart from other territorial approaches is their focus on productive entrepreneurship, which is supported and realized by the interdependencies between the above-mentioned components. EEs are in fact conceptualized both as entities that emerge and evolve in specific local contexts and as a conceptual lens that researchers can use to understand and explain how local, regional, or national economies enable or constrain entrepreneurial activity (Wurth et al., 2022).

Scholars interested in the processes of ecosystem emergence and evolution study how entrepreneurial activity is supported by the surrounding ecosystem. Autio et al. (2018), for example, propose a structural model where the combination of digital affordances (decoupling, disintermediation, and generativity) and spatial affordances creates a unique environment that facilitates the discovery and pursuit of entrepreneurial opportunities. They argue that, in contrast with traditional clusters, EEs support the cultivation of knowledge for business model innovation and provide the structure

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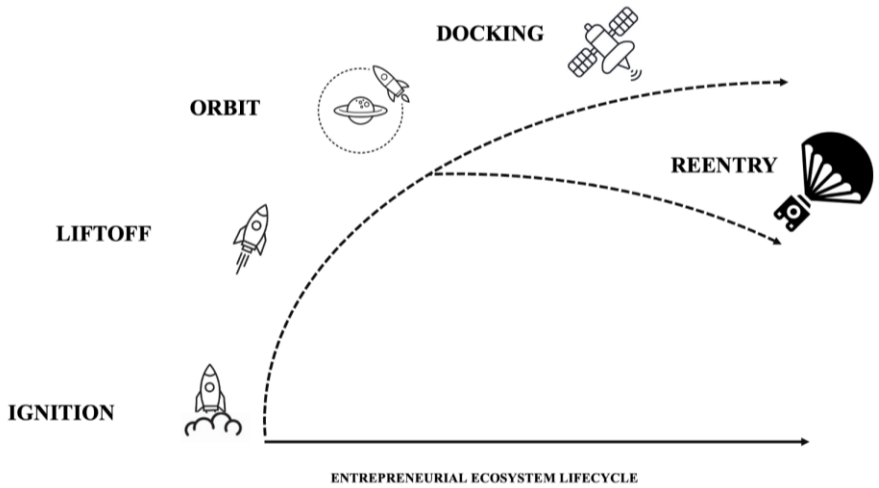
to support new ventures through the stages of stand-up, startup, and scale-up. Similar frameworks have been proposed in the attempt to map the temporal evolution of EEs, which vary in terms of stages and drivers of change. Mack & Mayer (2016) propose a four-stage model (birth, growth, sustainment and decline) identifying each stage based on the balance between firm entries and exits and shifts in the orientation of regional policy and finance. Cantner et al. (2021) introduce a five-stage model including birth, growth, maturity, decline, and re-emergence, which describes the system's oscillation between a startup-focused "entrepreneurial ecosystem" and a corporate-focused "business ecosystem". Other notable taxonomies include Kapturkiewicz (2022) three phases (emergent, developmental, and growth) anchored in institutional work and "flagship" successes like unicorn or big exits, and Spigel & Harrison (2018) process-based view that classifies systems as nascent, strengthening, or resilient (or, alternatively, weakened) based on the flow and recycling of entrepreneurial resources. Finally, frameworks inspired by ecology and complex adaptive systems, such as the one proposed by Auerswald & Dani (2017), suggest adaptive cycles characterized by the capacity to reorganize and reconfigure regional assets rather than following a linear path. This latter perspective reflects the recent calls in EE research concerning the use of Complex Systems (CAS) theory lens to the study of EEs. Roundy et al. (2018) explain that an EE is "a self-organized, adaptive, and geographically bounded community of complex agents operating at multiple, aggregated levels, whose non-linear interactions result in the patterns of activities through which new ventures form and dissolve over time" (p. 5). EEs thus follow discontinuous trajectories, are subject to path dependence and are characterized by non-linearity (Wurth et al., 2022; Brown et al., 2023; Ceci et al., 2026).

Based on this, we ask: How do EEs evolve across lifecycle stages over time?

Purpose of the paper. Our research question addresses the critical debate regarding the evolutionary dynamics of EEs. EE vitality has become a central issue for regional economic development as it allows researchers and policymakers to compare the performance of EEs across countries (OECD, 2025). However, the current scientific understanding we have about EEs emergence, growth and decline is still fragmented (Cantner et al., 2021). Our research question reflects the need to test, empirically, whether the lifecycle trajectories of EEs predicted by existing theory follow linear trajectories.

To guide our research inquiry, we introduce the metaphor of the rocket launch. We chose to use this metaphor for its explicatory impact, as we believe it responds to the conceptual resonance criterion that metaphors should have when used for theory formulation and testing (Biscaro et al., 2025; Cornelissen and Kafouros, 2008). To illustrate the lifecycle of EEs, we adopt the metaphor of a rocket launch, which captures the sequential nature of the ecosystem evolution. The first phase, Ignition, refers to the moment when the rocket's engines are activated while the vehicle remains on the launch pad. In our framework, this stage corresponds to the emergence of an EE, when initial actors, resources, and relationships begin to form but the system has not yet generated significant momentum. The second phase, Liftoff, occurs when thrust exceeds the rocket's weight and the vehicle leaves the launch pad, beginning its ascent through the atmosphere. This stage represents an ecosystem that is consolidating and gaining momentum. Much like in a rocket launch, this is a particularly critical phase as reaching orbit directly from the launch pad would violate the laws of physics, and similarly ecosystems require a gradual process of accumulation before reaching maturity. The third phase, Orbit, is reached when the rocket attains orbital velocity and enters a stable orbit around Earth. We associate this stage with the first moment of stability in the ecosystem, when its output is sustained productive entrepreneurship. The last two phases are alternatives. Reentry describes the moment when a spacecraft slows down and reenters the Earth's atmosphere, which we associate with a slowdown in ecosystem output, reflected in declining levels of productive entrepreneurship. Alternatively, the phase may be interpreted as Docking, the moment when a spacecraft successfully attaches to a space station, representing the peak of productive entrepreneurship, when the ecosystem reaches a high level of coordination and integration. We illustrate our metaphorical framework in Figure 1.

Figure 1. Evolutionary Framework of the EE Lifecycle



Source: Authors' own elaboration

Methodology.

Data and Sample. The study leverages privileged access to the Mind the Bridge (MTB)[5] proprietary database, which provides data on the annual creation of scaleups across countries. The dataset includes both the number of newly identified scaleups and the cumulative number of scaleups operating in each country and year. These data are combined with macroeconomic indicators retrieved from the World Bank World Development Indicators, including GDP, GDP per capita, and population. The MTB database focuses on scaleups operating in technology and digital sectors, which are typically characterized by strong scaling dynamics and high growth potential (Piaskowska et al., 2021; Reuber et al., 2021; Tippmann et al., 2023). Our analysis therefore captures the evolution of technology-oriented entrepreneurial ecosystems, where the scaling of innovative ventures represents a central ecosystem outcome. The dataset covers the annual creation of scaleups across national EEs between 2013 and 2024. The initial dataset includes observations for a large set of countries. To ensure meaningful comparison across ecosystems, countries with excessive zero activity were excluded. Specifically, countries with more than eight years of zero scaleup creation during the observation period were removed from the sample, as these cases provide insufficient variation to identify ecosystem dynamics. In addition, micro-states with populations below 500,000 inhabitants were excluded to avoid distortions arising from very small denominators when computing per-capita indicators. The final balanced panel consists of 80 countries, observed annually from 2013 to 2024, resulting in 960 country-year observations. The list of countries included in the analysis is reported in Table 1.

Productive entrepreneurship and the role of scaleups. EEs are commonly defined as sets of interdependent actors and factors that collectively enable productive entrepreneurship within a territory (Stam and van de Ven, 2021). Much of the empirical literature on EEs has focused on measuring the presence of ecosystem components, such as access to finance, institutions, talent, or support organizations. Even if these approaches provide insights into the structure and characteristics of ecosystems, they do not necessarily capture whether these structures actually translate into observable entrepreneurial outcomes. In this study, we adopt an output-oriented perspective and focus on scaleup[6] creation as an observable manifestation of productive entrepreneurship. Scaleups represent ventures that have successfully moved beyond the early startup stage and entered a phase of sustained growth, making them an important outcome of ecosystem dynamics. The importance of scaling processes has been underlined in several conceptual models of EEs. For instance, Autio et al. (2018) describe ecosystem development as enabling ventures to progress through phases of stand-up, startup, and scaleup, where the latter stage reflects the successful scaling of validated business models. In this perspective, the emergence of scaleups can be interpreted as an observable signal that ecosystem conditions enable entrepreneurial ventures to grow and expand.

Variable construction. To enable comparison across countries of different sizes, scaleup activity is normalized by population. Scaleup intensity is defined as the number of newly created scaleups per million inhabitants. This indicator captures the capacity of the EE to generate high-growth ventures. Yet, EEs are dynamic systems whose evolution cannot be fully captured by static measures alone. Studies drawing on complex adaptive systems perspectives point out that ecosystem trajectories are characterized by non-linear dynamics, path dependence, and temporal fluctuations (Brown et al., 2023; Roundy et al., 2018). To capture these dynamics, we complement scaleup intensity with two additional indicators. First, we compute the growth rate of scaleup creation (growth velocity), which captures the direction and speed of change in ecosystem output. Because scaleup formation can be episodic and subject to short-term volatility, growth rates are smoothed using a centred three-year moving average. Second, we compute acceleration, defined as the year-on-year change in the smoothed growth rate. This measure captures whether the momentum of scaleup formation is strengthening or weakening over time. Scaleup intensity, growth velocity, and acceleration provide a dynamic representation of ecosystem output, capturing both the level of productive entrepreneurial activity and the direction of its evolution. In particular, acceleration allows us to detect situations in which ecosystem growth is slowing down even if scaleup activity remains relatively high. Given the lack of systematic data on venture exits at the ecosystem level, ecosystem decline is therefore operationalized as a slowdown in the dynamic of scaleup creation.

Results. We identify five distinct configurations of ecosystem dynamics based on scaleup intensity, growth velocity, and acceleration. Table 2 reports the average values of these indicators for each phase and shows that the clusters are empirically well differentiated. The Ignition phase describes ecosystems characterized by very low scaleup intensity (0.244) but strong positive growth velocity (0.989) and high acceleration (0.871). This configuration corresponds to ecosystems where scaleup activity is still limited but the dynamics of entrepreneurial output growth are strengthening rapidly. The Liftoff phase combines higher scaleup intensity (0.892) with the highest growth velocity observed across all

[5] *Mind the Bridge is a global organization that provides innovation advisory services for corporates and startups. In 2014, Mind the Bridge was selected by the European Commission to lead the Startup Europe Partnership (SEP). Established in January 2014 at the World Economic Forum in Davos, SEP is a Startup Europe initiative dedicated to support the growth and sustainability of European startups able to compete and raise funds internationally. Based on its proprietary database, Mind the Bridge research unit regularly produces reports with the goal of sharing insights and data about startup/scaleup ecosystems in order to give relevant parties a macro overview of the current landscape (https://mindthebridge.com/research/).*

[6] *Although the definition of scaleups remains debated in the literature, it is acknowledged the role they play in introducing technologies to the market (Coutu, 2014). In line with Onetti (2014), Startup Europe Partnership (2015) and Autio (2016), we operationalize scaleups as ventures that have attracted at least USD 1 million in venture capital funding.*

phases (1.061) and the second highest acceleration (0.050). This configuration reflects ecosystems experiencing rapid upward expansion following the initial ignition stage. The Orbit phase corresponds to ecosystems with moderate scaleup intensity (2.163), positive but more moderate growth velocity (0.258), and limited acceleration (0.040). In the rocket metaphor, this phase captures ecosystems that have reached a relatively stable configuration characterized by sustained scaleup activity. The Reentry phase, by contrast, reflects ecosystems experiencing a slowdown in their growth dynamics. It is characterized by moderate scaleup intensity (1.534), near-zero growth velocity (-0.005), and strongly negative acceleration (-0.467), indicating a significant loss of momentum in scaleup creation. Finally, the Docking phase captures a small group of ecosystems with exceptionally high scaleup intensity (22.799), combined with moderate growth velocity (0.216) and slightly negative acceleration (-0.108).

Figure 2 presents the cross-sectional distribution of ecosystem phases in 2024. The figure confirms the predominance of intermediate and slowing configurations. Orbit accounts for 45% of ecosystems, while Reentry represents 46.25%. Only two ecosystems appear in the Docking phase (Luxembourg and Singapore), while Ignition is observed only in Bahrain and Slovakia, and Liftoff only in Morocco, Mexico, and Uganda.

Figure 3 reports the distribution of lifecycle phases across years between 2013 and 2024. The results reveal substantial variation in the composition of phases over time. The Orbit phase remains the dominant configuration throughout most of the observation period, consistently representing around half of all ecosystems. Yet, its prevalence declines sharply in the later years of the sample, particularly in 2023, when it falls to 27.5% of observations before partially recovering in 2024. At the same time, the Reentry phase becomes increasingly prominent in the later years of the dataset. In 2023, Reentry accounted for more than 60% of ecosystems, and it remains highly prevalent in 2024 (46.25%). This pattern suggests that many ecosystems experienced a slowdown in scaleup creation dynamics during the most recent years of the observation period. Early-stage phases show greater volatility. Ignition increases sharply in 2020 (22.5%), indicating a temporary rise in ecosystems characterized by rapid changes in scaleup activity. Liftoff also fluctuates over time, peaking in 2021 (18.85%) before declining again in the most recent years. Finally, the Docking phase remains rare throughout the sample, although its share temporarily increases in 2021 and 2022 before declining again thereafter.

Table 1. Cluster characteristics by ecosystem phase

	Mean	SD	N
Ignition			
Scaleup intensity (per million inhabitants)	.244	.467	64
Growth velocity (3-year moving average)	.989	.424	64
Acceleration of growth	.871	.41	64
Liftoff			
Scaleup intensity (per million inhabitants)	.892	1.501	114
Growth velocity (3-year moving average)	1.061	.376	114
Acceleration of growth	.05	.264	114
Orbit			
Scaleup intensity (per million inhabitants)	2.16	2.86	497
Growth velocity (3-year moving average)	.258	.196	497
Acceleration of growth	.04	.175	497
Reentry			
Scaleup intensity (per million inhabitants)	1.53	2.30	248
Growth velocity (3-year moving average)	-.005	.248	248
Acceleration of growth	-.467	.363	248
Docking			
Scaleup intensity (per million inhabitants)	22.799	9.26	37
Growth velocity (3-year moving average)	.216	.308	37
Acceleration of growth	-.108	.242	37

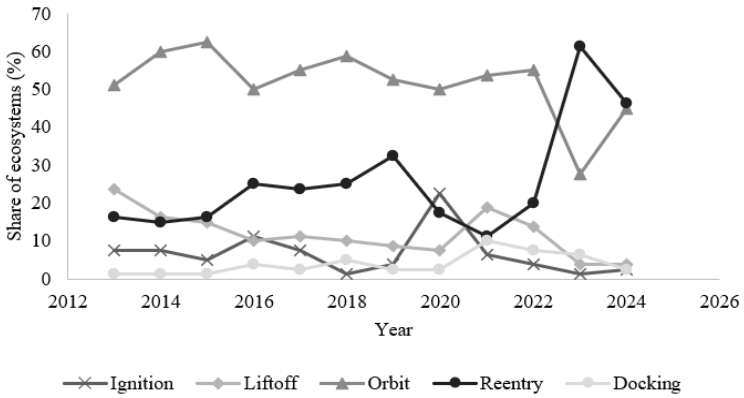
Source: Authors' own elaboration

Figure 2. Ecosystem phase classification in 2024

Ignition	Liftoff	Orbit		Reentry		Docking
Bahrain	Mexico	Canada	Kuwait	Argentina	Ireland	Luxembourg
Slovakia	Morocco	China	Lithuania	Armenia	Latvia	Singapore
	Uganda	Cyprus	Pakistan	Australia	Lebanon	
		Denmark	Panama	Austria	Malaysia	
		El Salvador	Peru	Bangladesh	Mauritius	
		Estonia	Poland	Belgium	New Zealand	
		Finland	Puerto Rico	Brazil	Nigeria	
		France	Saudi Arabia	Bulgaria	Norway	
		Ghana	South Africa	Chile	Philippines	
		Greece	Spain	Colombia	Portugal	
		Guatemala	Sweden	Costa Rica	Romania	
		Hong Kong SAR	Switzerland	Croatia	Russian Federation	
		India	The Netherlands	Czech Republic	Slovenia	
		Israel	Ukraine	Ecuador	South Korea	
		Italy	United Arab Emirates	Egypt	Tanzania	
		Japan	United Kingdom	Germany	Thailand	
		Jordan	United States	Hungary	Tunisia	
		Kenya	Uruguay	Indonesia	Turkey	
					Vietnam	

Source: Authors' own elaboration

Figure 3. Distribution of EE lifecycle phases over time



Source: Authors' own elaboration

To examine whether ecosystems follow predictable trajectories over time, Table 3 reports the transition matrix between lifecycle phases from year t-1 to year t. The results reveal a combination of persistence and movement across phases. Persistence is strongest for ecosystems in Orbit and Docking. Ecosystems already in Orbit remain in the same phase in 63.12% of cases, while ecosystems in Docking remain there in 71.43% of observations. These results suggest that both intermediate-stable and highly developed ecosystem configurations tend to be relatively persistent over time. By contrast, early-stage phases exhibit substantially greater instability. Ecosystems in Ignition, most frequently transition to Liftoff (48.39%), but also move to Orbit (27.42%) or directly to Reentry (24.19%). Similarly, ecosystems in Liftoff show high transition rates, with 44.14% remaining in the same phase and 43.24% moving to Reentry. These patterns indicate that rapid growth does not necessarily translate into sustained consolidation. The transition matrix also shows that Reentry does not represent a terminal phase. Although 24.17% of ecosystems remain in Reentry, a majority (62.09%) move back to Orbit in the following year. This suggests that slowdown in scaleup creation is often temporary and not irreversible. Thus, the transition patterns do not support a strictly deterministic lifecycle sequence: ecosystems show a mixture of persistence, reversibility, and occasional discontinuous shifts, consistent with the view of EEs as adaptive and evolving systems.

These dynamic patterns are further illustrated in Figure 4, which presents the temporal trajectories of ecosystem phases for a set of selected countries. The trajectories highlight the heterogeneity of ecosystem dynamics. Highly developed ecosystems such as Israel, Singapore, and Luxembourg exhibit persistent Docking configurations, reflecting extremely high scaleup intensity. Mature ecosystems such as the US, the United Kingdom, and Germany remain predominantly in the Orbit phase, with occasional temporary slowdowns. By contrast, emerging ecosystems such as Mexico and Morocco follow more volatile trajectories, moving across early-stage phases before reaching more stable configurations.

Table 2. Year-to-year transition matrix of EE phases (in %)

	Phase (t)					
Phase (t-1)	Ignition	Liftoff	Orbit	Reentry	Docking	Total
Ignition	**0.00**	48.39	27.42	24.19	0.00	100.00
Liftoff	1.80	**44.14**	9.91	43.24	0.90	100.00
Orbit	6.29	3.04	**63.12**	25.38	2.17	100.00
Reentry	12.80	0.95	62.09	**24.17**	0.00	100.00
Docking	0.00	0.00	17.14	11.43	**71.43**	100.00
Total	6.59	10.80	51.82	26.70	4.09	100.00

Source: Authors' own elaboration

Figure 4. Temporal trajectories of EE lifecycle phases in selected countries (2013-2024)

Country	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Israel	Docking	Docking	Docking	Docking	Docking	Docking	Docking	Docking	Docking	Docking	Docking	Orbit
Singapore	Orbit	Orbit	Orbit	Docking	Docking	Docking	Docking	Docking	Docking	Docking	Docking	Docking
Luxembourg	Orbit	Orbit	Orbit	Orbit	Orbit	Docking	Orbit	Orbit	Docking	Docking	Docking	Docking
Estonia	Liftoff	Reentry	Orbit	Orbit	Orbit	Docking	Reentry	Orbit	Docking	Docking	Docking	Orbit
United States	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Reentry	Orbit
United Kingdom	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Reentry	Orbit	Orbit	Orbit	Orbit	Orbit
Germany	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Reentry	Reentry
The Netherlands	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Reentry	Ignition	Liftoff	Liftoff	Reentry	Orbit
Spain	Reentry	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Orbit	Reentry	Orbit
Italy	Liftoff	Reentry	Orbit	Orbit	Ignition	Orbit	Orbit	Reentry	Orbit	Orbit	Reentry	Orbit
Morocco	Orbit	Orbit	Reentry	Orbit	Orbit	Reentry	Ignition	Liftoff	Liftoff	Liftoff	Liftoff	Liftoff
Mexico	Ignition	Liftoff	Liftoff	Reentry	Reentry	Ignition	Reentry	Ignition	Reentry	Ignition	Liftoff	Liftoff

Source: Authors' own elaboration

Research limitations. The study has several limitations. First, research is still ongoing and the analysis represents an initial attempt to identify large-scale dynamic patterns in the evolution of EEs using scaleups as a proxy for productive entrepreneurship. Yet, entrepreneurial ecosystems are complex adaptive systems shaped by multiple structural and institutional factors - including capital, infrastructures, entrepreneurial culture, networks, etc. (Stam and van de Ven, 2021) - which are not directly captured by the indicators so far used in the study. Third, the clustering approach identifies empirical patterns in ecosystem dynamics but does not establish causal mechanisms driving transitions between phases. As the research is still in progress, next steps include extending the analysis in several ways. First, we plan to examine the determinants of phase transitions by estimating panel models linking movements between lifecycle stages to macroeconomic conditions. Second, we will conduct robustness analyses of the clustering procedure, testing alternative specifications and clustering algorithms to assess the stability of the identified lifecycle configurations. Third, future research will investigate whether ecosystem lifecycle phases are associated with broader economic outcomes, such as innovation performance and the intensity of venture capital activity.

Managerial implications. Our framework reveals how entrepreneurial ecosystems transition across different phases of their lifecycle. Measuring ecosystem evolution through specific outputs such as the generation of scaleups can help ecosystem actors monitor the system's momentum over time, identifying phases of acceleration or slowdown. Our preliminary results also suggest that the phases initially framed as "reentry", may in fact represent periods of moderate slowdown rather than genuine ecosystem decline. This finding highlights that temporary reductions in productive entrepreneurship do not necessarily imply structural deterioration of the ecosystem. These insights also connect to important policy implications. In particular, they suggest the value of considering not only the level of ecosystem performance, but also the velocity and direction of its trajectory. Positioning ecosystems within lifecycle stages may therefore help policymakers design more targeted interventions and identify early signals of potential slowdown. Moreover, policymakers could focus not only on fostering ecosystem growth but also on facilitating transitions between lifecycle stages, which appear to represent critical moments in the evolutionary process of entrepreneurial ecosystems.

Originality of the paper. The study contributes to the EE literature in three main ways. First, we adopt an output-oriented perspective on EEs by focusing on scaleup creation as an observable manifestation of productive entrepreneurship. While much of the existing literature measures the presence of ecosystem components, this study instead examines the entrepreneurial outcomes generated by the ecosystem. Second, the paper introduces a dynamic empirical framework to analyze ecosystem evolution over time. By combining scaleup intensity, growth velocity, and acceleration, the study captures not only the level of ecosystem activity but also the direction and momentum of its evolution. This approach allows us to move beyond static comparisons across regions, and instead identify distinct configurations of ecosystem dynamics. Third, we provide empirical evidence on the lifecycle dynamics of EEs. While several conceptual models propose that ecosystems evolve through different stages, empirical tests of these lifecycle trajectories remain limited. Leveraging the MTB proprietary longitudinal database covering 80 countries over more than a decade, the study identifies lifecycle configurations and examines transitions between phases over time. The results show that ecosystem evolution does not follow a linear path. Instead, ecosystems exhibit a combination of persistence, reversibility, and discontinuous transitions across stages, consistent with perspectives that conceptualize EEs as complex adaptive systems.

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Cultural Embeddedness and Entrepreneurial Risk Perception in Peripheral Regions

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Abstract. *Entrepreneurship is vital for economic growth, especially in emerging economies where small and informal businesses are key sources of income and jobs. Previous studies have largely focused on structural barriers such as limited access to finance, poor infrastructure, and regulatory issues, but have paid less attention to how socio-cultural factors influence entrepreneurial decisions, particularly in peripheral areas. This research examines how cultural embeddedness affects risk perception among rural entrepreneurs in Ghana. Using embeddedness theory and entrepreneurship perspectives that consider context, the study examines how kinship ties, community norms, and informal institutions shape entrepreneurs' views and risk management.*

The research employs an emic, qualitative approach to understand entrepreneurs' experiences within their socio-cultural setting. A multiple-case study was conducted, with data gathered from semi-structured interviews of ten entrepreneurs across various sectors in Ghana's Gomoa East District. Thematic analysis revealed common patterns in how entrepreneurs perceive and handle risk in socially embedded environments.

Initial results show that social bonds and community structures significantly shape risk perception. Social networks serve as risk buffers by offering informal financial help, labour, and market information, which lessens financial uncertainty. Conversely, strong community ties increase reputational risk from potential business failures. Family duties and kinship obligations also influence risk-taking, often leading to more cautious choices. Additionally, informal institutions and local authorities help legitimise businesses and mediate economic exchanges.

This study advances entrepreneurship research by emphasising the social construction of risk perception in peripheral contexts. It also provides useful insights for policymakers designing entrepreneurship support that aligns with culturally embedded ecosystems in developing economies.

Keywords: E*mbeddedness; Risk perception; Entrepreneurship; Peripheral regions; Ghana; Social networks*

Framing of the research. Entrepreneurship is vital for economic growth, innovation and job creation worldwide (Stam and Van de Ven, 2021). In developing nations, where formal jobs are scarce and economies rely heavily on small and medium enterprises (SMEs), entrepreneurship often serves as a key means for creating livelihoods and reducing poverty (Acs, Desai, and Hessels, 2008; Naudé, 2010). Recent research continues to highlight its role in promoting inclusive growth and resilience in emerging markets (Acs et al., 2014). In sub-Saharan Africa, many entrepreneurial efforts occur in the informal sector (Musara and Nieuwenhuizen, 2020; Danquah, Schotte, and Sen, 2019; Sutter, Bruton, and Chen, 2019).

In Ghana, entrepreneurship is a key pillar of the national economy. The country consistently ranks high in early-stage entrepreneurial activity according to the Global Entrepreneurship Monitor (Singer, Amorós, and Moska, 2015). More recent assessments also recognise Ghana as one of Africa's most entrepreneurial economies, with a significant portion of economic activity driven by SMEs and microenterprises (Quartey et al., 2017; Agyapong and Attram, 2019). However, many of these entrepreneurial efforts take place within small, informal businesses embedded in local community networks and informal institutions (Abor and Quartey, 2010; Amankwah-Amoah, Boso, and Antwi-Agyei, 2018).

Despite high entrepreneurial activity, many Ghanaian enterprises remain small and face barriers such as limited capital, poor infrastructure, institutional issues, and market volatility (Abor and Biekpe, 2006; Mohammed and Bunyaminu, 2021, 2023). Research shows financial limits, complex regulations, skill gaps, and macroeconomic instability hinder SME growth. Access to credit remains a major obstacle, as SMEs often cannot meet collateral requirements or navigate financial systems, thereby restricting expansion and innovation (Agyapong, Mmieh, and Mordi, 2018).

Although the literature has extensively examined structural factors, there has been less focus on how social and cultural environments influence entrepreneurial decision-making, especially regarding risk perceptions. Risk perception is widely acknowledged as a crucial factor in entrepreneurial behaviour (Martínez, Crespo and Fernández-Laviada, 2017; Yin and Wu, 2023). Entrepreneurs frequently operate in uncertain conditions, and their decisions to pursue opportunities often hinge on how they interpret and manage potential risks (Shane and Venkataraman, 2000; Rauch and Frese, 2007). Recent studies increasingly emphasise the importance of perceived risks and barriers in shaping entrepreneurial intentions and sustainability, particularly in emerging economies with high institutional uncertainty (Hoogendoorn, Zwan, and Thurik, 2019).

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Historically, entrepreneurship research viewed risk perception primarily as an individual cognitive process shaped by personality traits, experience, and knowledge (Baron, 2004). More recent scholarship, however, indicates that risk perception is also socially constructed, influenced by cultural, institutional, and relational contexts (Gimenez-Jimenez et al.,2022; Welter, 2011; Welter and Gartner, 2016). Cultural norms, social expectations, and institutional environments all impact how individuals interpret uncertainty and assess entrepreneurial opportunities (Gimenez-Jimenez et al., 2022).

The embeddedness theory offers a key framework for understanding how social ties affect economic actions (Granovetter, 1985). It suggests that economic behaviour is rooted in social networks that influence access to resources, information, and opportunities (Granovetter, 1985). In entrepreneurial settings, this view indicates that entrepreneurs' risk perceptions are shaped not just by market factors but also by social expectations, community norms, and institutional contexts (Dammicco and Diaz-Zagarra, 2025). Recent studies on entrepreneurial networks show that relational and structural embeddedness greatly impact entrepreneurial actions and firm success by shaping access to information, advice, and support from family, friends, and professional contacts (Korsgaard et al., 2022).

This is particularly important in peripheral regions, typically situated outside major economic hubs and often lacking extensive infrastructure, industrial development, and formal institutional support (Rodríguez-Pose and Hardy, 2015; Fritsch and Wyrwich, 2017; De Rosa, Bartoli, and Pia, 2019). Despite these challenges, peripheral areas frequently demonstrate strong social cohesion, dense community networks, and locally embedded governance, all of which can significantly impact economic and entrepreneurial initiatives.

In rural Ghana, entrepreneurship typically occurs within social frameworks influenced by kinship, traditional leadership, and informal economies (Sutter, Bruton and Chen, 2019; Dzisi, 2008). These cultural factors shape entrepreneurs' perceptions and management of risks associated with the initiation and growth of businesses. For example, community support networks can alleviate financial risks through informal loans, shared labour, or advice. However, strong community ties may also heighten reputational risks if ventures fail, as social consequences in close-knit communities can be significant.

Despite the significance of these socio-cultural factors, research on how cultural embeddedness affects entrepreneurial risk perception in peripheral regions of developing economies remains limited. Most studies concentrate on urban entrepreneurial ecosystems or formal institutions, leaving rural and peripheral entrepreneurial environments less understood. Nonetheless, recent research on entrepreneurship in emerging economies highlights the need to understand how local social structures, community relationships, and institutional contexts influence entrepreneurial cognition and behaviour.

Purpose of the paper. This study seeks to address the identified gap by examining how cultural embeddedness shapes entrepreneurial risk perception in Ghana's peripheral regions. By integrating perspectives from embeddedness theory, institutional theory, and entrepreneurship research, the study aims to provide new insights into the social and cultural mechanisms that shape risk perceptions in rural entrepreneurship. The study thus seeks to answer the question "How do kinship networks, community norms, and traditional institutions both mitigate and amplify entrepreneurial risk perception in rural Ghana?"

To answer this question, the study pursues five primary objectives:

Specifically, the study aims to:

i. To identify the socio-cultural factors shaping entrepreneurial risk perception in peripheral regions
ii. To examine the role of social networks in shaping entrepreneurial risk perception
iii. To explore how kinship obligations and family responsibilities influence entrepreneurial risk-taking behaviour
iv. To analyse the influence of informal institutions on entrepreneurial risk perception
v. To assess how culturally embedded support systems influence entrepreneurial resilience

By addressing these objectives, the study seeks to contribute to the literature on contextualised entrepreneurship and provide insights into the socio-cultural foundations of entrepreneurial ecosystems in developing economies.

Methodology. This study employs an emic qualitative approach (Galperin et al., 2022) to understand how social embeddedness influences entrepreneurial risk perception in Ghana's peripheral regions. The emic perspective captures entrepreneurs' lived experiences within their socio-cultural environment, crucial for analysing behaviour shaped by local norms, community ties, and informal institutions. Originating from Pike's distinction between emic and etic perspectives (Pike, 1967), this method emphasises culturally specific interpretations from local actors. In entrepreneurship, this distinction is vital because behaviour depends on diverse social and cultural contexts.

Researchers in Entrepreneurship Studies emphasise the need for contextualised approaches to study entrepreneurial processes in diverse institutional settings (Welter, 2011; Welter et al., 2017; Autio et al., 2018). Peripheral regions feature complex socio-economic environments where entrepreneurial activity is rooted in community networks, kinship ties, and informal governance. An emic approach effectively explores how entrepreneurs in these areas interpret uncertainty and assess risks. By focusing on entrepreneurs' perspectives, the study shows how social relationships influence decision-making. Context-aware methods are recommended for studying complex social phenomena in entrepreneurship (Halkias et al., 2022).

Case Selection: The study uses a multiple-case study design to explore complex social processes in real-world settings (Yin, 2018). Case studies are common in entrepreneurship research because they enable in-depth exploration while accounting for context (Eisenhardt, 1989; Gehman et al., 2018). Following Eisenhardt's (1989) advice, purposive sampling was used to identify cases relevant to the research. Participants were chosen for their active roles in entrepreneurship in Ghana's peripheral regions and their engagement with local communities, where social ties impact business. Ten local entrepreneurs from Gomoa East District in Ghana were purposively selected based on accessibility and relevance.

Including firms from diverse sectors enhances the study's analytical richness and enables comparisons across entrepreneurial contexts while still focusing on common patterns of socially embedded entrepreneurial behaviour. A summary of the cases used for the research is presented in Table 1.

Table 1: Profile of cases

Case	Line of business	Number of employees	Number of employees
P1	Photography	None	Male
P2	Clothing designing	One	Female
P3	Food vending	None (works with her kids)	Female
P4	Carpentry	Two	Male
P5	Farming	None (works with family)	Male
P6	Metal fabrication	Three	Male
P7	Chemist	None	Female
P8	Poultry	Five	Female
P9	Clothing designing and tailoring	One	Male
P10	Car accessories replacement	None (works with his son)	Male

Data Sources: To develop a comprehensive understanding of socially embedded entrepreneurial risk perception, the study draws on multiple data sources. A multiple-case study strategy enables the identification of both cross-case patterns and context-specific variations, thereby strengthening theory development (Chetty et al., 2014). Primary data were collected through semi-structured interviews, a widely used method in qualitative entrepreneurship research that enables participants to share detailed insights into their experiences and decision-making processes (Kvale and Brinkmann, 2009).

Ten key entrepreneurs participated, providing firsthand knowledge of the risks associated with their activities. Interviews, conducted virtually over three months, were in three stages to enable reflection and depth. The first stage involved 45 semi-structured interviews on uncertainty, decision-making, and the influence of social networks on risk. During the second phase, preliminary insights were shared for validation to ensure credibility. Currently, a final follow-up allows participants to comment on emerging findings and add context.

This iterative data collection process allowed the researchers to refine emerging themes throughout the study and improve the analytical robustness of the research (Locke, Feldman, and Golden-Biddle, 2020). All interviews were recorded with participants' consent and subsequently transcribed for analysis**.**

Data Analysis: Interview transcripts were systematically coded to identify recurring patterns and themes (Braun and Clarke, 2006). The analysis focused on identifying themes related to financial risk perception, reputational risk, social obligations and family responsibilities, informal institutional influences, and community-based support systems. Thematic analysis enabled the researchers to examine how entrepreneurs interpret and negotiate different forms of risk within their socio-cultural environments.

Preliminary Results.

The analysis shows that entrepreneurial risk perception in Ghana's peripheral regions is heavily influenced by social structures. Rather than being purely a financial or market concern, risk is viewed through the lens of social ties, community expectations, and informal institutions. Five key themes emerged: social networks as risk buffers; reputational risk and social visibility; kinship obligations; informal institutions and traditional authorities; and collective resilience. These themes highlight the complex nature of risk perception in peripheral entrepreneurial ecosystems.

Social Networks as Risk-Buffering Mechanisms

A key discovery is how social networks help lessen the perceived financial risks of entrepreneurship. Entrepreneurs often point out that support from family, community ties, and local networks acts as a safety net, fostering business experimentation. Participants mentioned that informal financial methods, such as family loans or community savings groups, play a crucial role in reducing uncertainty during the initial phases of business. These networks frequently replace formal financial institutions, which can be hard to access or viewed as complex in peripheral regions.

One entrepreneur explained:

> "When you start a business here, you are not completely alone. Your brothers, cousins, and friends can help you if things become difficult. That support reduces the fear of starting." (P1, Male, 2026)

Participant 4, who runs a carpentry business, reiterated this by stating that:

> "Even when money is not enough, people you know can give you goods on credit because they trust you." (P4, Male, 2026).

These findings align with the theory of Embeddedness, introduced by Mark Granovetter, which suggests that economic actions are embedded within networks of social relationships that shape access to resources and opportunities (Granovetter, 1985; Stam, 2015). In peripheral regions, where formal financial institutions may be limited, these social networks serve as informal entrepreneurial ecosystems, enabling individuals to pursue business opportunities despite financial constraints.

Reputational Risk and Social Visibility in Close-Knit Communities

While social networks reduce financial risk, they also increase reputational risk associated with entrepreneurial failure. In tightly knit communities, business activities are highly visible, and entrepreneurs often operate within social environments where reputation plays a significant role in determining social status and trust.

Several participants noted that the potential for reputational damage influences their willingness to take risks or pursue innovative ventures.

One entrepreneur who operates a vegetable and animal husbandry farm explained that:

> "In the village, everyone knows your business. If you fail, people will talk about it, and that can affect how they see you." (P5, Male, 2026)

Another participant who operates a metal fabrication shop remarked:

> "You must be careful before starting something new because if it fails, the community may say you made a bad decision." (P6, Male, 2026)

These views emphasise the social aspects of entrepreneurial risk. Failure is seen not just as a financial setback but also as a risk to one's social reputation and standing within the community. Research in entrepreneurship increasingly acknowledges the role of social context in how risk is perceived. Findings indicate that individuals within tight social networks may face greater reputational pressures that affect their entrepreneurial choices (Aldrich and Zimmer, 1986; Welter, 2011).

In peripheral communities where social ties are particularly strong, reputational considerations may therefore act as both a constraint and a guiding mechanism for entrepreneurial behaviour.

Kinship Obligations and Risk Moderation

Another key finding from the data concerns how kinship obligations affect entrepreneurs' perceptions of risk. In numerous peripheral Ghanaian communities, entrepreneurs are often expected to provide financial support to their extended family members. These duties influence their business choices, leading them to favour stability and steady income over risky ventures.

An entrepreneur who operates the only chemist shop in her village explained that:

> "I have many people depending on me. If I take a big risk and the business fails, it will affect the whole family." (P7, Female, 2026)

Participant 3 highlighted this sentiment by reiterating that:

> "Sometimes you want to expand, but you must think about your responsibilities at home first." (P3, Female, 2026)

These findings imply that social responsibilities within kinship systems often temper entrepreneurial risk-taking. Researchers have extensively acknowledged how family structures influence entrepreneurial actions. Studies show that family obligations can affect resource distribution and strategic choices in small enterprises (Steier, 2007). In developing economies, extended family systems frequently serve as informal welfare networks, offering social security in environments with limited formal social protection. Although they provide support, these systems can also restrict entrepreneurial risk-taking by promoting more cautious decision-making.

Informal Institutions and Traditional Authority as Risk Regulators

The findings also emphasise how informal institutions and traditional authority influence entrepreneurial risk perception. In many Ghanaian peripheral regions, chiefs and elders are key figures in overseeing economic activities, settling disputes, and endorsing new ventures. Entrepreneurs frequently seek endorsement or backing from local leaders when starting businesses or exploring new markets.

One participant explained:

> "I started sewing school uniforms for kids in my village and realised the local leaders noticed that I was charging very little to have uniforms sewn for the kids in the town. I realised after a while, almost every parent was bringing their business to me, not knowing the elders had spoken to the schools in the town about my pricing. So, trust me, if the chief supports your business, people will trust you more, and they will be willing to buy from you." (P9, Male, 2026)

Another entrepreneur noted:

> "There is always going to be disagreements in business, but when there is a dispute with customers or suppliers, community elders can help resolve it." (P2, Female, 2026)

These findings show how traditional governance systems act as informal regulatory mechanisms that lower uncertainty and support economic transactions. Institutional theory, especially Douglass North's work, highlights that

economic behaviour is influenced not just by formal rules but also by informal norms and governance structures (North, 1990). When formal institutions are weak or difficult to access, informal institutions often serve as crucial mechanisms for managing economic interactions.

Traditional authorities can reduce perceived institutional risks associated with entrepreneurship by establishing legitimacy, facilitating conflict resolution, and building community trust.

Collective Resilience and Community-Based Coping Mechanisms

The final finding concerns how collective resilience influences entrepreneurs' responses to risk and uncertainty. In peripheral regions, entrepreneurs frequently depend on community-based coping strategies during economic hardships. These strategies can involve cooperative labour arrangements, informal financial aid, shared market information, and collaborative problem-solving.

Such practices enable entrepreneurs to adapt to uncertain economic environments and maintain business continuity. Participant 10 explained:

> "If someone in the community faces difficulties, others will help. That is how we survive." (P10, Male, 2026)

An entrepreneur operating a poultry farm echoed this by explaining that:

> "We share information about suppliers and markets so that everyone can improve their business." (P8, Female, 2026)

These findings underscore the significance of collective resilience in peripheral entrepreneurial ecosystems. Research indicates that collaboration and knowledge sharing within local networks can boost resilience and innovation among small businesses (Stam, 2015). Likewise, studies on informal economies reveal that community-based cooperation often is essential for helping entrepreneurs manage uncertain economic conditions (Williams and Nadin, 2010).

In peripheral regions, these culturally embedded practices contribute to the sustainability of entrepreneurial activities despite structural challenges such as limited infrastructure and financial constraints (Stam, 2015; Stam and Van de Ven, 2021).

The study indicates that in Ghana's peripheral regions, entrepreneurs' perceptions of risk are shaped by a complex interplay of social ties, cultural standards, and institutional influences. Social networks reduce financial uncertainty by providing informal support, while concerns about reputation and family duties can influence risk-taking behaviours. Additionally, informal institutions and traditional authorities impact decision-making by overseeing economic exchanges and granting legitimacy. These factors demonstrate that risk perception isn't solely an individual matter but is rooted in the social and cultural settings in which entrepreneurs operate.

Research limitations. The research is limited in scope, as we used only businesses in the Gomoa East District, which is in the southern part of Ghana; therefore, generalisation may be questioned, as the culture and life in peripheral areas of southern Ghana may differ from those of Northern Ghana and other countries. The result of this research will thus serve as a foundation for future research, starting with a comparison with peripheral entrepreneurs in the Northern part of Ghana, to help explore similarities and differences in how cultural embeddedness impacts risk perceptions amongst entrepreneurs from the two blocs.

Managerial implications. This study offers vital insights into strengthening entrepreneurial ecosystems in Ghana's peripheral regions, highlighting that risk perception is deeply embedded in social relationships and informal institutions. Therefore, effective policies should go beyond Western-centric approaches that focus on formal regulatory reforms and instead recognise the socio-cultural context of local economic activities (Welter, 2011). Since informal norms influence how rural entrepreneurs assess risk and mobilise resources (North, 1990), interventions should support, not override, existing community structures.

Social capital is vital for resilience, as entrepreneurs rely on family and community networks to overcome challenges and access resources (Granovetter, 1985). Support organisations should leverage these networks via trade groups and peer mentorship aligned with local trust. Policies must suit peripheral markets, where SMEs often lack formal credit (Abor and Biekpe, 2006; Abor and Quartey, 2010). Incorporating informal systems, such as rotating savings, and hybrid models that connect microfinance with community groups can enhance stability and flexibility (Beck and Demirgüç-Kunt, 2006).

Involving traditional leaders, such as chiefs and elders, is crucial, as they serve as informal regulators, provide social legitimacy, and mediate disputes. Their involvement in designing incubation or infrastructure projects can boost community support. Management should consider the "dual effects" of social embeddedness: kinship ties support entrepreneurs but may also reinforce conservative, socially driven business practices, risking reputational damage. Improving managerial skills and financial literacy helps entrepreneurs balance social responsibilities and business growth (Agyapong and Attram, 2019).

Originality of the paper. This research advances entrepreneurship by exploring how cultural embeddedness in Ghana's peripheral regions affects entrepreneurial risk perception. While previous studies have examined individual traits and cognitive biases (Simon, Houghton, and Aquino, 2000; Baron, 2004), less attention has been paid to the socio-cultural contexts that shape responses to uncertainty. Granovetter's (1985) concept of embeddedness shows that risk perception is socially constructed through networks, norms, and informal institutions, not just personal cognition. The study adds to

the literature by focusing on underrepresented peripheral environments, particularly in rural sub-Saharan Africa, and reveals how norms, kinship, and community influence perceptions of financial, social, and reputational risks.

It enhances understanding of entrepreneurial risk by showing how social embeddedness has dual effects: strong networks can lower financial risks through support and resources, but may increase reputational risks if failures threaten social standing. This adds complexity beyond traditional views that see social capital mainly as a facilitator of entrepreneurship (Wigren-Kristoferson, et al., 2022). The research also suggests policy insights for better supporting culturally embedded entrepreneurial ecosystems in developing countries. Linking cultural embeddedness to risk perception offers a new framework for understanding entrepreneurial behaviour in peripheral regions.

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Cultural heritage management in peripheral areas: the challenge of resource degradation

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Abstract. *This paper investigates resource development processes in contexts of cultural heritage (CH) degradation, with a particular focus on peripheral areas. Cultural heritage has increasingly become a strategic asset within the cultural and creative industries, contributing to economic development. At the same time, CH is characterized by significant vulnerabilities. While existing literature has extensively addressed CH protection and valorisation, limited attention has been paid to the dynamic processes through which CH evolves as a resource, especially in situations of degradation. To address this gap, the paper explores how resources are developed and combined in contexts where cultural heritage is deteriorating. The study focuses on the case of Castelnuovo, an abandoned 11th-century fortified hamlet located between the Marche and Emilia-Romagna regions in Italy. The analysis adopts the Resource Interaction Approach (RIA), which conceptualizes resources as products, process facilities, organisational units, and business relationships. Findings reveal a cumulative dynamic of resource deficiencies affecting all resource types—physical deterioration of the heritage asset, ineffective legal instruments, missing key actors and fragile or dormant relationships—resulting in a self-reinforcing cycle of decline. The study highlights the importance of analysing CH as a dynamic resource bundle in complex and fragile contexts.*
Keywords: *Cultural Heritage; Resource Degradation; Entrepreneurship; Peripheral Areas*

Framing of the research. Cultural heritage (CH) represents a pillar of the cultural and creative industry, which has been recognised as an engine of economic development (Huggins & Thompson, 2015). The main phenomena supporting this increasing role and impact of CH are the shift from manufacturing to service-led economic development (Bifulco & Russo Spena, 2017), the emergence of culture-led strategies promoting cultural tourism (Folgado-Fernández & Hernández-Rojas, 2025), urban regeneration, and the improving confidence and civic pride in local communities (Pendlebury & Porfyriou, 2017). In this evolving setting, CH is perceived as a «precious resource for the community, rather than a financial burden on the local economy» (Cirillo, 2017: 149)

According to the Faro Convention, CH is defined as "a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time" (Faro Convention, art.2, letter a). CH has a few distinctive features. It is a resource closely embedded in a specific location (UNESCO, 2013). Moreover, it is a fragile resource: natural or climate factors could affect the aesthetics and the robustness of tangible remains (Barriga Delgado et al., 2023), and, also, political turmoil and armed conflict could substantially harm CH in an unexpected manner (Schipper, 2022). It might have been left abandoned for a long time by private or public ownership, thus leading to a degradation over time (Meneghin et al., 2023; Barelles-Vicente et al., 2025). Restoration efforts might have been neglected or could have been limited due to fragmentation of activities or lack of adequate funding and technical capabilities. Lack of resources could affect the ability of institutions and local communities to start restoration and renovation projects (Barelles-Vicente et al., 2025). On the contrary, CH could be put in danger when it is excessively exploited as a resource, as in the case of overtourism, having a negative impact on the sustainability of CH initiatives (Folgado-Fernández & Hernández-Rojas, 2025).

CH management (CHM) has thus become a key theme both in the institutional and academic contexts. With regard to the former, over the years a key role has been played by UNESCO, in the light of its mission to protect and valorise CH in all its forms (UNESCO, 2013), which have changed over time, including various dimensions, as tangible, intangible (Vecco, 2010) and digital heritage (Lian & Xie, 2024). Also, the academic debate on CH has grown over the years and has involved a wide array of disciplines, ranging from humanities to economics and business and to the technical and digital ones (Duval et al., 2019). In terms of CHM activities, two main aspects have been discussed in more depth, in line with UNESCO's priorities: the protection of CH, with the goal of maintaining the features and attributes, and thus its value over time, also using advanced technologies (Colace et al., 2025); the valorisation of CH, in terms of its ability in generating cultural and economic value through specific projects and initiatives having direct and indirect effects on the local context (Cerquetti, 2017; Barelles-Vicente et al., 2025). A key aspect is the value dimension related to the use of CH, perceived as a resource or a potential resource. CH might be characterized by different approaches in terms of resource management, such as restoration, reuse, revitalization, integration with new structures (Dalla Torre et al., 2020; Barelles-Vicente et al., 2025). In these studies it is widely recognized that the policy-planning and the management dimensions are often strongly linked and interdependent, in the light of many "public" dimensions of CH and of the

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complexity of CHM initiatives, requiring capabilities, institutional support (Imperiale et al., 2025) and also "shared meaning" among different stakeholders, as argued by Barelles-Vicente (et al., 2025).

Thus far, CHM has been analysed in the literature with reference to different theoretical approaches. A recognized, even though fragmented, stream of research is concerned with the institutional and business context, placing emphasis on analysis of clustering processes and local communities' evolution, including those emerging in peripheral areas (Malisiova &Kostopoulou, 2024). CH is a key component of tangible reality in terms of space and time (Lazzeretti, 2024). Within this perspective meta-organizations could build a "strategic set", where local actors - with different nature/logic, resources, organization - are increasingly involved (Cicellin et al., 2017). Another consolidated area of research is linked to the service ecosystem approach, as it is applied to the CH sector (Holleland et al., 2017). The main focus is on the provision of cultural services, in the light of the protection/valorisation strategies, already discussed above, highlighting the interplay of institutions, technologies and actors, leading to specific socio-material practices (Russo Spena et al., 2017). However, existing conceptual frameworks do not discuss and provide analytical conceptualization of resource development in CHM, which could help in a better understanding of the transition from "ruin to resource", quoting the study by Barelles-Vicente (et al., 2025).

Notwithstanding the growing academic attention towards CHM in terms of protection/conservation and valorisation, it could be argued that the "resource" dimension has been largely neglected in its dynamic trajectories related to resource change and resource combinations processes. Various studies within the service ecosystem approach (Bifulco & Russo-Spena, 2017) highlight the role of resources in CHM and in the networked context where the main actors operate. However, with some insightful exceptions (Bareless-Vicente et al., 2025), existing research does not explore in more depth CH as a resource itself, its evolution - degradation, and restoration - and its combination processes with other contextual resources, including those detained by business firms and cultural organizations. This gap is particularly relevant in the analysis of "peripheral settings", where CH degradation processes are more likely and contextual resources are scarce or are based on fragile networks (Meneghin et al., 2023).

Purpose of the paper. This paper aims to undertake explorative research over resource development processes in the context of CH degradation. Therefore, it addresses this research question: how are resources developed and combined in the context of CH degradation in peripheral areas?

To pursue this research objective, an illustrative case study - Castelnuovo hamlet in the Marche Region and the unsuccessful attempts to renovate e valorise this historical site - is discussed according to the Resource Interaction Approach (RIA; Baraldi et al., 2012), which proposes a taxonomy of resources - product, process facilities, organisational units and business relationships (Baraldi et al., 2012). The RIA emphasizes resource interaction processes, which could be distributed over multiple firms, organisations and business networks (Landqvist & Lind, 2019), as shown with regard to inter-organisational projects (Silvestri et al., 2022), where actors might pursue different goals while using or combining shared resources (Lind, 2015) and could engage in conflictual interaction (Vaaland & Håkansson, 2003). A notable example is represented by public-private initiatives (Mattson & Anderson, 2019; Carloni, 2022), whose complexity is caused by the different logics behind the behaviour of partnering actors and by the specific nature of resources, which might show place-related features (Håkansson et al., 2006; Mutignani, 2025), as they are embedded in the local socio-cultural context. Resource-related processes could also be influenced by the existence of specific regulatory frameworks and contractual norms, which might rule over the access and use of specific resources (Mouzas & Ford, 2012), and by complex contexts requiring renewal, such as fragmented business networks (Ingemansson Havenvid et al., 2016) and peripheral areas (Mutignani, 2025). Recent conceptual developments concern the handling of resource deficiencies in terms of scarcity, quality and availability, thus highlighting the "change dimension" in resources (Tunisini et al., 2023).

The expected contribution of this research is twofold. Under an empirical perspective, this paper aims to provide a more fine-grained analysis of resource development and evolution in CH management, to address the gap highlighted above. In this vein, this research and its future development could provide insightful managerial implications for setting up appropriate organisational and networking mechanisms in complex CH contexts, where there is lack of resources - financial, technical, organisational - and difficulties in establishing, cultivating and restoring local relationships and networks, which often represent a weak "heritage" linked to the difficult evolution of CH. Under a conceptual perspective, CH is a context where the analysis of resource evolution - also in terms of degradation, decay (Karadag & Poppo, 2023) - in its networked and contextual settings can be examined more in depth, leading to new conceptual insights, widening the relevance of RIA as an analytical framework for complex business and organisational settings.

Methodology. This paper presents a preliminary analysis of a case-study in the CH sector: the castle of Castelnuovo, a small 11th-century fortified rural hamlet located on a ridge on the border between the Marche and Emilia Romagna regions. The research adopts an exploratory case study design (Yin, 2018), suited to the complex, multi-actor, and longitudinal nature of the phenomenon under investigation. The exploratory orientation reflects the preliminary and theory-building nature of the analysis: at this stage the paper focuses on a single illustrative case, but in the development of the research we aim at adding further exemplary cases to better answer the RQ also with respect to the resource development and combination processes, allowing for a richer understanding of how resources are developed and combined across different CH settings.

The case has been purposefully selected within the CH sector on the basis of three main criteria. First, the nature of the resources involved: the case combines tangible architectural heritage, fragile institutional relationships, and scarce

financial and organisational resources, making it a suitable setting for analysing the dynamic interplay of resource types within the RIA framework. Second, the long and well-documented process of resource degradation: spanning over two decades, the case offers a rich and traceable trajectory of resource change and decline, allowing for a retrospective analysis of the mechanisms driving CH degradation. Third, its typicality as a peripheral case: Castelnuovo exemplifies conditions commonly found in inner and marginal areas of Italy, where depopulation, limited financial capacity of local administrations, and the absence of strong private actors create a context of structural vulnerability for CH valorisation efforts. In this sense, it can be considered a "typical case" (Seawright & Gerring, 2008) of CH management in peripheral areas, likely to share structural features with analogous situations across the Italian territory and comparable European contexts.

Data collection was conducted through a combination of primary and secondary sources, following a multi-source approach consistent with case study methodology (Eisenhardt, 1989; Yin, 2018). Primary data were gathered through two semi-structured in-depth interviews, each lasting approximately one hour: the former Mayor of the Municipality of Auditore, who followed the case in its final phase, and an administrative lawyer, consulted due to his deep knowledge of public-private partnerships and his own engagement with the community of Auditore. Primary sources also include the complete documentation accessible relating to the case: municipal resolutions (delibere), minutes of council and administrative meetings (verbali), and urban planning documents (including the Detailed Plan approved in 2006). These allow for a direct reconstruction of the decisions taken and their official motivations. Secondary data consist of press releases, local and regional press coverage, books (Allegretti & Lombardi, 1995) and previous academic works (Mutignani, 2021; Traversari, 2007), which enabled triangulation of the primary accounts and reconstruction of phases of the process for which direct documentation was limited.

The analysis was conducted retrospectively, drawing on both interview transcripts and documentary sources to reconstruct the longitudinal trajectory of the case. The RIA framework and the 4Rs taxonomy - product, process facilities, organisational units, and business relationships (Baraldi et al., 2012) provided the conceptual lens for interpreting the data. The analytical process involved an iterative movement between the empirical material and the theoretical framework, consistent with an abductive research logic (Dubois & Gadde, 2002), aimed at both applying existing concepts to a new domain and generating new insights on resource degradation processes in CH settings. Given the exploratory and preliminary nature of this research, the findings presented in this paper should be interpreted as the basis for further theoretical development and empirical investigation, to be enriched through the inclusion of additional cases in the next stages of the research.

Results. Castelnuovo is a small 11th-century fortified rural hamlet located on a ridge on the border between the Marche and Emilia Romagna regions. Following the total emigration caused by the transformation of the Italian economy from agricultural to industrial after the Second World War, the hamlet is now completely abandoned and in ruins. In the attempt to preserve the structural heritage of the hamlet and its castle, in the year 2000, the former municipal administration signed a partnership with a private company - eborgo Srl - to restore and transform the village, establishing a purpose-driven urban transformation joint venture company (Società di Trasformazione Urbana - STU) named "Castelnuovo S.p.A." with the plan to be completed by 2010. However, despite two extensions granted until 2014, the new company never fulfilled its agreed obligations by carrying out the planned urbanisation and restoration works. When the municipal administration requested the company's liquidation, the private actor involved in the partnership attempted to appeal through legal ways, but suffered a decisive defeat in the administrative court. In addition to the dissolution of the joint venture, this proceeding led to the definitive abandonment of the restoration project, and the castle of Castelnuovo, after 25 years of abandonment, now lies in complete ruin.

According to RIA, the Castelnuovo hamlet could be qualified as the "product", conceived as a "bundle of resources" (Huemer & Wang, 2021), with some specific features: it is a combination of various tangible and intangible components. It is not a finished product, rather an intermediate product suffering from deterioration over time in its basic physical attributes and lacking complementary resources necessary to generate value according to the specific uses.

In the Castelnuovo hamlet case-study, there are many different organisational units involved, in the various phases: the Municipality, specifically the Mayors in charge and the Technical Office; the company eborgo Srl; the joint company Castelnuovo S.p.A., the Superintendency of Cultural Heritage, the Marche Region, and the hamlet inhabitants/community. There are also shadow "organisational units", as the supposed foreign investors. All these organisational units have a different nature - public, business, civil society (Imperiale et al., 2024), including, as in the case of Castelnuovo S.p.A, a hybrid nature (public/private).

In terms of process facilities, we might consider the procedural and legal frameworks at the basis of Castelnuovo S.p.A as an intangible process facility, in other words as a legal tool, laying the foundation for launching innovative projects aiming to start restoration and then valorisation of the Castelnuovo hamlet, in other words "leveraging" resources for product development (Mouzas & Ford, 2012). However, these legal "facilities" have not been activated and their effects have been left on paper.

The various organisational units are linked through various business relationships. However, the networked context shows some specific features. First, most of the relationships have mainly a formal dimension, are characterized by limited interaction processes and in some cases they are actually "sleeping" relationships, whose reactivation is difficult and complex. Some business relationships are "shadowed", as organisational units do not have a clear knowledge and

understanding of their existence and features. This "relational" uncertainty over time shapes expectations and slows the overall process of restoration and valorisation, making alignment among parties very difficult (Lind, 2015).

Lastly, the evolution of the Castelnuovo case is shaped by the lack of financial resources, both on the public and private sides. From this perspective, the failure of the STU represents not only an administrative and financial failure, but also a missed opportunity to maintain the link between the local community and a heritage that, with the expropriations, has been definitively detached from private ownership.

In terms of handling of resources, this case is characterised by the simultaneous negative impact of resource scarcity, quality and availability (Tunisini et al., 2023). Many of the resources in play show a progressive "change dimension" in one or more of the three resource elements, unfolding over a long timeframe. In this scenario appears clear that resource interaction itself has been largely neglected by the actors involved. This lack of awareness had relevant consequences, as it prevented actors from recognising the cumulative nature of the resource deficiencies and from considering alternative resource combinations or network reconfigurations in a timely manner.

In relation to the product - the Castelnuovo hamlet as a bundle of tangible and intangible resources - the most visible dimension is that of quality. The physical conditions of the buildings, the fortified walls, the church, and the surrounding land have progressively deteriorated over more than two decades of abandonment. What was already a fragile resource at the outset has undergone a continuous process of quality degradation to the point where the restoration effort required today far exceeds what was originally planned. This quality decline is not merely physical: the symbolic and community value attached to the hamlet has also eroded as the gap between the resource and any plausible use has widened over time. Crucially, a more careful analysis of the product's resource interfaces at an early stage could have prompted a selective approach - identifying which physical elements were still recoverable and worth combining with other resources - rather than treating the hamlet as an undifferentiated whole. A selection of key physical resources might have opened more realistic paths of resource recombination.

Concerning facilities - primarily the legal and regulatory instruments underpinning the STU - the deficiencies concern both quality and availability. In terms of quality, the STU instrument proved to be a rigid and poorly designed framework: it lacked feasibility requirements, left risk distribution undefined, and provided no effective enforcement mechanisms. Its structural rigidity made it unable to advance the project, and no attempt was made to compensate for these shortcomings through alternative procedural arrangements. In terms of availability, the instruments activated during the project - i.e., the Detailed Plan, the expropriation procedures, the administrative acts - became progressively unavailable as resources: the Detailed Plan lapsed after ten years without works being carried out, and any future restoration would require entirely new planning instruments, further delaying any recovery of the resource base.

In relation to organisational units, the deficiencies are primarily those of scarcity and availability. Scarcity is evident in the lack of managerial, technical, and financial competencies across all actors involved: the municipality lacked the capacity to monitor and enforce obligations effectively; eborgo S.r.l. lacked financial solidity and operational capability; and no competent third-party investor was ever identified. Availability is equally problematic: several organisational units that should have been active participants - the Superintendency of Cultural Heritage, the Marche Region, potential investors - were either absent, belatedly involved, or present only as "shadow" actors whose engagement never materialised. The neglect of resource interaction meant that the possible contribution of these actors to the resource base was never systematically explored, and no attempt was made to reconfigure the organisational network to compensate for the deficiencies that were accumulating.

Concerning relationships, all three deficiencies are simultaneously at play. Scarcity is visible in the thinness of the relational fabric, with no alternative pathways for resource access. Quality degraded progressively as trust eroded, obligations went unmet, and the relationship between the municipality and eborgo shifted from a collaborative partnership to an adversarial legal confrontation. Availability is perhaps the most structurally significant deficiency: many of the relationships that should have been activated - with investors, with the Superintendency, with the regional administration - were either never formed, formed too late, or remained dormant and difficult to reactivate. Moreover, the relationship with the local community has been definitively "broken", especially due to the expropriation. In Tunisini's (et al., 2023) terms, these are not short-term, single deficiencies but rather structural resource deficiencies, having an impact over the medium-to-long term and requiring a radical reconfiguration of the network that never occurred.

All this depicts a scenario of compounding resource degradation and fragile networks in the context of resource interaction over the years. What makes the Castelnuovo case analytically distinctive is the simultaneity and cumulative nature of the three deficiencies across almost all four resource types, in a self-reinforcing dynamic of decline.

Research limitations. This research is in-progress and is subject to an important limitation: it is based on a single case study. Although Castelnuovo was purposefully selected as a typical instance of CH management failure in peripheral areas - likely sharing structural features with analogous situations across Italy and comparable European contexts - the findings remain inherently illustrative and exploratory. Single-case research is well-suited to theory-building, but does not allow for systematic comparison across contexts, actors, or resource configurations. The mechanisms identified here - compounding deficiencies, dormant relationships, absence of resource interface analysis - may characterize differently other CH settings.

Managerial implications. The Castelnuovo case has also relevant implications for CH management: treating heritage sites as undifferentiated wholes - rather than as complex bundles of resources with different natures, conditions, and

trajectories - prevents actors from identifying what is still recoverable, which combinations remain viable, and where intervention is most urgent. Looking at resources in terms of their scarcity, quality, and availability is therefore not merely an analytical refinement, but a necessary precondition for any credible restoration or valorisation effort in complex CH settings.

Originality of the paper. The original contribution of this research is twofold. From an empirical perspective, this paper provides a contribution to the analysis of CHM and resource development in peripheral areas. Notably, the Castelnuovo case-study provides key insights over public-private interaction for new entrepreneurial initiatives and resource development in connection with CH. From a conceptual perspective, CH has proven a revealing domain for examining resource evolution - specifically in terms of degradation along the dimensions of scarcity, quality and availability - in networked settings, thus providing new insights into the growing stream of research on resources in business firms and in entrepreneurial settings.

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Narrating Venture Failure: Configurations of entrepreneurial failure narratives across cultural contexts

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Abstract. *When entrepreneurs experience venture failure, they are often expected to publicly account for what went wrong and explain the causes of the outcome. These explanations are rarely neutral descriptions of events. They are narrative constructions through which founders attribute responsibility, interpret adverse outcomes, and attempt to preserve their legitimacy as entrepreneurial actors. In entrepreneurial contexts where reputation and credibility are critical resources, how failure is narrated may shape how founders are evaluated by investors, collaborators, and other stakeholders. Moreover, because expectations regarding credibility and leadership vary across cultural contexts, the ways in which entrepreneurs publicly narrate failure may differ accordingly. Drawing on qualitative content analysis of 24 post-mortem statements published by startup founders on online platforms, this study examines how entrepreneurs from different cultural contexts narrate venture failure and identifies recurring narrative configurations through which founders attribute responsibility and reconstruct legitimacy after failure. The analysis focuses on two analytical dimensions: responsibility attribution (internal vs external), which captures how entrepreneurs explain the causes of venture failure, and legitimacy reconstruction (individual vs collective or systemic), which reflects how founders attempt to reaffirm credibility and professional identity after failure. The findings identify four narrative configurations through which entrepreneurs account for venture failure: Learning-from-Failure, Collective Learning, Analytical Justification, and Visionary Persistence narratives. These configurations represent distinct ways of framing failure and managing its reputational implications across different entrepreneurial contexts. By examining how these narrative patterns appear across cultural contexts, the study highlights the role of culture in shaping how entrepreneurs publicly interpret and communicate failure. Overall, the paper contributes to research on entrepreneurial failure and impression management by developing a typology of failure narratives and illustrating how founders use narrative practices to negotiate responsibility, legitimacy, and identity after venture failure.*

Keywords*: Entrepreneurial failure; Failure narratives; Impression Management; Narrative configurations; Cross-cultural contexts.*

Framing of the research. Entrepreneurial failure represents a critical moment in the entrepreneurial process, not only because it marks the end of a venture, but also because it generates significant identity, reputational, and legitimacy challenges for founders (Czakon et al., 2024; Klimas et al., 2021). Prior research shows that venture failure can destabilize the self-conceptions entrepreneurs construct around their role as venture creators, calling into question their competence, credibility, and future prospects in the entrepreneurial context (Shepherd, 2003; Shepherd & Haynie, 2011;Costa et al., 2023). Because entrepreneurial identities are often deeply intertwined with the ventures themselves, the venture collapse may also undermine founders' social standing and professional legitimacy, exposing them to negative evaluations and reputational stigma (Cardon et al., 2011; Simmons et al., 2014; Byrne & Shepherd, 2015). As a result, entrepreneurial failure is not only an economic outcome but also a socially consequential event that requires interpretation and explanation. When outcomes deviate from expectations of competence, leadership, and venture creation, entrepreneurs may face pressure to explain what happened and justify their role in the outcome. Classical sociological theory suggests that, in such circumstances, individuals produce accounts, defined as discursive explanations that attribute causes to events and frame responsibility in ways that protect valued aspects of the self (Scott & Lyman, 1968). In entrepreneurial settings, these accounts typically take the form of narratives through which founders interpret the causes of venture collapse and position themselves vis-à-vis relevant audiences within the entrepreneurial ecosystem. Therefore, narratives play a central role in shaping how organizational events are interpreted and evaluated. Organization and entrepreneurship research highlights that they constitute key mechanisms through which actors make sense of events, justify outcomes, and shape stakeholders' understanding of organizational experiences (Lounsbury & Glynn, 2001; Martens, Jennings, & Jennings, 2007). These dynamics become particularly salient in the context of venture failure, where entrepreneurs frequently construct retrospective narratives that explain the causes of collapse and articulate lessons derived from the experience (Mantere et al., 2013). Such narratives function both as explanations of past events and as interpretive frameworks that render failure socially intelligible, while also helping entrepreneurs manage the reputational consequences of venture collapse. In this sense, failure accounts are closely connected to processes of impression management, defined as strategic efforts individuals use to influence how others perceive and evaluate them (Goffman, 1959; Schlenker, 1980; Leary & Kowalski, 1990). In cases of venture collapse, these narratives frequently involve

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processes of responsibility attribution, through which entrepreneurs explain whether the collapse resulted from internal decisions or external circumstances. Failure may thus be framed either as the outcome of entrepreneurial mistakes or as the consequence of misfortune beyond the founder's control (Cardon et al., 2011), while explanations of venture collapse may distribute responsibility across individual, organizational, and contextual factors (Mantere et al., 2013). At the same time, such narratives address the legitimacy challenges generated by venture collapse. Because failure may undermine the entrepreneur's perceived appropriateness within socially constructed systems of norms and expectations (Suchman, 1995; Richey et al., 2025), founders often reinterpret failure to protect their credibility and reaffirm their identity as legitimate entrepreneurial actors (Navis & Glynn, 2011).

Purpose of the paper. Despite the growing body of research on entrepreneurial failure narratives and impression management, these literatures have largely evolved in parallel. Studies on entrepreneurial failure have examined how founders interpret and communicate venture collapse through retrospective narratives that explain what went wrong and what can be learned from the experience (Vaara, 2002; Kibler et al., 2017; Dobusch et al., 2022). At the same time, research on impression management highlights how actors strategically construct accounts in order to shape how they are perceived and evaluated by relevant audiences (Goffman, 1959; Leary & Kowalski, 1990). However, the intersection between these two perspectives remains underexplored. In particular, existing research has paid limited attention to the broader cultural contexts in which entrepreneurial failure narratives are produced and interpreted. While failure accounts are often treated as individual sensemaking practices or impression management strategies, institutional and cultural theory suggests that practices of justification, responsibility attribution, and self-presentation are embedded within socially structured systems of meaning that shape how actors interpret events and respond to adverse outcomes (Scott, 1995; Thornton, Ocasio, & Lounsbury, 2012). Therefore, cultural frameworks influence not only how failure is interpreted but also how entrepreneurs are expected to publicly account for it. Building on this perspective, this study explores how entrepreneurial failure narratives may vary across cultural contexts and how founders draw on different narrative strategies when accounting for venture collapse. Specifically, we conceptualize entrepreneurial failure narratives as culturally embedded accounts through which founders attribute responsibility for venture collapse and attempt to reconstruct legitimacy after failure. Accordingly, the study aims to address the following research question: How do entrepreneurs narrate venture failure across different cultural contexts?
To address this question, the study analyzes founders' post-mortem statements published on online platforms where entrepreneurs publicly reflect on the collapse of their ventures. By examining how founders frame failure experiences through different narrative strategies and interpretive forms, the analysis explores how cultural contexts shape the ways entrepreneurs attribute responsibility and reconstruct legitimacy in accounts of venture failure. By integrating insights from impression management theory, entrepreneurial failure research, and cultural perspectives on organizational communication, this study contributes to a deeper understanding of how entrepreneurs publicly account for venture collapse. More broadly, this study highlights how narratives of failure constitute culturally embedded practices through which founders negotiate responsibility, legitimacy, and identity within entrepreneurial ecosystems.

Methodology. This study adopts a qualitative research design to examine how entrepreneurs narrate venture failure and how these narratives reflect different ways of attributing responsibility and reconstructing legitimacy after venture collapse. In particular, the study focuses on founders' post-mortem statements, a form of public narrative in which entrepreneurs retrospectively explain the causes of startup failure and reflect on the entrepreneurial experience.

Post-mortem statements represent a particularly suitable empirical context for this study because they constitute public accounts addressed to entrepreneurial audiences, including investors, founders, and members of the startup ecosystem. As such, they provide rich insights into how entrepreneurs interpret failure and strategically communicate it to preserve credibility and professional identity.

Data collection. The empirical material consists of a dataset of entrepreneurial failure narratives collected from two widely used online platforms within the startup ecosystem: Failory and Medium. These platforms host numerous postmortem accounts written by startup founders who publicly recount the reasons behind their ventures' collapse. Such narratives represent a valuable source of qualitative data because they provide first-person accounts of failure written by entrepreneurs themselves and addressed to a broad audience within entrepreneurial communities. The data collection process followed a systematic multi-step procedure. First, postmortem narratives were identified through targeted searches on the selected platforms using keywords commonly associated with entrepreneurial failure narratives, such as "startup failure," "startup postmortem," "why our startup failed," and "lessons from failure." This initial search generated a broad pool of potential cases.

In a second step, the retrieved narratives were screened according to specific inclusion criteria. Only texts written directly by founders or co-founders describing the failure of their own startup were included in the dataset. Articles written by journalists, investors, consultants, or other external observers were excluded in order to maintain a consistent focus on entrepreneurs' self-narratives. In addition, the narratives had to contain a substantive reflection on the causes of failure and provide sufficient detail regarding the entrepreneurial experience. Very short texts or articles that merely mentioned failure without discussing it in depth were excluded from the sample. After applying these criteria, the final dataset consisted of 24 postmortem narratives describing the failures of startups across different national contexts. For each case, additional contextual information was collected to support subsequent analysis. This information included the startup's

name, industry sector, year of founding and closure (when available), the founder's nationality, and the country in which the venture operated. These details allowed the cases to be organized by the national context of the entrepreneurs and enabled cross-cultural comparisons. Specifically, to explore how narratives of failure may vary across broader cultural environments, the cases were subsequently organized into cultural clusters based on the classification proposed by the GLOBE Project (House et al., 2004). This framework groups countries into broader cultural clusters that share similar societal values and institutional characteristics. The dataset included cases associated with the following clusters: Anglo-American, Nordic, Germanic, Latin European, Latin American, Confucian Asian, and South Asian contexts. In the present study, cultural clusters are primarily used as an analytical lens to organize the empirical material and explore how entrepreneurial failure narratives appear across different contexts. The analysis, therefore, focuses on identifying recurring narrative configurations across cultural environments rather than establishing systematic cross-cultural differences.

Data analysis. The study employs qualitative content analysis to examine how entrepreneurs construct and communicate narratives of venture failure. Content analysis is particularly suitable for this research because it allows systematic interpretation of textual data to identify recurring themes, meanings, and communicative patterns within qualitative material (Krippendorff, 2018). The analysis followed a multi-step coding process. First, all postmortem narratives were carefully read several times to become familiar with the data and identify preliminary thematic patterns. During this initial phase, the texts were examined holistically to capture how entrepreneurs described the causes of venture collapse, the roles of the different actors involved, and the emotional and interpretative framing of the failure experience. In the second step, the analysis was guided by two analytical dimensions derived from the theoretical framework: responsibility attribution (Mantere et al., 2013) and legitimacy reconstruction (Richey et al., 2025). First, narratives were coded according to how founders explained the causes of venture failure. Failure accounts were classified depending on whether responsibility was primarily attributed to internal causes, such as strategic mistakes, managerial decisions, or flawed assumptions, or to external causes, such as market conditions, institutional constraints, or broader environmental dynamics. Second, the analysis examined how founders attempted to reconstruct legitimacy after failure. This dimension was operationalized by analyzing impression management strategies embedded in the narratives as suggested by Kibler et al. (2017). In particular, demonstrative and assertive strategies, typically associated with self-focused narratives emphasizing learning, competence, and leadership, were interpreted as mechanisms for reconstructing individual legitimacy. Conversely, defensive and other-focused strategies, which emphasize contextual constraints, structural conditions, or the collective role of the team, were interpreted as mechanisms for reconstructing collective or systemic legitimacy. Finally, the analysis examined how the two analytical dimensions, responsibility attribution and legitimacy reconstruction, interacted across the narratives. By comparing how different combinations of these two dimensions appear across the dataset, the analysis generated a typology of narrative patterns through which entrepreneurs account for venture collapse.

Results. Consistent with prior research that conceptualizes entrepreneurial failure as a socially interpreted event rather than merely an economic outcome (Cardon et al., 2011; Byrne & Shepherd, 2015; Johnson et al., 2022), the analysis shows that founders employ different narrative strategies when accounting for the collapse of their ventures. While all narratives acknowledge failure, they differ in the extent to which responsibility is attributed to internal decisions or external conditions, and in how founders reposition their professional identity after the venture's collapse. These variations reflect broader cultural expectations regarding leadership, accountability, and emotional expression. When examined through the two analytical dimensions of attribution of responsibility and legitimacy reconstruction, the narratives reveal four recurring configurations through which entrepreneurs interpret and communicate venture failure. These configurations represent distinct ways in which founders frame the causes of failure and position themselves within the entrepreneurial experience.

The first configuration, which we label the “Learning-from-Failure Narrative”, emerges when entrepreneurs attribute failure primarily to internal causes while reconstructing legitimacy at the individual level. In these narratives, founders openly acknowledge strategic mistakes or flawed assumptions but frame the experience as a valuable opportunity for learning and entrepreneurial development. Failure is therefore reinterpreted as a necessary step in the entrepreneurial journey and as evidence of reflexivity and resilience. As one founder admitted, “We did lots of things wrong,” while another stated, “I failed. I made mistakes.” In these accounts, self-criticism does not undermine legitimacy. Rather, it becomes a resource for signaling reflexivity, accountability, and entrepreneurial learning. This narrative pattern appears particularly recurrent in Anglo-American contexts, where publicly reflecting on errors and lessons learned is often interpreted as a marker of credibility, transparency, and entrepreneurial maturity rather than as a threat to professional legitimacy.

A second configuration, which we define as the “Collective Learning Narrative”, emerges when responsibility for failure is interpreted mainly as internal, yet legitimacy is reconstructed through a collective framing of the entrepreneurial experience. Rather than emphasizing individual accountability, founders highlight the team, collaboration, and shared experimentation. In these narratives, failure is often described as the outcome of a collective learning process rather than an individual shortcoming. The narrative focus shifts from personal responsibility to the broader experience of teamwork, collaboration, and joint exploration. For instance, one founder emphasized the collective dimension of the experience by stating, “My gratitude goes to the team who believed in the project until the very end,” while another entrepreneur noted,

"Our team gave everything to try to keep it alive." In such cases, legitimacy is reconstructed collectively through expressions of gratitude, shared commitment, and recognition of the broader community involved in the entrepreneurial journey. This narrative orientation appears in several cases in Nordic contexts, where cultural norms emphasize cooperation, social cohesion, and collective responsibility, shaping how entrepreneurial experiences, including failure, are publicly interpreted and communicated.

A third configuration emerges when founders attribute failure primarily to external or structural factors and reconstruct legitimacy through analytical explanations of contextual constraints. We refer to this configuration as the "Analytical Justification Narrative". In these narratives, entrepreneurs emphasize market dynamics, institutional barriers, or structural limitations that shaped the venture's trajectory. Rather than focusing primarily on personal reflection, founders provide detailed diagnoses of what went wrong. For example, one entrepreneur explained that "Each order generated a loss, pickup and delivery costs were too high," while another noted that "The LTV simply couldn't justify the rising acquisition costs". By framing failure as the outcome of complex external conditions, entrepreneurs maintain their credibility as competent decision-makers while situating it within broader systemic dynamics. Legitimacy is therefore preserved through the demonstration of professional expertise and rational assessment of the venture's collapse. This narrative pattern appears most frequently in Germanic contexts and, to a lesser extent, in Confucian Asian environments, where cultural norms place strong emphasis on analytical reasoning, procedural clarity, and structured explanations of organizational outcomes.

Finally, the fourth configuration, which we label the "Visionary Persistence Narrative", emerges when entrepreneurs attribute failure primarily to external conditions while simultaneously reaffirming their individual entrepreneurial identity and vision. In these narratives, founders frame the venture's failure as the result of contextual constraints while emphasizing their leadership, determination, and long-term entrepreneurial ambitions. Entrepreneurs often reinterpret the outcome not as a definitive failure but as a transitional moment within a broader entrepreneurial trajectory. For instance, one founder stated, "We are more confident today than ever," while another declared, "This is not a failure, this is evolution." Such statements reposition the founder as a persistent visionary whose entrepreneurial capabilities remain intact despite the venture's closure. Failure is therefore presented as a temporary setback rather than a definitive indicator of incompetence. This narrative pattern is particularly evident in Latin American and South Asian contexts, where entrepreneurial storytelling often combines contextual explanations with strong reaffirmations of leadership, ambition, and future entrepreneurial potential.

Research limitations. Although this study advances the understanding of entrepreneurial failure narratives across cultural contexts, it presents several limitations. In particular, the dataset is based on a limited number of publicly available post-mortem statements retrieved from platforms such as Failory and Medium. While these materials provide rich qualitative insights into how founders interpret and communicate failure, they consist primarily of self-reported accounts and publicly curated stories. As such, they capture how entrepreneurs publicly frame failure rather than the full range of internal organizational processes that may have contributed to venture collapse. Therefore, they may not fully capture the internal organizational dynamics behind startup failure or the perspectives of other stakeholders involved in the venture. Moreover, the selection of countries within each cultural cluster was partly constrained by the availability of documented startup failures, meaning that not all clusters identified in cross-cultural frameworks could be equally represented in the dataset. As a consequence, the cultural comparisons presented in this study should be interpreted as exploratory patterns rather than as systematic cross-cultural differences. In addition, the sample is largely composed of technology and digital startups, sectors characterized by high levels of experimentation and a strong culture of publicly narrating entrepreneurial failure. This sectoral concentration may limit the transferability of the findings to other industries. Future research could therefore examine whether similar narrative configurations emerge in more traditional industries or in entrepreneurial contexts where failure is less publicly discussed. Finally, the study relies on an interpretive qualitative framework grounded in narrative categories and impression management strategies. Although this approach enables an in-depth understanding of discursive patterns, interpreting narratives inevitably involves a degree of subjectivity. To strengthen the robustness of these insights, future studies could combine narrative analysis with additional methodological approaches, such as in-depth interviews with founders or mixed method designs that integrate qualitative and quantitative evidence.

Managerial implications. This study offers entrepreneurs, investors, and startup actors practical insights into how entrepreneurial failure can be communicated and managed across different cultural contexts. For entrepreneurs, the findings suggest that there is no universally valid narrative model for communicating entrepreneurial failure, as the legitimacy of different narrative strategies is shaped by the cultural and institutional context in which founders operate. Strategies such as openly admitting personal responsibility or framing failure as a learning experience may be well received in some entrepreneurial settings, particularly in Anglo-American environments, but may be less appropriate in contexts where leadership authority, collective harmony, or reputational stability are more strongly emphasized. This implies that communicating failure is not merely a personal storytelling exercise, but a strategic act of reputation management embedded within culturally specific expectations. Therefore, entrepreneurs operating in international or multicultural environments should carefully consider the cultural expectations surrounding responsibility, vulnerability, and leadership legitimacy when communicating the end of a venture. Being attentive to these expectations may help founders preserve credibility within entrepreneurial ecosystems and maintain access to future opportunities despite venture collapse. For investors, accelerators, and startup support organizations, the results highlight the strategic role of

post-failure communication in shaping founders' reputations and future opportunities. The way founders narrate the closure of a venture can influence how they are perceived by investors, employees, and future collaborators. Encouraging transparent reflection on failure can be valuable for learning within entrepreneurial settings, but communication practices should remain sensitive to cultural differences in how responsibility, authority, and emotional exposure are publicly negotiated. Tailoring communication guidelines and mentorship practices to different cultural environments may therefore improve the effectiveness of failure-learning initiatives.

Originality of the paper. This study advances impression management and entrepreneurship research by introducing a cross-cultural perspective into the analysis of entrepreneurial failure narratives. While prior studies have examined how entrepreneurs strategically frame venture collapse (Kibler et al., 2017; Dobusch et al., 2022; Castelló et al., 2023), they have largely treated impression management strategies as relatively context-independent communicative practices. By comparing founders' postmortem narratives across multiple cultural clusters, this study shows that the narrative strategies entrepreneurs use to attribute responsibility, express emotions, and reconstruct legitimacy are embedded within broader cultural environments. In doing so, the paper extends impression management theory in the entrepreneurship domain by demonstrating that the communication of entrepreneurial failure is shaped by culturally specific expectations regarding leadership, accountability, and reputation management. More broadly, the findings suggest that failure narratives function as discursive mechanisms through which entrepreneurs reinterpret adverse events, protect professional credibility, and renegotiate their entrepreneurial identity after venture collapse. As a result, it contributes to the growing literature on entrepreneurial failure by highlighting the role of narrative practices in legitimacy reconstruction within entrepreneurial ecosystems. Overall, the study provides an exploratory cross-cultural examination of impression management in entrepreneurial failure narratives, illustrating how the communication of failure varies across cultural environments and how these variations reflect broader cultural expectations surrounding legitimacy, responsibility, and leadership.

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New actors in entrepreneurial networks: the emerging role of venture builders

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Abstract. *Entrepreneurial networks support the creation and growth of new ventures by enabling access to resources, knowledge, and strategic relationships. While prior research has mainly focused on actors such as science parks, incubators, and accelerators, the role of venture builders as emerging actors in entrepreneurial networks remains underexplored. This study investigates how venture builders interact with entrepreneurial networks and how network ties influence their business model development. By adopting a qualitative approach, the research is based on a case study of an Italian venture builder. Data were collected through semi-structured interviews and secondary sources. The findings show that venture builders act as new actors that integrate venture creation, strategic consultancy, and resource orchestration, reconfiguring network relationships and supporting the development of new ventures.*
Keywords*: entrepreneurial networks; network ties; network relationships; venture builder*

Framing of the research

Entrepreneurial network

Entrepreneurial ecosystems are complex and interconnected environments that support innovation, collaboration, and economic development by providing entrepreneurs with key resources such as access to funding, mentorship, and a cultural context that encourages experimentation and risk-taking (Tula et al., 2024). The entrepreneurial ecosystem has been considered as the regional aggregate of economic, political, cultural, and social factors that support the establishment and growth of innovative enterprises by encouraging early entrepreneurs and other actors to start their own businesses, raise funding, and take high-level risks. This ecosystem includes cultural factors (supportive culture, entrepreneurial history), social factors (employees' ability, financial capital, and human networks), physical factors (universities, infrastructure, and markets) and so on. In other words, an entrepreneurial ecosystem is a conceptual model designed to stimulate economic growth by supporting entrepreneurship and the development of innovative small firms, while emphasizing the broader business environment in which entrepreneurs and startups operate as individual actors (Kumari et al., 2025).

In a wider perspective, Entrepreneurial Network (EN) provides social capital that increases a new venture's likelihood of success (Smith and Lohrke, 2008). The high network density supports collaboration between large companies and local startups, sustaining access to relevant resources (Ancona et al., 2023). Particularly, EN provides SMEs with easy access to resources in the external environment (Pulka et al., 2021; Das and Goswami, 2019). In the EN, a key role for entrepreneurial innovation has been undertaken by science and technology parks, incubators and accelerators, and more recently by venture builders. Science and technology parks create an environment that promotes technology transfer and innovation (Hansson et al. 2005), mainly related to the development of new ventures based on physical space. Science and technology parks have been considered urban innovation projects that provide the local infrastructure for an intensified cooperation between companies and scientific institutions (Mieg, 2012). The minimum infrastructure of science and technology parks is made up by a compound with private companies and one or more university institutes, a business incubation center, a centralized park management, an urban structure with a minimum of centralized facilities (Mieg, 2012). Particularly, science park characteristics can facilitate the advantages of cluster dynamics, affecting science park performance (Yang and Lee, 2021), firm performance (Clemente-Ciscar et al., 2025) and universities' innovation (Iqbal et al., 2026). In this regard, the function of Science Parks has been focused on collaboration with different internal and external organizations to improve the innovation development process. The increasing focus on more intangible and high-value services also outlined a new incubating business model (Grimaldi and Grandi, 2005). The value provided by incubators to new firms includes access to networks as part of their value proposition (Hansen et al., 2000). Such incubators are often located inside the science parks that support the innovation process for tenants and other actors involved in R&D projects. Incubation is considered as a model of start-up facilitation (Bruneel et al., 2012). As stated by Hackett and Dilts (2004, p.71), most researchers agree that incubators-incubation represents a systematic method of providing business assistance to firms in the early-stages of their development. This assistance is provided with the aim of increasing firm survival (Bollingtoft, 2012), promoting innovation and entrepreneurship (Aerts, Matthyssens, and Vandenbempt 2007). From this perspective, an incubator is an innovative system designed to provide technology and management supports to assist entrepreneurs in the development of new ventures (Colombo and Delmastro, 2002), through three mechanisms identified in buffering, bridging and curating (Amezcua et al., 2020). The buffering mechanism is founded on resources provided to tenants in a protected environment. The bridging mechanism relates to connections of tenants with the external environment, while the curating mechanism is a particular form of bridging as a start-up could be best paired with a specific resource. In this regard, the increasing density of community can improve the opportunities for mutualism and learning among incubators (Hou et al., 2020).

In general, innovation hubs support entrepreneurial ideas, leading to business startups, or work together to develop innovative ideas that benefit the organizations in the hub (Pfotenhauer et al., 2022). Science parks and business incubators are property-based organizations with identifiable administrative centers focused on the mission of business acceleration through knowledge agglomeration and resource sharing (Phana, Siegel, and Wright, 2005). Policy actors see them as a tool to initiate or revive innovativeness in regions and universities as a way to commercialize research results (Aaboen, 2009). An incubator can achieve service differentiation and enhanced customer (tenant) value (Vanderstraeten and Matthyssens, 2012). Three different types of incubators have been identified: for profit, non-profit, university-based incubators (Peters et al., 2004). The differences between incubator models relate to the purpose of the incubator and the nature of relationships it manages.
Over the years, accelerators have been considered as new incubators with specific peculiarities (Clarysse et al., 2015) and thus central intermediary (Clayton et al., 2018; Goswhami et al., 2023) within the EN. Accelerators sustain startups in the identification of funding opportunities to strengthen their financial capabilities (Paoloni and Modaffari, 2022) and offer strong infrastructural backing to innovative ventures (Fuad et al., 2024). Accelerators are classified by considering the supporters (e.g., corporate accelerators versus university accelerators) and the sector of reference (e.g., social accelerators, ecosystem builders) (Mansoori et al., 2019). In some cases, innovation hubs are compared to accelerators, as they focus on nurturing early-stage startups and helping de-risk innovative ventures (Ayamga et al., 2026).
Recent literature on ENs highlights that the increasing complexity and dynamism of markets have favored the emergence of new categories of actors and a consequent decline of traditional forms of corporate entrepreneurship, in favor of more distributed and hybrid support organizations. For example, corporate service providers are gaining relevance in ENs, offering specialized resources, mentorship, and market access (Ferrigno et al., 2025). This evolution in the ENs reflects the central role of flexibility, external collaboration, and support programs, which are becoming critical in favoring startup growth (Amjad, 2025). These new actors play a fundamental role in promoting networking opportunities, facilitating connections among startups, investors, and established firms, and enhancing knowledge exchange and resource mobilization within the ENs (Pardo-del-Val et al., 2025).
In this context, venture builders (VB) are emerging for their ability to start from scratch, providing not only financial support but also technological, human and strategic resources (Hassel et al., 2025). A VB is a start-up factory, an organization that systematically creates new businesses based on market trend analysis to identify and meet potential and latent demand (Baumann et al., 2018). VBs create a portfolio of high-quality, low-risk start-ups. The structured and methodical approach enables businesses to grow more quickly and reach the market in a short time frame. The VB business model is founded on an in-depth analysis of the market and its emerging trends to identify entrepreneurial opportunities. Unlike the traditional approach, which starts with the idea of a single founder, VBs use an analytical and systematic approach to create start-ups with a higher scalability.

Actor's business model: a relational perspective
The literature on business planning mainly focused on both antecedents to business planning (Brinckmann et al., 2019) and its outcomes (Brinckmann et al., 2010). A key element of business plan is the description of business model that includes concepts relating to the firm's value offering, economic model, customer interface and relationships, partner network and roles, internal infrastructure/ connected activities and target markets (Morris et al., 2005). In addition, the business model has been considered as a representation of strategic choices for creating and capturing value within a value network. Business model describes "the structure, content, and governance of transactions between the focal firm and its exchange partners and represents a conceptualization of the pattern of transactional links between the firm and its exchange partners" (Zott and Amit, 2007, p. 181). The business model involves the "configurations of interrelated capabilities, governing the content, process and management of the interaction and exchange in dyadic value co-creation" (Nenonen and Storbacka, 2010, p 9).
According to Zott et al. (2011), systems-level thinking in business models is required as dynamic activities are performed by the firm and by third parties, such as partners, suppliers, and customers. Multiple stakeholders interact and co-operate to face challenges (Zott & Amit, 2009). In this regard, business models are founded on new forms of collaboration for value creation that require a whole-system approach (Ng et al, 2013).
As stated by Ford and Mouzas, networking relates to the way business relationships are framed. Focusing on a structural perspective, business models depict how an organization creates, delivers, and captures value. Considering firm activities (Pinazo-Dallenbach et al. 2016), business models refer to how firms develop their business, based on the value proposition, value creation, and value capture (Clauss et al. 2019).
Business models, founded on Industrial Network, recognize that firms are embedded in a network (Freytag and Clarke 2012). In this regard, "an open-business model examines the creation of value between stakeholders, rather than simply considering the value created within the boundaries of a single firm" (Coombes and Nicholson, 2013, p. 658).

Purpose of the paper. In the ENs, new actors have been identified in the role of venture builders (VBs), i.e., new entrepreneurial players that systematically produce, develop, and market startups (Hassel et al., 2025). For example, in 2023, Italian VBs received funding of € 41,022 million to focus primarily on managerial support, product and service design and development, marketing and sales strategies, and initial capital for starting the company (Social Innovation Monitor, 2025).

Even if the literature on ENs from the perspective of resource dependency theory has received increasing attention, the consequences of entrepreneurial networks have been considered vague (Abu-Rumman et al., 2021). In this context, the aim of the research is to investigate the key role undertaken by VBs and the reconfiguration of the EN. Particularly, the VB is a new type of actor that operates as a venture factory (Baumann et al., 2018; Hassel et al., 2025). This study tries to address the following research questions: What is the role of VBs in the EN? What is the role of network ties in the configuration of their business model?

Methodology. Due to the exploratory nature of the research, we adopted a qualitative research design based on a single case study (Siggelkow, 2007), which enables an in-depth and contextualized understanding of complex phenomena (Yin, 2009). This methodological approach is particularly appropriate when investigating emerging organizational models and processes which are still underexplored in the literature, such as venture builders and the evolution of their business models. A single case study allows researchers to capture insights and analyze the relationships and mechanisms of the phenomenon under investigation. Specifically, our data collection relies on both primary and secondary sources to ensure a comprehensive and triangulated understanding of the case (Yin, 2009).
Company A was selected as the focal case for this study as it represents a relevant example of a VB operating within a dynamic EN. The organization provides a suitable context to investigate how venture builders structure their activities, interact with partners in the EN, and evolve their business models over time. Moreover, the accessibility of key informants and the availability of internal documentation make Company A an appropriate case for conducting our qualitative investigation. The case selection was guided by the following selection criteria: representativeness of the phenomenon, relevance within the EN, accessibility to key informants, and availability of rich and longitudinal data sources.
The data collection process is currently ongoing. The case has been elaborated on the basis of semi-structured interviews conducted from 2020 to 2026 with the founder of venture incubators. Over these years, the entrepreneurial context has been analyzed also through interviews with innovation experts.
The semi-structured interview followed a protocol developed based on the academic literature on VBs and ENs. The interview protocol includes questions on the founder's professional background, the role of business relationships in the establishment of the VB, the most relevant actors within its EN, and the main challenges encountered during its development. In addition to the interview, we collected secondary data from multiple sources, such as the official corporate website, social media platforms, articles from specialized magazines, and available documents (e.g., Social Innovation Monitor, 2025), in order to improve robustness (Natow, 2020; Jack and Raturi, 2006). These data, together with the interview transcript, were analyzed by the researchers using coding procedures.

Results.
Key partners in business model development
Company A is a venture building company founded in 2021. Company A manages digital startups and SMEs from their inception, bringing them to market with rapid and effective execution. As a venture builder, Company A offers its expertise in the development of new digital business models created by entrepreneurs or professionals with specific know-how. In the initial phase, Company A operated as a vertical innovation consulting center, connecting the needs of firms with European-level scouting: the goal was to bring tangible benefits to businesses by offering targeted solutions and support in the dialogue between companies and startups.
In 2022 Company A and a venture capital company listed on the Italian Stock Exchange that invests in early-stage digital startups have signed a partnership agreement to launch joint innovation programmes aimed at large companies. The collaboration aimed to expand the joint open innovation offering to large companies through the creation of tailor-made programs using the Corporate Venture Building approach: the identification, creation, development and market launch of new "on-demand" businesses, based on specific innovation needs. The relationship with this venture capital company supported the transformation of Company A's Venture Building model aimed at SMEs and large companies defined as "originators", promoters of the initiative. Company A, thanks to its expertise in the operational execution of digital business models, supports the originator throughout the entire development process, from inception to scaleup.
In this initial phase of Company A's development, several actors played a key role. In this regard, the founder of Company A highlighted the importance of a crowdfunding lending platform that allows small and medium-sized businesses to quickly access financing through a fully digital process:
"Among our project's first partners was a crowdfunding lending platform, which helped us validate our model. From there, after this first case, we began to scale."
Company A's business model involves a team and a three-year contract with companies, with an annual fee that increases based on the company's performance. The team is made up of managers with significant experience in the digital sector, who constantly study solutions that can improve customers' businesses, understand needs, and offer customized solutions. Company A handles tax and financial matters, as well as internal processes for digital start-ups and SMEs. In this regard, Company A develops solutions for companies belonging to various sectors that are activating the process of digital transformation. The company acts as a temporary team partner, working with the client to improve operational efficiency and promote growth.
In 2025, a qualified investment holding company and innovation platform dedicated to innovative start-ups and SMEs, has acquired Company A. The innovative approach of Company A has been strengthening by expanding the offering to new customer categories, including corporate companies, thanks to the integration of the expertise and network of the

investment holding platform. Company A continues to operate with its own brand by offering venture building services. The evolution of Company A has led to a clear distinction between strategy/technology and legal areas. The legal division oversees consulting services, while the strategy/technology division focuses on the development of new business models and the implementation of digital transformation projects.

Key activities in business model development

Three key activities have been identified as characterizing the business model of Company A: validation, creation, and execution. With reference to validation activity, Company A identifies the business idea and implements the methodologies and processes to validate its feasibility and market competitiveness. Company A analyzes the market, problem relevance, economic viability, and investor appeal to determine whether a project has a solid foundation to be built. In this regard, the founder of Company A stated:

"When it comes to validation, our company has expertise it can share with clients to improve their business model. [...] For example, we intervene during generational transitions in SMEs. We analyze skills, the market, and technologies and produce a feasibility study in which we provide a series of our insights. If they match the client's goals, they effectively become a key business driver."

The main output delivered by Company A is the market analysis, the MVP analysis, planning and valuation, and investor strategy. In terms of market analysis, quantitative and qualitative analysis of the target market is developed to identify and assess key trends, market size, and the competitive landscape. As regards MVP analysis, mixed methods (surveys, interviews, landing pages) are adopted for preliminary business model and MVP definition, along with problem-solution fit validation. The planning and valuation stage is founded on the development of a short- and mid-term financial plan to assess the project's economic feasibility, funding needs, and company pre-money valuation. The investor strategy relates to the preparation of the investor deck and definition of the fundraising strategy.

Following the creation activity, Company A experts co-found the startup and support technical, legal, and operational aspects related to incorporation, launch preparation, and go-live. Company A experts move forward only after the capital increase has been approved and subscribed, ensuring real commitment and project sustainability. The output delivered is the venture foundation, the operations setup, the team, and partners setup. In terms of venture foundation, the incorporation of the newco is considered together with the management of technical and legal aspects, and the execution of the funding round. The operations setup involves the setup of tools for monitoring business performance, communication systems, document sharing, and administration. The team setup and the team and partners setup involve the definition of the organizational structure, the search and selection of the professional roles needed by the startup, together with the training of the internal team and the identification of partners relevant to industrial or commercial business development.

With reference to the execution activity, after laying out the foundations, Company A takes a proactive role in managerial decisions, with the goal of achieving metrics and market traction. According to the key informant, this is most challenging activity for a VB:

"Execution is the most challenging part of our process, but not internally for us, as we simply need to be ready to manage the metrics. The challenge of this phase is making the client, who may not have digital experience, understand that they need to completely overhaul their business model. This often creates friction and slowdowns in the process."

The areas of intervention relate to operations, finance, strategy, and marketing. The operations are identified in the operational coordination of the team and monitoring business performance. Finance relates to the financial management of the newco, including planning, management control, accounting oversight, performance monitoring, and reporting. With reference to strategy, business development and strategy supervision, including the definition of growth objectives and management of investor relations. Furthermore, marketing and digital strategy are combined with digital advertising, content creation, social media marketing, UX/UI design, and web development. In addition, legal management includes supervision of legal matters, risk management, and advisory on regulatory compliance and corporate governance.

Furthermore, the execution phase can evolve in two operational directions, depending on the maturity of the team and the needs of the project, venture building complete service or CXO as a service. In the first case, venture building complete service, Company A continues to operate as the internal team, guiding the startup through go-to-market, growth, and day-to-day management. This is the continuation for businesses that started with Company A from 0 to 1 and need full-team support.

In the second case, CXO as a service, Company A develops activities to strengthen specific functions to accelerate the growth of structured teams. Particularly, CFO As a Service is an innovative service that allows companies to access the expertise of a Chief Financial Officer without having to hire a full-time employee. It is designed to support businesses in strategic consulting and operational finance management. The CIO as a Service aims to strategically coordinate technological changes, identify new opportunities, and models to promote business innovation. The 'COO as a Service' service supports companies in operational management, business strategy and process improvement. The 'CLO as a Service' service offers companies strategic legal support to manage compliance, legal risks and constantly evolving regulations.

Research limitations. This work in progress study presents some limitations related to its exploratory nature and the adoption of a single case study, which may limit the generalizability of the findings to other contexts. The analysis focuses

on one VB operating within a specific EN. Furthermore, as the research is still in progress, the data collection process is ongoing, and additional interviews and evidence will be required to further refine and validate the emerging insights.

Managerial implications. In terms of managerial implications, this study highlights that the VB requires new competences and capabilities more oriented to the analysis of the business landscape and the configuration of strategic thinking. Network competence and network ability are also required.
In addition, VBs outline the relevance of a relational perspective in the configuration of a business model and access to resources in the early stage of new ventures (Bally et al., 2025). As VBs serve as central nodes connecting entrepreneurs, investors, mentors, service providers, and corporations, managers should focus on building and maintaining strong relational capital across stakeholders. VBs have become increasingly influential actors within entrepreneurial networks as they combine venture creation, resource integration, and ecosystem coordination. For managers, this means shifting from traditional startup support toward a more systemic, portfolio-based, and network-centric approach. Organizations that effectively leverage VBs can enhance innovation outcomes, reduce entrepreneurial risk, and strengthen long-term ecosystem competitiveness.
While VBs provide several advantages to startups, some power dynamics and governance challenges emerge. Because venture builders often hold significant equity and operational control, tensions may arise with founders, therefore transparent governance models are essential.

Originality of the paper. The preliminary results of this study highlight that VBs can rely on institutional investors such as venture capital funds, family offices, banks, and even public funds. These channels provide the resources needed to launch and support the start-ups created that benefit from a structured ecosystem, provider of financial, strategic, and operational resources. The development path of startups is strongly influenced by the approach and priorities of the venture builder (Baumann et al., 2018). Our findings contribute to the literature by highlighting how VBs orchestrate multiple funding channels simultaneously and expanding the current understandings of resource mobilization in ENs.
According to our findings, the VB combines the peculiarities of incubators and accelerators, considering the support provided at startup foundation, early stage, and growth. As a new actor, VB presents peculiarities different from other actors belonging to the EN. The VB identifies entrepreneurial opportunities, launches the startup, and provides equity. This new actor is also characterized by consultancy services provided to startups and other firms.
As highlighted by findings, the business model of the VB has been transformed over the years through networking that ensures fertile ground for the development of entrepreneurial ideas. At the beginning, the attention of VB was focused on startups while later the attention moved to new ventures and corporations as well, based on the competences provided by key business partners. This evolution reveals a dynamic and adaptive business model, offering novel empirical evidence on how VBs continuously reconfigure their value proposition in response to ecosystem changes.
Focusing on the entrepreneurial process, the first key activity is the identification of new business opportunities through market analysis and evaluation of current trends. Once a promising opportunity has been identified, the next step is market validation, which involves testing the idea in the field and verifying that it meets market needs. The venture builder then proceeds to build the team needed to develop the idea. Professionals with specialized skills are selected, and teams are formed to work together to transform the idea into a concrete product or service. The choice of startup team members, including the CEO of the company, is crucial to ensure the necessary skills. In parallel, the venture builder also raises the necessary funding to support the startup in its early stages. This process recognizes the VB as a key player of EN characterized by a strategic role. VB support new venture launch and development through traditional entrepreneurial services (tutorship, mentorship, networking) and additional strategic consultancy services related to the identification of latent needs and the configuration of a strategy for the launch of the company and its solution. Our study extends prior research by detailing VB activities, highlighting how these actors actively shape venture creation processes. Furthermore, VBs support the launch and growth stages of new ventures as well as the new business development (corporate VBs).
Over the years, the attention of VB has moved to strategic consultancy services provided to SMEs in order to improve their growth strategies. The changes in business model, that supported the growth of the VB, have been enabled by interconnected business relationships that facilitated the sharing of resources, mainly competences, to provide innovative consultancy services. Relationships activated with other actors have supported Company A in the development of CXO services. In a rapidly evolving context, Company A supports start-ups, SMEs and large companies in digitization and the development of innovation culture. In addition, startups, SMEs and large companies can benefit from high-level part-time operational leadership to optimize operations, implement lean strategies, and manage organizational change. Moreover, Company A assists companies in implementing effective legal policies and creating governance processes that promote sustainable growth. In this regard, VBs are associated with activities characterized by a stronger focus on the later stages of business consolidation.
The VB business model requires the integration between the internal and external perspective of value creation sustaining its mission. In pursuing its mission, Company A aims to consolidate the startup ecosystem by introducing validated solutions. Another key objective is to support entrepreneurial skills with a view to growing innovative new businesses. In this regard, business partners support the direction of VB development, also considering the focus on new ventures and corporations. Changes in EN take place in a continuum structured by actor bonds, resource ties and activity links (Chou and Zolkiewski, 2012; Ford and Håkansson, 2006), considering different actors of the EN. In conclusion, this study

provides original insights into the evolving role of VBs as integrators of ecosystem resources, contributing to the understanding of value co-creation dynamics within ENs.

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Non-financial support by reward-based crowdfunding backers: An exploratory study

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Abstract. *The paper investigates the decisions to provide additional non-financial support to reward-based crowdfunding campaigns by backers who have pledged financial support. In particular, the study analyzes two forms of non-financial support: (a) word-of-mouth (WOM) and (b) active contribution or suggestions for the development of the product/service object of the funded project or suggestions for the dissemination of the project (project development support). Building on the literature on reward-based crowdfunding, we account for various factors associated with non-financial contribution, such as the backers' motivations (e.g., interest in the product and social or environmental impact), their psycho-cognitive profile (trust and altruism) and pre-existing relations with project creators. The search for information about the project or its creators outside the platform is another potentially important factor, revealing that the decision to contribute is based on a significant level of backers' sophistication and cognitive effort. The empirical analysis drawn on data collected through an online survey of 211 backers contributing to Ideaginger, an Italian reward-based crowdfunding platform. Logit estimates highlight the importance of motivational, relational and psychological correlates of backers' non-financial contribution.*
Keywords: *reward-based crowdfunding; WOM; non-financial support; backers' motivations and psychological traits*

Framing of the research. Crowdfunding is an alternative source of financing for innovation that has received increasing attention from management scholars and business practitioners (Chemla & Tinn, 2020; Mollick, 2014; Stanko & Henard, 2017). Along with funding, crowdfunding is used to test new business ideas in the market, learn about consumers' preferences, and engage in user-based innovations (Belleflamme et al., 2014). Unlike other crowdfunding models, e.g., equity-based, lending and donation models, reward-based crowdfunding offers mainly three types of rewards to supporters: pre-orders of products, services (e.g., writing software code) and recognition (e.g., the backer's name on the company website and in-product acknowledgment). In reward-based crowdfunding, often, users are key players driven by different motivations than traditional financiers and respond to various values such as "what is in it for me" and "what is in it for others" (Nielsen & Binder, 2021).

Beyond financial support, backers may provide non-monetary contributions. Backers may act as "ambassadors" who contribute through word of mouth (Bi et al., 2017; Thies et al., 2016), promoting a campaign by sharing it with their contacts on social networks or leaving positive comments online (opinion-based social interaction). Even if the impact of word of mouth is weaker than the public availability of the number of backers (action-based social interaction), it is more persistent over time (Thies et al., 2016).

Moreover, crowdfunders may provide product- and market-related insights, which represent a form of crowdsourcing. Involvement of customer investors, in particular, increases funding success, as customers influence product development and reduce agency costs for prospective customers (e.g., Cornelius & Gokpinar, 2020).

Despite the variety of studies addressing different dimensions of reward-based crowdfunding, there is still a limited understanding of the mechanisms underlying the behavior of participants, such as the process through which funders' motivations and psychological profile affect how they search for (and select) projects to support and the type of (monetary and non-monetary) support they provide. Earlier studies have found that non-monetary and pro-social motives are important among reward-based crowdfunders (Boudreau et al., 2021; Jiang et al., 2021; Li & Wang, 2019; Zhang & Chen, 2019). However, other works have reported that campaigns' performance improves when offering tangible resources - goods and services - rather than symbolic resources - love or status, which could appear at odds with pro-social motivations and reveal utilitarian motivations (e.g., James et al., 2021). The importance of utilitarian motives is indicated by the positive impact of reward-based rhetoric, such as, for example, "this is an opportunity for backers to obtain access to an exciting product with the best features" (Tajvarpour & Pujari, 2022: 128). The literature has also found that pre-existing relations with the campaign positively affect the contribution and that backers with pre-existing relations with the fundraiser make higher contributions (Shneor et al., 2023). Funders' willingness to contribute also depends on their perception and beliefs about the expected impact of their support on the project outcome. The motivation to support a

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crowdfunding project increases as the project funding approaches its target goal and significantly decreases after the target goal is reached (Kuppuswamy & Bayus, 2017). Moreover, funders possessing greater ability and motivation to make careful evaluations scrutinize issue-relevant information, e.g., entrepreneurs' education. Instead, inexperienced, first-time funders are mostly influenced by cues as calls for commitment based on group identity (Allison et al., 2017). Heuristic cues have proven to affect crowdfunding performance, suggesting that unsophisticated crowdfunding investors use psychological shortcuts to make decisions rather than engaging in extensive reasoning and algorithmic processing (Zhu et al., 2023).

The crowdfunders' motivations and psychological characteristics, such as trust and altruism, have received limited attention in the reward-based literature. This is an important gap, since accounting for these factors exogenous to participation may help understand the crowdfunders' willingness to engage and contribute to project co-creation and campaign success. Motivations and psychological traits may affect funders' search for projects to support and the selection process, which in turn could affect their commitment.

Purpose of the paper. The paper aims to investigate factors related to backers' decisions to provide additional non-financial support to the campaigns they have pledged to. In particular, the study analyzes two forms of non-financial support: word-of-mouth (WOM) and active support or suggestions for the development of the product/service that is the objective of the funded project or for the dissemination of the project (project development support). Both forms of support may be relevant for the success of a project. On the one hand, spreading information on the project favors the success of an "all-or-nothing" crowdfunding campaign and the consequent project start, and on the other hand, active support and suggestions for the project's development offered by backers may help improve it, providing the campaign's creators with benefits that are typical of crowdsourcing experiences.

Given the exploratory, preliminary nature of the study, we investigate the potential relevance of two categories of factors: backers' individual characteristics and the relationship between backers and campaigns.

Methodology. Data were collected in the first half of 2025 through an online questionnaire administered to individuals who supported a campaign on the Ideaginger platform from 2021 onwards. Ideaginger (www.ideaginger.it) is an Italian "all-or-nothing" reward-based crowdfunding platform established in 2013. Since its launch, this platform has hosted nearly 2,000 crowdfunding campaigns, with a success rate of 96%, raising over 21.8 million euros from more than 281,500 backers (Ideaginger, 2026). The invitation to complete the questionnaire was sent to around 60,000 backers. Some questionnaires could not be delivered because the associated email accounts had been deactivated, and others may no longer have been in use. We received 1,017 responses, corresponding to a response rate of approximately 1.7%. Of these, only 271 were considered valid questionnaires suitable for the analysis. Due to the presence of missing data, our final sample is made up of 211 backers.

We conducted logistic regression analyses to test the relationships between the backer's individual characteristics and his/her relationship with the campaign, on the one hand, and the decision to offer non-financial support (in addition to funding), on the other. We tested three models using three different dependent dummy variables: "WOM", which equals 1 if the respondent has provided non-financial support by spreading information about the project, and 0 otherwise; "Project development support" which equals 1 if the respondent has actively contributed to the product/service creation or has offered suggestions concerning the project, and 0 otherwise; and "Non-financial support", which is equal to 1 if the backer declared to provide at least one of the two previous forms of support.

Regarding independent variables, we operationalized backers' individual characteristics using psychological trait measures. In particular, we focus on two psychological traits related to interpersonal relationships – altruism and trust – which we measured using scales validated in previous studies. We drew from the 7-point scale 10 items IPIP-derived metrics to measure "Altruism" (Goldberg, 1999), and tracked the tendency to trust others ("Trust") with a single-item 11-point scale (Zmerli & Newton, 2008).

The other category of factors examined concerns the backer-campaign relationship (with regard to the last campaign supported by the backer), since the decision to offer non-financial support may be affected by the backer's relationship with the creator and the path and decision-making process that have led to financing the campaign. We thus included in the analysis the dummy variable "Pre-existing relationship", which equals 1 if the backer knew the project creator before offering support. Concerning the process that has led to the decision to pledge to the campaign, we included the dummy variable "Other information sources" as a proxy of the depth of information gathering; the variable equals 1 if the respondent has collected information from sources external to the platform before deciding to support a project, and 0 otherwise. Concerning the motivations underlying the decision to support the project, backers were asked to indicate the factors they evaluated when selecting the project they backed; the dummy variable "Interest in product/service" indicates whether respondents reported being interested in the product or service the project aimed to create. Given that pro-social motivations may determine different behaviors while deciding whether and how to help the campaign creators, we introduced a dummy variable that measures backers' orientation towards pro-social projects ("Interest in pro-social projects"), which equals 1 if the respondent flagged "social", "environment" and/or "social inclusion" among the categories of crowdfunding projects they are more interested in.

We included a set of control variables regarding both backers' characteristics and their relationship with the campaign. Concerning the backers, we controlled for their previous experience with crowdfunding, measured by the overall number of campaigns supported by the respondent on Ideaginger or other platforms ("N. projects backed"). We also included

some variables to control for potential effects of socio-demographic traits of backers: gender (operationalized through the dummy variable "Gender: male"), "Age", "Education" (measured using a scale from 1, corresponding to lower high school, to 5 for PhD), "Income" (operationalized through a scale comprising 4 discrete income brackets), geographic area (represented with dummy variables "Emilia Romagna", that is the region in which is located the platform owner, "North-East", for the other north-eastern Italian regions, "North-West", using "Centre-South" as the baseline), and occupation (represented with dummy variables "Entrepreneur or self-employed" and "Student", using other types of occupation as the baseline).

Concerning the relationship between the backer and the last campaign supported by the backer, we first included two variables related to the financial support offered and concerning, respectively, the amount of the backer's contribution ("Pledged amount") and the choice made between receiving a reward and providing a donation without reward (dummy variable "Reward"). Given the potential influence of the process that has led to the decision to pledge to the campaign, we also introduced the variable "Project known", which is a dummy that equals 1 if the backer has known about the project outside the crowdfunding platform, and 0 if the backer learned about the campaign by navigating the crowdfunding platform. Finally, we asked backers to assign a score indicating to what extent the creator, the project characteristics, and the rewards, respectively, influenced their decision to support the campaign; we included in the analysis the variables "Project % weight" and "Rewards % weight" which measure the percentage weight attributed to the project characteristics and to the promised rewards respectively (the weight assigned to the creator characteristics is the baseline).

Results. Tab. 1 and 2 report, respectively, descriptive statistics and the correlation matrix (including jointly the three dependent variables). Correlation coefficients suggest that collinearity is not a major concern.

Tab. 1: Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Non-financial support	211	0.58	0.50	0	1
WOM	211	0.52	0.50	0	1
Project development support	211	0.18	0.39	0	1
Project known	211	0.87	0.34	0	1
Pledge amount	211	86.01	183.97	1	2000
Reward	211	0.24	0.43	0	1
N. projects backed	211	3.08	2.21	1	14
Project % weight	211	0.45	0.10	0	0.83
Rewards % weight	211	0.13	0.11	0	0.45
Gender: male	211	0.40	0.49	0	1
Age	211	54.89	12.90	23	84
Education	211	3.10	1.04	1	5
Entrepreneur/self-employed	211	0.15	0.36	0	1
Student	211	0.25	0.43	0	1
Income	211	2.67	0.92	1	4
North-West	211	0.43	0.50	0	1
Emilia Romagna	211	0.33	0.47	0	1
North-East	211	0.15	0.35	0	1
Altruism	211	56.04	7.31	35	70
Trust	211	6.44	2.01	0	10
Pre-existing relationship	211	0.69	0.46	0	1
Other information sources	211	0.26	0.44	0	1
Interest in product/service	211	0.46	0.50	0	1
Interest in pro-social projects	211	0.91	0.29	0	1

Tab. 2: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Non-financial support	1																							
2	WOM	0.883**	1																						
3	Project development support	0.407**	0.143*	1																					
4	Project known	0.090	0.069	0.078	1																				
5	Pledge amount	0.126	0.138*	0.019	0.124	1																			
6	Reward	-0.088	-0.063	0.050	-0.078	-0.057	1																		
7	N. projects backed	-0.017	0.018	-0.062	-0.252**	-0.022	-0.015	1																	
8	Project % weight	0.043	0.036	-0.043	-0.160*	-0.034	-0.266**	0.098	1																
9	Rewards % weight	-0.069	-0.085	0.014	-0.050	-0.108	0.403**	0.055	-0.528**	1															
10	Gender: male	-0.062	-0.076	0.107	0.093	0.059	-0.071	0.071	-0.011	-0.004	1														
11	Age	0.109	0.103	0.040	-0.021	0.087	-0.186**	0.133	-0.027	-0.129	0.211**	1													
12	Education	-0.071	-0.095	0.058	-0.001	-0.046	0.073	0.148*	-0.037	0.129	-0.110	-0.172*	1												
13	Entrepreneur/self-employed	-0.013	-0.014	0.071	0.049	0.201**	0.075	0.087	-0.003	-0.081	0.084	-0.042	0.059	1											
14	Student	0.074	0.057	0.034	0.065	-0.038	-0.169*	0.113	0.007	-0.062	0.260**	0.660**	-0.153*	-0.245**	1										
15	Income	-0.075	-0.087	-0.030	0.043	0.166*	0.016	0.086	-0.064	-0.032	0.273**	0.270**	0.201**	0.108	0.183**	1									
16	North-West	-0.059	-0.048	-0.065	0.196**	0.107	-0.030	-0.119	0.069	-0.067	-0.025	-0.072	-0.077	0.063	-0.080	-0.048	1								
17	Emilia Romagna	0.043	0.088	0.006	-0.174*	-0.067	0.110	0.112	-0.027	0.057	-0.037	0.039	-0.012	0.015	0.039	-0.005	-0.601**	1							
18	North-East	0.029	0.000	0.009	-0.074	-0.018	-0.011	0.040	0.019	0.011	0.014	-0.074	0.010	-0.026	-0.024	0.031	-0.358**	-0.289**	1						
19	Altruism	0.180**	0.140*	0.123	-0.118	-0.006	-0.135	0.035	0.187**	-0.265**	-0.128	0.015	0.056	0.036	-0.050	0.078	0.053	-0.029	-0.024	1					
20	Trust	-0.047	-0.038	-0.001	-0.053	0.120	-0.072	0.061	0.056	-0.157*	0.022	0.173*	0.021	0.118	0.118	0.061	-0.032	0.033	0.022	0.242**	1				
21	Pre-existing relationship	0.282**	0.197**	0.238**	0.465**	0.133	0.010	-0.144*	-0.204**	-0.139*	0.025	0.015	-0.150*	0.082	-0.016	-0.093	0.057	-0.016	0.074	-0.017	0.008	1			
22	Other information sources	0.136*	0.164*	0.051	-0.213**	-0.071	-0.026	-0.051	0.048	0.035	-0.113	-0.058	0.086	-0.101	-0.120	-0.095	0.055	-0.046	-0.063	0.070	0.036	-0.235**	1		
23	Interest in product/service	0.257**	0.216**	0.169*	-0.028	0.033	0.084	-0.095	0.037	0.041	-0.067	0.020	-0.011	0.030	0.052	-0.103	0.042	-0.021	-0.011	0.117	-0.001	0.045	0.161*	1	
24	Interest in pro-social projects	0.067	0.060	0.064	-0.074	0.021	0.020	0.072	-0.020	-0.079	-0.147*	0.011	-0.112	-0.005	-0.085	-0.149*	0.104	0.043	-0.103	0.161*	0.168*	0.113	0.036	-0.006	1

** Correlation is significant at the 0.01 level (two-tailed).
* Correlation is significant at the 0.05 level (two-tailed).

Tab. 3 reports the results of the logistic regression analyses conducted using as dependent variables, respectively, the dummy variable concerning the overall "Non-financial support" (Models 1 and 2), and the two dummy variables concerning the two different kinds of non-financial support studied, "WOM" (Models 3 and 4) and "Project development support" (Models 5 and 6). Models 1, 3, and 5 include only control variables as predictors, while Models 2, 4, and 6 also include the independent variables of interest.

We find that the likelihood of providing non-financial support, in terms of both WOM and project development support, is higher in the case of backers who knew the creator before the crowdfunding campaign, testifying to the relevance of personal relationships in shaping backers' behaviors that go beyond financial support.

We also find an association between non-financial support and crowdfunders' psychological characteristics, which points to their importance in shaping this kind of supportive behavior. More specifically, altruism is positively and significantly related to the likelihood of offering non-financial support in general (Model 2), as well as the two specific forms of support analyzed - the spreading of information about the project (Model 4) and help and suggestions for the development of the product/service and the crowdfunding campaign (Model 6). The coefficient for the variable trust, instead, is negative and significant in the model concerning overall non-financial support (Model 2), and in the model with WOM as the dependent variable (Model 4), while it is not significant in the model explaining support for project development (Model 6). While the positive coefficients on altruism are expected, the negative coefficients on trust could be surprising. Why are crowdfunders with a high level of trust less willing to support a project they have financed through word of mouth? A possible explanation is that funders with a high level of trust are more confident that project creators will be able to autonomously reach the target or that other backers will provide non-financial support, thus making their support less compelling.

Another variable that turns out to be positively related to non-financial support in general and to WOM in particular is the dummy "other information sources", which traces whether the backer has searched for information about the project outside the platform before deciding to finance it. This variable, instead, is not a significant predictor of project development support. This result seems to suggest that those who have pledged money to a project after collecting information from multiple sources outside the crowdfunding platform have adopted an informed and rational decision-making approach, and are also more motivated to support the project by spreading information about it.

We also find that respondents more interested in the product or service the project aims to create are more likely to offer non-financial support. Models 2, 4, and 6, indeed, show that the variable "Interest in product/service" is positively and significantly associated with the three dependent variables. A possible interpretation of this result is that a backer motivated by a utilitarian interest in the development of the product or service has an incentive to provide additional forms of support to increase the probability of campaign success. On the contrary, the backers' pro-social orientation, proxied

by the variable "Interest in pro-social projects", turns out to be non-significant.

Research limitations. The study has some limitations pointing to opportunities for future research. It investigates the behavior of backers of crowdfunding campaigns hosted on the Ideaginger platform. This platform operates in Italy, focuses on reward-based campaigns with an "all-or-nothing" model, and is characterized by a very high success rate. Although financial contribution and crowdfunding success are not the object of this study, future research could extend the analysis to other platforms to investigate the relationship between non-financial contributions and the success of crowdfunding campaigns. Generalizing the analysis to other platforms would also allow understanding whether and how the specificities of the local context and the platform hosting reward-based crowdfunding are related to different behaviors regarding non-financial support.

Moreover, this study investigates the relevance of individual traits and the relationship between backers and campaign creators, but it does not account for campaign characteristics. Further research is needed to investigate how backers' non-financial support is affected by campaign characteristics, such as its social impact, size, location, and narrative rhetoric.

Managerial implications. The analysis of non-financial contributions to reward-based crowdfunding campaigns yields interesting insights into the motivations and psychological traits of funders, whose knowledge is useful to both project creators and crowdfunding platform owners. Our findings show that pre-existing relationships with project creators increase the likelihood that the funder spreads information on the project (word of mouth) and provides suggestions to improve the project's quality. This highlights the importance of actions that project creators should take to leverage their professional or personal network and engage supporters in co-creation, i.e., allowing them to contribute by sharing ideas, making comments on updates of the project, responding to other crowdfunders' comments, or testing early prototypes. Co-creation affects psychological ownership, a mental state in which crowdfunders have the feeling of ownership and influence over the decisions concerning the organization and directions of the project (Zheng et al., 2018), which favors crowdfunders' commitment to the project and eventually benefits the outcome of the project (Gerber & Hui, 2013; Xu et al., 2016). Moreover, crowdfunders' non-financial contribution - especially suggestions to improve the project - is driven by their interest in the product/services associated with the campaigns. Instead, word of mouth is positively associated with the search for information on the projects or their creators outside the platform hosting the crowdfunding campaign. The two findings underscore the importance of utilitarian motivations as a driver of non-nancial contributions and indicate that funders provide such contributions based on data and reasoning rather than heuristics. The implications for project creators are clear and highlight the value of investing in communication strategies targeting sophisticated users who can be reached through information channels beyond the crowdfunding platform. By the same token, the association between non-financial support and crowdfunders' psychological characteristics points to the importance of altruism and trust that should be accounted for in drafting a campaign communication strategy.

Tab. 3: Logistic regression analyses

	DV: non-financial support		*DV: WOM*		*DV: project development support*	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Coef. (St.Err.)	Coef. (St.Err.)	Coef. (St.Err.)	Coef. (St.Err.)	Coef. (St.Err.)	Coef. (St.Err.)
Project known	0.66	0.194	0.593	0.592	0.592	-0.563
	(0.473)	(0.626)	(0.478)	(0.602)	(0.693)	(0.949)
Pledged amount	0.003	0.003	0.004 *	0.003 *	0	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Reward	-0.219	-0.356	-0.094	-0.098	0.475	0.442
	(0.387)	(0.44)	(0.386)	(0.419)	(0.464)	(0.533)
N. projects backed	-0.005	0.029	0.041	0.086	-0.114	-0.091
	(0.071)	(0.081)	(0.071)	(0.077)	(0.101)	(0.115)
Project % weight	1.381	3.47	0.599	1.17	-0.029	1.951
	(1.861)	(2.252)	(1.849)	(2.116)	(2.371)	(2.908)
Rewards % weight	0.274	3.023	-0.676	0.358	-0.069	1.778
	(1.728)	(2.14)	(1.725)	(1.985)	(2.132)	(2.549)
Gender: male	-0.377	-0.307	-0.397	-0.31	0.688 *	1.217 **
	(0.326)	(0.379)	(0.326)	(0.361)	(0.409)	(0.481)
Age	0.02	0.021	0.02	0.019	0.013	-0.001
	(0.016)	(0.019)	(0.016)	(0.018)	(0.02)	(0.023)
Education	-0.073	-0.083	-0.12	-0.144	0.273	0.475 **
	(0.155)	(0.178)	(0.154)	(0.167)	(0.198)	(0.228)
Entrepreneur/self-employed	-0.117	-0.038	-0.254	-0.151	0.548	0.719
	(0.451)	(0.512)	(0.451)	(0.49)	(0.527)	(0.585)
Student	0.051	0.361	-0.061	0.187	0.148	0.729
	(0.487)	(0.576)	(0.481)	(0.536)	(0.617)	(0.726)

Income	-0.256	-0.105		-0.271	-0.183		-0.343	-0.391	
	(0.183)	(0.216)		(0.18)	(0.202)		(0.222)	(0.264)	
North-West	-0.225	-0.832		0.125	-0.084		-0.749	-1.496	**
	(0.532)	(0.656)		(0.532)	(0.588)		(0.611)	(0.722)	
Emilia Romagna	0.223	-0.136		0.653	0.668		-0.409	-1.064	
	(0.549)	(0.666)		(0.547)	(0.604)		(0.611)	(0.715)	
North-East	0.275	-0.194		0.416	0.372		-0.29	-0.888	
	(0.623)	(0.737)		(0.616)	(0.672)		(0.7)	(0.804)	
Altruism		0.073	***		0.052	**		0.079	**
		(0.026)			(0.024)			(0.033)	
Trust		-0.205	**		-0.16	*		-0.102	
		(0.095)			(0.087)			(0.103)	
Pre-existing relationship		1.898	***		1.003	**		2.911	***
		(0.488)			(0.447)			(0.877)	
Other information sources		1.21	***		1.22	***		0.635	
		(0.442)			(0.407)			(0.502)	
Interest in product/service		0.886	**		0.691	**		0.813	*
		(0.348)			(0.327)			(0.439)	
Interest in pro-social projects		0.325			0.043			0.846	
		(0.617)			(0.59)			(0.909)	
Constant	-1.118	-7.206	***	-1.115	-5.022	**	-2.441	-9.81	***
	(1.662)	(2.534)		(1.658)	(2.339)		(2.134)	(3.154)	
Log likelihood	-135.36	-111.89		-136.68	-122.10		-95.09	-78.92	
Pseudo R-squared	0.058	0.221		0.065	0.165		0.058	0.219	
N	211	211		211	211		211	211	

**** p<0.01, ** p<0.05, * p<0.1*

Originality of the paper. While the crowdfunding literature primarily focuses on individual decisions to support a campaign and the characteristics of projects that may affect these decisions, backers' non-financial support to a campaign remains much less explored (e.g., Cornelius & Gokpinar, 2020; Thies et al., 2016). This paper contributes to the latter stream of research by providing a novel contribution on the following grounds. First, studying a sample of individuals who have supported a reward-based crowdfunding campaign allows us to identify the factors that differentiate backers who limit their support to financial resources from those who also try to favor the campaign's success by spreading information about the project or providing suggestions or aid for project development. In doing so, the paper highlights the importance of motivational factors (e.g., interest in the product or service promoted by a campaign) and relational factors (e.g., pre-existing relationships with project creators). Second, this paper analyzes the roles of psychological traits, which have also received limited attention in previous crowdfunding studies. To the best of our knowledge, only a few studies on reward-based crowdfunding have addressed the effect of campaigns' rhetoric (e.g., heuristic cues and calls for commitment using a group identity) on backers' action (e.g., Allison et al. 2017; Zhu et al., 2023). We contribute to this stream of research by directly examining backers' psychological characteristics (trust and altruism) and search for information about the project or project creators outside the platform, leading to non-financial support. In doing so, the study aims to enhance our understanding of the process that leads from the backers' awareness of the campaign to their pre- and post-donation behaviors, and how these behaviors are interrelated.

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Processi di legittimazione e di differenziazione competitiva nei mercati nascenti: una rassegna della letteratura

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Abstract. *La nascita di nuovi mercati è un tema che ha suscitato crescente interesse negli studi di management e imprenditorialità. Tuttavia, la letteratura ha finora trattato in modo relativamente separato i processi di legittimazione e le dinamiche di differenziazione competitiva tra le imprese nei suddetti mercati. Il presente lavoro ha l'obiettivo di sviluppare una sintesi teorico-integrativa della letteratura. In primo luogo, il paper presenta una mappa della letteratura sui processi di legittimazione del mercato. In secondo luogo, lo studio analizza i processi di differenziazione competitiva nei mercati nascenti e presenta una seconda mappa della letteratura. Da una lettura parallela delle due mappe, proponiamo un framework integrativo che indica gli elementi determinanti nella dinamica evolutiva potenziale dei mercati nascenti, nonché il ruolo della legittimità e delle dinamiche competitive di differenziazione. In particolare, facendo leva sul framework, noi proponiamo che il raggiungimento di una soglia di legittimità collettiva possa riconfigurare la natura della competizione nei mercati nascenti, fungendo da possibile punto di inflessione tra logiche di costruzione della categoria e logiche di differenziazione competitiva. Questo cambiamento può riconfigurare — piuttosto che dissolverla — la tensione tra il mantenimento dell'appartenenza categoriale e la differenziazione necessaria a garantire il vantaggio competitivo, offrendo una possibile base strutturata per comprendere l'evoluzione dei mercati nascenti.*
Keywords: *mercati nascenti; legittimazione; processi competitivi; creazione di mercati.*

Inquadramento della ricerca. I mercati nascenti rappresentano un contesto competitivo in fase di formazione in cui le imprese devono ancora stabilire le condizioni per la propria sopravvivenza e il conseguimento di un vantaggio competitivo (Rindova et al., 2010; Santos & Eisenhardt, 2009; Guerra et al., 2025). Da un lato, tali mercati presentano elevate potenzialità di sviluppo e nuove opportunità per le imprese, come è avvenuto a valle della commercializzazione di Internet (Santos & Eisenhardt, 2009; Rindova et al., 2010) e/o per le tecnologie fotovoltaiche solari (Guerra et al., 2025). Dall'altro lato, la genesi di un mercato nascente è caratterizzata da condizioni di instabilità ed incertezza. L'incertezza sia tecnologica sia della domanda, derivante, ad esempio, dalla definizione del prodotto e dei bisogni dei consumatori, aumenta le sfide strategiche che le imprese sono chiamate ad affrontare (Santos & Eisenhardt, 2009; Guerra et al., 2025).

A partire dal crescente interesse per comprendere la genesi e l'affermazione dei mercati nascenti, la letteratura ha prodotto numerosi studi sul tema (Agarwal et al., 2025). Molti hanno messo in luce il modo in cui i mercati nascenti si affermano, trovano legittimità e accettazione sociale attraverso narrazioni, standard e argomentazioni prospettiche (Navis & Glynn, 2010; Kennedy, 2008; Harmon et al., 2023). Altri studi hanno concluso che le imprese fanno fronte all'incertezza attraverso la sperimentazione (Guerra et al., 2025) e che gli attori del mercato costruiscono collettivamente infrastrutture che consentono l'apprendimento collettivo (Casasnovas & Ferraro, 2022). Ulteriori contributi hanno indagato come le imprese definiscano i confini del mercato attraverso la formazione dell'identità e le dinamiche di potere inter-impresa (Santos & Eisenhardt, 2009; Ozcan & Santos, 2015), come le azioni competitive possano operare in modo diverso nei mercati nascenti (Rindova et al., 2010), e i meccanismi sottesi alla frammentazione in diversi mercati, ciascuno con determinate caratteristiche e ambito di operatività (Casasnovas & Ferraro, 2022). Nonostante questi contributi abbiano permesso, nel complesso, di accrescere la conoscenza esistente sul tema, essi focalizzano l'attenzione su aspetti specifici, restituendo una visione inevitabilmente frammentata dei mercati nascenti. Nello specifico, il rapporto tra questi due processi (legittimazione vs. differenziazione) è stato ancora limitatamente analizzato in modo integrato e dinamico, lasciando aperta la questione di come essi si influenzino reciprocamente nel tempo. La letteratura esistente non fornisce ancora una cornice integrata capace di valorizzare tali diversi focus e di chiarire come essi entrino in gioco nel favorire l'evoluzione e lo sviluppo dei mercati nascenti. Or dunque, gli studi non consentono di mettere a fuoco l'interazione tra legittimità e processi di differenziazione competitiva in siffatte configurazioni di mercato.

Obiettivo del paper. L'obiettivo del paper è quello di sviluppare un framework concettuale che metta in relazione i processi di costruzione del mercato e le dinamiche di differenziazione competitiva, evidenziando il ruolo della legittimità collettiva come elemento di riconfigurazione delle logiche competitive. In particolare, proponiamo che, al crescere della legittimità collettiva e della comprensibilità della categoria da parte dei pubblici di riferimento, le imprese possano progressivamente spostare il focus da attività di costruzione del mercato verso strategie di differenziazione intra-categoriale. A tal fine, si intende restituire una visione complessiva degli studi fin qui pubblicati sui mercati nascenti, attraverso due mappe della letteratura e, infine, pervenire a un unico framework processuale che integra la ricerca della legittimità e le dinamiche competitive. Il framework suggerisce che la legittimità collettiva opera come punto di inflessione che trasforma, piuttosto che dissolvere, la tensione tra legittimità e posizionamento competitivo fino al raggiungimento di livelli sufficienti di legittimità. Al crescere del riconoscimento sociale, le imprese operanti in quel mercato tendono a modificare la loro azione competitiva, affiancando progressivamente la costruzione cooperativa con

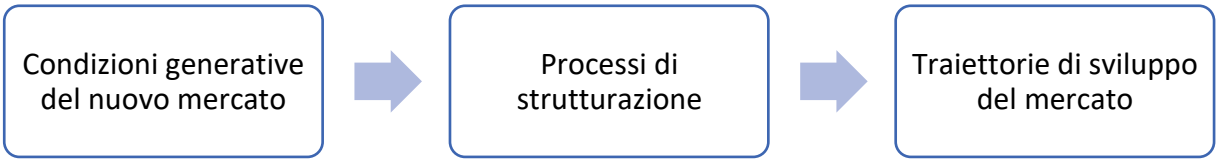
strategie di differenziazione, sebbene l'appartenenza categoriale continui a conferire legittimità, generando una tensione strategica riconfigurata tra la conformità alle norme della categoria e la differenziazione necessaria per garantire il vantaggio competitivo. In nuce, il lavoro intende riorganizzare la letteratura esistente e frammentata in un framework integrato capace di identificare gli elementi che plasmano l'evoluzione dei mercati nascenti. All'uopo, tale studio rappresenta una sintesi strutturata sui mercati nascenti che possa fungere da riferimento per gli studiosi che si approcciano al tema, ma anche per i manager e gli imprenditori, affinché comprendano quali dinamiche supportino l'evoluzione di tali mercati nel tempo e riescano a cogliere elementi utili a una gestione efficace di tali dinamiche, ma anche con un intento precipuo di chiarificazione teorica e applicativa.

Metodologia. Al fine di predisporre un framework integrato della letteratura sui mercati nascenti (Torraco, 2005; Palmatier et al., 2018), si seguono le indicazioni offerte da Tranfield et al. (2003) per l'identificazione e la selezione degli articoli. La revisione dei contributi sui mercati nascenti consente di consolidare conoscenze frammentate e di costruire basi solide che possono condurre, in prospettiva, a nuove teorizzazioni (Torraco, 2005). Tale approccio appare particolarmente adatto allo studio dei mercati nascenti, poiché si tratta di un ambito caratterizzato da prospettive teoriche ed evidenze empiriche eterogenee e disperse, da cui discende la necessità di predisporre un framework integrato capace di delineare un quadro generale che, mappando i diversi aspetti studiati fin qui, consenta di orientare verso prospettive di ricerca futura (Palmatier et al., 2018). Considerato lo scopo dello studio e il panorama frammentato della ricerca sui mercati nascenti, a gennaio 2026 ci si è avvalsi del database Scopus, ampiamente adottato per le review della letteratura negli studi di management e imprenditorialità (Bartoloni & Ancillai, 2024). Questa scelta muove da due principali considerazioni: in primo luogo, Scopus fornisce una copertura completa delle riviste di fascia alta e, dunque, di alto impatto; in secondo luogo, esso presenta una robusta capacità di selezione e filtraggio dei documenti che supporta procedure di ricerca articolate e replicabili. In via preliminare, sono state condotte ricerche tese a identificare la terminologia più appropriata per cogliere i fenomeni legati ai mercati nascenti, dalle quali è emerso che il termine 'nascent market*' coglieva solo una parte, peraltro limitata, della letteratura sul tema. Questa prima indicazione riflette il fatto che gli studi centrali sui mercati nascenti adottano diverse terminologie — incluse anche descrizioni orientate al processo della formazione del mercato ('market* formation', 'build market*') e formulazioni a livello settoriale ('nascent industry') — facendo riferimento allo stesso concetto **o a** declinazioni simili. È stata sviluppata una stringa di ricerca booleana completa: "nascent market*" OR "nascent industry" OR "market* formation" OR "build market*" OR "nascent W/2 market*". L'operatore di prossimità 'W/2' (within 2 words) ha permesso di includere anche espressioni modificate (ad es. 'nascent drone market') e di preservare la coerenza semantica. Al fine di affinare l'analisi, migliorarne la rilevanza per gli studi manageriali e garantirne la replicabilità (Hüttinger et al., 2012), si è scelto di applicare filtri specifici per aree disciplinari, tipologia di documento e lingua, includendo tutti gli articoli e le review in inglese pubblicati nelle aree di Business, Management and Accounting. Conformemente all'obiettivo di privilegiare la rilevanza concettuale dei contributi, si segue il lavoro di Adams et al. (2016) nel non applicare soglie di impact factor per la selezione delle riviste, preferendo garantire una maggiore e più ampia copertura e mantenere il rigore scientifico attraverso l'esclusivo ricorso a pubblicazioni peer-reviewed indicizzate su Scopus. Si tratta di una scelta che tiene in considerazione la novità del dominio di ricerca sui mercati nascenti. La ricerca così condotta ha prodotto 251 risultati, coprendo il periodo dal 1981 al 2026, con una crescita significativa delle pubblicazioni a partire dal 2015. Sono stati inclusi i lavori che: (1) affrontavano esplicitamente il tema dei mercati nascenti, inclusi aspetti quali l'emergere, la formazione e/o lo sviluppo; (2) fornivano contributi teorici o empirici sulle condizioni generative, sui processi o sulle conseguenze dell'evoluzione dei mercati nascenti. Sono stati, ad esempio, esclusi i lavori che affrontavano il tema dei mercati maturi e solo tangenzialmente il tema dei mercati nascenti per poi focalizzarsi sui mercati maturi.

I contributi che rispettano i criteri di inclusione/esclusione sopra definiti sono stati letti ed esaminati seguendo un processo di codifica ancora in fieri iterativo e induttivo: le principali intuizioni sono state estratte mediante codifica aperta, progressivamente raffinate in categorie tematiche attraverso il confronto costante tra articoli. Laddove più contributi affrontavano fenomeni correlati, questi venivano poi sintetizzati al fine di identificare convergenze e lacune teoriche, fornendo la base delle due mappe processuali sviluppate nelle sezioni seguenti sulla costruzione del mercato e sulla legittimazione, indi integrate in un unico framework. Tale integrazione risulta necessaria onde restituire una visione sistematica del fenomeno.

Risultati. Dall'analisi della letteratura si sviluppano due diverse mappe della letteratura. La prima mappa (Figura 1) è stata sviluppata codificando induttivamente le condizioni generative, i processi di strutturazione e le traiettorie di sviluppo del mercato con un focus sulla prospettiva competitiva.

Figura 1: Mappa della letteratura sulla costruzione dei mercati: una prospettiva competitiva



Condizioni generative del nuovo mercato. I mercati nascenti emergono in condizioni generative che simultaneamente o separatamente abilitano la costruzione del mercato. Tali condizioni generative comprendono tutti quei fattori che concorrono a formare il processo di creazione di un mercato nascente, vale a dire: la generatività tecnologica, le incertezze della domanda e quelle tecnologiche, l'ambiguità e l'hype imprenditoriale.

La generatività tecnologica riguarda l'insieme di tutte le condizioni dirompenti e le profonde trasformazioni capaci di innescare un cambiamento radicale dell'intero paradigma settoriale (Anderson & Tushman, 1990; Christensen, 2003, in Golicic & Sebastiao, 2011). A partire da questa innovazione tecnologica, che costituisce la condizione generativa primaria (Guerra et al., 2025; Santos & Eisenhardt, 2009), si innescano successive evoluzioni tecnologiche che aprono la strada ad applicazioni destinate a differenti segmenti di clientela, e che danno origine a una pluralità di mercati nascenti. Questi ultimi si manifestano in sequenza temporale, con strutture settoriali ancora non definite e definizioni di prodotto poco chiare. Tale condizione costringe le imprese a gestire una duplice traiettoria evolutiva, sia tecnologica sia della domanda, dal momento che l'obiettivo finale non è chiaro (Wang & Seidle, 2020).

L'incertezza di mercato e tecnologica rappresentano entrambe fattori cruciali per le imprese che operano in contesti in cui gli standard tecnologici non sono ancora definiti, le caratteristiche della domanda — in termini di bisogni e aspettative — sono poco chiare e le soglie minime di performance, unitamente al ritmo e alla direzione tecnologica, rimangono imprevedibili (Guerra et al., 2025; Wang & Seidle, 2020; Hilkamo et al., 2021).

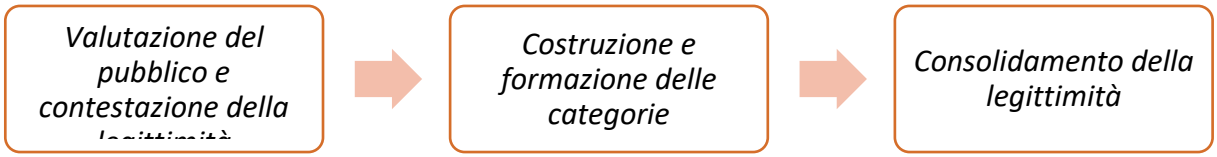
L'ambiguità, intesa quale assenza di strutture di significato condiviso che definiscano che cosa sia il mercato, chi vi appartenga e cosa costituisca una partecipazione legittima (Santos & Eisenhardt, 2009; Rindova et al., 2010), si distingue concettualmente dall'incertezza, che attiene all'incapacità di assegnare probabilità ai risultati futuri.

Infine, l'hype imprenditoriale opera come meccanismo di sensegiving orientato al futuro, capace di generare crescente attenzione e supporto da parte degli stakeholder nonostante l'incertezza prevalente, risultando particolarmente critico nel superare la liability of newness dei nuovi venture (Logue & Grimes, 2022), sostenendo la mobilitazione iniziale delle risorse.

I processi di strutturazione. Tali processi si riferiscono alle attività attraverso cui gli attori del mercato riducono progressivamente l'indeterminatezza che caratterizza i mercati nascenti — sia cognitiva, riguardante cos'è il mercato e come funziona, sia relazionale, riguardante chi sono gli attori rilevanti e come si coordinano: due meccanismi interconnessi che trasformano i mercati nascenti da una condizione di ambiguità iniziale verso realtà sempre più strutturate. Tra i processi di strutturazione, la costruzione della conoscenza e la sperimentazione consentono alle imprese di navigare l'incertezza attraverso la verifica sistematica delle varianti di prodotto, l'esplorazione dei casi d'uso e lo sviluppo di asset complementari (Guerra et al., 2025; Wang & Seidle, 2020). Le imprese osservano i concorrenti attraverso il vicarious learning e si impegnano direttamente con i clienti attraverso accordi di beta testing per perfezionare l'offerta. Simultaneamente, lo scaffolding culturale e materiale (ovvero la costruzione di framework regolatori, organizzazioni intermediarie e strumenti di mercato condivisi) trasforma i mercati nascenti da possibilità concettuali in sistemi di scambio funzionanti (Casasnovas & Ferraro, 2022), allorché tali elementi raggiungono una sufficiente stabilizzazione. Un secondo elemento, altrettanto critico, è rappresentato dalla struttura relazionale e di rete. Gli imprenditori impiegano strategie di alleanza per gestire le minacce competitive provenienti da imprese dominanti nei mercati adiacenti, cooptando i potenziali concorrenti attraverso accordi di revenue-sharing, investimenti azionari e antileader positioning (Santos & Eisenhardt, 2009). I modelli di business in rete guidano il modo in cui gruppi di imprese creano valore collettivamente, mentre il multimarket contact plasma il modo in cui le imprese sviluppano e contestano i frame tecnologici (Bankel & Govik, 2024; Hsu & Cohen, 2022).

Le traiettorie dei mercati nascenti. Infine, le traiettorie che i mercati nascenti seguono nel tempo possono consolidarsi in un mercato stabile quando le aspettative dei clienti sulle funzionalità del prodotto diventano chiare e si sviluppano i asset complementari (ovvero le risorse e infrastrutture di supporto, come canali distributivi, standard tecnici e partnership commerciali, necessarie alla commercializzazione su larga scala; Guerra et al., 2025). In alternativa, il mercato può non riuscire ad emergere: quando gli attori chiave provenienti da settori diversi non raggiungono un accordo sull'architettura del nuovo mercato (ovvero su chi controlla il cliente finale, quali standard tecnici adottare e come distribuire il valore tra gli attori) si innesca un ciclo di rinvio degli investimenti che impedisce la commercializzazione su larga scala (Ozcan & Santos, 2015; Guerra et al., 2025). Sennonché, si parla anche di speciazione del mercato quando un mercato nascente inizialmente unificato si divide in mercati autonomi con identità, pratiche e infrastrutture distinte (Casasnovas & Ferraro, 2022). Questo processo emerge in presenza di due specifiche condizioni strutturali: field overlap, che si verifica quando il mercato nascente emerge a seguito dell'intersezione di più campi preesistenti, ciascuno con logiche distinte che spingono il mercato in direzioni diverse; e il material anchoring, che si verifica quando le strutture materiali sviluppate nelle prime fasi del mercato — ovvero le pratiche condivise, le organizzazioni intermediarie e i quadri regolatori a supporto dell'attività di mercato — attraggono risorse significative e consolidano una posizione di riferimento nel campo. Ciò rende difficile l'affermazione di modelli alternativi, favorendo la coesistenza di mercati separati piuttosto che la convergenza verso un unico disegno (Casasnovas & Ferraro, 2022). La speciazione si attiva quando gli attori coinvolti nel processo di costruzione del mercato, valutando i risultati concreti delle pratiche e delle infrastrutture sviluppate collettivamente, concludono che queste non stanno risolvendo i problemi che li avevano motivati a parteciparvi e, in presenza di sottogruppi con obiettivi sufficientemente divergenti, il mercato tende a frammentarsi in entità distinte

(Casasnovas & Ferraro, 2022). Infine, la struttura del settore e le dinamiche competitive possono emergere dall'interazione tra le strategie deliberate delle imprese dominanti (Bradley & Kolev, 2023) e le risposte adattive delle altre imprese, che osservano il comportamento dei concorrenti per ridurre l'incertezza strategica (Wang & Seidle, 2020), delineate e, per tal ragione, d'uopo considerate in chiave sistemica.
La seconda mappa della letteratura, rappresentata in Figura 2, organizza la ricerca esistente sulla legittimazione nei mercati nascenti in tre fasi che riflettono una progressione temporale: i mercati affrontano inizialmente la contestazione del pubblico su ciò che è legittimo; successivamente, gli attori costruiscono attivamente un'identità collettiva condivisa e definiscono i confini della categoria (ovvero i criteri che stabiliscono chi ne fa parte e secondo quali pratiche); infine, la legittimità si consolida, sebbene non senza generare trade-off intrinseci tra la crescita del mercato e la coerenza dell'identità, dacché tali dinamiche evolvono congiuntamente.



La valutazione del pubblico e la contestazione della legittimità. La legittimazione delle nuove categorie di mercato include processi in cui le imprese produttrici si impegnano nel sensegiving attraverso etichette, frame e narrazioni affinché le nuove identità diventino intelligibili, comprensibili e attraenti, mentre i pubblici si impegnano nel sensemaking per valutare le rivendicazioni organizzative (Lounsbury & Glynn, 2001; Navis & Glynn, 2010, in Lee et al., 2017). La legittimità può essere raggiunta attraverso tre percorsi: (1) legittimazione retrospettiva: la credibilità si costruisce gradualmente man mano che i prodotti dimostrano la propria utilità attraverso prove accumulate, ma rimane largamente inaccessibile ai primi entranti, data l'assenza di un track record storico; (2) legittimazione associativa: la credibilità proviene da domini legittimi adiacenti; e (3) legittimazione prospettica: la credibilità emerge attraverso narrazioni orientate al futuro, collegando nuove offerte a esiti futuri desiderabili prima che emergano prove materiali (Harmon et al., 2023). Quest'ultimo percorso rappresenta la via più critica per i mercati nascenti, chiaramente caratterizzati da elevata incertezza. Inoltre, i mercati nascenti sperimentano anche la contestazione della legittimità, poiché vari attori avanzano rivendicazioni in competizione relative ai confini della categoria e alle pratiche appropriate, onde tale dinamica si intensifica quando più pubblici presentano aspettative contraddittorie (Lee et al., 2017).

Costruzione e formazione delle categorie. Gli imprenditori ricorrono proattivamente a meccanismi per costruire e consolidare la propria identità di mercato (adottando template familiari ma sufficientemente distanti, diffondendo storie vivide e segnalando la leadership) dimostrandosi così più propensi a diventare referenti cognitivi nei mercati che rivendicano, raggiungendo il dominio cognitivo attraverso un processo di sensegiving (Santos & Eisenhardt, 2009). A livello collettivo, i produttori si impegnano in comportamenti di legittimazione per demarcare i confini categoriali attorno all'identità condivisa, utilizzando storie, comunicati stampa e codici per stabilire identità prototipiche (Lee et al., 2017), all'uopo rafforzando la riconoscibilità della categoria. Emerge una tensione centrale: i pionieri che impongono un rigido isomorfismo identitario tra i membri possono garantire la coerenza della categoria di mercato, ma al costo di una crescita limitata e della marginalità, donde deriva un equilibrio instabile tra coerenza e sviluppo (Lee et al., 2017).

Il consolidamento della legittimità. Il consolidamento della legittimità è critico e richiede che i mercati nascenti evolvano da contesti di elevata ambiguità verso forme più stabili e socialmente accettate. Dopo che una soglia di legittimità è stata raggiunta, gli attori del mercato si concentrano sul differenziare le proprie organizzazioni e sul ritagliarsi una nicchia vitale, confrontandosi con altri produttori per raggiungere posizioni competitive stabili (Navis & Glynn, 2010). Il processo di legittimazione si completa quando le comprensioni derivanti dalle fasi precedenti diventano compiute (Harmon et al., 2023). Tuttavia, la legittimità rappresenta una lama a doppio taglio: mentre una più ampia accettazione sociale può favorire la crescita della categoria, i comportamenti di ricerca della legittimità generano tensioni tra i nuovi pubblici e l'identità collettiva dei membri originali, potenzialmente separando la categoria dal suo ethos fondante (Lee et al., 2017), per l'appunto alterandone i confini simbolici. Inoltre, il consolidamento della legittimità non è irreversibile — la perdita della legittimità pubblica può innescare la perdita del supporto delle politiche e il declino del mercato (Chung & Kaynak, 2025), indi evidenziando la natura dinamica e contingente di tale processo.
Mentre la prima mappa relativa alla costruzione del mercato da una prospettiva competitiva (figura 1) suggerisce come le imprese sviluppino progressivamente conoscenze, relazioni e strutture settoriali in condizioni di elevata incertezza, la seconda mappa (figura 2) è incentrata sul ruolo della legittimazione e illustra come la legittimità collettiva venga costruita, contestata e consolidata nel tempo. L'integrazione tra la prima e la seconda mappa in un unico framework rivela una dinamica temporale critica: la legittimazione non precede semplicemente la costruzione del mercato come prerequisito, ma co-evolve con essa in modo ricorsivo, e la sua accumulazione genera un cambiamento qualitativo nella natura delle sfide che le imprese devono affrontare. In particolare, man mano che la legittimità collettiva si avvicina e supera un punto di inflessione (Navis & Glynn, 2010; Ozcan & Santos, 2015), il problema strategico centrale si trasforma: la priorità si sposta dalla costruzione cooperativa della categoria, in cui le imprese beneficiano della legittimazione collettiva del

mercato, alla differenziazione competitiva, in cui devono ritagliarsi posizioni distinte all'interno di uno spazio di mercato ormai riconosciuto. Tale tensione riguarda il modo in cui le imprese si conformano alle norme categoriali emergenti, preservando al contempo la distintività organizzativa (Lee et al., 2017). Dopo il punto di inflessione, la tensione si inverte: le imprese non si interrogano più su come costruire collettivamente la legittimità della categoria, bensì su come mantenere l'appartenenza categoriale, che continua a conferire legittimità, differenziandosi al tempo stesso in misura sufficiente a garantire un vantaggio competitivo, di poi ricalibrando le proprie strategie. Pertanto, tale dinamica evidenzia il carattere evolutivo e non lineare del rapporto tra legittimità e competizione nei mercati nascenti

Limitazioni della ricerca. Il presente studio presenta alcune limitazioni. In primo luogo, il framework processuale sviluppato si fonda su una sintesi concettuale della letteratura esistente e non sono stati ancora sottoposti a corroborazione empirica: in particolare, la proposta teorica relativa alla riconfigurazione della tensione tra appartenenza categoriale e differenziazione competitiva nella fase post-inflection point costituisce un contributo originale che necessita di ulteriore scrutinio empirico. In secondo luogo, l'analisi della letteratura è ancora in fieri e necessita di un double check di tutti gli autori. Sebbene questa pratica possa ridurre i potenziali bias interpretativi degli autori, essi non sono completamente eliminabili, risultando peraltro intrinseci a ogni processo di sintesi teorica e, nondimeno, meritevoli di attenta considerazione.

Implicazioni manageriali. Il framework integrativo proposto offre ai manager e agli imprenditori che operano in contesti di mercato nascente uno strumento per riconoscere connessioni tra variabili che, osservate separatamente, risulterebbero difficilmente interpretabili. Le condizioni generative identificate non rappresentano solamente degli elementi che caratterizzano il mercato nascente, ma costituiscono leve strategiche attraverso cui si gioca la rivalità inter-impresa prima ancora che il mercato prenda forma e si consolidi. Comprendere queste condizioni consente al manager di identificare in quale fase del processo evolutivo si trova il proprio contesto competitivo e, di conseguenza, su quali meccanismi sia più opportuno agire, all'uopo orientando le decisioni strategiche.

Un'implicazione centrale emerge dalla struttura tripartita della mappa in figura 1: nei mercati nascenti, la rivalità competitiva non si esercita primariamente sul prodotto o sul servizio, ma sui meccanismi di costruzione del mercato stesso. Le attività di strutturazione della conoscenza, di sperimentazione, di costruzione delle relazioni inter-impresa e di scaffolding istituzionale rappresentano elementi che caratterizzano la strategia competitiva. Il manager che riconosce questo punto può riorientare le proprie priorità: investire nella costruzione della categoria, nella definizione dei confini del mercato e nella cooptazione di attori chiave non è un costo, ma la forma primaria di posizionamento competitivo nella fase nascente, donde deriva un vantaggio anticipato.

Infine, il framework aiuta il manager a comprendere quale tipo di player voglia essere. Le traiettorie di sviluppo di un mercato nascente (consolidamento, speciazione, fallimento del mercato) non sono determinate esclusivamente dalla tecnologia o dalla domanda, ma dalla capacità degli attori di costruire framework cognitivi condivisi, di allineare scaffolding materiale e culturale, e di navigare i trade-off tra ricerca di legittimità, coerenza dell'identità e posizionamento competitivo. Questa lettura apre una prospettiva strategica concreta: il manager di un mercato nascente non è solo un competitor in un'arena già definita, ma un co-costruttore dell'arena stessa. Riconoscere questo ruolo - e agire di conseguenza - rappresenta la principale implicazione pratica che il framework consente di derivare, al fine di guidare l'azione strategica.

Originalità del paper. Il contributo originale di questo studio risiede in due piani complementari. Sul piano della sintesi, le due mappe organizzano in modo coerente i principali filoni della letteratura sui mercati nascenti in una struttura tripartita, con un contenuto sostantivo che emerge interamente dalla nostra analisi della letteratura sui mercati nascenti. Sul piano del contributo teorico, tuttavia, la giustapposizione tra i due framework supporta una nuova concettualizzazione della legittimità collettiva come punto di inflessione che riconfigura — piuttosto che eliminarla — la tensione tra appartenenza categoriale e differenziazione competitiva. Questa riconfigurazione dei trade-off è invisibile quando i due framework processuali vengono letti separatamente ed emerge solo dalla loro integrazione, costituendo il contributo teorico primario di questa revisione.

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Quantifying Ethics: The E3S Model for Student Entrepreneurship Education

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Abstract. *In an era defined by climate change, social inequality, and shifting institutional trust, higher education systems must evolve beyond traditional knowledge transfer to cultivate responsible, value-driven individuals. Entrepreneurship education, specifically Student Entrepreneurship Educational Programs (SEEPs), represents a critical frontier for this transformation. SEEPs are uniquely positioned to foster "relational ethics" and "social learning" by combining practical business experience with social value creation. However, a significant gap remains: how do we measure the ethical impact of these programs? Traditional metrics—such as revenue, scalability, or business plan robustness—fail to capture the internalization of ethical principles. This work-in-progress paper addresses the central research question: Is it possible to propose a dynamic tool for measuring ethics in SEEPs that incorporates individual, team, and ecosystem levels? To answer this, we conducted a non-systematic literature review considering the General Ethics Scales, the Managers' Ethics Scales, and the Entrepreneurs' Ethics Scales. Starting from that, we propose the Ethical Entrepreneurial Education Scorecard (E3S). The study adopts an exploratory sequential design in the context of the ENACTUS program as the ideal pilot for validating the E3S. For educators, it provides a roadmap for ethics-focused pedagogy. For universities, it offers a tool to align global sustainability standards and demonstrate social impact to stakeholders. For policymakers, the model suggests new standards for national quality assurance that reward the creation of conscientious global citizens rather than just the number of startups launched.*
Keywords: *Entrepreneurship Education; Ethics Measurement; SEEPs; E3S Scorecard; Social Impact; ENACTUS*

Framing of the research. Amidst an intensifying global crisis from ecological instability to the fracture of institutional trust, the mandate for higher education has shifted from mere knowledge dissemination toward the cultivation of "value-driven" agency (Malone, 2015; Ul Hassan et al., 2025). This pedagogical evolution is most critical within entrepreneurship education, which is increasingly tasked with developing individuals capable of navigating systemic complexity with ethical resolve (Passarelli & Bongiorno, 2025). Rather than prioritizing the output of profit-centric graduates, institutions are now required to foster competencies that catalyze inclusive and sustainable societal transitions (Redman & Wiek, 2021).

Student Entrepreneurship Educational Programs (SEEPs) represent a transformative nexus where experiential learning converges with social value creation (Duval-Couetil, 2013; Kassean et al., 2015). These programs serve as incubators for a new cohort of "ethical entrepreneurs" change agents who internalize relational ethics and care through collective social learning (Dacin et al., 2010; Elmes et al., 2012). Because SEEPs function across micro, meso, and macro scales, they provide a unique longitudinal laboratory for examining ethics as both an individual virtue and a systemic practice.

Consequently, this conceptual paper investigates a pivotal research question: Is it possible to design a dynamic assessment tool for SEEPs that integrates individual, team, and ecosystem-level ethical dimensions? To address this, we propose a multidimensional, context-sensitive framework that challenges the hegemony of traditional metrics.

While existing literature offers various quantitative instruments to evaluate moral judgment and ethical reasoning (Pathak & Muralidharan, 2020), these often overlook the "lived" and contingent nature of morality. Quantitative methods provide essential standardization but frequently reduce the density of ethical decision-making to static variables, risking the omission of cultural nuance and the distortion of results through social desirability bias (Islam, 2022). Furthermore, ethical maturation is an inherently fluid process, shaped by emotional triggers, interpersonal friction, and iterative reflection—elements that remain largely invisible to survey-based scales.

We therefore argue for a hybrid methodological approach that synthesizes the objective rigor of quantitative data with the descriptive depth of qualitative inquiry (Heyler et al., 2016; Casali & Perano, 2021). Ethics within the entrepreneurial journey cannot be audited via a simplified checklist; it must be mapped as a developmental trajectory deeply embedded in emotional, relational, and institutional contexts. By framing ethics as a multifaceted construct, the proposed model seeks to capture the authentic moral evolution of students as they navigate the complexities of the modern entrepreneurial landscape.

Traditional entrepreneurship indicators—primarily revenue growth, market scalability, and the technical robustness of business plans—insufficiently capture the transformative participant experiences and the substantive social value generated by educational programs (Saebi et al., 2019). While specialized instruments like the primary school "sense of belonging to ethical values" scale (Yardimciel & Kılıç, 2023) and the Ethical Leadership Scale (Sen & Gocen, 2021) have been validated, a significant research gap persists regarding the application of these values across diverse educational and

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organizational landscapes. To authentically evaluate the impact of ethics-centric entrepreneurial pedagogy, next-generation assessment tools must account for the longitudinal evolution of personal values, the deep internalization of moral principles, and the development of systems-thinking competencies (Douglas et al., 2001; Vázquez-Parra et al., 2022; Passarelli et al., 2025).

To contextualize the current state of measurement within SEEPs, a non-systematic literature review was undertaken (Aria and Cuccurullo, 2017). This approach was particularly suitable for the aims of the present study. Specifically, it enabled the development of a broad and up-to-date overview of ethics measurement scales within the fields of management and entrepreneurship, while avoiding the limitations associated with the rigid inclusion and exclusion criteria that typically characterize systematic reviews. Such flexibility is especially valuable in an emerging and conceptually heterogeneous area of research, as it allows the incorporation of recent and relevant contributions that may not be captured through more restrictive review procedures. In addition, this approach facilitates the exploration of diverse theoretical perspectives and methodological traditions, thereby supporting a more comprehensive and nuanced understanding of the phenomenon under investigation. The review was conducted in Web of Science (WoS) and initially using a very basic query, which generated a first set of 3653 academic contributions. However, the preliminary screening of the literature revealed the presence of heterogeneous streams of research, thus indicating the need to broaden the scope of the inquiry. More specifically, it became evident that the analysis should not be limited to the entrepreneurial domain alone, but should also encompass the managerial sphere and, more broadly, the ethical dimensions associated with the principal actors operating within firms. Accordingly, the initial search terms were subsequently combined with additional keywords such as "management," "manager," and "entrepreneur" to identify a broader, more coherent, and analytically relevant body of literature ((TS =(ethic* AND (scale* OR instrument* OR measure* OR measurement*) AND (business OR management OR firm* OR organization* OR entrepreneur*))).

Thus, the analysis of the papers allows us to select some specific papers that allowed us to identify three distinct typologies of ethics scales (see Table 1):

- General Ethics Scales: Universal instruments addressing ethical evaluation without actor-specific constraints.
- Managers' Ethics Scales: Frameworks designed to quantify ethicality and moral reasoning within managerial roles.
- Entrepreneurs' Ethics Scales: Specialized research developing metrics for entrepreneurial virtues and social orientation.

Table 1. The three major typologies of Ethics Scales in the literature

General Ethics Scale					
Title	***Authors***	***Year***	***Journal***	***Scale Description***	***Conceptual Aspect***
Some Initial Steps toward Improving the Measurement of Ethical Evaluations of Marketing Activities	*R. Eric Reidenbach & Donald P. Robin*	*1988*	*Journal of Business Ethics, Volume 7, pages 871–879*	*"Multidimensional Ethics Scale" (MES), composed of 5 factors summarizing 29 items: (1) Justice scale – 3 items; (2) Relativist scale – 5 items; (3) Egoism scale – 7 items; (4) Utilitarian scale – 9 items; (5) Deontological scale – 5 items.*	*Using the framework of Pluralistic Moral Philosophy, it rejects the use of a single global philosophy, suggesting that individuals use a combination of morals. It evaluates decisions through deontology, utilitarianism, relativism, egoism, and justice.*
A Multidimensional Scale for Measuring Business Ethics: A Purification and Refinement	*Randall S. Hansen*	*1992*	*Journal of Business Ethics, Volume 11, pages 523–534*	*Scale composed of 4 factors totaling 16 items: (1) Broad ethical judgment – 8 items; (2) Deontological judgment – 2 items; (3) Social contract judgment – 2 items; (4) Teleological judgment (includes elements of egoism and utilitarianism) – 4 items.*	*Through Multidimensional Scale Refinement, it refines the measurement of ethics by including a specific dimension of social contract, assessing whether an action violates unwritten promises or commitments to society.*
Judging the morality of business practices: The influence of personal moral philosophies	*Donelson R. Forsyth*	*1992*	*Journal of Business Ethics, Volume 11, pages 461–470*	*(1) Idealism scale – measures concern for others' well-being. Example: 'One should never intentionally harm another person, even to a small degree.' (2) Relativism scale – assesses rejection of universal moral principles in favor of context-based ethics. Example: 'What is ethical varies from one situation to another.'*	*Through a Taxonomy of Ethical Ideologies, it classifies personal moral philosophies on two dimensions: Idealism (concern for the well-being of others) and Relativism (skepticism toward universal rules).*

The perceived role of ethics and social responsibility: A scale development	*Anusorn Singhapakdi, Scott J. Vitell, Kumar C. Rallapalli, Kenneth L. Kraft*	*1996*	*Journal of Business Ethics, Volume 15, pages 1131–1140*	*PRESOR Scale, with 3 factors comprising 13 items: (1) 'Social Responsibility and Profitability' – 4 items including 'If company survival is at stake, ethics and social responsibility should be ignored'; (2) 'Long-term gains' – 6 items; (3) 'Short-term gains' – 3 items including 'If shareholders are unhappy, nothing else matters.'*	*Based on the Determinants of Organizational Effectiveness, he proposes that the perception of the importance of ethics (PRESOR) is a critical determinant in recognizing ethical issues and guiding decision-making toward social responsibility.*
Proposal for a Measurement Scale of the Ethical Climate in Business: A Study in the Area of B-to-B Selling	*Laure Lavorata*	*2007*	*Recherche et Applications en Marketing (English Edition), Vol. 22(1), pages 1–23*	*Ethical climate measurement scale with 14 items across 4 dimensions: (1) Business ethics procedures – 5 items; (2) Peer behavior – 3 items; (3) Sales practices – 3 items; (4) Compensation plan – 3 items.*	*Using Ethical Climate for Salesforce, adapt the concept of ethical climate to the B2B sector, highlighting how pressure to perform and compensation plans influence perceptions of moral standards.*
Measuring Corporate Social Responsibility: A Scale Development Study	*Duygu Turker*	*2008*	*Journal of Business Ethics, Volume 85, pages 411–427 (2009)*	*CSR scale includes 4 factors summarizing 17 items: (1) CSR toward social and non-social stakeholders – society, environment, future generations, NGOs; (2) CSR toward employees – e.g., 'Management decisions are generally fair'; (3) CSR toward customers – e.g., 'Our company respects consumer rights beyond legal requirements'; (4) CSR toward government – e.g., 'Our company complies with legal regulations in full and timely manner.'*	*Using Stakeholder Theory, it defines CSR as corporate behavior that aims to positively influence various stakeholders, going beyond mere economic interests.*
The Corporate Ethical Virtues Scale: Factorial Invariance Across Organizational Samples	*Maiju Kangas, Taru Feldt, Mari Huhtala & Johanna Rantanen*	*2013*	*Journal of Business Ethics, Volume 124, pages 161–171 (2014)*	*Corporate Ethical Virtues Scale (CEV), includes 8 dimensions (58 items): (1) Clarity – 'The organization clarifies how to obtain necessary authorizations'; (2) Supervisor congruence – 'My supervisor sets a good example in ethical behavior'; (3) Senior management congruence – 'Senior leaders reflect shared norms and values'; (4) Feasibility – 'I don't have enough time to act responsibly'; (5) Supportability – 'There is mutual trust in my work environment'; (6) Transparency – 'If a colleague does something wrong, my manager will find out'; (7) Discussability – 'There is room to discuss unethical behavior in my workplace'; (8) Sanctionability – 'Ethical conduct is rewarded in my workplace'.*	*Using Aristotelian Virtues in Organizations, identify eight "corporate virtues" that act as organizational traits to stimulate ethical conduct among members.*
Ethics scale for management					
Title	***Authors***	***Year***	***Journal***	***Scale Description***	***Conceptual Aspect***
Toward the development of a multidimensional scale for improving evaluations of business ethics	*R. Eric Reidenbach & Donald P. Robin*	*1990*	*Journal of Business Ethics, Volume 9, pages 639–653*	*The scale consists of 3 dimensions: (1) Broad moral equity dimension (4 items: Right/wrong, Fair/unfair, acceptable/unacceptable for my family, Morally/not morally right); (2) Relativistic dimension (2 items: Traditionally acceptable/unacceptable, Culturally acceptable/unacceptable); (3) Contractual dimension (2 items: Violates/does not violate an implicit promise, Violates/does not violate an unwritten contract).*	*Seeking to refine the Multidimensional Ethics Scale, Distilla distills ethical judgment into three fundamental dimensions: moral equity (justice), relativism (cultural norms), and contractualism (mutual obligations).*
An investigation of the moral reasoning of managers	*Dawn R. Elm & Mary Lippitt Nichols*	*1993*	*Journal of Business Ethics, Volume 12, pages 817–833*	*Uses 3 scales: (1) Defining Issues Test (DIT) – assesses moral reasoning level based on Kohlberg's theory, evaluating post-conventional moral thinking; (2) Ethical Climate Questionnaire (ECQ) – 26 items across 3 dimensions: Egoistic, Utilitarian, Principle-based climates; (3)*	*Using the Interactionist Perspective, they argue that moral reasoning (Kohlberg's stages) is a function of the interaction between individual attributes (self-monitoring) and*

				Snyder's Self-Monitoring Scale – measures personal orientation to internal vs. external behavioral standards.	*situational attributes (perceived ethical climate).*
The Perceived Role of Ethics and Social Responsibility: An Alternative Scale Structure	*John M. Etheredge*	*1999*	*Journal of Business Ethics, Volume 18, pages 51–64*	*Uses Singhapakdi's PRESOR Scale, with 2 primary factors: (1) Importance of ethics and social responsibility (5 items, e.g., 'Moral values are irrelevant to business'); (2) Subordination of ethics and social responsibility (4 items, e.g., 'Shareholders' primary interest is maximum return').*	*Through the Cultural Theory of Perception, examine how cultural differences (e.g., Hong Kong vs. the US) influence the structure of ethical perception. Distinguish between the intrinsic importance of ethics and its subordination to profitability or survival objectives.*
A Multidimensional Ethics Scale for Indian Managers' Moral Decision Making	*Seema Gupta*	*2010*	*JBO - Electronic Journal of Business Ethics and Organization Studies, Vol. 15 (1)*	*Adapted from Reidenbach & Robin's MES (1988). Factor analysis revealed: Scenario 1: four factors – Moral equity, Egoism, Utilitarianism, Contractualism; Scenario 2: three factors – Moral equity, Egoism, Utilitarianism. Confirms the relevance of justice, contractualism, relativism, utilitarianism, and egoism in managerial ethical decision-making.*	*It analyzes how managers integrate five moral philosophies: justice, deontology (contractualism), relativism, utilitarianism, and egoism. A central aspect is the identification of a distinct construct of egoism that emerges as a critical factor in the Indian context.*
Cultural values and management ethics: A 10-nation study	*Terence Jackson*	*2001*	*Human Relations, Vol. 54(10), pages 1267–1302*	*Scale includes 3 categories of ethical relationships in management: (1) External stakeholders – 2 items (e.g., 'Giving gifts/favors for preferential treatment'); (2) Organizational loyalty – 6 items (e.g., 'Disclosure of confidential information'); (3) Group loyalty – 2 items (e.g., 'Taking credit for others' work').*	*Use Hofstede's dimensions (individualism-collectivism and uncertainty) to explain different attitudes toward the "gray areas" of day-to-day management, emphasizing the value of socio-cultural aspects.*
A Scale to Assess Ethical Leadership of Indian Private and Public Sector Managers	*Rooplekha Khuntia & Damodar Suar*	*2004*	*Journal of Business Ethics, Volume 49, pages 13–26 (2004)*	*Ethical Leadership Scale (ELI), 22 items across 2 main dimensions: (1) Empowerment – 12 items on leaders enhancing subordinates' self-efficacy through inclusion and support; (2) Motive and Character – 10 items on altruism, integrity, openness to criticism, and consistency between words and actions.*	*It integrates the altruistic motivation of the leader with their strategies of influence. It defines ethical leadership through the empowerment of subordinates and the moral character of the leader in a context of transformational leadership.*
Ethics scale for entrepreneurship					
Title	***Authors***	***Year***	***Journal***	***Scale Description***	***Conceptual Aspect***
The Ethical Context of Entrepreneurship: Proposing and Testing a Developmental Framework	*Michael H. Morris, Minet Schindehutte, John Walton & Jeffrey Allen*	*2002*	*Journal of Business Ethics, Volume 40, pages 331–361*	*The measurement scale used by the authors is based on a combination of: (1) Locus of control: perception of control over outcomes, measured using a modified version of Rotter's scale (6 items); (2) Achievement motivation: level of drive to achieve success, measured using a subscale from the Entrepreneurial Attitude Orientation (EAO) scale; (3) Tolerance of ambiguity: ability to manage uncertainty, measured using Budner's scale (16 items); (4) Machiavellianism: tendency to manipulate others to achieve goals, measured using the Mach IV scale; (5) Composite scales: Sophistication scale (7 items), Scenarios scale (ethical situations), and Satisfaction scale (ethical program satisfaction).*	*Within the Ethical Development Framework, they analyze how the ethical climate evolves throughout the life cycle of the company. They distinguish between explicit structures (formal, compliance with rules) and implicit structures (informal, based on integrity and core culture).*
The Development of a Virtue Ethics Scale	*Kevin J. Shanahan & Michael R. Hyman*	*2003*	*Journal of Business Ethics, Volume 42, pages 197–208*	*Virtue Ethics Scale (VES) includes 6 factors: (1) Empathy – awareness and sensitivity to others' needs; (2) Protestant Work Ethic – individualism, responsibility, and belief in equal opportunity; (3) Piety – moral emotions like shame and guilt; (4) Respect – openness to dissenting views; (5) Reliability – trustworthiness; (6)*	*Based on the belief that ethics reside in the character of the individual, drawing on Aristotelian Virtue Ethics, it identifies specific traits such as empathy (caring for others), reliability, and incorruptibility*

				Incorruptibility – honor, honesty, and integrity, key traits for leaders.	*as preferred traits in the business world.*
Ethical leadership: A social learning perspective for construct development and testing	*Michael E. Brown, Linda K. Treviño & David A. Harrison*	*2004*	*Organizational Behavior and Human Decision Processes, Volume 97, Issue 2, July 2005, Pages 117–134*	*Ethics Leadership Scale includes 10 items such as: (1) listening to employees, (2) disciplining unethical behavior, (3) living ethically, (4) caring for employee interests, (5) fairness, (6) trust, (7) discussing ethics, (8) modeling ethical conduct, (9) emphasizing ethical processes as well as results, and (10) asking 'what is the right thing to do?'*	*Using the framework of Social Learning Theory, he proposes that ethical leadership depends on the perception of the leader as an attractive and legitimate role model. He focuses on moral management through the communication of values and the reinforcement of ethical behavior.*
The Impact of Moral Intensity and Desire for Control on Scaling Decisions in Social Entrepreneurship	*Brett R. Smith, Geoffrey M. Kistruck & Benedetto Cannatelli*	*2014*	*Journal of Business Ethics, Volume 133, pages 677–689 (2016)*	*Multidimensional scale based on moral intensity, including: (1) Magnitude of consequences; (2) Social consensus; (3) Probability of effect; (4) Temporal immediacy; (5) Proximity; (6) Concentration of effect.*	*Using Moral Intensity Theory, examine how the perception of a problem's intensity (magnitude of consequences, social consensus, proximity) influences decisions to increase social impact.*
Individual social entrepreneurship orientation: towards the development of a measurement scale	*Mir Shahid Satar & Saqib Natasha*	*2019*	*Asia Pacific Journal of Innovation and Entrepreneurship, Vol. 13, Issue 1, pages 49–72*	*Individual Social Entrepreneurship Orientation Scale (ISEO) includes 4 dimensions: (1) Social passion – e.g., 'I explicitly focus on creating social value'; (2) Innovativeness – 4 items; (3) Proactiveness – 3 items, e.g., 'I plan projects in advance'; (4) Risk-taking – 3 items.*	*Based on Individual Social Entrepreneurial Orientation Adapts classic entrepreneurial orientation (innovation, risk, proactivity) to the social context. Introduces Social Passion as an individual drive to alleviate the suffering of others.*
Organizational social entrepreneurship: scale development and validation	*Merie Kannampuzha & Kai Hockerts*	*2019*	*Social Enterprise Journal, Vol. 15, Issue 3, pages 290–319*	*Organizational Social Entrepreneurship Scale (OSE) includes: (1) Social change intent: 'social mission' (2 items), 'change enacted' (4 items); (2) Commercial activities: 'earned income' (4 items), 'paid employees' (2 items); (3) Inclusive governance: 'democratic decision-making' (4 items), 'stakeholder participation' (4 items), 'social impact' (3 items).*	*Processes based on social entrepreneurship and conceived as a set of practices and behaviors rather than a legal form. It includes three formative pillars: intention for social change, commercial activity, and inclusive governance.*
Societal Ethics and Social Entrepreneurship: A Cross-Cultural Comparison	*Saurav Pathak & Etayankara Muralidharan*	*2020*	*Cross-Cultural Research, Vol. 54(2–3), pages 180–208*	*The study positions ethics as a factor influencing the likelihood of individuals engaging in social entrepreneurship at the national level. Includes: (1) Normative ethical context – behavioral ethics index based on WVS; (2) Cognitive context – importance attributed to altruism (WVS); (3) Normative public-sector ethics – derived from WEF, measures integrity, corruption, and favoritism.*	*Using an institutional theory approach, he links ethics to three institutional pillars: normative (behavioral ethics), cognitive (altruism/unselfishness), and regulatory (public sector ethics).*

Purpose of the paper. While SEEPs are uniquely positioned to foster this transformation, existing evaluation metrics remain stuck in a "profit-first" paradigm, focusing on revenue or scalability. This paper addresses a critical gap: the lack of a dynamic, multi-level tool to measure ethical development within SEEPs. We propose the Ethical Entrepreneurial Education Scorecard (E3S) to answer the question: How can we measure ethics as a developmental journey involving individuals, teams, and the broader ecosystem? The preliminary literature review underscores a critical fragmentation in existing evaluative instruments; while various scales address ethics in entrepreneurship, there remains a distinct lack of an integrated metric capable of simultaneously capturing the micro (individual), meso (team), and macro (ecosystem) perspectives. To bridge this gap, this research develops a holistic measurement tool aimed at capturing the multi-layered nature of ethical development in SEEPs.

Methodology. The study utilizes an exploratory sequential mixed-methods design, structured in two distinct phases. The initial qualitative phase employs semi-structured interviews and focus groups to generate, refine, and contextualize potential scale items, ensuring the tool reflects the "lived" ethical experiences of participants. These qualitative insights

will inform the construction of a structured instrument to be deployed in the subsequent quantitative phase, where a broad-scale survey will be conducted to establish psychometric reliability and construct validity.

The purposive sample for this study comprises students and project teams from Enactus, a global non-profit organization operating across universities worldwide. Enactus provides an unparalleled research laboratory: it engages diverse cohorts of students in the execution of real-world, socially impactful ventures. This context offers the necessary environmental complexity to observe and measure how ethical constructs—such as social responsibility, relational care, and sustainability orientation—are operationalized in practice.

Data analysis will proceed through a rigorous statistical workflow. An Exploratory Factor Analysis (EFA) will be performed to uncover the underlying dimensional structure of the newly developed scale and verify its alignment with the proposed three-level framework. Furthermore, Cronbach's alpha coefficients will be calculated to ensure high levels of internal consistency and instrument reliability. By synthesizing qualitative depth with quantitative rigor, this methodology aims to provide a validated, context-sensitive scorecard for the future of ethical entrepreneurial education.

Results. To address the multifaceted nature of ethical maturation in SEEPs, the Ethical Entrepreneurial Education Scorecard (E3S) offers a granular, three-tiered assessment framework. By synthesizing individual, team, and ecosystemic dimensions, the model provides a holistic lens through which to evaluate ethics not as a static state, but as a dynamic competence (see Table 2).

At the individual level, the framework moves beyond traditional psychometric snapshots to capture the "lived" ethical orientation of the student. By utilizing longitudinal, pre- and post-program assessments, educators can map how students mobilize ethical reasoning and creative problem-solving during real-world project delivery. This longitudinal tracking provides visibility into the evolution of emotional intelligence and leadership maturity, offering a deeper understanding of the student's moral trajectory.

At the team level, the analytical focus shifts toward the dynamics of "relational ethics" and collective agency. Recognizing that entrepreneurial decisions are rarely solitary, the E3S makes explicit the processes of negotiation, contestation, and shared accountability. This dimension evaluates the qualitative aspects of interpersonal communication and the degree to which ethical standards are co-constructed and maintained within the peer group.

The ecosystem level expands the evaluative scope to the institutional and innovation landscape. This tier is bifurcated into the University domain—incorporating global benchmarks such as HEInnovate, STARS, and THE Impact Rankings—and the Entrepreneurial domain. The latter enables an audit of how external stakeholders (mentors, funders, and partners) either facilitate or obstruct ethical practice and sustainable innovation.

Furthermore, the E3S integrates cross-dimensional quantitative metrics via adapted Multidimensional Ethics Scales (MES). This ensures structural coherence, capturing universal value orientations such as justice and care-based reasoning across all levels of the scorecard. Designed for contextual flexibility, the E3S allows program coordinators to recalibrate assessment strategies based on specific cultural settings and resource availability.

Table 2. The E3S (Ethical Entrepreneurial Education Scorecard)

Dimensions/Pillars	***Sub-Dimensions***	***Indicators & Tools***	***Type***
1. Ethical Orientation	*a) Real-Life Ethical Decision-Making*	*Vignettes/scenario-based assessment*	
		360-degree ethical feedback (peers, mentors, stakeholders)	
		Stakeholders' interviews	*Qualitative*
	b) Hypothetical Scenario Ethics	*Moral Reasoning Scale (e.g., DIT2)*	*Quantitative*
2. Ethical Entrepreneurial Mindset	*a) Empathy, Adaptability, Resilience*	*Ethical Entrepreneurial Mindset Profile (EMP)*	
		Design thinking challenge feedback	
		Peer/team evaluation reports	*Mixed*
	b) Impact and Sustainability Orientation	*Social impact pitch simulation*	
		Theory of Change articulation	
		Resource mobilization analysis	*Qualitative*
3. Ethical Personal Development	*a) Emotional & Leadership Maturity*	*Emotional Intelligence Survey (e.g., TEIQue, MSCEIT)*	
		Leadership reflection log	*Mixed*
	b) Civic and Professional Engagement	*Longitudinal survey (1-3 years post-program)*	
		Community engagement logbook	
		Capstone interviews	*Mixed*
4. Cross-Dimensional Quantitative Ethics Measures	*a) Ethical Value Orientation*	*Adapted Multidimensional Ethics Scales*	*Quantitative*

	b) Integrity in Practice	*Ethical Climate/Organizational Fit Score* *Compliance/adherence during project implementation*	*Mixed*
5. Ethics in the SEEP	*a) Ethical contents* *b) Educator's ethical orientation*	*Syllabus assessment* *Educators' interviews*	*Qualitative* *Qualitative*
6. Ethics in the Innovation/Entrepreneurial Ecosystem	*Ethical ecosystem orientation*	*Stakeholders' interviews*	*Qualitative*

Research limitations. While the E3S model provides a robust conceptual framework for assessing ethics in SEEPs, several limitations remain that invite further empirical exploration and validation. Primarily, as a newly proposed assessment tool, its cross-cultural applicability and institutional scalability require rigorous testing across diverse global settings.

A significant limitation lies in the implementation requirements of the E3S, which necessitate deep engagement from educators, coordinators, and policy-makers. The transition from theory to practice requires faculty training in ethics-centered experiential pedagogy and a systemic shift in university reward structures, moving beyond academic excellence to incentivize sustainable innovation. This underscores that the integration of ethics is not merely a matter of metrics, but a fundamental cultural shift in the definition of 21st-century education.

Future research should specifically address Impact Realization to capture the tangible and intangible effects of student-led projects on beneficiary communities. Integrating methodologies such as Social Return on Investment (SROI) and environmental impact assessments will be essential to fully quantify the "value" created. Additionally, longitudinal studies are needed to evaluate Lifelong Transformation, tracking the enduring influence of SEEPs on alumni career trajectories, social commitments, and leadership behaviors.

By employing alumni tracking and qualitative storytelling, future scholars can move beyond the "subtlety" of personal transformation to provide empirical evidence of education as a force for ethical and sustainable societal change. Ultimately, validating the E3S through case studies like ENACTUS will help refine the metrics needed to reflect the complex, long-term nature of human and social development.

Managerial implications. From a managerial perspective, the paper suggests that universities and program managers should rethink the way they design, manage, and evaluate entrepreneurial education. In this perspective, the value of the program does not depend solely on the number of startups generated, but on the ability to train "conscious entrepreneurs" who are thoughtful and capable of producing sustainable and ethically valid impact. The E3S offers a tool for integrating qualitative and quantitative dimensions, orienting teaching, mentoring, and incentive systems toward outcomes of social impact and sustainability. Therefore, the design, implementation, and reporting of programs cannot focus solely on economic KPIs but require indicators capable of capturing moral learning processes, ethical deliberation skills, and responsibility toward stakeholders. In particular, it is not enough to consider the results of the team's work, but also the quality of interactions, transparency in decision-making, inclusiveness of deliberative processes, the ability to deal with dissent, and the effective distribution of responsibilities. Meanwhile, with regard to policy and administrative mechanisms, incentive systems could be created not only for the ability to generate numerically significant business projects, but also for the effective creation of pathways that produce social impact. Only in this way will it be possible to make the definitive transition from ethics treated rhetorically to the driving force behind entrepreneurial education programs.

Originality of the paper. The paper was written to fill a gap in the measurement of ethics as a dynamic process in the context of SEEPs, seeking to overcome or integrate traditional indicators linked to business planning. In fact, E3S is a multidimensional tool that, through three levels, seeks to understand how students develop responsibility, social awareness, and a focus on sustainability throughout their educational journey. Therefore, on the one hand, it seeks to integrate the concept of success in SEEPs with 'value-based' elements. On the other hand, it provides a managerial basis for aligning existing or developing programs with standards linked to a vision of entrepreneurship as a responsible and socially oriented practice.

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Rethinking Mixed Embeddedness in Incubation Programmes for Migrant Women Entrepreneurs

GIULIO PALMAS[1]

Abstract. *Questo studio riconcettualizza programmi di incubazione come mediatori strutturali di livello meso all'interno del framework della Mixed Embeddedness (ME), esaminando come il posizionamento istituzionale dell'incubatore, e non soltanto i servizi offerti, influenzi la capacità delle imprenditrici migranti (MWE) di convertire le proprie risorse in accesso al mercato mainstream in Italia. Attraverso uno studio qualitativo comparativo basato su 20 interviste semi-strutturate con MWE che hanno partecipato a due modelli di incubazione strutturalmente differenti (un programma fisico a governance pubblica e un programma digitale a governance privata), lo studio mostra che i due modelli producono forme qualitativamente diverse di embeddedness. Il programma istituzionalmente radicato opera come equalizzatore di risorse, abilitando la traduzione istituzionale, la navigazione burocratica e l'accesso ai finanziamenti pubblici. Il programma digitale deterritorializzato funziona come amplificatore di risorse i cui esiti dipendono dalle dotazioni preesistenti e dalla maturità imprenditoriale delle partecipanti. Le MWE dimostrano un'agency generativa, convertendo l'identità migrante e le barriere burocratiche in posizionamento competitivo, ma tale conversione è condizionata dall'embeddedness istituzionale dell'incubatore. Lo studio estende la teoria ME mostrando che gli incubatori sono mediatori strutturalmente situati la cui embeddedness determina se il supporto equalizza o amplifica le diseguaglianze preesistenti.*
Parole chiave: *Imprenditrici migranti; Genere; Mixed Embeddedness; Incubazione d'impresa; Embeddedness istituzionale; Italia*

Inquadramento della ricerca. I servizi di supporto all'imprenditorialità (BSS) sono considerati uno strumento per favorire l'integrazione economica dei migranti, tuttavia la loro efficacia rimane controversa e fortemente situata (Marchand e Dijkhuizen, 2018; Bruton et al., 2023). Per le imprenditrici migranti (MWE), i vincoli intersezionali di genere, status migratorio e isolamento dalle reti professionali possono rendere il supporto ricevuto inefficace o addirittura controproducente, confinandole in attività marginali anziché facilitare l'accesso al mercato mainstream, inteso come lo spazio economico in cui gli scambi avvengono su base impersonale e contrattuale e in cui l'impresa serve una clientela generalista in diretta concorrenza con gli operatori nativi (Jones et al., 2014; Zubair e Brzozowski, 2018).

Questa tensione è particolarmente rilevante nel contesto italiano, dove l'imprenditoria femminile migrante ha registrato una crescita del 37,8% negli ultimi anni, con 164.509 imprese guidate da donne straniere (Centro Studi e Ricerche IDOS, 2025). Tuttavia, la crescita quantitativa non è accompagnata da condizioni paritarie di accesso: il 75,6% delle imprenditrici migranti ricorre esclusivamente all'autofinanziamento e il 71% non intrattiene alcun rapporto con le associazioni di categoria italiane (Fondazione Leone Moressa, 2024). Inoltre,il quadro istituzionale rimane fondato su logiche di controllo piuttosto che di integrazione (Sciortino e Vittoria, 2023). Le MWE si trovano così in una condizione di disallineamento strutturale che riflette una più ampia liability of foreignness (Zaheer, 1995; García-Cabrera et al., 2020): la mancata valorizzazione dei titoli produce una svalutazione professionale di genere (Bijedić e Piper, 2018), l'accesso al credito è ostacolato dall'assenza di garanzie reali (Desiderio, 2014; Chreim et al., 2018), e l'opacità normativa trasforma l'informazione in un processo difficile da interpretare (Jones et al., 2014; Qin, 2023). Le reti sociali, infine, pur offrendo supporto pratico ed emotivo, possono confinare l'attività in nicchie autoreferenziali (Azmat e Fujimoto, 2016; Ram et al., 2017).

La ricerca sui BSS per migranti ha identificato diverse barriere di accesso e ha evidenziato i limiti di approcci standardizzati che ignorano l'autonomia dei partecipanti (Qin, 2023; Polychronopoulos e Nguyen-Duc, 2024). Due aspetti restano tuttavia da approfondire: come il posizionamento strutturale dell'incubatore nell'ecosistema locale condizioni la capacità di convertire le risorse in accesso al mercato (Knox et al., 2025), e come i meccanismi relazionali interni influenzino specificamente l'embeddedness delle MWE, intesa come la loro capacità di radicarsi nel tessuto economico del paese ospitante superando l'isolamento etnico (Jürgens et al., 2022; Bergman e McMullen, 2022).

Obiettivo del contributo. Attraverso la lente della Mixed Embeddedness (Kloosterman et al., 1999; Kloosterman, 2010), che considera l'interazione tra risorse individuali (micro), struttura delle opportunità (meso) e vincoli istituzionali (macro) come elementi determinanti del comportamento imprenditoriale, questo studio riconceptualizza gli incubatori come mediatori strutturali di livello meso la cui efficacia dipende dal loro radicamento istituzionale nella struttura locale delle opportunità. Estendendo lo studio di Meister e Mauer (2019), sosteniamo che è l'embeddedness istituzionale dell'incubatore stesso, e non soltanto le risorse erogate, a determinare se il supporto si traduce in accesso effettivo al mercato. Tale mediazione si realizza attraverso la traduzione istituzionale, intesa come la conversione concreta dei

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progetti imprenditoriali in strumenti leggibili dalle istituzioni e dai canali di finanziamento del paese ospitante, il brokeraggio verso gli stakeholder dell'ecosistema, e i meccanismi di legittimazione (Barrios et al., 2025; Suchman, 1995).

Lo studio affronta due domande di ricerca: (1) In che modo i programmi di incubazione influenzano la conversione delle risorse delle MWE in accesso istituzionale e supporto relazionale? (2) In che modo modelli di incubazione strutturalmente diversi influenzano l'embeddedness delle MWE nel mercato mainstream? Per rispondere a tali domande è stato condotto uno studio multi-caso qualitativo (Eisenhardt, 1989; Yin, 2018) su un campione di 20 MWE che hanno partecipato a due programmi di incubazione strutturalmente diversi nel contesto italiano. Lo studio si concentra sulle voci delle imprenditrici, analizzando le loro narrazioni per ricostruire come negozino i vincoli e percepiscano l'efficacia del supporto ricevuto (Adeeko e Treanor, 2022; Lassalle e Shaw, 2021).

Lo studio offre tre contributi principali. In primo luogo, estende la teoria ME (Kloosterman et al., 1999; Kloosterman, 2010) introducendo l'embeddedness istituzionale dell'incubatore come variabile di mediazione meso, mostrando che gli incubatori radicati operano come equalizzatori di risorse, quelli deterritorializzati come amplificatori. In secondo luogo, riconceptualizza l'agency delle MWE come generativa: non intesa come mera reazione ai vincoli strutturali, ma come capacità di convertire l'esperienza migrante in un vantaggio competitivo (Knox et al., 2025). In terzo luogo, mette in discussione la misurazione dell'efficacia dell'incubazione attraverso la sola sopravvivenza economica (Bergman e McMullen, 2022), rispondendo alle sollecitazioni per una lettura intersezionale della ME (Romero e Valdez, 2016; Ram et al., 2017).

Metodologia. La ricerca adotta un disegno qualitativo esplorativo basato su casi di studio multipli (Eisenhardt, 1989; Yin, 2018), particolarmente adatto a catturare gli effetti intersezionali che caratterizzano l'esperienza di imprenditrici situate all'intersezione di molteplici strutture di svantaggio difficili da identificare attraverso indagini quantitative (Lassalle e Shaw, 2021). Il disegno multi-caso consente di esaminare pattern di somiglianza e differenza tra gli incubatori analizzati, identificando quali meccanismi di supporto producono esiti simili o diversi a seconda del modello adottato (Yin, 2018).

Sono stati selezionati due programmi di incubazione in Italia mediante un campionamento ragionato (Patton, 1990; 2014) come casi emblematici di approcci strutturalmente distinti in termini di governance, modalità di erogazione e approccio al supporto. Il Programma A è un incubatore fisico a governance pubblica promosso congiuntamente dal Ministero e dalla Camera di Commercio, che offre un percorso di 2-3 mesi con formazione prevalentemente in presenza, sviluppato in fasi progressive che includono orientamento, formazione tecnico-pratica, supporto alla stesura del business plan, assistenza all'avvio dell'impresa e monitoraggio iniziale. Il Programma B è un incubatore digitale a governance privata gestito da un'organizzazione non profit internazionale, che offre un percorso di cinque mesi interamente online, con mentoring individuale settimanale e workshop di gruppo, finalizzato alla realizzazione di un business plan, un pitch deck e un open day pubblico.

Il campione finale è composto da 20 MWE (16 dal Programma A e 4 dal Programma B) provenienti da 16 diversi paesi d'origine, per lo più in possesso di laurea e con precedente esperienza professionale, operanti in settori che spaziano dalla biotecnologia alla gastronomia, dalla mediazione culturale all'ingegneria. Il reclutamento è stato mediato dai responsabili dei programmi, che hanno agito come gatekeeper fidati per questa popolazione difficile da raggiungere (Harima et al., 2020; Meister e Mauer, 2019). I dati sono stati raccolti tramite 20 interviste semi-strutturate condotte online tra maggio e novembre 2025, della durata di 30-40 minuti ciascuna, strutturate attorno a quattro aree tematiche: percorso migratorio e motivazioni alla partecipazione, sfide imprenditoriali e reti di supporto preesistenti, esperienza durante il percorso, esiti post-programma (Kallio et al., 2016). Le interviste sono state condotte in italiano o in inglese secondo la preferenza di ciascuna partecipante, trascritte verbatim e verificate da ricercatori bilingui attraverso un confronto riga per riga con la registrazione audio (Khatib et al., 2024). Fonti secondarie costituite da report ufficiali degli incubatori, interviste ai partecipanti condotte dagli stessi programmi e partecipazione diretta a eventi pubblici di presentazione dei risultati sono state utilizzate per triangolare i dati (Yin, 2018; Jack e Raturi, 2006). L'analisi è stata condotta mediante Analisi Tematica Riflessiva con approccio deduttivo-induttivo ibrido (Braun e Clarke, 2006; 2019), supportata dal software NVivo 15, con due codificatori indipendenti, sessioni di peer debriefing e procedure di member-checking per garantire il rigore analitico e la corrispondenza dei risultati con l'esperienza vissuta dalle partecipanti (Creswell e Miller, 2000).

Risultati. I due modelli di incubazione producono forme qualitativamente diverse di embeddedness. Il Programma A, istituzionalmente radicato nella struttura locale delle opportunità attraverso la Camera di Commercio, opera come equalizzatore di risorse: converte attivamente i business plan in strumenti leggibili dalle istituzioni e dai canali di finanziamento pubblico, fornisce navigazione burocratica e offre un sostituto relazionale alle reti familiari e comunitarie assenti (Kloosterman, 2010; Suchman, 1995). Le partecipanti descrivono i propri tutor in termini affettivi e parentali, rivelando una funzione sostitutiva che va ben oltre il supporto imprenditoriale standard e che risponde a un bisogno specifico della condizione migrante, ovvero l'assenza di reti primarie di riferimento nel paese ospitante (Azmat e Fujimoto, 2016). Il Programma A consente alle MWE di trasformare la propria identità migrante e le stesse barriere burocratiche in posizionamento competitivo, sfruttando l'ibridità culturale e il doppio radicamento come vantaggio di mercato nell'accesso a segmenti di clientela che le imprenditrici native non riescono a raggiungere (Sandoz et al., 2022; García-Cabrera et al., 2020).

Tuttavia, anche il Programma A incontra un limite strutturale nel sistema creditizio privato, dove i requisiti di garanzia reale prevalgono sulla valutazione meritocratica e dove genere, origine geografica e status migratorio si intersecano per rafforzare la diffidenza istituzionale (Desiderio, 2014; Chreim et al., 2018). La liability of foreignness (Zaheer, 1995) non è ridotta dall'accumulo di qualifiche, ma dipende dall'inserimento nel sistema amministrativo del paese ospitante: è proprio su questo squilibrio che l'incubatore istituzionalmente radicato interviene con maggiore efficacia.

Il Programma B produce contributi significativi alla strutturazione cognitiva dei progetti imprenditoriali ma, in assenza di mediazione con il sistema amministrativo locale, funziona come amplificatore di risorse: i suoi esiti dipendono dalle dotazioni preesistenti e dalla maturità imprenditoriale delle partecipanti (Qin, 2023). Chi aveva già avviato un'attività riesce a trasformare gli strumenti formativi in connessioni locali; chi era in fase di pre-avvio tende a restare in una fase intermedia. L'isolamento dalla comunità di pari e la variabilità del mentoring amplificano tali effetti (Jürgens et al., 2022; Bergman e McMullen, 2022). Emerge infine una barriera specifica al contesto italiano: la chiusura relazionale delle reti produttive familiari, superabile solo attraverso la mediazione istituzionale locale (González et al., 2025).

Limitazioni della ricerca. I risultati devono essere interpretati entro condizioni specifiche. Il contesto normativo italiano, caratterizzato da elevata complessità burocratica e politiche di integrazione degli immigrati ancora limitate (Sciortino e Vittoria, 2023; Centro Studi e Ricerche IDOS, 2025), può amplificare l'importanza della traduzione istituzionale e rendere più visibili le limitazioni dei modelli deterritorializzati rispetto ad altri contesti nazionali. Il disegno qualitativo e la selezione di due casi, pur garantendo una profondità analitica difficilmente raggiungibile con altri approcci (Marshall e Rossman, 2014), suggeriscono cautela nella generalizzazione dei risultati a contesti istituzionali e culturali diversi.

Il reclutamento mediato da gatekeeper, pur essendo la prassi standard per popolazioni difficili da raggiungere (Harima et al., 2020; Adeeko e Treanor, 2022), potrebbe aver introdotto un bias di selezione, favorendo le partecipanti con esperienze più strutturate o con relazioni più consolidate con i responsabili dei programmi. Il disegno cross-sezionale coglie l'embeddedness in un unico momento temporale, escludendo l'osservazione delle dinamiche evolutive nel corso del tempo e la possibilità di verificare se gli effetti dell'incubazione si intensifichino, si attenuino o si trasformino a distanza di anni dalla partecipazione al programma.

Le ricerche future potrebbero adottare disegni longitudinali per osservare se l'embeddedness acquisita durante l'incubazione si consolidi nel tempo. Studi comparativi con incubatori digitali a diverso grado di connessione locale aiuterebbero a distinguere gli effetti del formato da quelli dell'embeddedness istituzionale. L'adozione di metodi misti permetterebbe di validare i risultati su scala più ampia (Parry et al., 2021), mentre studi cross-country potrebbero chiarire come diversi framework normativi influenzino le opportunità e i vincoli delle MWE.

Implicazioni manageriali. Gli interventi orientati all'inclusione economica dovrebbero incorporare funzioni di traduzione istituzionale e brokeraggio verso gli attori territoriali, anziché limitarsi a moduli formativi (Meister e Mauer, 2019; Qin, 2023). Un supporto efficace per le MWE richiede una mediazione attiva tra la singola imprenditrice e l'ecosistema istituzionale locale, inclusi le Camere di Commercio, i canali di finanziamento pubblico e le reti professionali, e non soltanto la fornitura di formazione imprenditoriale di carattere generale. Gli incubatori che aspirano a produrre una reale integrazione economica dovrebbero pertanto valutare il proprio posizionamento istituzionale come una variabile strategica, e non soltanto come un contesto dato (Serpente et al., 2025).

Il vincolo creditizio basato sulle garanzie reali costituisce una barriera strutturale che le MWE non possono superare mediante il solo sforzo individuale (Desiderio, 2014; Chreim et al., 2018). Strumenti ponte come programmi di microcredito, fondi di garanzia e partnership pubblico-private sono necessari per abilitare l'accesso al sistema finanziario formale, interrompendo il circolo vizioso che spinge le imprenditrici verso l'autofinanziamento (Romero e Valdez, 2016; Ram et al., 2017).

Originalità del contributo. Questo studio contribuisce alla teoria ME (Kloosterman et al., 1999; Kloosterman, 2010) introducendo l'embeddedness istituzionale dell'incubatore come variabile finora inesplorata a livello meso. Sebbene la letteratura esistente abbia mostrato che l'incubazione rafforza l'embeddedness dei migranti attraverso l'espansione del capitale sociale e lo scambio di conoscenze (Meister e Mauer, 2019) e che le dinamiche relazionali interne abilitino connessioni all'ecosistema locale (Jürgens et al., 2022), l'analisi comparativa evidenzia che tale rafforzamento non è automatico ma dipende dalla posizione strutturale dell'incubatore all'interno della struttura locale delle opportunità. Gli incubatori istituzionalmente radicati operano come equalizzatori di risorse, riducendo la dipendenza dal capitale preesistente pur con un limite strutturale nel credito privato (Desiderio, 2014; Chreim et al., 2018); quelli deterritorializzati operano come amplificatori, con esiti dipendenti dalle dotazioni iniziali e dalla maturità dell'attività. Questa distinzione non era stata teorizzata in precedenza nella letteratura ME e risponde alle osservazioni di Serpente et al. (2025), che evidenziano come strutture prive di embeddedness rischino di operare come sistemi paralleli che non producono reale integrazione.

Lo studio avanza la concettualizzazione dell'agency delle MWE da reattiva a generativa. La letteratura ha spesso raffigurato le imprenditrici migranti come vittime passive delle ingiustizie strutturali o come mere estensioni di strategie familiari (Villares-Varela e Essers, 2019), lasciando i meccanismi concreti di tale agency sottosviluppati (Knox et al., 2025; David e Terstriep, 2025). I meccanismi documentati in questo studio vanno oltre la tendenza a trattare l'agency come mera disponibilità di risorse (Cunha et al., 2024) e dimostrano che tali leve diventano operative soltanto quando

vengono stabilite connessioni efficaci con il mercato mainstream (Lassalle e Shaw, 2021; Adeeko e Treanor, 2022), rispondendo alle sollecitazioni per una lettura intersezionale della ME (Romero e Valdez, 2016; Ram et al., 2017).

Infine, lo studio mette in discussione l'assunzione che gli effetti dell'incubazione siano misurabili esclusivamente attraverso la sopravvivenza economica (Bergman e McMullen, 2022). Mostrando che la legittimazione identitaria perdura oltre la cessazione dell'attività e che la funzione sostitutiva delle reti familiari risponde a bisogni specifici della condizione migrante femminile, il lavoro offre la prima evidenza empirica dal contesto italiano di come genere e embeddedness familiare plasmino i percorsi di legittimazione in modi irriducibili alle sole dimensioni economiche (Sandoz et al., 2022; García-Cabrera et al., 2020).

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Signaling Theory in Venture Capital Stage Financing Research: A Review and Research Agenda

LUIGIA CALELLA, PIETRO TARAGONI

Abstract. *Information asymmetry represents a fundamental challenge in venture capital markets, where investors must evaluate ventures with little to no established performance history. The Signaling Theory offers a lens to analyze how ventures communicate unobservable qualities to potential investors. While existing literature has extensively examined signaling dynamics in early-stage financing, comparatively little attention has been devoted to how signals evolve across the different stages of venture capital financing. This paper addresses this overlooked area through a narrative literature review, that maps signals and their relevance as ventures progress through subsequent stages. The findings suggest that signals should be understood as dynamic mechanisms, whose relevance evolves, rather than as static indicators of venture quality.*
Keywords: *Signaling Theory; Venture Capital; Stage Financing; Entrepreneurial Finance; Narrative Literature Review; Information Asymmetry.*

Framing of the research. In markets where information is scarce, the ability to send and receive signals might be considered privileged, as signals can become an asset to competitive advantage and investment opportunities. Therefore, the possibility to differentiate good investment from "lemons", known as bad investments (Akerlof, 1970), is crucial for investors, who could reduce the risk of investing in the wrong venture (Connelly et al., 2011). Building on the information asymmetry proposed by Akerlof (1970), Spence (1973, 2002) developed the "Signaling Theory", as a mechanism in which an informed party can transmit information to an uninformed party. In his seminal work, the employer (receiver) can't perfectly assess the job applicant (signaler) qualities, thus the signaler provides the information that is not observable, in this way remarkable employees can stand out with, for example, signaling a higher educational level (Spence, 1973). It is precisely from this tension between what is known and what, instead, remains hidden, that the necessity to decipher, interpret, and trust the information, or signals, of others becomes an inescapable condition of market participation. Over the years this theory had a great impact on the entrepreneurial landscape (Bergemann & Hege, 1998; Connelly et al., 2011; Kleinert et al., 2022), demonstrating how ventures use signals to convey unobservable information to investors, in order to obtain financing for their projects (Busenitz et al., 2005).

This paper turns its attention to venture capital investments, a context particularly fruitful for Signaling Theory, since new ventures at early stages are characterized by high uncertainty because of a lack of track record and, thus, verifiable data (e.g. Plummer et al., 2016). Under these conditions, venture capitalists face information asymmetry when deciding whether to invest in a new venture or not (Busenitz et al., 2005), this problem arises especially in the beginning, when investors need to assess the venture's performance, at the early stage, where the most uncertainty resides (Gompers, 1995; Gompers & Lerner, 2001). Gompers (1995) identifies the stages of capital infusions as one of the control mechanisms that the venture capital can draw upon to monitor the project, while retaining the option to discontinue the investment, if it underperforms. Monitoring and control are central for the venture capitalist, which does not play a passive role, but is instead an active actor in the firm's life (Gompers, 1995), hence every staging round serves as a learning process for the venture capitalist (Chan et al., 1990), and for the entrepreneur, that can benefit from the non-monetary value of the investors' contribution: expertise, mentorship and guidance (Perry, 1988).

Consequently, because of uncertainties, both parties are exposed to moral hazard, and contracts are structured to share this risk across different stages (Bergemann & Hege, 1998). Both internal and external uncertainty shape the design of the financial contract between the venture capitalist and the entrepreneur: the first is proved to be an important factor for incentives and control mechanism; the second is meant to align the contractual risk to the exogenous environmental risk (Kaplan & Stromberg, 2004). Whereas in the short-term period the investor needs to recover the costs at each stage, given the absence of any binding commitment, long-term contracts can enhance risk distribution by granting the investor a greater return in the early stages (Bergemann & Hege, 1998).

However, several studies (e.g. Reuer & Ragozzino, 2012; Hallen & Pahnke, 2016; Liu & Tian, 2022) identify, apart from the most known dyad – venture-venture capitalist – other non-conventional signalers and receivers. For instance, the relationship venture-venture, venture capitalist-venture, and market-venture capitalist, constitute other relevant interactions that highlight that almost all the economic agents involved in the marketplace can take part in the signaling process, either as signalers or receivers.

It is precisely in this context of informational imbalances that signaling is frequently applied in the study of entrepreneurial finance, due to its ability to address information asymmetries between parties with different levels of knowledge, because of its "accessible" character it has been often adopted in various research fields (Bafera & Kleinert, 2022).

Purpose of the paper. Despite the growing body of literature on signaling theory, few gaps remain unresolved.

Past research has analyzed several signals, predominantly concentrated in the early stage, between the entrepreneur and the investor, such as crowdfunding success (Ahlers, 2015); affiliation with venture development organizations (VDOs) (Renault, 2012); founder's expertise (Reuber & Fischer, 1994); third-party affiliations (Plummer et al., 2016); marketing innovation (Sapienza & Amason, 1993); dividend payment (Asquith & Mullins, 1986); amongst the most cited. Yet also third parties can send signals, as an endorsement for the new venture, putting their reputation on the line (Pollock et al., 2010). Signalers and receivers have multiple connections – for example, the most extensively studied connection in the literature, as widely acknowledged, is between new ventures at the early stage and venture capitalists, but signals could also be sent from ventures to ventures, in relation to competitive market signaling (Heil & Robertson, 1991); venture capitalists can act as signalers to ventures (Hallen & Pahnke, 2016). Additionally, the role of the market could have prominence in signaling toward venture capitalists (Liu & Tian, 2022) and toward ventures' investments (Soh et al., 2004). This evidence highlights how signaling operates across a broader ecosystem of actors, and across multiple research fields, beyond the entrepreneur-venture capitalist relationship alone.

While past research has improved our understanding on how signals impact venture capital stage financing shedding light on a variety of signals and actors, this literature remains largely anchored to the early stage of the financing process, where information asymmetry is most acute and the need for truthful signals is greatest (Gompers, 1995; Busenitz et al., 2005). Specifically, little attention has been paid to how signaling can manifest itself across the different stages of the financing process, and to understanding whether the same signal carries more prominence in an early stage or a subsequent one, thus providing different degrees of significance in a multi-stage process (Ko & Mckelvie, 2018). Hence, extant research leaves critical research questions unresolved: first, in what ways do the intrinsic properties of signals contribute to building the relationship between signalers and receivers, and how do they change in relation to the different financing stages? Second, how does the interpretation of signals change in relation to the different relationships between economic agents? Third, how does the relevance of signals evolve throughout the financing stages?

This paper aims to contribute to literature by reviewing existing theoretical and empirical contributions on Signaling Theory applied to venture capital stage financing. Rather than advancing a novel empirical test, the purpose of this work is to study how signaling mechanisms affect venture capitalists' decision making across the different financing phases, while identifying underexplored connection between signals and financing stages, and lay the ground for future contribution in this field.

Methodology. This paper adopts a narrative literature review methodology, an approach often used in management and entrepreneurship research, suited to the purpose of synthesizing and evaluating existing theoretical contributions (Baumeister & Leary, 1997). Unlike systematic reviews, which prioritize exhaustiveness and protocol, narrative review allows for a more flexible engagement (Tranfield et al., 2003).

The review process began with the identification of foundational works in Signaling Theory, starting from the most prominent contributions, such as Spence (1973) and Akerlof (1970), whose frameworks on signaling and information asymmetry constitute the backbone of this field. From this origin, the research was extended to include subsequent theoretical developments and empirical applications in the entrepreneurial finance domain. The primary databases consulted were SCOPUS and Web of Science databases which collectively provided a broad coverage of peer-reviewed journals. The search was conducted using a combination of keywords including: "signaling theory", "signals", "venture capital", "stage financing", "information asymmetry", "entrepreneurial finance", "startup signals", "investor decision-making", and "early-stage funding", as well as combinations of these keywords to capture intersections between relevant streams.

The selection of papers followed a criterion of theoretical and contextual relevance rather than a predefined numerical threshold. The articles included contributed meaningfully to the understanding of signaling mechanisms, with a particular focus on venture capital relationships. Priority was given to contributions published in high-quality peer reviewed journals, including the Journal of Finance, Academy of Management Journal, the Journal of Business Venturing, and Entrepreneurship Theory and Practice, among others. Seminal works were included regardless of their publication date, given their foundational role in shaping the field, while more recent contributions were selected to reflect the current state of the debate. The papers were included (see Tab. 1) if they met the following criteria: if they applied signaling theory to entrepreneurial finance or venture capital and if they addressed dimensions of signaling theory, for example, the actors, signal characteristics and financing stages. An initial database included 81 results, after the screening, 37 papers were excluded; the exclusion was based on the type of journal they were published on, publication date and contribution prominence.

The review was further guided by three key review papers on signaling theory: Connelly et al. (2011), who established the theory's core constructs across management research; Colombo (2020), who mapped signal use specifically in new venture financing; and Bafera and Kleinert (2022), whose systematic review of signaling in entrepreneurship research provided a direct reference point.

The paper is organized around three areas: the characteristics of signals and properties, the different relationships between signalers and receivers, and the role of financing stages where signals dynamics evolve. This organization allows the research to move from the general concept of signals to their role in the financing stages, and to how the relationship between entrepreneurs and venture capitalists evolves as successive funding rounds unfold.

Table 1. List of included papers by Journal

Journals	***N. of Articles***
Entrepreneurship Theory and Practice	*6*
Academy of Management Journal	*6*
The Journal of Finance	*3*
Journal of Financial Economics	*3*
Journal of Business Venturing	*3*
Journal of Banking & Finance	*2*
Journal of Management	*2*
Quarterly Journal of Economics	*2*
Academy of Management Review	*2*
Financial Management	*1*
British Journal of Management	*1*
International Economic Review	*1*
The Journal of Economic Perspectives	*1*
Strategic Management Journal	*1*
Management Science	*1*
Organization Science	*1*
American Economic Review	*1*
Other Journals	*7*

Source: authors own elaboration

Results. The following analysis unfolds along three interconnected dimensions: the characteristics and properties of signals, the relationships between signalers and receivers, and the evolution of signaling dynamics across the financing stages. The first examines how signals are defined and evaluated for credibility; the second maps the actors involved, moving beyond the conventional venture-venture capitalist dyad; the third investigates how the relevance of signals shifts across financing stages.

Signals can be divided in different categories, regarding the characteristics: clarity, consistency, aggressiveness (Heil & Robertson, 1991), message, intentionality (Bafera & Kleinert, 2022) and costs (Connelly et al., 2011). These properties determine if a signal shows credibility for investment decisions, and their relative importance in the financing stage.

A signal is clear when the receiver can read it rapidly and accurately, because of the certain nature; instead, a noisy signal is an ambiguous announcement used to lure receivers to disclose potential responses (Heil & Robertson, 1991), in stock markets they can also create differences in signal quality between large and small firms, with the former, being more informed, leading the latter's returns (Chan, 1993). According to Gomulya and Mishina (2017), noisy signals can be distinguished depending on their source: signal's own nature and signaler's conduct, when the latter it's called into question, investors try to rely toward signals that are harder to manipulate, it appears to matter particularly in early-stage ventures, where the absence of observable track records makes it is difficult to establish signal clarity.

The consistency of a signal refers to the degree to which a current signal aligns with its past behavior (Heil & Robertson, 1991), indeed prior success achieved by the founder on a crowdfunding platform represents a salient signal to prospective investors, as it conveys both credibility and experiential knowledge (Courtney et al., 2017), therefore it is a property that gains relevance over time, a venture's consistency accumulates overtime, thus investors can analyze it.

A signal is likely to be interpreted as aggressive if it could damage the receiver, or if it seems disproportionate relative to industry norms (Heil & Robertson, 1991). In this case, for example, the receiver is another company, that needs to interpret the competitor's signals in order to formulate or adjust its competitive response. In contrast, it is more difficult to find aggressive signals in a venture-venture capitalist relationship, since the former has the necessity to demonstrate quality to the latter to attract investments.

The degree to which signals are sent purposefully is known as signal intentionality, but they are not always intended as calculated moves, sometimes the signals reach the market without an explicit intent (Bafera & Kleinert, 2022), if the venture capitalist decides to withdraw from an investment, this action could send an unintentional signal about the venture's quality to possible new investors, even though the decision was based on personal priorities (Shafi et al., 2020; Bafera & Kleinert, 2022), this dimension regards the later stages, when a relationship between the venture and venture capitalist was already established.

The idea of costs refers to the fact that certain signalers are better able to bear the related expenses than others (Connelly et al., 2011). An example is endorsement, which functions as a credible signal, that derives from the endorser's reputational exposure to potential harm, as they incur in losses, if the venture fails to perform well (Gomulya et al., 2019).

The message of a signal refers to the object of the information that signal communicates to receivers (Bafera & Kleinert, 2022). In discussing the message of signals, Bafera and Kleinert draw on Bruton et al. (2009, p. 911), citing that "signals are not universal in the issues they address", a distinction could be observed in conflicts between adverse selection and moral hazard conflicts, the first is more acute in early stages and requires the signals confirming the firm's information

credibility, whilst the second requires the signals demonstrating that the firm is precisely monitored, which becomes more important in later stages, because there is the need to monitor how funding was allocated (Bruton et al., 2009).

A signaler might be encouraged to consider false signaling, if they lack the reliability of the signal, but, in the meantime, they feel that the advantages of signaling surpass the expenses of creating it; however, those who incur in false signals are exposed to penalty costs (Connelly et al., 2011). Entrepreneurs and venture capitalists might have different interests, thus low-performing ventures could communicate deceptive signals, because of this problem, the receiver has the necessity to rely on "universal signals" (Colombo, 2020, p. 253), which give reliable proof of the message (Colombo, 2020). However, this does not contradict the idea of Bruton et al. (2009) that note that "signals are not universal in the issues they address", because it does not preclude the existence of "universal signals", which don't refer to a signal's ability to address all information, but to its capacity do provide verifiable proof to the receiver.

Therefore, trust becomes a crucial element in economic relationships, particularly when it may be undermined by opportunistic behavior and strategic ambiguity; citing Rousseau et al. (1998, p. 395), trust can be defined as "a psychological state comprising the intention to accept vulnerability to the actions of another party based upon the expectation that the other will perform a particular action that is important to you" (Six et al., 2010, pp. 289-290). In the economic field the argument of trust could have managerial implications, because economic agents need to rely on other parties to achieve their individual objectives (Mayer et al., 1995).

In venture capital operations, where there are informational asymmetries and diverging interest, trust can't be fully guaranteed, hence stage financing acts as a "leash", by limiting managerial discretion and reduce the investor's exposure to value destroying decisions (Gompers, 1995). Stage financing, therefore, serves a mechanism to address the misalignment of interests between the entrepreneur and the venture capitalist; entrepreneurs might be driven by personal motivations to continue a project, even if it is poorly performing, these motivations bear little attention to financial returns investors expect, thus creating a risk with knowingly channeling resources toward projects that only serve their ambition (Gompers, 1995).

A trustworthy indicator of a project-specific uncertainty is the stage of development at the time of financing, which gradually declines as the venture grows, Li (2008) distinguishes three general stages based on the Venture Economics classifications: at the Seed/Startup stage, both the funding needed and the possibility of success remain uncertain, in this stage investors rely on the founder's educational path and expertise; at the Early stage, commercial viability starts to emerge, whilst uncertainty remains, thus for the venture having the backing of an endorser amplifies the chances of subsequent investments (Ko & Mckelvie, 2018); at the Expansion/Late stage, established products and predictable revenues enable the venture capitalist to assess costs and returns with less uncertainty (Li, 2008). A growing trend is the "spray-and-spray" (Ewens et al., 2018, p. 423), where venture capitalists, rather than concentrating capital and oversight a selected number of ventures, distribute little amounts across multiple early-stage companies and, eventually, abandon them (Ewens et al., 2018).

Across these stages, venture capitalists consistently occupy the role of the receivers, and it is their ability to interpret signals that ultimately determines the outcome of the relationship: whether they will commit to funding the venture or not. It is therefore important to take into account their main characteristics as receivers according to Bafera and Kleinert (2022): ability, the degree to which they are able to detect and comprehend signals, based on their individual experiences; identity, the degree to which the receiver shares similarities with the signalers, for example a venture capitalist might prefer to invest in companies geographically closer (Tian, 2011); objectives, the degree to which receiver institutional logic affect how they perceive signals; irrationality, which refers to the influence of cognitive biases on investors.

However, shifting the focus from the signal and its properties to the signaling relationships requires acknowledging the actors involved to understand how their role evolves beyond the know venture-venture capitalist relationship, because venture capitalists are not the only receivers in the entrepreneurial finance field, signals can also flow from ventures to other ventures, from the venture capitalist to ventures and from the market to the venture capitalists.

In M&A transactions involving newly public firms, for instance, where acquirers face information asymmetry when evaluating a target's quality, and therefore rely on signals such as a venture capitalist backing or the reputation of the underwriting investment bank (Reuer & Ragozzino, 2012). Signals between ventures can also include competitive marketing signals, including announcements of new goods, price reductions or market entry, which could be genuine or deceptive (Heil & & Robertson, 1991).

Hallen and Pahnke (2016) considered a reverse relationship, with the venture capitalist acting as signaler and the venture as a receiver, the latter will need to evaluate potential investors' quality, the evaluation is found to be shaped by their embeddedness in networks, motivation in the evaluation process, and the target firm's prominence, this last one plays a great role, because entrepreneurs are often biased, thus, despite being well-connected, they remain vulnerable. This reverse relationship demonstrates that the quality of the investor is itself an object of uncertainty, thus both parties send and receive signals.

Macroeconomic factors also function as important signals for venture capitalists' investments, providing informational input for the receiver, for instance, the capital flowing into venture funds acts as a market signal for the venture capitalist: when capital is abundant, investors are more willing to experiment with risky early-stage ventures; when it is scarce, they retreat toward safer and more mature investments (Paik & Woo, 2014). From a real option perspective, when market conditions are volatile, venture capitalists tend to postpone financing decisions, as preserving the option to act later holds more value than committing capital under uncertainty (Li, 2008). Furthermore, Liu and Tian (2022) show that venture capitalists actively extract information from public market to guide their investment decisions, and that the quality of the

information influences how they structure their involvement with portfolio companies, when stock prices reflect future business prospects, investors rely less on tight monitoring through the financing stages as the market itself provides reliable signals.

Throughout the various phases of venture creation and funding, signaling methods are dynamic rather than constant, with a temporal approach, it is possible to contend that various signals can provide varied degrees of significance overtime (Ko & Mckelvie, 2018). Paik and Woo (2014) highlight that ventures in intermediate and later stages face a different signaling challenge compared to their early-stage counterparts: rather than needing to signal credibility, they must demonstrate that their project justifies other capital allocations. Intermediate-stage ventures offer neither the low-cost appeal of early-stage ventures nor the proximity to exit that characterizes later-stage investment, thus venture capitalists need evidence that the venture is not consuming viable resources (Paik & Woo, 2014).

Ko and Mckelvie (2018) show that signals do not carry the same weight throughout the entire financing process, but rather shift in relevance as the venture progresses to next rounds, in the early-stage human capital signals play an important role, because venture capitalists rely on the founder's education and managerial capabilities, however after the initial phase, past experience becomes less decisive, whereas education continues to matter, especially if it is accompanied by the endorsement of prominent investors, whose backing signals quality.

Venture capitalists primarily engage in financing firms during their earliest stages of development, when ventures typically lack an established track record that investors can rely upon (Ewens et al., 2018). At this stage, investment decisions are therefore often shaped by the interpretation of signals conveyed by entrepreneurs and their ventures. However, once this initial phase has been overcome, namely, when a venture begins to accumulate observable performance indicators and the relationship between the entrepreneur and the investors becomes more established, venture capitalist may rely less on interpreting and trusting such signals (Sapienza & Amason, 1993). In principle, the interaction between the two parties should evolve toward a relationship characterized by greater mutual knowledge and trust. Accordingly, in later stages they will likely employ well-established channels to interact as the business develops and its issues become more clearly delineated (Sapienza & Amason, 1993).

Nevertheless, as discussed above, broader market dynamics continue to play a significant role in shaping venture capitalists' investment decisions. Moreover, it can't be assumed that entrepreneurs will always communicate transparently. In some cases, they might strategically deploy misleading or exaggerated signals in an attempt to influence investors' perceptions (Trester, 1998). Given that venture capitalists typically lack full visibility into how the funds they provide are ultimately deployed within the venture, they may once again face conditions of uncertainty.

For this reason, it would be particularly valuable to examine how signaling mechanisms evolve across subsequent funding rounds and to investigate how venture capitalists adjust their investment decisions in response to these evolving signals.

Research limitations. It is important to acknowledge the inherent limitations of this review methodology. The absence of a formal screening protocol means that the review cannot claim exhaustiveness, and the possibility of omitting relevant contributions cannot be entirely ruled out. Additionally, the paper does not empirically test the arguments it advances; the considerations emerged remain theoretical and would benefit from validation.

Managerial implications. Although primarily theoretical, this review might lead to practical relevance. For entrepreneurs, it suggests the importance of adapting their signaling strategy as the venture matures, since signals effectiveness in attracting early-stage investment may carry less weight in later stages (Ko & Mckelvie, 2018), it was seen that human capital signals carry an important weight in the first phase, furthermore, entrepreneurs must cultivate relationships with prominent endorsers to enhance prior human qualities and then rely on observable metrics to communicate efficiency and trust. For venture capitalists, the review sheds light on the value of remaining attentive to how informational environment shifts across stages, as ventures can manipulate signals to their advantage, therefore investors should privilege signals that are costly to fake; venture capitalists could also be biased by the VC syndicate they belong to (Gomulya et al., 2019), which could lead to herd behavior (Gompers et al., 2008). For future contributions, it would be useful to investigate which signal influences investor's investment decisions, since a venture capitalist normally invests in multiple rounds.

Finally, more broadly, the findings suggest that monitoring mechanisms might benefit from being sensitive to the evolving signaling context at each stage of the financing relationship, stage financing contracts might be structured to explicitly account for signal evolution by incorporating the different milestones that the venture should achieve in the various financing rounds, particularly with the aim of mitigating moral hazard concerns.

Originality of the paper. This review contributes to the literature by offering a stage-sensitive lens on signaling in the venture capital financing field. While prior contributions (Connelly et al., 2011; Colombo, 2020; Bafera & Kleinert, 2022) have extensively examined signals, signalers and receivers, the importance of signals throughout financing stages has received comparatively little attention. This paper attempts to organize existing knowledge around the evolution of signaling dynamics throughout the financing lifecycle, and to offer a starting point for future empirical research.

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Student Micro-Entrepreneurship and the role of technologies: preliminary findings from 4 African Public Universities

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Abstract. *The rapid growth of financial technology (fintech) has greatly transformed access to finance in developing countries, especially in Sub-Saharan Africa, where mobile money plays a key role in digital financial inclusion. Although previous research has mainly examined households, informal traders, and macro-financial indicators, there has been little qualitative focus on student entrepreneurs in universities. This study investigates how mobile money assists student entrepreneurship in Ghana and influences their venture strategies, liquidity management, and risk mitigation efforts.*
Utilising the Technology Acceptance Model (TAM), Financial Inclusion Theory, and Effectuation Theory, this study employs an exploratory qualitative approach. Seventeen student entrepreneurs from Ghanaian public universities completed open-ended questionnaires. Thematic analysis indicates that mobile money serves as more than just a payment method; it is a vital entrepreneurial infrastructure. It promotes liquidity flow, enables immediate supplier payments, boosts customer trust with instant confirmations, reduces dependence on formal banking, supports low-cost risk testing through prepayment options, and aids market growth by integrating with social media commerce.
Despite challenges such as transaction fees, fraud risks, and network instability, participants view these as manageable trade-offs given the operational benefits. The findings expand TAM to micro-entrepreneurial environments, demonstrate how digital finance facilitates financial inclusion at the venture level, and show how mobile money aids effective decision-making under uncertainty. This paper adds to entrepreneurship research by showing how digital financial tools influence venture resilience and growth in resource-limited settings.
Keywords*: Mobile Money; Student Entrepreneurship; Fintech; Financial Inclusion; Ghana; Effectuation*

Framing of the research. The rapid diffusion of financial technology (fintech) has significantly transformed global financial transactions by offering digital alternatives to traditional banking systems (Gomber et al., 2018). In many developing economies, fintech innovations have played a crucial role in expanding financial access for populations that were previously excluded from formal financial systems (Aker and Mbiti, 2010). These technologies reduce barriers such as high transaction costs, limited banking infrastructure, and geographical constraints that often prevent individuals from accessing financial services (Demirgüç-Kunt et al., 2018).

Among fintech innovations, mobile money has emerged as one of the most transformative financial tools. Mobile money refers to electronic financial services accessed via mobile phones, allowing users to send, receive, and store funds without relying on conventional banking institutions (Jack and Suri, 2011). By eliminating the need for physical bank branches and extensive documentation, mobile money has enabled millions of previously unbanked individuals to participate in formal financial systems.

Sub-Saharan Africa has emerged as the global leader in mobile money adoption, mainly due to high mobile phone penetration and limited traditional banking infrastructure. Kenya's M-Pesa exemplifies how mobile money can improve household resilience and enable more stable consumption (Jack and Suri, 2014; Suri and Jack, 2016). In addition to peer-to-peer transfers, these platforms are now supporting savings, microcredit, and merchant transactions, which help foster small businesses and microenterprise growth.

Ghana is a notable example in the development of mobile money in Sub-Saharan Africa. Since 2009, mobile money, locally called "MoMo" has transformed from basic peer-to-peer transfers to a full-fledged digital financial ecosystem. The sector has seen swift increases in transaction numbers and account openings, reflecting its significant role in the country's economy (GSMA, 2024; GSMA, 2025).

Government and regulatory support have further boosted this growth. Policies by the Bank of Ghana, such as interoperability frameworks linking mobile wallets with bank accounts, have improved the functionality and accessibility of mobile money services (Bank of Ghana, 2019; 2024). Consequently, Ghana has become one of the leading mobile money markets in Sub-Saharan Africa.

Existing research highlights how mobile money promotes financial inclusion and helps small businesses thrive (Osei-Assibey, 2015; Odei-Appiah, Wiredu, and Adjei, 2022). However, most studies focus on rural households, informal traders, or low-income groups. Less attention is paid to digitally literate users, like university students, a rapidly growing segment of mobile money users.

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As fintech expands, student entrepreneurship is becoming more prominent in higher education worldwide. Universities promote entrepreneurial endeavours among students to address youth unemployment and stimulate innovation (Musariwa and Tinonetsana, 2023). Student entrepreneurship involves business activities that students start and manage during their studies (Morris, Kuratko, and Cornwall, 2013).

In Ghana, entrepreneurship education programs and institutional initiatives have fostered the growth of student-led ventures (Gyamfi, 2014; Larbi and Gyedu, 2021). Many universities have created incubation centres and entrepreneurship hubs to support student innovators and encourage self-employment among graduates (Nyadu-Addo and Mensah, 2018). As a result, Ghanaian students more frequently run micro-enterprises in fields like online retail, digital marketing, fashion, and creative services (Owusu, Yankson, and Osei, 2016; Arko *et al.,* 2024).

Despite this growth, student entrepreneurs face structural challenges similar to those of other microenterprises, including limited access to start-up capital, difficulty obtaining formal credit, and dependence on informal funding such as personal savings or family support (Abor and Biekpe, 2006; Galloway and Brown, 2002). Although social media platforms like Facebook and WhatsApp have lowered entry barriers with affordable marketing options (Ainin et al., 2015; Boateng and Okoe, 2015), the financial infrastructure supporting these student ventures, especially mobile money, remains relatively underexplored.

While quantitative research has explored patterns of mobile money adoption and usage (Blay and Caesar, 2022; Takyi, Sorkpor and Asante, 2025), there remains a lack of qualitative studies examining how different user groups strategically utilise these technologies in routine business activities. Notably, the experiences of student entrepreneurs who use mobile money in their enterprises have been largely overlooked in scholarly discussions.

Considering Ghana's youthful population, widespread mobile phone use, and a growing digital financial sector, university students form a distinct, tech-savvy demographic whose entrepreneurial efforts increasingly rely on digital payment platforms. Analysing how student entrepreneurs incorporate mobile money into their businesses can offer important insights into the links between fintech, financial inclusion, and youth entrepreneurship.

This study draws on three complementary theoretical perspectives to understand how student entrepreneurs utilise mobile money in their business activities. Initially, the Technology Acceptance Model (TAM) (Davis, 1989) describes how people decide to adopt new technologies through two main factors: perceived usefulness and perceived ease of use. TAM has been extensively used in research on mobile payment adoption (Zhou, 2011). Second, Financial Inclusion Theory highlights the crucial role of access to affordable and suitable financial services in promoting economic participation and growth (Demirgüç-Kunt *et al.,* 2018). Mobile money platforms help overcome geographic, institutional, and procedural obstacles that typically hinder access to financial services. Third, Effectuation Theory (Sarasvathy, 2001) proposes that entrepreneurs tend to rely on readily available resources and means rather than on forecasting, especially in uncertain settings. Digital financial tools, such as mobile money, serve as strategic resources, enabling entrepreneurs to test business ideas and manage financial risks at low cost.

Together, these theoretical perspectives provide a comprehensive framework for examining how student entrepreneurs adopt and strategically deploy mobile money within their business operations.

The paper thus seeks to answer the question, "*How does mobile money shape the strategic and operational practices of student entrepreneurs in Ghana?"*

Purpose of the paper. In answering the research question, the paper seeks to:

i. Examine how student entrepreneurs perceive the usefulness and ease of use of mobile money.
ii. Explore how mobile money influences liquidity management and resource circulation.
iii. Analyse how digital payments enable risk mitigation and effectual decision-making.
iv. Identify constraints associated with mobile money adoption in student-led ventures.

The study advances entrepreneurship research in three ways. First, it broadens TAM into micro-venture contexts, redefining perceived usefulness in terms of performance-oriented entrepreneurship. Second, it enhances understanding of financial inclusion by examining how digital finance becomes part of everyday venture routines. Third, it shows how fintech can operationalise effectuation principles in uncertain conditions. Instead of viewing mobile money as merely a supplementary payment tool, the paper positions it as an integral part of entrepreneurial infrastructure that shapes the exploitation of opportunities, experimentation, and resilience.

Methodology. This study adopts an exploratory qualitative research design (Creswell and Poth, 2018) to capture in-depth insights into student entrepreneurial practices. At this time, 17 student entrepreneurs have been purposively selected from Ghanaian tertiary institutions. Participants operated micro-enterprises in fashion retail, food vending, cosmetics sales, digital marketing, online reselling, and baking. All participants actively used mobile money for business transactions.

The selection was based on currently enrolled students who are engaged in an entrepreneurial activity on or off campus. The use of open-ended questionnaires was deemed appropriate and convenient for obtaining responses from student entrepreneurs, given constraints on access to them (Neergaard and Ulhøi, 2007). The instrument included questions on frequency and purpose of mobile money use, perceived benefits and challenges, cash-flow management practices, and risk mitigation strategies. The open-ended nature of the questions allowed participants to articulate experiences in their own words.

Data were analysed using thematic analysis, following Braun and Clarke's (2006) approach, which combines deductive and inductive approaches. The deductive codes were derived from TAM, financial inclusion theory and effectuation

theory. The inductive codes emerged from participant narratives. TO enhance credibility, patterns were cross-validated across responses and themes were refined.
To protect respondents' anonymity, each participant was assigned an abbreviated identifier (P1–P17). These codes were used in all quotations reported in the study, and any identifying information was removed. Participation was voluntary, and responses were used solely for academic research purposes.
Analysis focused on identifying how mobile money shaped operational efficiency, strategic risk management and institutional position vis-à-vis formal banking. Findings were interpreted in relation to established literature on entrepreneurship and fintech to strengthen the theoretical contribution.

Results. The findings show that mobile money has a complex role in student entrepreneurship. It is not just a payment tool but also serves as an entrepreneurial infrastructure integrated into daily business activities. Six key themes emerged: ease of use and perceived usefulness; faster liquidity access; decreased reliance on banking; managing uncertainty via prepayments; market growth; and operational limitations.

1. Perceived Ease of Use and Entrepreneurial Usefulness

Aligned with the TAM (Davis, 1989), participants highlighted ease of use and usefulness as key factors for adoption. However, unlike typical consumer-focused TAM research, usefulness was specifically described using entrepreneurial language.
Participant 1 noted:

> *"Mobile money is straightforward. Even if you are busy with lectures, you can send and receive payments quickly without going to the bank."*

Similarly, Participant 4 explained:

> *"I don't need to leave campus to handle payments. Everything is on my phone."*

Ease of use was associated with improved time efficiency and greater operational flexibility, which are especially important for those balancing roles as students and entrepreneurs. This supports Zhou (2011), who suggests that perceived convenience encourages ongoing use and, in this context, contributes to venture sustainability.
Usefulness was repeatedly framed in terms of performance outcomes. Participant 7, who operates a cosmetology business, stated:

> *"Customers trust you more when you have mobile money because they can pay instantly."*

This indicates that usefulness is partly based on reputation. Instant transaction confirmation serves as a trust signal, aligning with Oliveira et al. (2016), who claim that perceived usefulness increases when users link technology to economic benefits. In this case, economic benefits include greater legitimacy and more seamless customer relationships.

2. Liquidity Acceleration and Cash-Flow Management

A dominant theme was liquidity management. Participants highlighted how mobile money accelerates working capital rotation, which is crucial for micro-ventures operating with minimal financial buffers. Participant 3 stated:

> *"When customers pay through Momo, I can quickly pay my supplier. It keeps the business moving."*

Participant 8 also added:

> *"There is no need to wait for bank clearance. I receive money and use it immediately."*

Liquidity acceleration shortens transaction delays and reduces cash-flow bottlenecks, aligning with findings from Jack and Suri (2014) and Riley (2018) that mobile money enhances financial resilience through quick transfers. In student entrepreneurship, this means faster reinvestment and lower operational downtime. Additionally, having instant access to funds decreases dependence on informal credit. Participant 10 noted:

> *"Before, I sometimes had to borrow a little money to restock. Now, when customers pay instantly, I don't face that problem."*

This suggests that mobile money indirectly lessens reliance on short-term borrowing, aligning with Beck et al. (2018)'s argument that digital payment systems decrease transaction frictions in developing economies.

3. Financial Inclusion and Reduced Dependence on Formal Banking

Mobile money has become a replacement for formal banking systems. While most users had bank accounts, they used them little for business purposes. Participant 5 explained:

> *"I have a bank account, but I hardly use it for my business. Mobile money is faster and more flexible."*

Participant 12 reiterated this sentiment by stating that:

> *"As a student, you don't always have the time for banking procedures. Mobile money works anytime."*

Participant 14 emphasised accessibility:

> *"There's always an agent nearby if you need to withdraw or deposit. It makes business easier."*

These findings align with the existing literature on financial inclusion (Demirgüç-Kunt et al., 2018; Osei-Assibey, 2015), which emphasises accessibility as a key component. Nonetheless, this study broadens the perspective by demonstrating that inclusion goes beyond mere access; it also involves seamless integration into venture operations.
Therefore, mobile money functions as a quasi-bank embedded within entrepreneurial routines. It reduces bureaucratic obstacles associated with formal institutions, aligning with Evans and Pirchio (2014), who argue that mobile money

thrives in regions with scarce or complex formal banking infrastructure.

4. Managing Uncertainty Through Prepayment Strategies

Participants explained how they use mobile money strategically to handle demand uncertainty and inventory risks. Prepayment systems became a key means of reducing these risks. Participant 11, an owner of a baking business, explained:

"Customers pay before I bake. That way I don't waste ingredients."

Similarly, Participant 6, involved in fashion retail, explained:

"I only order items after customers confirm payment. It reduces losses."

These strategies adhere to the "affordable loss" principle central to Effectuation Theory (Sarasvathy, 2001). Instead of predicting demand, students reduce risk by collecting payments upfront. Fisher (2012) asserts that effectual reasoning is prevalent in uncertain and resource-limited situations. Mobile money supports effectuation by reducing transaction barriers and securing commitments before resources are allocated.

Therefore, digital payment systems do more than facilitate transactions; they influence entrepreneurial thinking. Mobile money acts as a tool for iterative experimentation, aligning with Nambisan's (2017) view that digital technologies boost entrepreneurial improvisation.

5. Market Expansion and Hybrid Digital Business Models

The study showed that integrating with social media platforms enabled entrepreneurs to expand their geographic reach beyond campus boundaries, as explained by Participant 9:

"I have customers outside the university. They pay through mobile money, and I send the product through a delivery service."

This sentiment was similarly shared by Participant 13, who added:

"Most of my orders come from Instagram. Customers send payment through momo and I arrange delivery."

From these Mobile money complements social media marketing (Ainin et al., 2015; Boateng and Okoe, 2015), enabling hybrid digital commerce models. In remote transactions, payment confirmations were used to reduce barriers. This demonstrates how fintech integrates into broader digital entrepreneurship ecosystems, reinforcing the argument of Gomber et al. (2018) that fintech reshapes value-creation processes across sectors.

6. Constraints: Fees, Fraud and Network Instability

Despite strong benefits, participants reported operational challenges. These challenges ranged from transaction and other fees, which can impact the profit margins of student businesses, since these businesses are currently operating at a micro scale. This sentiment was shared by Participants 2 and 16. Participant 2 argued that:

"The charges can reduce your profit, especially when transactions are small."

Participant 16 also expressed negative sentiments about network connectivity, noting that it sometimes affects business operations. She stated:

"Sometimes the network delays confirmation, and customers think you haven't received payment."

Fraud risks, particularly fake alerts, were also mentioned. These findings align with Kelly and Palaniappan (2023), who highlight perceived risk and cost as moderators of continued mobile money usage.

However, participants largely framed these issues as manageable trade-offs. As Participant 1 concluded:

"Even with the challenges, I prefer mobile money. It makes business smoother."

This cost-benefit framing suggests that perceived usefulness outweighs perceived risk, reinforcing TAM's predictive relevance in entrepreneurial contexts.

Discussion. This research validates the Technology Acceptance Model (TAM), showing that perceived ease of use and usefulness drive the ongoing adoption of mobile money by student entrepreneurs in Ghana. Participants described the technology as intuitive, accessible, and efficient, supporting Davis's (1989) view that user perceptions are key to technology acceptance. While TAM typically targets individual consumers, this study broadens its scope to include entrepreneurs, in which technology serves as a vital business facilitator. In this setting, mobile money's usefulness goes beyond convenience, aiding liquidity management, speeding up supplier payments, and enabling real-time transaction tracking. This aligns with Zhou's (2011) conclusion that usefulness is closely tied to performance enhancement. Additionally, Oliveira et al. (2016) highlight that perceived usefulness strongly predicts long-term usage when users perceive clear economic benefits, such as better working capital management.

Recent adaptations of TAM in sub-Saharan Africa, particularly by Kelly and Palaniappan (2023), indicate that perceived risk and cost significantly influence perceived usefulness. Despite transaction fees and fraud risks, mobile money's operational advantages usually outweigh these issues. From a financial inclusion perspective, this research shows how mobile money overcomes traditional banking barriers such as collateral requirements and formal income verification. As shown by Jack and Suri (2011) in Kenya and supported by Osei-Assibey (2015) in Ghana, mobile money greatly reduces access barriers to financial services. Acting as a "quasi-bank account," these platforms exemplify a broader move towards digital-first financial systems that may complement or replace conventional banks (GSMA, 2025). This shift is crucial for entrepreneurs with limited capital who face geographic and bureaucratic challenges.

Beyond just technical approval, effectuation theory (Sarasvathy, 2001) details how entrepreneurs leverage mobile money to handle uncertainty. By using the platform to secure prepayments and test new offerings, students follow the "affordable

loss" principle, reducing financial risks. This transforms mobile money from a simple transaction tool into a strategic decision-making aid. Fisher (2012) emphasises that such approaches are essential in resource-limited environments. Ultimately, the incorporation of fintech into student ventures results from a synergy of technological utility, structural accessibility, and behavioural risk management.

Research limitations. The study is exploratory and limited to 17 participants, constraining generalisability. Data are self-reported and context-specific to Ghana. Future research could adopt mixed-methods, longitudinal, or cross-country approaches.

Managerial implications. This study's findings offer several managerial insights for universities, fintech providers, policymakers, and student entrepreneurs. It shows that mobile money serves not just as a payment tool but also as an integrated entrepreneurial infrastructure, emphasising how digital financial technologies can enhance youth entrepreneurial ecosystems in emerging economies.

Universities and entrepreneurship support organisations should incorporate digital financial tools into entrepreneurship curricula and incubation programs. Data show that student entrepreneurs frequently rely on mobile money platforms such as Mpesa and MTN Momo to manage transactions, liquidity, and payments to suppliers. Therefore, entrepreneurship training should cover digital financial management, fintech adoption, and the integration of online commerce. Research on entrepreneurial education highlights that experiential learning and the use of practical resources significantly enhance venture success and entrepreneurial skills (Morris, Kuratko and Cornwall, 2013). Additionally, as entrepreneurial ecosystems become increasingly digital, universities need to prepare students to operate effectively within digitally mediated business environments (Nambisan, 2017). Incorporating fintech literacy into entrepreneurship curricula can therefore strengthen students' ability to manage financial flows and leverage digital infrastructures in their ventures.

Second, fintech providers should recognise university students as a rising segment of micro-entrepreneurs and develop services tailored to their operational needs. The data indicates that student ventures often depend on frequent, low-value transactions and need quick access to liquidity. Therefore, fintech companies could introduce specialised features, such as micro-business wallets, simplified transaction dashboards, and integrated sales-tracking tools. Digital financial platforms add value by minimising transaction friction, enhancing transparency, and enabling resource flow within small firms (Beck *et al.,* 2018; Gomber *et al.,* 2018). Additionally, research on digital platforms shows that ecosystem-focused fintech services can significantly boost the scalability of small ventures by linking payment systems to broader digital networks (Parker, Van Alstyne and Choudary, 2016). By creating solutions tailored for micro-entrepreneurs, fintech providers can boost platform adoption and foster youth business growth.

Third, policymakers and regulators should recognise mobile money as a vital tool for fostering youth entrepreneurship and financial inclusion. Data indicate that many student entrepreneurs prefer mobile money over traditional banking because it is more accessible, faster, and offers greater operational flexibility. Establishing regulatory frameworks that promote interoperability between banks and mobile money services, such as initiatives by the Bank of Ghana, can significantly enhance financial access and efficiency. Research on financial inclusion emphasises that accessible financial services are essential for empowering entrepreneurship and encouraging economic participation among underserved groups (Demirgüç-Kunt et al., 2018; Aker and Mbiti, 2010). Furthermore, studies of mobile money ecosystems show that digital financial services can stimulate local economies by lowering transaction costs and strengthening financial resilience (Jack and Suri, 2014; Suri and Jack, 2016). Thus, policies that support digital payment infrastructure can bolster entrepreneurial ecosystems and reduce barriers for young entrepreneurs with limited financial resources.

Fourth, the findings indicate that student entrepreneurs can enhance their financial management by using mobile money to make effective decisions. Many participants reported employing prepayment strategies to mitigate uncertainty and prevent inventory losses. This behaviour aligns with the "affordable loss" principle in Effectuation Theory, which suggests that entrepreneurs facing uncertainty should focus on minimising potential losses rather than relying solely on predictive planning (Sarasvathy, 2001). Digital payment systems support this by allowing entrepreneurs to secure customer commitments before allocating resources. Research shows that effectual logic is especially prevalent among resource-limited entrepreneurs working in uncertain settings (Fisher, 2012). Mobile money fosters experimentation and iterative opportunity development, helping student entrepreneurs test products, validate demand, and grow gradually with limited risk.

Finally, managers of digital business ecosystems should acknowledge the increasing integration of social media platforms and mobile payment systems in emerging entrepreneurial models. Many entrepreneurs use platforms like Instagram, WhatsApp, and Facebook, along with mobile money, to enable online orders, remote payments, and delivery-based commerce. This hybrid digital commerce approach illustrates broader changes in entrepreneurial ecosystems, where digital technologies foster new opportunities and market access (Nambisan, 2017). Existing research confirms that social media significantly extends small businesses' marketing reach, especially when paired with accessible digital payment systems (Ainin *et al.,* 2015; Boateng and Okoe, 2015). Promoting the integration of digital marketing, logistics, and payment systems can therefore help student entrepreneurs expand their market access beyond campus.

Overall, the managerial implication of this research is that mobile money should be viewed as a foundational component of contemporary entrepreneurial ecosystems rather than merely a financial service. When effectively integrated into entrepreneurship education, fintech platform design, and public policy frameworks, digital financial technologies can

accelerate venture experimentation, enhance financial inclusion, and strengthen the operational capabilities of youth-led enterprises.

Originality of the paper. This paper conceptualises mobile money as entrepreneurial infrastructure embedded within student venture ecosystems. By integrating TAM, Financial Inclusion Theory, and Effectuation Theory, it bridges fintech and entrepreneurship scholarship and contributes context-sensitive insight into youth-led micro-enterprises in emerging markets.

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The Evolving Role of University in the development of Entrepreneurial Ecosystems: a multi-stage framework

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Abstract. *This short paper examines how an entrepreneurial university catalyzes the emergence of an entrepreneurial ecosystem in a peripheral and institutionally thin context by orchestrating social capital. The study focuses on SEIUNISA, a university-led platform launched by the University of Salerno to promote student entrepreneurship and activate multi-stakeholder engagement. Adopting a qualitative single-case design, the paper draws on interviews, participant observation, and documentary evidence. Findings identify a four-stage process through which the university acts as an anchor organization: building an internal community, activating boundary-spanning ties, converting external connections into embedded collaborations, and enabling more autonomous bottom-up ecosystem dynamics. The paper shows that university-led ecosystem emergence depends on the sequential development of bonding and bridging social capital and on their transformation through structural, cognitive, and relational mechanisms. The study contributes to entrepreneurial ecosystem and entrepreneurial university research by offering a process model of university-led ecosystem leadership in peripheral contexts, highlighting bridging-to-bonding conversion as a key mechanism, and showing that autonomous ecosystem development is path-dependent on prior orchestration. Managerially, the findings stress the importance of dedicated platform capabilities, recurring co-creation arenas, and long-term institutional commitment.*

Keywords: *entrepreneurial universities; entrepreneurial ecosystems; social capital; anchor organizations; peripheral regions; case study*

Framing of the research. In recent years, the entrepreneurial ecosystem (EE) perspective has become a central lens for understanding how entrepreneurship is enabled within specific territories (Audretsch & Belitski, 2017; Theodoraki, 2020; Wurth et al., 2022). EEs are commonly described as configurations of interdependent actors, institutions, and contextual conditions that jointly support productive entrepreneurship within a given territory (Stam & Spigel, 2016; Spigel, 2017). While this literature has significantly improved our understanding of the key components of ecosystems, much of it still adopts a structural and relatively static view, focusing on the presence or absence of enabling factors rather than on the processes through which ecosystems actually emerge and evolve over time (Brown & Mason, 2017; Stam & van de Ven, 2021).

A growing stream of research has started to challenge this limitation by emphasizing that EEs are not pre-existing systems waiting to be activated, but socially constructed, path-dependent, and institutionally embedded processes (Audretsch et al., 2021; Wurth et al., 2022; Ritala et al., 2021). From this perspective, ecosystems are shaped through continuous interaction among heterogeneous actors, legitimacy-building efforts, institutional work, and the gradual alignment of resources and expectations (Mack & Mayer, 2016; Ritala et al., 2021). This processual view is particularly relevant in nascent or fragile contexts, where entrepreneurial density is low, support infrastructures are weak, and coordination mechanisms are underdeveloped (Spigel & Harrison, 2018; Donaldson et al., 2025). In such settings, the emergence of EEs depends less on optimizing an already existing system and more on creating the conditions that enable collective entrepreneurial action in the first place ((Sotarauta & Pulkkinen, 2011).

Within this debate, universities have increasingly been recognized as strategic actors in ecosystem development (Audretsch & Link, 2017; Lira & Guerrero, 2025). Entrepreneurial university (EU) research has shown that universities are no longer confined to their traditional missions of teaching and research, but are progressively expected to contribute to regional innovation, venture creation, and wider socio-economic development (Hayter, 2016; Klofsten et al., 2019; Rådberg & Löfsten, 2024). However, although prior studies have documented the importance of entrepreneurship education, technology transfer, incubators, and partnerships, fewer contributions have explained how universities actively foster the emergence of an EE, especially in contexts where intermediary organizations are scarce and local coordination is weak (Foss & Gibson, 2015; Kwong et al., 2022; Maritz et al., 2024). In other words, the literature acknowledges that universities matter, but still provides limited understanding of the mechanisms through which they build communities, connect internal and external actors, and sustain ecosystem evolution and consolidation beyond isolated initiatives.

This issue becomes even more significant in peripheral and institutionally thin regions. In these contexts, resource constraints, fragmented networks, lower levels of trust, and weak support structures can hinder the development of opportunity-driven entrepreneurship and reduce the capacity of local actors to coordinate around shared innovation agendas (Xu & Dobson, 2019; Ghio et al., 2019). Under such conditions, the role of a legitimate and relatively stable

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actor becomes crucial. Recent studies suggest that universities may perform this function as anchor organizations, namely actors capable of providing continuity, legitimacy, brokerage, and strategic direction to emerging ecosystems (Benneworth & Cunha, 2015; Breznitz & Feldman, 2012; Spigel & Harrison, 2018). Yet the anchoring role of universities should not be interpreted merely in infrastructural or organizational terms. Rather, it is fundamentally relational: it depends on the capacity to foster repeated interaction, shared narratives, trust-based collaboration, and durable linkages across multiple categories of stakeholders (Lamine et al., 2015; Roundy et al., 2018).

This is why social capital offers a particularly useful lens for framing university-led ecosystem emergence. In the formative stages of an ecosystem, when formal institutions and market connections are still fragile, the development of social capital becomes a key mechanism through which actors gain access to information, legitimacy, mentoring, and collaborative opportunities (Spigel, 2017; Spigel & Harrison, 2018; Davidsson & Honig, 2003). Social capital is not only about network density or the existence of ties; it also concerns the presence of shared meanings, reciprocal expectations, and trust that make coordination sustainable over time (Bourdieu, 1986; Nahapiet & Ghoshal, 1998). For this reason, distinguishing between bonding and bridging social capital is especially valuable. Bonding ties help create internal cohesion, a shared identity, and an initial entrepreneurial community, while bridging ties connect that community to external stakeholders such as firms, investors, incubators, and public organizations (Claridge, 2018; Liao & Welsch, 2005; Burt, 2000). However, ecosystem emergence and consolidation ultimately depend on more than the coexistence of these ties: it requires mechanisms through which external connections are progressively transformed into embedded and durable collaborations (Harima & Harima, 2025; Inkpen & Tsang, 2005).

Against this background, the present study frames university-led ecosystem emergence as a staged and relational process. The paper conceptualizes EU as an anchor organization that intentionally orchestrates the formation and transformation of social capital over time (Harima & Harima, 2025; Spigel & Harrison, 2018). This framing is particularly suitable for understanding how ecosystems can be built "from scratch" in peripheral regions, where the challenge is not only to connect actors, but also to create the relational foundations that allow an entrepreneurial ecosystem to take shape and progressively become more self-sustaining.

Purpose of the paper. The purpose of this paper is twofold. First, it aims to explain how an EU can catalyze the emergence of an EE in a peripheral and institutionally thin context. Second, the study investigates how university-led action can intentionally support the creation, expansion, and consolidation of relationships among heterogeneous actors in ways that progressively enable ecosystem development beyond emergence. To address these aims, the study adopts a social capital perspective. This lens is particularly suitable because it allows entrepreneurial ecosystem emergence to be interpreted as a relational and staged process, rather than as the mere presence of favorable actors or conditions. In particular, the paper draws on the distinction between bonding and bridging social capital, and on the idea that ecosystem development depends on mechanisms through which these ties are progressively transformed into more embedded and durable forms of collaboration. On this basis, the paper investigates how a university-led platform builds and transforms bonding, bridging, and conversion social capital during the emergence of an entrepreneurial ecosystem in an institutionally thin region. At the same time, it examines the conditions under which university-led orchestration can foster a transition from coordinated, top-down ecosystem building to more autonomous, bottom-up ecosystem dynamics. Overall, the paper seeks to offer a process-based understanding of university-led ecosystem emergence by clarifying the relational mechanisms through which entrepreneurial universities move from internal community formation to broader and more self-sustaining ecosystem dynamics.

Methodology. The study adopts a qualitative single-case study design (Yin, 2018; Eisenhardt, 1989) that is particularly appropriate for investigating complex, context-dependent, and processual phenomena such as ecosystem orchestration, community formation, and cross-boundary collaboration. The inquiry follows an abductive logic, iterating between empirical material and theory in order to refine the interpretation of bonding, bridging, and conversion dynamics rather than testing predefined hypotheses. The research aimed to investigate the role of the entrepreneurial university across different stages of entrepreneurial ecosystem development, follows a two-step approach. In the first step, the study focused on the emergence phase of the ecosystem. In the second phase (currently under development), the study explores the university's role in the consolidation of the ecosystem.

The empirical setting is SEIUNISA (Student Entrepreneurship and Innovation @UNISA), a university-led initiative developed at the University of Salerno in Southern Italy. The case was selected purposively because it offered a suitable context for observing ecosystem emergence in a peripheral and institutionally thin environment, and because the initiative was explicitly designed to activate student entrepreneurship through interaction with a broader set of external stakeholders. As such, the case provides a useful opportunity to examine how a university-led platform can operate as an anchor for ecosystem development.

Data were collected through the triangulation of multiple qualitative sources between 2022 and 2024. First, the study relied on extended participant observation across a broad range of SEIUNISA activities, including workshops, mentoring sessions, team-building moments, project meetings, training activities, community events, and international study tours. This longitudinal immersion made it possible to observe how relationships evolved over time across both formal and informal settings. Second, six semi-structured interviews were conducted with key actors involved in the initiative, including the program coordinator, tutors, students, startup founders, and external stakeholders. The interviews explored participants' perceptions of the initiative's evolution, with particular attention to trust formation, collaboration patterns,

and interactions across organizational and institutional boundaries. Third, documentary sources were collected to support triangulation and temporal reconstruction, including internal reports, communication materials, calls, slide decks, web content, media coverage, and other program-related documents.

A second wave of follow-up data collection started in 2025 and is still ongoing. This phase involves interviews with entrepreneurs and founders of university startups connected to the SEIUNISA program, with the aim of understanding the needs and challenges that emerge in the later stage of ecosystem development and exploring how the EU can support them during this phase.

All interviews were recorded and transcribed, and observational and documentary materials were systematically archived through a case study protocol.

Data analysis was conducted through iterative rounds of qualitative coding and interpretive comparison. In the first stage, descriptive coding was used to identify relevant actors, activities, and interaction contexts. In the second stage, the analysis focused on relational mechanisms associated with the structural, cognitive, and relational dimensions of social capital, such as trust building, knowledge sharing, collective identity formation, and stakeholder engagement. In the final stage, these mechanisms were interpreted through the bonding–bridging–conversion framework in order to reconstruct the process through which the university-led platform supported ecosystem emergence over time. Triangulation across interviews, observations, and documents, together with analytical memos and ongoing comparison among sources, strengthened the credibility and internal consistency of the findings. All participants provided informed consent and data were anonymized.

Results. The analysis shows that SEIUNISA supported entrepreneurial ecosystem emergence through four cumulative, interconnected, and partially overlapping stages of social capital creation. Across these stages, the university acted not merely as a provider of entrepreneurship support, but as an anchor organization that intentionally built an internal community, connected it to external stakeholders, consolidated selected ties into embedded collaboration, and progressively enabled more autonomous ecosystem dynamics. In this sense, ecosystem emergence in a peripheral context depended on the sequential development of bonding and bridging social capital across cognitive, structural, and relational dimensions.

Stage 1: Building an internal community. The first stage focused on creating an internal entrepreneurial core of students, researchers, laboratories, and university staff around a shared entrepreneurial mindset. SEIUNISA primarily fostered bonding social capital through cognitive and relational mechanisms, especially via the Innovators program, which selected 50 students from 17 departments and positioned them as both trainees and peer diffusers of entrepreneurial culture within the university. This internal consolidation was reinforced through branding, identity-building, communication channels, and enabling infrastructures such as laboratories, research centers, and co-working spaces. Together, these mechanisms strengthened trust, belonging, and collective identification, while also increasing the initiative's credibility toward external stakeholders.

Stage 2: Connecting external stakeholders. Once an internal core had been established, SEIUNISA expanded outward and activated bridging social capital by connecting the community with regional and international actors, including incubators, investors, public agencies, entrepreneurs, innovation networks, and academic partners. This stage was mainly structural and cognitive, as the platform broadened its relational reach through mentoring, inspirational talks, one-to-one meetings, and international exposure activities. Internationalization played a particularly important role through study tours, visiting professors, and participation in international networks. These activities did more than simply add contacts: they enhanced the legitimacy of both the platform and its participants and transformed the university's institutional standing into actionable opportunities and boundary-spanning ties.

Stage 3: Integrating and converting ties. The third stage marked a shift from network expansion to tie consolidation. The evidence suggests that simple connectivity was not sufficient to sustain ecosystem emergence; what mattered was the platform's ability to convert selected external ties into more embedded, trust-based, and durable collaborations. SEIUNISA pursued this through repeated interaction, co-creation formats, and mechanisms that institutionalized collaboration around projects and ventures. Meet-up events, team-building activities, the collection of external calls for ideas, and the A.L.I. program (providing pre-incubation and seed support for student-founded startups), all contributed to connecting internal and external actors through concrete collaboration and validation processes. In this phase, internal bonding ties were projected outward, while external bridging ties were progressively internalized into the ecosystem's relational core. As a result, external stakeholders ceased to be occasional contacts and became recurring collaborators embedded in shared practices and mutual expectations.

Stage 4: Advancing toward autonomous ecosystem dynamics. In the fourth stage, ecosystem dynamics became increasingly self-reinforcing and less directly dependent on university coordination. While earlier phases were shaped by visible top-down orchestration, this phase was marked by bottom-up initiatives from students, startups, and external organizations. Local banks, public agencies, corporations, and other actors proactively engaged with initiatives generated by the SEIUNISA community, while student-founded ventures independently expanded their networks within and beyond

the university. The cases of Startup A and Startup B illustrate this transition, showing how the relational infrastructure built in earlier stages generated path-dependent effects: once trust, legitimacy, and collaboration routines had been established, actors increasingly mobilized resources and formed partnerships without direct orchestration by the university. Autonomy therefore emerged not as an alternative to leadership, but as the outcome of earlier sequenced orchestration.

With specific reference to the second step of the research project, preliminary follow-up evidence suggests that the transition toward ecosystem consolidation, does not imply a complete withdrawal of the EU. Rather, once startups begin to emerge from the ecosystem and move toward market-facing development, a new set of needs becomes visible, requiring a different and more selective form of university support. In this post-emergence phase, the role of the university appears to shift from broad ecosystem orchestration to venture-oriented anchoring, especially for startups that still depend on external validation, access to specialized competences, and legitimacy in front of key stakeholders such as incubators, corporate partners, and investors. More specifically, the follow-up interviews indicate two recurrent areas in which university role remains relevant. First, startups continue to require active support in the early development of their ventures, particularly in product, technology, and market validation. Even when entrepreneurial teams have already gained a degree of autonomy, they often still rely on university laboratories, expert networks, mentors, and applied research competences to refine prototypes, test assumptions, and strengthen the technical and commercial credibility of their projects. In this sense, some of the validation mechanisms already observed in Stage 3 do not disappear after ecosystem emergence, but continue to matter in a more targeted way as startups move from relational embedding to venture consolidation. Second, the university continues to play an important reputational and legitimating role. As startups approach investors and external markets, affiliation with the university can function as a signal of quality, seriousness, and selection, reducing uncertainty for external evaluators. This suggests that, in the consolidation phase, the university's contribution is not limited to providing knowledge or infrastructure, but also includes symbolic and reputational intermediation that supports startups in crossing the threshold from ecosystem emergence to broader market recognition.

Overall, the results indicate that SEIUNISA fostered ecosystem emergence through a multi-staged process in which internal cohesion, external brokerage, relational conversion, and autonomous advancement built on one another over time. At the same time, preliminary follow-up evidence suggests that the end of the emergence phase does not eliminate the role of the entrepreneurial university, but redefines it: as the ecosystem enters a consolidation phase, university support becomes more selective and venture-oriented, especially in relation to validation activities and reputational endorsement toward external stakeholders. The case therefore shows that in institutionally thin contexts, university-led ecosystem building depends not only on the capacity to intentionally generate and transform social capital during emergence, but also on the ability to sustain post-emergence venture development through targeted forms of technical, relational, and legitimacy support.

Research limitations. This study presents some limitations that should be acknowledged. First, the findings are based on a single qualitative case study and are therefore context-specific. SEIUNISA operates in a peripheral and institutionally thin region of Southern Italy, characterized by particular institutional, economic, and cultural conditions. As a result, the transferability of the findings to other university settings, regions, or more mature entrepreneurial ecosystems should be considered with caution. Second, although the study benefits from longitudinal immersion and rich triangulation across interviews, observation, and documentary sources, it mainly captures the early stages of ecosystem emergence. The analysis therefore offers limited evidence on the long-term stability of the relational dynamics observed, especially regarding whether the transition toward more autonomous ecosystem development can be sustained over time. Third, the qualitative design privileges processual depth over empirical breadth. While this approach is appropriate for reconstructing mechanisms of bonding, bridging, and conversion social capital, it does not allow systematic comparison across different institutional environments or program configurations. Future studies could strengthen external validity by adopting comparative multi-case designs and longer-term longitudinal approaches.

Implications. This study advances research on EE, social capital, and EU. First, it develops a process-based account of university-led ecosystem emergence by illustrating how the bonding–bridging–conversion logic unfolds across a four-stage orchestration sequence. In doing so, the paper extends recent work on ecosystem leadership by specifying the enabling conditions and action mechanisms through which a university-led platform builds internal cohesion, activates boundary-spanning ties, converts them into embedded collaboration, and gradually enables more autonomous ecosystem dynamics. The findings also suggest that these stages are sequenced yet partially overlapping, and that ecosystem momentum depends on continuity across stages rather than on a linear progression from one phase to the next (Harima and Harima, 2025; Spigel and Harrison, 2018; Wurth et al., 2022). Second, the study advances social capital theorization in entrepreneurial ecosystem research by clarifying the dynamic interplay between social capital forms and dimensions during ecosystem emergence. The findings show that bridging ties and structural brokerage, while necessary, are not sufficient to generate durable ecosystem development unless they are supported by cognitive alignment, repeated interaction, and trust-based collaboration. In particular, the paper identifies bridging-to-bonding conversion as a pivotal mechanism through which external connections become embedded partnerships. This helps explain how ecosystems move from a loose network of contacts to a collaborative community capable of sustained collective action (Nahapiet & Ghoshal, 1998; Inkpen & Tsang, 2005). Third, the paper refines EU theory by conceptualizing the university not simply as a provider of entrepreneurial support, but as an anchor organization whose orchestration capabilities accumulate path-

dependently over time. The case shows that bottom-up initiatives and decentralized ecosystem dynamics do not emerge spontaneously, but become feasible only after earlier orchestration has created legitimacy, trust, and collaborative norms. The study therefore contributes to a more relational and evolutionary understanding of the EU, particularly in peripheral and institutionally thin contexts where ecosystem emergence depends on the presence of a stable and legitimate coordinating actor (Benneworth and Cunha, 2015; Breznitz and Feldman, 2012; Rådberg and Löfsten, 2024). Fourth, the preliminary follow-up evidence extends this contribution by suggesting that once startups begin to operate more autonomously in the ecosystem and approach broader market-facing development, the university's function appears to shift from ecosystem orchestration to more selective forms of venture-oriented support, especially in relation to product, technological, and market validation, as well as reputational endorsement toward external stakeholders such as incubators and investors.

The findings generate practical implications for both universities and policymakers. For universities, the results suggest that effective ecosystem building requires a stage-contingent and platform-based approach. In early phases, universities should invest in internal community formation by creating recurring programs, visible identity markers, stable interaction spaces, and shared narratives that cultivate an entrepreneurial culture across students, researchers, and laboratories. Once an internal nucleus is established, universities should deliberately expand toward external engagement by designing mentoring programs, challenge-based initiatives, networking events, and partnership formats that connect internal actors with firms, incubators, investors, public agencies, and innovation networks. The findings also show that universities should move beyond episodic collaborations and invest in conversion mechanisms that stabilize external ties over time. Structured co-creation events, matchmaking tools, and shared validation routines are especially important because they help transform temporary contacts into trust-based and recurrent partnerships. This, however, requires sustained institutional commitment and dedicated professional capacity, including governance roles, staff, and routines that ensure continuity and prevent fragmentation across short-term initiatives. Finally, universities should plan for progressive decentralization by enabling peer-led formats, community champions, and bottom-up initiatives once relational infrastructure and legitimacy are sufficiently established.

For policymakers, the study suggests that ecosystem policy should not be limited to startup-level or project-based support. In institutionally thin contexts, policy should also strengthen the orchestration capacity of legitimate coordinating actors, often universities, by providing multi-year funding, capability-building support, and incentive systems that reward collaboration, engagement, and durable cross-actor outcomes. Policymakers can also facilitate ecosystem maturation by supporting joint forums and shared platforms where universities, industry, government, and civil society interact regularly and co-design priorities. At the same time, policy frameworks should encourage governance arrangements that progressively reduce long-term dependency on the orchestrator as the ecosystem becomes more autonomous and self-reinforcing.

Originality of the paper. The originality of this paper lies in its process-based explanation of how an EU catalyzes the emergence of an entrepreneurial ecosystem in a peripheral and institutionally thin context. Rather than portraying the university as a simple provider of entrepreneurial support, the study conceptualizes it as an anchor organization that intentionally orchestrates the staged development of social capital over time. In particular, the paper advances existing research by proposing a multi-stage process model that shows how internal community building, external stakeholder connection, relational conversion, and autonomous ecosystem advancement unfold through partially overlapping phases. It also highlights bridging-to-bonding conversion as a pivotal mechanism through which external ties become embedded, trust-based, and durable collaborations, thereby clarifying how ecosystems move from fragmented connections to more self-sustaining dynamics. In this way, the study contributes a relational and evolutionary account of university-led ecosystem emergence that is especially relevant for peripheral settings, where ecosystem development depends on deliberate orchestration before more autonomous bottom-up dynamics can emerge (Harima and Harima, 2025; Spigel and Harrison, 2018; Wurth et al., 2022). Moreover, research follow-up insights suggest that advancing toward autonomous ecosystem dynamics should not be interpreted as a condition of full independence from the university, but rather as the beginning of a new phase in which ecosystem autonomy and selective university support coexist. While collective ecosystem dynamics become more decentralized, some ventures still require the university to act as validator, broker, and reputational guarantor. This extension opens an important line of inquiry for the broader research project, namely how the role of the entrepreneurial university evolves from ecosystem emergence to ecosystem consolidation, and how its support mechanisms change as ventures move from community-based development to market-facing growth.

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The Hidden Costs of Entrepreneurial Soft Skills: Identity, Behavioural Integrity and Word-Deed Misalignment. Evidence from a ZMET Analysis.

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Abstract. *Identity economics theorises that misalignment between values and behaviours generates Identity Costs (IC). While this construct has considerable theoretical appeal, its assessment remains critical. Behavioural Integrity (BI) research offers validated word-deed alignment measures but has analysed alignment exclusively from the observer's perspective, leaving the actor's own experience unexplored.*

This study aims to reveal the hidden costs of entrepreneurial soft skills and operationalises Identity Cost (IC) through Behavioural Integrity (BI), reorienting BI from observer perception to actor experience.

The Zaltman Metaphor Elicitation Technique (ZMET), which leverages the metaphorical nature of cognition to access deeper cognitive patterns, was applied in twelve interview sessions. Data coding, run with Atlas.ti, distinguishes Espoused Prescriptions (ESP) and Enacted Behaviours (ENA). Further interpretations rely on Carl Rogers' framework of intrapersonal congruence, where word-deed alignment is assessed as congruent or incongruent.

As a result, two types of entrepreneurial practices emerge: "Congruent" entrepreneurs with aligned patterns and coherence metaphors ("pack", "little fish"); and "Incongruent" entrepreneurs with misaligned patterns and distance metaphors ("drawer", "solitary battle"), showing entrepreneurial hidden costs in the use of soft skills.

Research limitations: Cross-sectional, single-region design requires longitudinal and cross-industry replication.

Managerial implications: Reflexive practices help entrepreneurs surface word-deed incongruence. Behavioural Integrity offers entrepreneurs a path toward sustainable competitive advantage.

Originality of the paper: The study offers a multidisciplinary exploration of entrepreneurial soft skills' hidden costs, through a novel operationalisation of Identity Costs, shifting the measurement perspective of Behavioural Integrity from external observer to the actor's own experience.

Keywords: *Soft Skills, Entrepreneurship, Identity Cost, Behavioural Integrity, Identity Economics, ZMET, SMEs entrepreneurs.*

Framing of the research. When entrepreneurs publicly espouse values about how they manage people and organisations, yet struggle to act on them, the problem is not simply one of inconsistency. The gap between words and deeds carries a specific theoretical name: Akerlof and Kranton (2000, 2005, 2010) call it Identity Cost (IC), a utility loss that occurs when a person's behaviour violates the prescriptions attached to the social category they belong to. For SME entrepreneurs, these prescriptions go beyond technical excellence (hard skills) and extend into how people are managed.

This gap between what entrepreneurs say and what they do has concrete consequences: psychological distress and eroded sense of authenticity and ultimately, constrained performance (Simons et al., 2015, 2022). Identity Economics, as developed by Akerlof and Kranton (2000, 2005, 2010), provides a robust theoretical foundation for understanding how personal identity shapes economic behaviour. However, translating their economic model into measurable constructs within specific organisational contexts requires methodological innovation to quantify identity costs. A separate line of research, Behavioural Integrity (BI), has followed a different path. Simons (2002) and Simons et al. (2022) built validated scales to measure how followers perceive the consistency between what their leaders say and what they do (Palanski & Yammarino, 2007, 2009). Both BI and Identity Economics deal with the consequences of gaps between words and actions, but so far the two literatures have remained largely disconnected. This is especially problematic in entrepreneurial settings, where the behavioural prescriptions tied to identity are often implicit and constructed individually rather than shared across a professional group (Simons et al., 2022). As such, this study addresses the following research question:"How do soft skills incongruence generate hidden costs that constrain entrepreneurial practice?"

This study adopts three complementary theoretical lenses to address this gap. Behavioural Integrity (BI) provides the observational framework to detect word-deed misalignment, yet has so far measured alignment only from the observer's side (company workers evaluating their leaders). In contrast, the actor's own experience of misalignment remains unexplored. Identity Economics addresses precisely this gap. In Akerlof and Kranton's model, when a person violates the behavioural prescriptions associated with their social category, the result is a utility loss, which the authors describe as "evokes anxiety and discomfort in oneself" (2000, p. 728). The construct is theoretically powerful, but the economic framework stops there: it tells us that the cost exists, not what it looks like psychologically. This is where Rogers (1959) becomes necessary. In his person-centred theory, congruence refers to how close or how far the distance is between a person's self-concept, meaning how they represent themselves to themselves, and their experience, meaning what they do

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and feel in practice. When a significant discrepancy exists between these two levels, the person enters a state of incongruence that generates anxiety and reliance on defensive processes. Translated into our framework, the entrepreneur's espoused soft-skill prescriptions (ESP) function as self-concept declarations, while enacted behaviours (ENA) constitute experience. When ESP and ENA align, the entrepreneur is congruent in Rogers' sense of the term. When the two levels diverge, the person enters a state of incongruence, and the discomfort that follows, we argue, is what Akerlof and Kranton (2000) formalise as Identity Cost. Rogers gives us something that Identity Economics alone does not provide: a psychological account of why misalignment is costly for the person who experiences it, not only for those who observe it from the outside. It is this convergence across the three frameworks (BI to detect the gap, Identity Economics to frame it as a cost, Rogers to explain why it hurts) that allows us to study what happens when entrepreneurs live a distance between what they declare and what they practice. Recent management scholarship helps fill this gap: identity processes operate at an intrapersonal level (Bataille & Vough, 2022), and identity threats are subjective experiences appraised by the actor (Petriglieri, 2011), not evaluations made by external observers. So, if IC is intrapersonal in nature, studying it requires a conceptual reorientation of BI, moving from observer perception to actor intrapersonal experience. A methodology can access that internal experience: the Zaltman Metaphor Elicitation Technique (ZMET), a projective interview method that surfaces unconscious cognitive structures through visual metaphor analysis (Utama & Widyarini, 2025; Zaltman & Coulter, 1995; Lakoff & Johnson, 2008), precisely because IC, as a latent construct rooted in self-perception, would remain systematically concealed by conventional interview or survey approaches.

Entrepreneurs of micro-enterprises and SMEs (10–30 employees) provide an appropriate empirical context. In firms of this size, it is difficult to separate the entrepreneur from the enterprise. The founder's personal values and behavioural integrity directly affect how the firm is perceived and how it performs (Cardon et al., 2005). When the entrepreneur says one thing and does another, clients, employees, and the local community notice. The Veneto region, in northeastern Italy, offers a particularly suitable context for this investigation: it hosts one of the highest concentrations of SMEs in Europe, and its artisan tradition emphasises quality, authenticity, and the relationship with the client (Kroezen et al., 2021; Micelli, 2011). Measuring IC in this context, however, is not straightforward. Entrepreneurs may incur identity costs without realising it. The constraints that word-deed misalignment imposes on practice often operate through mechanisms that are implicit and hard to put into words, which is precisely why conventional survey instruments risk missing them. This study contributes to filling this gap by operationalising identity costs and connecting Identity Economics with the BI literature. It also shows that ZMET can surface identity prescriptions that would otherwise remain invisible to other methods.

Purpose of the paper. This study aims to reveal the hidden costs of entrepreneurial soft skills and operationalises Identity Cost (IC) through Behavioural Integrity (BI), reorienting BI from observer perception to actor experience. Akerlof and Kranton (2000, 2005, 2010) introduced personal identity as a key variable in economic behaviour, extending utility models to incorporate social categories and the behavioural prescriptions associated with them. In their framework, identity derives from social categories, such as "entrepreneur," "craftsperson," or "professional", each carrying prescribed behaviours (Davis, 2011). Individuals experience utility gains when actions align with identity-based prescriptions and utility losses when they misalign (Solomon & Mathias, 2020). As Akerlof and Kranton (2000, p. 719) observe, "People may choose their actions to avoid losses in identity". When actions diverge from prescriptions, "there is a loss of utility" (ibid., p. 720) that may exceed material gains from divergent behaviour. This psychological cost operates through the cognitive dissonance arising when behaviour contradicts internalised norms (Tajfel et al., 2001). Entrepreneurial identity presents a compelling application of this framework as entrepreneurs occupy a social category with strong behavioural prescriptions around autonomy and innovation, among others (Mmbaga et al., 2020; Shepherd & Haynie, 2009; Cardon et al., 2005). In the case of SMEs entrepreneurs, identity prescriptions often go beyond technical competence and extend into how people are managed: collaboration, leadership, communication, and participative decision-making. When an entrepreneur declares these values but does not consistently act on them, the result can be psychological tension and a sense of reduced authenticity. Simons et al. (2015, p. 832) define BI as "the perceived pattern of alignment between an actor's words and deeds". What makes BI particularly useful for our purposes is that, unlike IC, it has been operationalised through validated scales. Simons' meta-analysis shows that word-deed alignment is strongly associated with trust, commitment, and performance: when leaders do what they say, followers trust them more and engage more (Simons et al., 2022). BI can serve as a measure of IC. Our conceptual Hidden Costs formula is operationalised as follows:

$P = K - CI$

Where P represents entrepreneurial practice, K represents competency endowment (encompassing hard skills, soft skills and human capital; Teece, 2007), and CI captures identity costs. We present this as a conceptual formula rather than a testable equation: K is held constant across our analysis, while CI varies across entrepreneur profiles. The formula proposes that entrepreneurial practice depends not only on what entrepreneurs can do (K = competencies) but also on IC from behavioural inconsistency. We measure IC as inversely related to BI: entrepreneurs with high word-deed alignment experience lower costs, whereas those with persistent misalignment incur higher costs. Both constructs address the psychological discomfort and performance consequences of gaps between stated values and enacted behaviours. Our ZMET approach is designed to reveal these IC in entrepreneurial contexts where prescriptions may be tacit and individually constructed.

Methodology. This study uses ZMET to assess IC through BI in SME entrepreneurial contexts. We randomly selected twelve entrepreneurs from the membership of Confartigianato Vicenza, a major trade association in the Veneto region. Target firms employ 10–30 workers and are led by founder-owners who participate directly in production and client relations. At this size, the entrepreneur operates at once as leader, producer, and organisational representative — a condition that makes identity-behaviour dynamics observable in their full range. ZMET differs from conventional interviews in that it does not depend on verbal fluency or conscious recall. Instead, participants work with visual images, and the technique draws on the idea that metaphors are not ornamental but constitute a primary structure of thought, one that connects what people can articulate with what they understand only tacitly (Lakoff & Johnson, 2008). Each participant collected 8-12 images that, in their view, symbolised soft skills relevant to their business. The instruction was to choose images on the basis of felt resonance, not analytical fit. Each sessions lasted approximately 50 minutes and took place at each entrepreneur's business places. Conducting the interviews on site had a practical reason: the familiar setting helped participants speak more freely and refer spontaneously to actual workplace situations. All sessions were audio-recorded with informed consent and transcribed verbatim. The interview protocol followed Zaltman's (2003) established procedures while adapting elicitation prompts to the specific context of entrepreneurial BI. Each session began with storytelling, as entrepreneurs described their selected images and their personal significance. The interviewer employed laddering techniques to probe deeper into metaphorical meanings: "What does this image represent for you? Why did you choose this specific image? What would the opposite look like?". These questions made it possible to trace how surface concepts connect to deeper values, and how concrete visual elements point toward abstract identity commitments (Hill & Levenhagen, 1995). Participants were also asked whether any important idea was missing, something they had wanted to represent but could not find an image for. These absent images often turned out to be among the most revealing, precisely because they pointed to tacit dimensions of BI that do not lend themselves to visual expression. Throughout the sessions, the interviewer's role was to elicit meanings, not to interpret them; analysis was deferred to a later phase in order to avoid premature closure. The data corpus consists of twelve transcribed interviews of approximately 35,000 words in total. Field notes complement the transcripts: they record hesitations, emotional reactions, non-verbal cues. Some participants spontaneously placed images side by side during the session and constructed composite visual arrangements that showed how different identity elements related to one another in their experience. Transcript analysis was carried out with Atlas.ti, following thematic analysis principles (Braun & Clarke, 2006) adapted to the specific demands of ZMET data. The coding framework draws on BI research (Simons, 2022) and distinguishes two categories: Espoused Soft-skill Prescriptions (ESP), for instance the values entrepreneurs declared through their metaphors, and Enacted Behaviours (ENA), such as how those same skills surfaced or failed to surface in descriptions of daily management practice. Comparing ESP and ENA revealed the word-deed alignment central to BI. Following Rogers (1959), we adopt the terms Congruent and Incongruent to classify predominant ESP-ENA patterns.

Results. Analysis revealed two profiles based on predominant ESP–ENA patterns: Congruent profile entrepreneurs showing aligned word-deeds, and Incongruent profile entrepreneurs showing misaligned patterns.

Table 1 reveals a recurring pattern across the five soft skills examined: for each competency, some entrepreneurs demonstrate word-deed alignment while others present evident gaps. Note that only soft skills with a minimum of 5 total occurrences across the sample are included. Leadership, for instance, can be enacted coherently, as E4 shows through the "pack leader" metaphor sustained by collaborative behaviours ("we work as a pack, together"); or remain misaligned, as in E9's case, where "inspiring, setting example for others" collapses into "one life alone, it is isolation". The same dynamic emerges for the soft skills: Teamwork, Empathy, Time Management, and Collaboration. What distinguishes Congruent and Incongruent entrepreneurs is not which soft skill the entrepreneur espouses, but whether daily enacted behaviours correspond to espoused values. When words find corroboration in deeds, IC remain contained and competencies translate effectively into practice. When, instead, a persistent incongruence separates what entrepreneurs declare they value from what they actually practice, IC accumulates progressively. Table 1 shows that the congruence/incongruence distinction is detectable at the metaphorical level: congruent cases show semantic continuity between espoused and enacted metaphors, while incongruent cases reveal a structural fracture between the two.

Tab. 1: Soft Skills Espoused-Enacted Analysis

Soft Skill	Interviewee number	Representative Quotes of GAPS	Roger's Congruence
Leadership	E9	ESP: "Leadership means inspiring, setting example for others..." ENA: "...entrepreneurship is one life alone, it is isolation"	Incongruent
	E4	ESP: "I'm the leader of a pack..." ENA: "...we work as pack, together. I'm thin on my own... at my back people said: you go, we deliver"	Congruent
Teamwork	E7	ESP: "Teamwork is a squad pulling together..." (E7) ENA: "...I experienced repeated betrayals"	Incongruent
	E4	ESP: "Teamwork is like being in a pack..." ENA: "...in a pack you have defined roles with individual freedom"	Congruent
Empathy	E7	ESP: "I know I have to be very empathetic..." ENA: "...I put empathy in the drawer"	Incongruent
	E12	ESP: "Empathy is a choice..." ENA: "I chose concentric circles - if you're inside the circle, I've embraced you...	Congruent
Time management	E6	ESP: "Managing time is one the greatest skills..." (E6) ENA: "...time left is zero, it is renouncing"	Incongruent
	E4	ESP: "Time management always represented me..." ENA: "...I used to work unitl 9-10pm, now I stop at 4: 30. I take time for myself".	Congruent
Collaboration	E2	ESP: "Reasoning together" ENA: "Solitary battle against everyone"	Incongruent
	E3	ESP: "You need everyone, so you try to get along with all..." ENA: "... You must find common ground, mediate because truth is in the middle"	Congruent

Source: Authors' own elaboration

Congruent profile entrepreneurs articulated clear soft-skill values and practised them in daily operations. What distinguished them was not perfect execution, but a capacity for self-awareness: when gaps existed, they recognised and named them. The clearest illustration comes from E4, who expressed leadership through the metaphor of being "thin on my own", recognising his dependence on others and actively learning from his son. This humility translated directly into teamwork practices described as a "pack" where each member has defined roles with individual freedom. Rather than framing competitiveness as external aggression, he spoke of it as an internal challenge: "I remove the world around me". His "intraprendenza" (entrepreneurial spirit) emerged through the "little fish" metaphor, lived with authentic emotion in how he navigated market challenges. Throughout his interview, espoused values and daily practices pointed in the same direction. A similar coherence appeared in E5, who valued teamwork without idealising it, accepting disappointments and losses as part of collaboration. He described competitiveness as "being first in class", but practised it as an economic necessity rather than aggression toward competitors. His espoused value of evolution matched concrete actions: transitioning from manual cutting to digital systems, implementing ISO 9001, and maintaining continuous learning. "Courage" was not merely declared but evidenced through taking a substantial personal loan at age 21 and innovating despite market scepticism. E8 articulated "Creativity" as a resource and lived it as "the only space of authentic joy" in daily work. Her observation skills, spontaneously added as a competency during the interview session, were demonstrated through concrete examples of studying competitors and structured companies. Not all alignment came through confident enactment. E10 demonstrated an unusual form of coherence through acknowledged limitations: she valued "Empathy" but openly admitted, "I don't know how to do it." Rather than generating IC, this awareness of the incongruence itself created coherence: an honest recognition that maintained BI. She valued not neglecting family relationships and practised this by maintaining family as "backstage certainty", which supported her work. E11 described "Teamwork" as central,

discovered over time, starting from "doing everything myself", narrating an evolution from isolation to collaboration that he had actually lived. When he spoke of "Delegation", he called it necessary and difficult, and he was actively working on it rather than claiming false competence. Finally, E12 expressed "Vision" as "prospective, sixth sense" and demonstrated it consistently in strategic decisions. "Curiosity" meant "studying, getting my hands in it", determination was described as "constancy, training" and lived coherently in daily practice. Even "Energy", which was abundant ("I have it to sell"), came with honest acknowledgement of needing to "escape" periodically. These entrepreneurs showed minimal IC because their metaphorical articulations of soft-skill values matched enacted behaviours. When misalignment existed, they were recognised and acknowledged, creating what Rogers (1959) would describe as congruence through awareness rather than through perfect execution. It is worth noting that Rogerian congruence does not require flawless alignment; rather, it requires that the person remain open to the discrepancy rather than distort or deny it.

Incongruent profile entrepreneurs showed predominantly misaligned patterns between espoused and enacted soft skills. These artisans articulated soft-skill values but struggled to translate them into consistent behaviours. The metaphors they used frequently conveyed distance or isolation. E1 and E2 illustrate two different manifestations of the same dynamic. E1 valued "Collaboration" as active and reciprocal but practised it passively, with "a need to be protected". She emphasised "Mediation" but consistently avoided conflict, fleeing confrontation and delegating difficult conversations. Though she declared that entrepreneurship implies "Leadership", she felt "not visionary". Her "Quick thinking", presented as a strength, became "isolation and fear": seeing what others did not, created distance rather than connection. E2's pattern was more extreme. He talked about "Collaboration" as "reasoning together", but practised a "solitary battle against everyone" where "I" was the only subject. He valued "Giving support" yet experienced "disappointment and betrayal". Most strikingly, despite his entrepreneurial role, he believed "I'm not capable", confirming an old family judgment. "Risk" was described as normal, but lived as "teetering, fear". E6 showed a pattern where soft-skill values were espoused in principle but experienced as exhausting or absent in practice. She declared "Collaboration" as primary but reduced it to instrumental necessity: "you just need everyone". "Conflict management" was fundamental in principle, but practised with "so much effort" and desire to "escape". "Empathy" was a stated competence, but felt draining: "I shouldn't be the nurse", the "giant ear" creating discomfort rather than connection. "Patience" was a virtue in words, but "exhaustion, resistance to the limit" in practice. E6 called "Collaboration" the most important, yet described it as "absent, not realised". "Teamwork" was something you breathed, but remained idealised, with no mention of conflict. "Energy" was positive in words, but lived as "running without stopping". "Time management", which E6 described as fundamental, was practised with "regret, renunciation, pain", illustrating the distance between declaration and experience. The remaining two cases show particularly vivid metaphorical distance. E7 said "I would be very empathetic" but admitted "I put empathy in the drawer" with "bitterness", a containment metaphor suggesting conscious suppression of a valued skill. Teamwork meant pulling together, but her experience was "repeated betrayals". She claimed, "I'm not inclined to control" while doing everything herself. E9 valued "Welcoming" but practised selective empathy: "inside the circle or outside". "Leadership" meant inspiring others, but she lived "one life alone". She resisted questions about personal limits and showed difficulty acknowledging misalignments. These entrepreneurs experienced IC through recurrent distance between stated soft-skill values and actual behaviours across multiple domains. The distinction between profiles is not perfectly binary: entrepreneurs' behaviours and beliefs may shift over time, and some individuals showed mixed patterns. The key difference is whether alignment or misalignment predominates across the full range of espoused soft skills. Self-awareness also differed between profiles. Congruent profile entrepreneurs openly recognised their limits (E10 admitted she could not do empathy, E11 acknowledged delegation struggles). Incongruent profile entrepreneurs tend to normalise gaps as inevitable or attribute them to external pressures. In Rogerian terms, these entrepreneurs exhibit defensive processes, such as distortion and denial, that protect their self-concept from acknowledging discrepancies between experience and reality.

A second interpretive round, now under way, goes back to the ESP–ENA coding and reads it through the lens of intrapersonal congruence. In practice, this means reorganising the soft skills from Table 1 into four thematic clusters derived inductively from the interviews: Self-Management, Interpersonal, Team & Organisation, and Entrepreneurial. What is emerging is that incongruence concentrates almost entirely in the Interpersonal cluster. The entrepreneurs who show persistent misalignment do so in relational competencies: empathy, conflict management, collaboration. If this pattern holds, it would mean that the hidden costs we are tracking are primarily relational, not technical or managerial, which makes sense given how central interpersonal prescriptions are to craft-based professional identity. These results are preliminary and will be further developed in the extended version of the paper. Overall, the distinction between congruent and incongruent profiles suggests a consistent pattern: identity costs do not stem from the absence of soft skills, but from the extent to which they are enacted consistently in practice.

Discussion. The findings support the proposition that BI can function as a measure of IC. Congruent profile entrepreneurs show minimal ESP-ENA distance. When a gap does appear, they register discomfort and correct course, that is a response pattern consistent with identity threat dynamics. In terms of the Hidden Cost formula, P = K - CI, this means that CI stays low and P remains close to K: competencies translate into practice with relatively little loss.

Incongruent profile entrepreneurs show systematic ESP-ENA misalignment. Their metaphors suggest BI has become peripheral to their operative identity. Drawing on Simons' (2022) findings and subsequent meta-analytic evidence, we suggest that the pathways through which IC constrains P include trust erosion and reduced follower commitment. IC also operates through internal psychological mechanisms. Incongruent entrepreneurs, by contrast, showed little conscious

discomfort as if their self-concepts had adjusted to accommodate the gap. The costs, however, do not disappear simply because the person stops noticing them. Rogers (1959) described exactly this mechanism: when incongruence is denied or distorted, the underlying tension is not resolved but re-routed into rigidity and selective perception. This is what we observed in the incongruent entrepreneurs' metaphors of containment and isolation. The two profiles also differed in the business outcomes they reported. Congruent entrepreneurs pointed to concrete results like media coverage ("articles in Il Sole 24 Ore"), quality certifications (ISO 9001), and team autonomy ("you go, we'll deliver"). Incongruent entrepreneurs described a different reality: stakeholder criticism ("some criticise me"), a sense of fragility ("I seem weaker"), and acknowledged strategic limits ("one cannot be visionary"). These findings have a practical side. The most direct implication concerns self-monitoring. Congruent entrepreneurs already do it: they notice when their behaviour drifts from their stated values, and the discomfort this produces is itself the corrective mechanism. For incongruent entrepreneurs, who lack this internal feedback loop, the equivalent would need to come from outside as structured self-assessment or peer feedback. Trade associations like Confartigianato are well placed to facilitate this: peer-coaching circles that pair entrepreneurs with different alignment profiles, or an annual BI self-assessment built into existing member services, would be low-cost interventions with potentially significant returns.

For entrepreneurship education, the findings suggest that BI matters for entrepreneurial practice. Current programs typically emphasise hard and soft skills development (building K) while neglecting IC, something that, as we suggest, affects how competencies translate into results. Training programs could incorporate reflective exercises, helping entrepreneurs recognise value-behaviour gaps and drawing on approaches from counseling and coaching practice.

Conclusion. This study started from a concrete problem: Identity Economics tells us that violating one's own behavioural prescriptions is costly, but it does not tell us how to detect or measure that cost. We proposed that Behavioural Integrity (the alignment between what a person says and what a person does) can serve as a way of assessing Identity Cost, and we tested this proposition with twelve SMEs entrepreneurs from the Veneto region through ZMET interviews.

What emerged were two distinct profiles. Congruent entrepreneurs showed aligned ESP-ENA patterns, and their metaphors reflected this: shared effort ("pack"), natural challenges ("little fish"), honest self-recognition ("thin on my own"). Incongruent entrepreneurs showed persistent misalignment, and their metaphors carried a different register, one of distance ("drawer"), selective inclusion ("inside/outside circle"), isolation ("solitary battle"). The distinction maps into Rogers' (1959) framework: congruent entrepreneurs remained open to discrepancies between self-concept and experience, while incongruent entrepreneurs relied on defensive processes that masked the gap without resolving it. The interview narratives also pointed to performance differences that are consistent with the Hidden Costs formula: congruent entrepreneurs could name concrete business results; incongruent entrepreneurs described constraints they could not fully explain. Clarifying the theoretical contribution on Behavioural Integrity (BI), prior research has predominantly approached BI as an externally perceived alignment between words and deeds. The present study complements this view by considering how alignment is experienced by the actor, and uses BI to explore identity-related tensions at the intrapersonal level.

The limits of the study are evident. Twelve entrepreneurs, one region, one sector, one point in time. As such, the findings are not intended to be generalised in a statistical sense. Rather, the study adopts an exploratory and theory-oriented approach, aimed at uncovering underlying mechanisms that are difficult to capture through standard methods. Whether these profiles are stable or whether entrepreneurs move between them over the course of their careers is a question we cannot answer with a cross-sectional design. In this respect, the contribution lies in offering an interpretive framework that can be further examined across contexts. Testing the P = K - CI formula against objective performance data would be a necessary next step, as would replication in different industries and geographical contexts. The relationship between gap awareness and IC (why some entrepreneurs see the misalignment and others do not) remains, in our view, the most promising direction for further work.

This study suggests that the most consequential hidden cost for SMEs entrepreneurs may not reside in the soft skills they lack, but in those they espouse yet consistently fail to enact. This is a cost that remains hidden precisely because it disguises itself as competence. If this is the case, then investing in soft skills development alone is not sufficient. What entrepreneurs need is not more competencies, but greater alignment between the ones they declare and the ones they live. Future research could examine how identity costs evolve over time, and whether entrepreneurs move between congruent and incongruent profiles across different stages of their activity. A further step would be to test the proposed relationship between BI and IC using mixed or quantitative designs.BI gives entrepreneurs and those who support them a concrete lens through which to examine how word-deed alignment shapes relationships, daily practice, and professional identity.

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The role of entrepreneurship support organizations in creating inclusive entrepreneurial ecosystems for immigrant entrepreneurs: A relational approach

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Abstract. *Immigrant entrepreneurs contribute to innovation, job creation, and the diversification of entrepreneurial ecosystems, yet often face barriers to accessing host-country resources, networks, legitimacy, and finance. Entrepreneurial support organizations (ESOs) are commonly presented as mechanisms for addressing these barriers through training, mentoring, networking, and access to resources. This paper reframes ESOs as intermediary organizations that mediate immigrant entrepreneurs' access to entrepreneurial ecosystems by connecting them with relevant actors, supporting capability development, coordinating access to resources, and shaping selection and legitimacy processes. Drawing on qualitative research on ESO models and migrant entrepreneur profiles in Italy, the study examines how organizational orientations and relational practices influence access to networks, knowledge, and institutional support. The findings show that ESOs can both facilitate and constrain inclusion depending on how they structure selection processes, mentoring relationships, and ecosystem connections. The paper contributes to research on entrepreneurial ecosystems and migrant entrepreneurship by showing how ESOs operate as relational intermediaries through which inclusion and exclusion are actively produced, and by highlighting the importance of aligning support models with heterogeneous migrant entrepreneur profiles.*
Keywords: *immigrant entrepreneurship; entrepreneurial ecosystems; entrepreneurship support organizations; inclusion; relational approach*

Framing of the research. Entrepreneurial ecosystems have become a central framework for understanding how new ventures emerge and grow within specific regional contexts. These ecosystems consist of interconnected actors, institutions, and resources—including entrepreneurs, investors, universities, incubators, accelerators, and public agencies—that collectively facilitate the circulation of knowledge, capital, and talent (Stam, 2015; Spigel, 2017; Autio et al., 2018). Rather than functioning as neutral infrastructures, entrepreneurial ecosystems are shaped by relational dynamics that influence how opportunities, resources, and information are distributed among different actors (Spigel, 2017; Theodoraki et al., 2018; Hernandez-Chea et al., 2021). In this sense, ecosystems are constituted by networks of relationships that determine who gains access to key resources and who remains excluded from them (Bolzani et al., 2025).

Within these ecosystems, entrepreneurial support organizations (ESOs)—such as incubators, accelerators, and pre-incubation programs—play a particularly important role. Over the past two decades, governments, universities, and private actors have increasingly invested in these support infrastructures in an effort to stimulate innovation and improve the survival rates of new ventures (Audretsch et al., 2020). Broadly speaking, ESOs provide entrepreneurs with structured forms of assistance—including mentoring, training programs, networking opportunities, workspace, and access to financial resources—to facilitate the creation and development of new ventures (Ratinho et al., 2020). However, recent research suggests that ESOs should not be understood only as service providers, but also as intermediary organizations operating between entrepreneurs and the wider ecosystem (e.g. Goswami et al., 2018; Hernandez-Crea et al., 2021).

The literature on innovation intermediaries provides a useful basis for this conceptualization. Howells (2006) shows that intermediaries perform a broad range of functions in innovation processes, including scanning and processing information, combining knowledge, brokering relationships, gatekeeping access, supporting commercialization, and evaluating outcomes. Applied to entrepreneurial ecosystems, this means that ESOs do not merely deliver predefined services to entrepreneurs; they also mediate relationships among entrepreneurs, mentors, investors, universities, public agencies, and other resource providers. In particular, they mobilize resources, coordinate relationships, and influence collaboration patterns within entrepreneurial ecosystems through practices of connection, development, coordination, and selection (Hernandez-Chea et al., 2021; Goswami et al., 2018).

This intermediary role is closely connected to the relational foundations of entrepreneurial ecosystems. By developing structural, cognitive, and relational forms of social capital, ESOs can create ties that enable access to resources, foster shared goals and language among ecosystem members, and build trust and complementarity across actors. Their effectiveness therefore depends not only on connecting entrepreneurs to networks, but also on coordinating the fit between entrepreneurs, mentors, and ecosystem actors, and on selecting participants and mentors with appropriate knowledge, motivation, and relational orientation. In this sense, ESOs organize relational processes, match entrepreneurs with relevant resources, and structure access to ecosystem opportunities (Theodoraki et al., 2018; Goswami et al., 2018).

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Despite their growing prominence within entrepreneurial ecosystems, the effectiveness and functioning of these organizations remain subjects of ongoing debate. Existing research has primarily examined incubators and accelerators in terms of their service portfolios, performance outcomes, and contribution to venture growth (Bruneel et al., 2012; Hausberg & Korreck, 2020). At the same time, scholars have highlighted that the capacity of these organizations to provide meaningful relational support—such as mentorship, network brokerage, and legitimacy-building—varies significantly across different models and institutional contexts (Assenova, 2020; Bergman & McMullen, 2021; Goswami et al., 2018). Moreover, much of the literature has focused on highly skilled entrepreneurs in developed economies or on disadvantaged entrepreneurs in developing contexts, leaving important questions unanswered about how entrepreneurial support infrastructures operate for different social groups (Assenova, 2020; Anderson et al., 2018; Dutt et al., 2016).

One group for which these dynamics are particularly relevant is migrant entrepreneurs. International migration is having a profound impact on European labor markets and local economies, bringing new resources, capabilities, and entrepreneurial aspirations into cities and regions. Migrant entrepreneurs contribute significantly to job creation, innovation, and the revitalization of local communities (Arrighetti et al., 2014; Raimi & Mahmoud, 2025; OECD/European Union, 2024). However, their entrepreneurial trajectories are often shaped by unequal access to financial resources, market opportunities, professional networks, and institutional support. These disparities are frequently analyzed through the lens of mixed embeddedness, which emphasizes how entrepreneurial outcomes emerge from the interaction between individual resources and the opportunity structures created by markets, regulatory frameworks, and local institutions (Kloosterman et al., 1999; Kloosterman, 2010).

Research on migrant entrepreneurship further shows that migrants are embedded in multiple relational spheres simultaneously. On the one hand, co-ethnic and transnational networks can facilitate entry into entrepreneurship by providing trust-based relationships, information flows, and access to capital (Saxenian, 2002; Elo et al., 2018). On the other hand, reliance on homophilous networks may confine entrepreneurs to saturated niches and limit access to high-value knowledge, investors, and broader market opportunities (Guercini et al., 2017; Sepulveda et al., 2011). Migrant entrepreneurs therefore often face the challenge of navigating between these relational spheres in order to access more resource-rich segments of entrepreneurial ecosystems.

Against this backdrop, ESOs have increasingly been considered important instruments for promoting inclusion within entrepreneurial ecosystems (Serpente et al., 2025). Incubators and accelerators are expected to function not only as providers of physical space or training programs but also as gateways to networks, knowledge, and legitimacy (Rath & Swagerman, 2016; Solano et al., 2019). Yet, when viewed as intermediary organizations, their role appears more complex. ESOs may help migrant entrepreneurs build connections, develop entrepreneurial capabilities, coordinate access to relevant mentors and ecosystem actors, and gain legitimacy within the host-country ecosystem (Serpente et al., 2025). At the same time, they may also operate as gatekeepers, since their selection criteria, business models, and organizational logics influence which entrepreneurs are admitted, which forms of entrepreneurship are valued, and which types of support are made available (Assenova, 2020; Bruneel et al., 2012; Hausberg & Korreck, 2020). This point is particularly important because support systems for migrant entrepreneurship cannot be assumed to be neutral (Bolzani et al., 2025). Access to markets, technologies, and entrepreneurial ecosystems is mediated by institutional arrangements, support practices, and intersectional factors such as legal status, race, gender, and socio-economic background. Institutional intermediaries—including incubators, accelerators, NGOs, and funding agencies—may therefore both enable and constrain migrant entrepreneurship through the ways they design, target, and implement support initiatives. In this sense, ESOs are not simply instruments for inclusion, but organizations through which inclusion and exclusion are actively produced (Bolzani et al., 2025).

This article addresses these gaps by integrating perspectives from migrant entrepreneurship, mixed embeddedness, entrepreneurial ecosystems, and intermediary organization research to conceptualize ESOs as relational intermediaries. Rather than treating ESOs as neutral support providers, the paper argues that these organizations actively shape migrants' embeddedness by mediating access to economic, social, and institutional resources (Bolzani et al., 2025). Through their selection practices, organizational logics, support programs, and everyday interactions with entrepreneurs, ESOs influence which entrepreneurial projects are considered legitimate, which networks entrepreneurs can access, and how migrant entrepreneurs become integrated into—or remain disconnected from—local entrepreneurial ecosystems.

Purpose of the paper. This study explores how ESOs and related support infrastructures mediate the relationship between migrant entrepreneurs and the opportunity structures available in host-country entrepreneurial environments (Rath & Swagerman, 2016; Solano et al., 2019).

More specifically, the paper seeks to address two research questions. First, how do the organizational structures associated with different ESO business and governance models shape opportunities and constraints for immigrant entrepreneurs? Second, what types of interactions are established within ESOs between staff members and immigrant entrepreneurs, and how do these interactions influence entrepreneurs' access to ecosystem resources?

These research questions allow us to account for the heterogeneity present on both sides of the ESO–entrepreneur relationship. On the supply side, ESOs differ significantly in terms of their missions, funding structures, governance arrangements, and operational practices. These organizational characteristics influence how support programs are designed, how participants are selected, and how ESOs engage with diverse entrepreneurial populations (Bruneel et al., 2012; Assenova, 2020; Hausberg & Korreck, 2020). Consequently, different types of ESOs may offer distinct pathways through which entrepreneurs access networks, knowledge, and financial resources.

On the demand side, immigrant entrepreneurs themselves represent a highly heterogeneous group. Their entrepreneurial trajectories are shaped by differences in migration histories, legal status, educational backgrounds, professional experience, and transnational ties (Bolzani, 2024). These factors influence not only the resources available to entrepreneurs but also their ability to navigate the institutional and relational opportunity structures within the host-country ecosystem (Kloosterman et al., 1999; Kloosterman, 2010; Elo et al., 2018). By examining these variations, the study aims to identify the mechanisms through which ESOs can either facilitate or hinder connections between immigrant entrepreneurs and the broader entrepreneurial ecosystem.

To address these objectives, the paper adopts a relational perspective that emphasizes the role of networks, interactions, and institutional contexts in shaping entrepreneurial processes. From this perspective, ESOs are not simply providers of services or infrastructure; rather, they function as relational spaces in which entrepreneurs interact with mentors, peers, investors, and institutional actors, thereby gaining access to knowledge, legitimacy, and strategic connections (Spigel, 2017; Bergman & McMullen, 2021). Understanding these relational dynamics is essential for explaining how entrepreneurial support organizations influence the inclusion—or exclusion—of immigrant entrepreneurs within entrepreneurial ecosystems.

Methodology. In this paper, we draw on the Italian context as a significant site for research. Italy has experienced a rapid increase in international migration over the past two decades, contributing to a more diverse and transnational socio-economic context (UN DESA, 2020; Ambrosini, 2012; Riccio, 2008). Despite migrants often facing labour market disadvantages and precarious employment (Istituto Cattaneo, 2019; Zanfrini, 2020), migrant entrepreneurship has become a consolidated phenomenon, with over 600,000 firms representing about 9.6% of all Italian businesses (Unioncamere, 2018a; Bolzani, 2021). While migrant businesses remain concentrated in traditional sectors, participation in innovative and high-tech activities is gradually increasing (Sepulveda et al., 2011; Kloosterman, 2014; Solano, 2020). To investigate the research question, a qualitative approach was employed. We first produced a list of all the ESOs in the country, based on manual search on the Internet, use of available listings (e.g., Italian government-certified incubators), and referrals from industry/entrepreneurship experts and academics. For each ESO, we carried out desk research to collect information about the year of foundation, governance structure, business model, main goals, services provided, and target groups. We have identified "immigrant-focused" ESOs, who exclusively focus on immigrants; and "generalist" ESOs, who do not declare a specific target group. We then designed a selection grid so that we could invite for interviews those ESOs ensuring heterogeneity across the following dimensions: governance structure (i.e., private vs. public vs. mixed), services provided (i.e., pre-incubation training, incubation, acceleration and seed investing), and target group (i.e., migrant-focused vs. generalist). These ESOs were contacted via email or telephone, to ask participation in a semi-structured interview. We interviewed 24 people working for 20 ESOs. To triangulate these information, we asked the interviewed ESOs to provide us with access to some of their beneficiaries, and we thereby interviewed 11 entrepreneurs.

Results. The findings suggest that ESOs play a significant but complex role in shaping the inclusion of immigrant entrepreneurs within entrepreneurial ecosystems, as they produce differentiated outcomes depending on their organizational orientation and relational practices.

ESOs act as intermediaries that facilitate access to key ecosystem resources such as funding, mentorship, and professional networks. For immigrant entrepreneurs who often lack established local networks, this intermediary role can be particularly valuable. ESOs can introduce entrepreneurs to investors, industry partners, and potential collaborators, thereby reducing barriers to entry within the ecosystem. However, the study also finds that access to ESOs themselves is often uneven. Many organizations rely on selection processes that prioritize certain characteristics such as advanced education, prior entrepreneurial experience, or technological innovation. These criteria tend to favor highly skilled immigrant entrepreneurs who already possess significant human capital. As a result, immigrant entrepreneurs with fewer resources may struggle to gain entry into these programs.

The research also highlights the importance of relational practices within ESOs. Successful organizations often emphasize mentorship, peer learning, and network-building activities that allow entrepreneurs to develop trust-based relationships with mentors and ecosystem actors, allowing immigrant entrepreneurs gain legitimacy and credibility within the ecosystem. In contrast, ESOs that focus primarily on standardized training programs or short-term acceleration models may provide limited opportunities for relationship-building. In such environments, immigrant entrepreneurs may struggle to access informal networks that are essential for securing funding or partnerships.

Another important finding concerns the alignment between ESOs' models and entrepreneur profiles. Socially oriented ESOs tend to adopt more inclusive selection criteria and offer tailored support programs that address the specific challenges faced by immigrant entrepreneurs. These organizations may provide language support, legal guidance, or networking opportunities specifically designed for immigrant founders. Mainstream for-profit ESOs, on the other hand, tend to prioritize ventures with strong growth potential and may provide less targeted support for immigrant entrepreneurs. While these ESOs can offer valuable resources and investor connections, they may inadvertently exclude entrepreneurs who lack the credentials or networks required to meet their selection criteria.

Overall, the findings suggest that inclusion within entrepreneurial ecosystems is not simply determined by the presence of ESOs but by how these organizations structure their relational practices and selection processes.

Research limitations. As with any study, several limitations should be acknowledged. First, the research is based primarily on qualitative data collected in one country and therefore, while the selected context provides valuable insights, the findings may not be fully generalizable to other regions with different institutional environments or immigration patterns. Second, the study focuses primarily on ESOs and does not examine other ecosystem actors such as venture capital firms, universities, or government agencies in depth. These actors also play important roles in shaping entrepreneurial ecosystems and may influence the inclusion of immigrant entrepreneurs in ways not fully captured in this study. Third, the research relies on interview data that reflect participants' perceptions and experiences. While these perspectives provide rich insights into relational dynamics, they may also be influenced by individual biases or subjective interpretations. Future research could build on these limitations by conducting comparative analyses across a wider range of countries and ecosystem contexts. Quantitative studies could also complement qualitative insights by examining patterns of ESO participation and entrepreneurial outcomes among immigrant entrepreneurs.

Managerial implications. The findings of this study have important implications for ESO managers, policy makers, and ecosystem stakeholders seeking to promote inclusive entrepreneurship. For ESO managers, the results highlight the importance of adopting relational practices that actively facilitate network-building and mentorship for immigrant entrepreneurs. Programs that emphasize long-term mentoring relationships, peer learning, and ecosystem integration can significantly enhance immigrant entrepreneurs' ability to access resources and opportunities. ESOs should also consider revising their selection criteria to ensure that they do not inadvertently exclude promising entrepreneurs who may lack traditional indicators of entrepreneurial success, such as formal educational credentials or prior startup experience.

For policy makers, the study suggests that supporting socially oriented or hybrid entrepreneurial support models may be particularly effective in fostering inclusive ecosystems. Public funding programs could encourage ESOs to develop targeted initiatives for immigrant entrepreneurs, including mentorship programs, legal guidance, and networking events.

Finally, ecosystem stakeholders such as investors, universities, and industry partners can contribute to inclusive ecosystems by collaborating with ESOs to expand access to networks and resources for immigrant entrepreneurs.

Originality of the paper. By focusing on the relational dynamics of entrepreneurial support, this study contributes to ongoing debates about inclusiveness within entrepreneurial ecosystems and provides insights into how ESOs can better support immigrant entrepreneurs.

This paper contributes to the literature on entrepreneurial ecosystems and immigrant entrepreneurship by adopting a relational perspective on entrepreneurial support. While previous studies have examined the role of ESOs in supporting startups, relatively little attention has been paid to how relational dynamics within ESOs influence inclusion for immigrant entrepreneurs.

By highlighting the interaction between support models and entrepreneur profiles, the study provides a more nuanced understanding of how ESOs shape access to entrepreneurial ecosystems. The findings suggest that inclusion is not simply a matter of providing services but depends on the relational practices through which entrepreneurs connect to networks, resources, and institutions. This relational perspective offers new insights into how ESOs can function as key intermediaries within entrepreneurial ecosystems and how their organizational practices can either promote or constrain inclusion.

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The T-Rex Effect in the Entrepreneurial Ecosystem

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Abstract. *Large incumbent firms can profoundly shape the economic and institutional structures of the cities in which they operate. In highly attractive and advanced urban environments such as smart cities, the concentration of large firms may alter the configuration of entrepreneurial ecosystems by redistributing key resources, opportunities, and institutional dynamics. Building on the entrepreneurial ecosystem framework, this study introduces the concept of the T-Rex effect, conceptualizing large incumbent firms as dominant actors capable of reshaping ecosystem dynamics. Using a longitudinal panel of 42 Italian cities over a 15-year period and employing a dynamic Generalized Method of Moments (GMM) approach, the analysis investigates how the presence of large firms influences multiple dimensions of the entrepreneurial ecosystem. The findings suggest that while corporate concentration strengthens knowledge flows, talent attraction, and infrastructural resources, it is also associated with lower entrepreneurial activity and weaker liveability and informal institutional dynamics. These results highlight the T-Rex effect, whereby dominant corporate actors simultaneously generate ecosystem spillovers while altering the internal equilibrium of entrepreneurial ecosystems in smart cities.*

Keywords: *Entrepreneurial Ecosystem; Large Firms; Smart Cities; Entrepreneurial Dynamics; T-Rex Effect; Urban Environment*

Framing of the research. Although often portrayed as a powerful predator, the Tyrannosaurus Rex (T-rex) was not a particularly fast runner. Palaeobiological studies suggest that its massive body constrained its running speed, making rapid movement unlikely (Hutchinson & Garcia, 2002). Yet, despite this limited mobility, the Tyrannosaurus profoundly shaped the ecological systems in which it lived, dominating the environment and altering the behavior and ecological positioning of other species within the ecosystem. Drawing inspiration from this ecological metaphor, this study argues that a similar dynamic emerges at the intersection of smart cities, entrepreneurial ecosystems, and urban environments, where large incumbent firms (often characterized by organizational inertia and lower adaptive flexibility) can exert a disproportionate influence on local economic structures. By concentrating substantial resources, talent, and employment within a single city, these actors may reshape the configuration and functioning of entrepreneurial ecosystems in smart cities.

Over the past two decades, cities have increasingly adopted the smart city paradigm as a strategic framework to enhance their economic dynamism, sustainability, and global competitiveness (Albino et al., 2015). Following the early definition proposed by Kourtit & Nijkamp (2012), smart cities have been conceptualized as "urban systems shaped by knowledge-intensive and creativity-driven strategies designed to improve the socio-economic, ecological, logistical, and competitive performance of urban areas. In this perspective, smart cities rely on the interaction of multiple forms of capital, including human capital (e.g., highly skilled labor), infrastructural capital (e.g., advanced digital and communication infrastructures), social capital (e.g., dense and open collaborative networks), and entrepreneurial capital (e.g., innovative and risk-taking business activities)"(p. 93). These elements contribute to shaping cities as complex environments where innovation, knowledge exchange, and entrepreneurial initiatives can emerge and scale. Within this context, cities (Adler et al., 2019; Audretsch & Belitski, 2017; Tavassoli et al., 2021) and smart cities (Barba-Sánchez et al., 2019; Ferraris et al., 2020; Khurana & Dutta, 2024; Marchesani et al., 2025; Marchesani & Kummitha, 2026) are increasingly understood as closely intertwined with the development of entrepreneurial ecosystems .

Urban environments provide the spatial and institutional conditions that enable firms, entrepreneurs, and supporting organizations to interact and co-evolve, thereby generating new economic opportunities and reinforcing local innovation capacity (Fujita & Thisse, 2003; Glaeser, 1999; Glaeser & Gottlieb, 2009). At the same time, the relationship between smart cities and entrepreneurship is inherently dynamic (Tavassoli et al., 2021). Previous research shows that entrepreneurial activity produces both direct and indirect effects on urban economic development. While the direct effects (among the others) arise from the creation of new firms (Marchesani et al., 2025; van den Buuse & Kolk, 2019) and employment (Balland et al., 2020; Betz et al., 2016), indirect effects emerge through broader mechanisms such as increased competition, knowledge spillovers, innovation diffusion, and improved productivity among incumbent firms (Abid & Marchesani, 2025; Adler & Florida, 2021; Feldman & Audretsch, 1999; Florida et al., 2017; Pinkse et al., 2024). Importantly, these dynamics tend to unfold over time and are often amplified in larger urban systems, where agglomeration economies and critical mass facilitate the diffusion of entrepreneurial knowledge and market opportunities (Audretsch et al., 2015).

Taken together, these insights suggest that smart city development, urban environments, and entrepreneurial dynamics are deeply interconnected. The implementation of smart city strategies tends to enhance urban attractiveness and expand

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the availability of knowledge, talent, and capital within cities (Ferraris et al., 2020; Kourtit & Nijkamp, 2012; Marchesani et al., 2025). In turn, these conditions can improve the opportunity structure for firms and entrepreneurs, facilitating experimentation, innovation, and the creation of new ventures (Mora et al., 2017; Muñoz & Cohen, 2016; Shearmur & Doloreux, 2021). Within this context, urban environments act as the spatial and institutional arenas where entrepreneurial processes unfold. The concentration of human capital, infrastructures, and collaborative networks enables firms and individuals to interact, exchange knowledge, and mobilize resources (Audretsch et al., 2019, 2023; Audretsch & Fritsch, 1994; Audretsch & Lehmann, 2005; Feldman & Audretsch, 1999). These interactions both (i) influence the emergence of entrepreneurial initiatives and (ii) shape the broader economic trajectory of cities over time.

Considering the intersection between economic and urban environment, entrepreneurial ecosystems represent the systemic configuration of actors, institutions, and resources that co-evolve within a given urban context (Wurth et al., 2022). Such ecosystems are inherently embedded in the environments in which they operate and continuously interact with the economic, institutional, and spatial conditions of the city (Audretsch & Belitski, 2017). As a result, understanding how entrepreneurial ecosystems evolve within smart cities becomes crucial for explaining how urban systems generate long-term economic value and innovation capacity.

In this vein, as noted by Wurth et al. (2022, p. 741), "smart city policies promote entrepreneurship through fostering the ecosystem". At the same time, however, different forms of entrepreneurship and firm typologies may themselves reshape the structure and functioning of the ecosystem. In this sense, ecosystems are not only enabling environments but also evolving outcomes of the actors embedded within them. According to Audretsch & Belitski (2017) entrepreneurial ecosystems are conceptualized as geographically bounded systems in which "institutional and organizational as well as other systemic factors interact and influence the identification and commercialization of entrepreneurial opportunities" (p. 1031).

However, entrepreneurial ecosystems do not evolve solely through the interaction of start-ups, entrepreneurs, and supporting institutions. A growing body of research highlights that large incumbent firms represent central actors within entrepreneurial ecosystems, shaping resource allocation, institutional arrangements, and local opportunity structures (Changoluisa & Fritsch, 2020; Herzog et al., 2024; Markman & Waldron, 2014; Rohrbeck et al., 2009). According to the framework proposed by Stam and Van de Ven (2021), entrepreneurial ecosystems consist of interconnected resource endowments and institutional arrangements, including talent, knowledge, finance, leadership, demand, and physical infrastructure, whose interactions ultimately determine the level of productive entrepreneurship (p. 813). Within these systems, large corporations frequently act as anchor organizations that influence multiple ecosystem components simultaneously (Engel et al., 2018). Empirical evidence shows that corporations contribute to ecosystem development by attracting highly skilled workers, investing in local infrastructure, and participating in public–private initiatives aimed at improving urban attractiveness and quality of life (Baumol, 2002; Herzog et al., 2024; Marchesani & Ceci, 2025). They also support entrepreneurial activity through accelerators, incubators, mentoring programmes, and venture investments, thereby expanding the financial and knowledge resources available to start-ups (Florida et al., 2017) while also function as a talent magnet, recruiting highly skilled workers and providing advanced training opportunities that enhance the overall human capital base of the region (Marchesani et al., 2023).

However, recent evidence suggests that the influence of large firms is more ambivalent than traditionally assumed. While corporations inject resources into the ecosystem, they may also absorb a disproportionate share of skilled talent, raise wage expectations, and reshape local opportunity structures, potentially constraining entrepreneurial activity (Gilbert et al., 2008; Lucarelli et al., 2025). Despite these insights, three important gaps remain in the literature. First, ecosystem research has predominantly focused on the presence of actors and resources, while the specific structural role of large incumbent firms within the ecosystem configuration remains underexplored (Herzog et al., 2024, p. 1296). Second, existing studies largely examine the resource-enhancing effects of corporations, whereas the potential systemic imbalances within the urban environment generated by dominant corporate actors have received limited theoretical attention (Baumol, 2002; Keskin & Markus, 2022; Sternberg & Arndt, 2001). Third, while smart city research emphasizes urban attractiveness as a driver of entrepreneurial activity, little is known about how the localization of large corporations within highly smart cities reshapes entrepreneurial ecosystems and their internal dynamics (Ferraris et al., 2020; Khurana & Dutta, 2024; Marchesani & Ceci, 2025). Addressing these gaps is crucial for understanding the evolving relationship between urban environment and entrepreneurial ecosystems. When large firms concentrate substantial employment and strategic resources within a city, they may simultaneously stimulate economic growth while structurally reshaping labour markets, institutional priorities, and opportunity structures within the ecosystem. Against this background, this study asks the following research question: "How does the concentration of large incumbent firms within smart cities influence the structural configuration of entrepreneurial ecosystems?"

To address this question, we conceptualize the T-Rex effect as the structural influence exerted by large incumbent firms that concentrate a substantial share of employment and strategic resources within a single urban ecosystem. In highly attractive urban environments such as smart cities, these firms often emerge as dominant actors capable of shaping labour markets, knowledge flows, and institutional priorities. Similar to apex actors within ecological systems, large corporations may simultaneously generate positive spillovers (such as knowledge diffusion, infrastructure development, and increased demand) while also absorbing critical ecosystem resources including talent, capital, and institutional attention. As a result, their presence may alter the internal balance of entrepreneurial ecosystems, reinforce certain dimensions while constrain others.

Purpose of the paper. Despite the growing body of research on smart cities and entrepreneurial ecosystems, limited attention has been devoted to understanding how the presence of large incumbent firms reshapes the internal structure of urban entrepreneurial systems. Existing studies largely emphasize the resource-enhancing role of corporations, while the potential systemic imbalances generated by dominant actors within highly attractive urban environments remain underexplored. In particular, little is known about how the concentration of large firms within smart cities influences the configuration of entrepreneurial ecosystem dimensions such as talent, knowledge, infrastructure, and finance. This study addresses this gap by introducing the T-Rex effect, conceptualized as the structural influence exerted by large incumbent firms that centralize substantial employment and strategic resources within a city. Using a longitudinal analysis of 42 Italian cities over 15 years, the paper examines how increasing levels of corporate dominance reshape both the overall entrepreneurial ecosystem and its key structural components. By doing so, the study advances research on smart cities and entrepreneurial ecosystems by highlighting how dominant corporate actors may simultaneously generate spillovers while constraining entrepreneurial opportunity structures.

Methodology. Using a longitudinal panel of 42 Italian cities over a 15-year period, we examine how the concentration of large incumbent firms (250+ employees) affects the structural configuration of entrepreneurial ecosystems. The empirical analysis is conducted using the Generalized Method of Moments (GMM) estimator (Lee & Yu, 2014; Roodman, 2009), which allows us to account for potential endogeneity, dynamic effects, and unobserved heterogeneity across cities. The analytical framework follows the systemic conceptualization of entrepreneurial ecosystems proposed by Stam and Van de Ven (2021), which emphasizes the interaction between resource endowments and institutional arrangements in shaping productive entrepreneurship. Consistent with this approach, we operationalize the ecosystem through seven core dimensions capturing the main structural conditions of urban entrepreneurial systems: (1) Industry and Economic Environment, (2) Leadership, (3) Knowledge and Human Capital, (4) Physical Infrastructure, (5) Livability and Leisure, (6) Informal Institutions, and (7) Finance.

Each dimension is measured through a combination of indicators and composite indices constructed from multiple variables. The indicators are derived from national and international data sources, allowing us to capture both the structural characteristics and the dynamic evolution of entrepreneurial ecosystems across cities. These dimensions represent the key pillars through which urban environments interact with the entrepreneurial ecosystem structure and determine the capacity of cities to generate and sustain entrepreneurial activity. By examining the impact of large firms across each dimension, the empirical design enables us to assess both the overall ecosystem configuration and the specific mechanisms through which dominant firms reshape ecosystem components.

Results. Preliminary results indicate that the presence of large incumbent firms is positively associated with the overall configuration of the entrepreneurial ecosystem, while revealing differentiated effects across its core dimensions. In particular, cities hosting a higher concentration of large firms tend to experience improvements in knowledge and human capital, talent attraction, and the strengthening of the industry and economic environment as well as physical infrastructure supporting entrepreneurial activity.

These dynamics appear to enhance the availability of resources such as skilled labor, innovation networks, and market opportunities. However, the results also reveal emerging structural imbalances across ecosystem dimensions. In particular, higher levels of corporate concentration are associated with a decline in entrepreneurial activity and a weakening of informal institutional conditions within the city, such as informal networks, public participation and community-based support mechanisms. This pattern suggests that increasing corporate dominance may reshape the internal equilibrium of entrepreneurial ecosystems in smart cities, reinforcing some resource-based pillars while simultaneously constraining entrepreneurial dynamism and grassroots ecosystem interactions.

Research limitations. This study presents several limitations that open avenues for future research. First, the analysis focuses on Italian cities, which may limit the generalizability of the findings to other national contexts characterized by different institutional and economic structures. Second, while the study adopts a longitudinal panel design, the operationalization of entrepreneurial ecosystem dimensions relies on available secondary indicators, which may not fully capture the complexity of informal institutional dynamics. Third, the measurement of corporate dominance is based on employment concentration of large firms, which may overlook other forms of influence such as financial power, technological leadership, or platform dominance. Fourth, although the empirical strategy accounts for potential endogeneity using dynamic panel techniques, causal interpretations should be considered with caution given the structural complexity of urban entrepreneurial ecosystems. Finally, the study focuses on city-level dynamics, which may mask important micro-level interactions among entrepreneurs, institutions, and corporate actors that shape ecosystem evolution over time. Future research could address these limitations by exploring different geographical contexts, incorporating alternative measures of corporate influence, and examining ecosystem dynamics through multi-level or qualitative approaches.

Managerial implications. The preliminary findings provide implications for entrepreneurs, urban policymakers, city managers, and ecosystem stakeholders involved in smart city development. While attracting large corporations may strengthen key ecosystem resources such as knowledge, talent, and infrastructure, excessive corporate concentration may

also generate structural imbalances within the entrepreneurial ecosystem. Policymakers should therefore design governance mechanisms that balance the benefits generated by large incumbent firms with policies that sustain entrepreneurial diversity, informal institutional support, and opportunity distribution within the city. This may include strengthening local entrepreneurial networks, supporting start-up ecosystems, and ensuring that large corporate actors remain integrated within the broader urban innovation system rather than dominating it.

Originality of the paper. This study contributes to the literature on smart cities and entrepreneurial ecosystems by introducing the concept of the T-Rex effect, which conceptualizes the structural influence of large incumbent firms within urban entrepreneurial ecosystems. By examining how corporate dominance reshapes multiple ecosystem dimensions simultaneously, the paper moves beyond traditional spillover-based perspectives and highlights how large firms may both reinforce and constrain entrepreneurial ecosystem dynamics. In doing so, the study provides a novel framework for understanding how dominant corporate actors reshape the internal equilibrium of entrepreneurial ecosystems in smart cities.

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Training for Automotive Company Creation: a case study for university students' entrepreneurial action and education

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Abstract. *This paper investigates how learning-by-doing approaches within an interdisciplinary program can foster student entrepreneurship and contribute to the regional ecosystem of innovation. Grounded in the literature on the entrepreneurial university, the study interprets higher education institutions not only as knowledge producers but as institutions that integrate structural transformation with educational innovation to nurture entrepreneurial mindsets and venture creation. This entails a shift from knowledge production for its own sake toward addressing concrete societal and economic challenges, repositioning universities as active agents within innovation ecosystems rather than isolated knowledge producers (Audretsch, 2014). Within this transformation, the university assumes a strategic developmental role by aligning its educational mission with innovation-driven outcomes.*

Empirically, the paper presents as a case study the program called Training for Automotive Company Creation (TACC), organized by the University of Modena and Reggio Emilia (Emilia Romagna region, IT), designed as a lean and problem-driven entrepreneurial pathway that brings together students, lecturers, and mentors in an experiential learning environment. The program is structured around early-stage problem identification of burning issues in the automotive industry and team development, followed by iterative prototyping and validation, culminating in the creation of a comprehensive project work and, in some cases, the creation of junior spin-offs. This architecture reflects principles of human-centered and interdisciplinary learning, emphasizing experimentation, user focus, and action under conditions of uncertainty. The program indeed adopts a design thinking approach, that is here discussed in its distinctive features and as an approach suitable to foster entrepreneurial competence development. Rather than a linear methodology of problem-solving, design thinking indeed represents a set of practices and cognitive orientations that emphasize framing and reframing of problems, thus generating multiple solution alternatives, then prototyped and tested, and learning through feedback loops. Its diffusion in higher education answers to the need of bridging technical expertise with the competencies required in entrepreneurial mindset and education (Klenner et al., 2022; Micheli et al., 2019).

The results highlight two interrelated dimensions central to the program's effectiveness: (1) team formation and functioning, particularly the role of interdisciplinary collaboration and self-organized team building in shaping entrepreneurial dynamics; and (2) the impact of the approach on entrepreneurship education, especially in terms of managing ambiguity, fostering leadership, and supporting transformational learning processes. By examining TACC and its experiential methodologies the paper contributes to the debate on how universities can act to empower students to become proactive entrepreneurs. Overall, the study depicts a transferable model for institutions seeking to embed entrepreneurship more deeply into their academic structures. In doing so, it provides not only pedagogical guidance for educators but also strategic insights for university managers and technology transfer practitioners aiming to cultivate an innovation-oriented and ecosystem-driven university environment.

Keywords: *entrepreneurial education; junior spin-offs; academic entrepreneurship; design thinking.*

Framing of the research. A key contribution to defining the so-called third mission of the university comes from Perkmann et al. (2013), who distinguish between academic engagement and academic entrepreneurship. The former refers to knowledge-based collaborations between academic researchers and external organizations, while the latter focuses on technology transfer through the creation of startups and spin-offs aimed at commercializing academic research (Shane, 2004). This distinction clarifies that the entrepreneurial turn in higher education is not limited to firm creation, but encompasses a broader spectrum of relational and institutional mechanisms that connect universities with industry and society. The entrepreneurial university model therefore requires stronger collaboration between academia, industry, and government. Such collaboration entails structural and organizational transformations, including the establishment of entrepreneurship centers and technology transfer offices (Grimaldi et al., 2011; Baglieri et al., 2018), the integration of new institutional purposes and hybrid business models (Miller et al., 2014), and the development of managerial and collaborative capabilities among both students and faculty (Linton and Klinton, 2019). However, structural adaptation alone is insufficient, and requires also to innovate the educational approach. Today, universities are then expected not only to generate knowledge but also to adapt their structures, activities, and values to promote entrepreneurship among students (Audretsch, 2014).

As knowledge increasingly drives innovation, universities play a crucial role not merely in transferring technology but in cultivating an entrepreneurial mindset. By integrating innovative approach to entrepreneurial education and

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interdisciplinarity, universities can ultimately empower students to become proactive entrepreneurs within local and regional ecosystems (Etzkowitz et al., 2000). In this sense, the entrepreneurial university emerges as a systemic configuration in which education and third mission activities converge to generate technological innovation and social value. The transition toward an entrepreneurial university then implies a reconfiguration of courses or the integration of specific programs that are designed to foster entrepreneurial cognition and behavior (Klenner et al., 2022). In this perspective, innovation in higher education becomes a central lever through which universities operationalize their entrepreneurial mission, and the educational program grounded in experiential and interdisciplinary learning become central. Innovative approaches, when embedded within university structures that support experimentation and external engagement, contribute to strengthening the university's third mission not only at an institutional level but also at the level of individual capability development.

Among the approaches that have gained relevance in both management research and higher education research, design thinking is one of the most notable (Sarooghi et al., 2019). Originally rooted in design practice, it has progressively expanded into management, social sciences, and entrepreneurship as a tool for addressing complex and ill-defined problems, to generate customer value and market opportunities (Micheli et al., 2019). It has been conceptualized as a structured yet flexible problem-solving paradigm that combines user-centeredness, iterative experimentation, and abductive reasoning (Baltador et al., 2024; Linton and Klinton, 2019). Design thinking indeed represents a human-centered non-linear approach for developing innovative solutions that integrates user needs, technological feasibility, and viable business strategies (Lynch et al., 2021; Vignoli ey al. 2023). Micheli et al. (2019) highlight that "doing" design thinking involves the integration of three core dimensions: (1) a human-centered orientation grounded in empathy and deep user understanding; (2) an experimental logic based on prototyping and iterative testing; and (3) collaborative and interdisciplinary work structures that challenge traditional functional silos. These elements are particularly relevant in context where uncertainty, ambiguity, and resource constraints require actors to move beyond purely analytical reasoning toward abductive and action-oriented approaches, like in entrepreneurial contexts

Design thinking emerges then as particularly relevant for fostering an entrepreneurial education and mindset, as it trains students to sense opportunities, act rapidly, and mobilize resources under conditions of uncertainty (Baltador et al., 2024; Kazakeviciute et al., 2016; Sarooghi et al., 2019). Through iterative and practice-based processes, students develop critical tangential skills, including teamwork, communication, networking, empathy, and the ability to manage ambiguity in complex contexts (Micheli et al., 2019; Vignoli et al., 2023). Empirical evidence highlights how this approach enables transformational learning: students are often pushed beyond their disciplinary comfort zones and encouraged to move from a rule-based, purely analytical orientation toward a more creative and value-driven perspective (Klenner et al., 2022; Micheli et al., 2019). Although initial difficulties may arise due to time pressure and team dynamics, the experiential nature of the method allows participants to overcome the limits of traditional analytical models and to internalize entrepreneurial ways of thinking and acting. Moreover, the design thinking approach is inherently interdisciplinary, requiring collaboration across fields such as engineering, business, and the arts to achieve breakthrough innovation. This interdisciplinary dimension aligns with evidence from case-based studies (Klapper and Tegtmeier, 2010; Sorici et al., 2023), which confirm the importance of cross-disciplinary education and field experimentation in developing entrepreneurial competencies and supporting start-up creation.

Purpose of the paper. How can universities effectively foster student entrepreneurship while strengthening their role as drivers of innovation in knowledge-based societies? This paper addresses this broad question by examining how higher education institutions assume a more entrepreneurial and engaged position within regional knowledge ecosystems through cross-disciplinary and action-oriented educational programs. Specifically, the study investigates how structured entrepreneurial pathways can support student-led venture creation. In this preliminary analysis, we present the analytical framework and methodological approach adopted, and we introduce the case study of the Training for Automotive Company Creation (TACC) program at the University of Modena and Reggio Emilia (Unimore), located in the Emilia-Romagna region of Italy. By analyzing the experiences of participating students, the paper aims to explore the mechanisms through which problem-driven learning environments can enhance entrepreneurial competencies and contribute to the university's third mission within its regional ecosystem.

Methodology. We adopt a qualitative case study approach (Yin, 2003; Eisenhardt, 1989), suitable for investigating complex phenomena within their real-life context. The empirical setting is the Training for Automotive Company Creation (TACC) program, promoted by the University of Modena and Reggio Emilia. TACC is selected as a significant case, given its consolidation over multiple editions and its explicit orientation toward venture creation within a structured university–industry partnership framework. The case study design allows an in-depth exploration of how this entrepreneurial educational program operates and how it influences students' entrepreneurial mindset development.

Data collection relies on multiple sources to ensure triangulation and enhance construct validity (Yin, 1994). First, we conducted participant observation during program activities, including workshops, mentoring sessions, team formation processes, and final project presentations. This enabled direct observation of team dynamics, interdisciplinary collaboration, and iterative learning processes. Second, we carried out document analysis of internal program materials, project outputs (business models and business plans), and communication materials. These sources provide insight into the formal structure of the program, its educational approach, and its evolution over time. Third, data about junior spin-off creation, stemming from projects evolved during the TACC program, at university level are analyzed.

Data analysis followed an iterative strategy consistent with case study research (Eisenhardt, 1989; Yin, 2003). The empirical material collected through participant observation and document analysis was systematically analyzed. First, field notes and program documents were subjected to open coding in order to detect emerging themes grounded in the textual data. This initial phase allowed the identification of key analytical categories, such as management of uncertainty, problem framing, prototyping practices, leadership emergence. Second, we connect empirical evidence with the theoretical framework on entrepreneurial universities and design thinking. This process enabled pattern matching between observed practices and conceptual constructs derived from the literature. Last, longitudinal assessment of venture creation and performance is performed. The analytical approach thus combines inductive insights with theory-driven interpretation. Triangulation across data sources—observational evidence, internal documents, and project outputs—was used to enhance internal validity and reduce potential bias. Particular attention was devoted to cross-edition comparison, allowing a process-oriented interpretation of how the program evolved over time.

Results. TACC is promoted by the University of Modena and Reggio Emilia and MUNER Motor Valley University of Emilia Romagna, in partnership with AVL and Confindustria Emilia Area Gruppo Giovani Imprenditori, Rete Professionisti Motorsport, and Fondazione di Modena, with several other sponsors. Since its launch in 2018, TACC has progressed through five editions, in each improving its educational structure and approach. TACC combines workshops with managers and entrepreneurial mentors, corporate visits, and participation in fairs, offering a rich entrepreneurial learning experience between its two phases. The first phase is focused on team creation and idea elaboration. The second phase is focused on prototyping, in terms of technical feasibility and business viability. TACC is open to PhD students, students of Master's Degree and 5-year combined Bachelor' s/Master's degree. To date, TACC has gathered applications from over 360 students, with 150 students from the departments of Communication, Economics, Engineering, Law, Physics and Mathematics participating in it.

The uniqueness of TACC lies in its lean and problem-focused approach, which is consistent with the principles of design thinking. The program is structured around an initial phase centered on problem identification and business model architecture, followed by a prototyping phase aimed at translating validated assumptions into concrete and viable solutions within a limited time frame. This sequence shifts attention from abstract theorization to action-oriented experimentation, encouraging students to engage directly with real market and user-related constraints. In doing so, the program reinforces an entrepreneurial mindset understood as the capacity to perceive opportunities, act, and mobilize resources rapidly under conditions of uncertainty.

The emphasis on early problem framing, rather than solution elaboration, exposes participants to complex and ill-defined challenges, requiring them to define the boundaries of the problem autonomously rather than relying on predefined analytical schemes. This deliberate exposure to ambiguity supports the development of cognitive flexibility and tolerance for uncertainty, key attributes of entrepreneurial behavior. The subsequent prototyping and validation phase institutionalizes an iterative logic based on testing hypotheses, feedback collection, and progressive refinement. Students learn to transform ideas into tangible artifacts, gather immediate market responses, and adjust their solutions accordingly. This process operationalizes the principle of learning through experimentation and normalizes failure as an informative step within the innovation cycle rather than as a negative outcome.

The activities culminate in a supervised project work developed with lecturers and mentors, including the elaboration of a business model, a business plan, and the organizational design of the new venture. This structured deliverable consolidates analytical rigor with creative exploration, ensuring that experimentation is anchored to strategic coherence and economic feasibility. The combination of conceptual modeling and field validation strengthens students' abilities in strategic thinking, prioritization, and project management under time pressure. The human-centered orientation of the program further reinforces its entrepreneurial impact. By emphasizing user needs and latent demand, students are trained to ground innovation in empathy and value creation rather than in purely technical sophistication. This focus strengthens their capacity to identify viable market opportunities and to articulate convincing value propositions, particularly in pitching contexts.

Through this process, students develop essential entrepreneurial competencies, including effective communication, networking capabilities, shared leadership, and collaborative decision-making, effectively converting interpersonal and professional tensions into powerful drivers for creative problem-solving. Beyond skill acquisition, the educational impact of design thinking assumes a transformative dimension. As highlighted in the literature (Klenner et al, 2022; Micheli et al., 2019), engaging students in the resolution of complex and ill-defined problems shifts their perspective from a passive, rule-based and predominantly analytical stance toward a proactive orientation centered on real-world value creation. This transition is not merely methodological but cognitive and identity-related, as students progressively internalize an action-oriented logic grounded in experimentation and responsibility for outcomes. Through this approach, participants develop critical transversal competencies, including critical thinking, effective communication, and the capacity to act decisively under time pressure and conditions of extreme uncertainty. In this sense, design thinking operates not only as a problem-solving methodology but also as a catalyst for entrepreneurial agency, reinforcing the alignment between pedagogical innovation and the broader objectives of the entrepreneurial university.

Team building represents a core structural element of the program. Unlike traditional didactic formats, students autonomously form teams through a call for ideas followed by a voting process. This mechanism enhances ownership and intrinsic motivation while simulating early-stage entrepreneurial dynamics. This evolutionary configuration of teams

around problem-seeking processes emerges as a distinctive element of the program. In the first phase of TACC, teams initially emerge around a problem or an early-stage idea. Participants who have already explored a specific problem domain present their proposal to the cohort, allowing other students to join their initiative and collaboratively develop it through a design thinking approach. However, identifying a problem beforehand is not a prerequisite for participation; rather, it represents an initial aggregation mechanism that helps orient participants toward specific thematic areas. Between the first and the second phase of the program, teams are allowed—and often encouraged—to reconfigure. Participants may decide to abandon the original idea, join another group whose concept has demonstrated greater potential, or merge competences with other participants around more promising problem–solution trajectories. As a consequence, not all initial ideas progress to the prototyping phase; only those that withstand early validation continue to evolve, and teams progressively reorganize themselves around these emerging opportunities. These dynamic reverses the traditional logic in which teams are expected to generate ideas regardless of their viability. Instead, the TACC model adopts a problem-driven architecture, in which the team adapts to the most promising problem–solution configurations rather than forcing an idea to fit a pre-existing group structure.

This adaptive mechanism reinforces participants' entrepreneurial competence by exposing them to processes of opportunity recognition, resource recombination, and strategic decision-making under uncertainty. Opportunity seeking therefore emerges as the outcome of the iterative exploration process embedded in the program rather than as a starting assumption. Similarly, the potential creation of new ventures represents a downstream result of this multi-phase learning trajectory, in which validated problems, recomposed teams, and experimentally tested solutions progressively converge toward viable entrepreneurial initiatives. In addition, interdisciplinarity is actively promoted by encouraging the participation of students from different knowledge domains. Although heterogeneous teams may initially experience communication frictions and divergent perspectives, these tensions are intentionally leveraged through structured problem exploration processes that enable participants to progressively develop a shared understanding and a common working language across disciplines. The interdisciplinary configuration reflects the design thinking ethos, which relies on the integration of diverse cognitive frameworks—such as engineering, business, and creative disciplines—to generate breakthrough solutions. By challenging students from different backgrounds to align their mental models, the program intentionally simulates the cognitive dissonance inherent in real-world innovation ecosystems.

Finally, TACC extends beyond simulation by supporting the actual creation of junior spin-off companies. This dimension ensures that entrepreneurial learning produces tangible organizational outcomes. The spin-offs function as concrete manifestations of the iterative learning journey, translating educational processes into real ventures embedded in the university ecosystem. There are 7 spin-offs established following the TACC program, from 2020 to date, and still in activity at the end of 2024. Two more junior spin-offs are in the actual phase of creation at the end of 2025, while 3 more potential junior spin-off may constitute as results of the final awards from the latest TACC Edition (ended in February 2026). All the ventures are classified as deep-tech or high-tech. Overall, the TACC approach does more than just simulate entrepreneurship; it builds effective and potentially long-lasting ventures. This evidence suggests that the educational approach based on iterative validation and problem framing importantly reduces the risk of failure in the early years of a new ventures, allowing for the creation of a technological solution that is in line with the market needs, and that can be adapted to these evolving needs. This is reinforced by the problem-driven and evolutionary team configuration typical of TACC, that increases the likelihood of venture creation by allowing ideas, competences, and participants to progressively realign around the most promising problem–solution opportunities, enabling entrepreneurial competences to be actively enacted rather than merely designed or simulated within a protected learning environment. The tensions that emerge within teams and the coordination dynamics participants are required to manage closely resemble those of a venture in its early stages of formation, as do the challenges of bridging the gap between an initial idea, the development of a viable solution, and its eventual market introduction.

Research limitations. As this research is still at an early stage, several limitations must be acknowledged. First, the findings are based on a single case study and capture a specific temporal phase of the program's development. The program is currently being updated and will broaden its disciplinary scope, while maintaining its educational approach. A long-term assessment of outcomes is necessary to evaluate the sustainability of the new ventures created by students, the persistence of entrepreneurial competencies among participants, and the overall replicability of the model. Longitudinal monitoring would allow a more robust evaluation of impact and help distinguish short-term educational effects from sustained entrepreneurial trajectories. Second, the study focuses on a single institutional context embedded in a specific regional ecosystem characterized by a strong industrial base and support structures for innovation. This setting may indeed limit the generalizability of the findings. The results should therefore be interpreted in light of the broader national framework of innovation policies, university–industry collaboration, and startup support mechanisms. Cross-national comparisons with analogous initiatives in other higher education systems would strengthen the empirical validity of the study and allow the identification of transferable best practices as well as context-dependent factors. Such comparative research would contribute to a more systematic understanding of how universities can effectively operationalize their entrepreneurial mission within diverse innovation ecosystems.

Managerial implications. Overall, entrepreneurship programs can function not only as venture creation platforms but also as strategic tools for cultivating an innovation-oriented culture within the university and reinforcing its role within the regional ecosystem. This study offers several managerial implications for universities. First, entrepreneurship

educational initiatives should be strategically embedded within the institutional framework rather than treated as isolated programs. Alignment between governance and resource allocation is essential to ensure continuity and impact of these types of programs. Second, experiential and problem-driven learning educational formats should be prioritized. Programs structured around iterative validation, prototyping, and real-world challenges appear more effective in fostering entrepreneurial competencies than traditional classroom-based approaches. Clear phase articulation and structured mentorship can help students navigate uncertainty while maintaining strategic coherence. Third, interdisciplinary collaboration requires active facilitation. While cross-departmental teams enhance creativity and opportunity recognition, they also generate coordination challenges. Formal support and facilitation mechanisms should be designed, such as mentoring, credit recognition between departments, alignment of teaching calendars and timetables for participation by multiple departments, to strengthen inter-disciplinary team creation. Fourth, entrepreneurial programs may benefit from structuring teams around problem exploration rather than fixed project assignments, allowing team composition to evolve as ideas are validated. This adaptive configuration enables resources and competences to progressively concentrate around the most promising opportunities, fostering the development of entrepreneurial competences through real decision-making, coordination, and uncertainty management.

Originality of the paper. This study contributes to the literature by positioning TACC as an empirically grounded example of how "entrepreneurship in practice" can be systematically embedded within higher education. Rather than focusing solely on institutional structures or policy frameworks, the case highlights the micro-foundations of entrepreneurial learning, showing how pedagogical design, interdisciplinary team formation, and iterative experimentation can be integrated into a coherent educational architecture oriented toward venture creation.

The combination of documented student-led projects, the establishment of active spin-offs, and the longitudinal observation across multiple program editions provides process-based insights into how entrepreneurial competencies are developed and consolidated over time. This allows the paper to move beyond descriptive accounts of entrepreneurship education and to identify concrete design principles that support both learning outcomes and tangible entrepreneurial results. The case further generates actionable knowledge regarding best practices for fostering cross-departmental collaboration, structuring team dynamics, and managing the tensions inherent in interdisciplinary work. It also sheds light on recurrent obstacles—such as coordination challenges, ambiguity management, and time pressure—and on the mechanisms adopted to address them through mentorship, structured workshops, and iterative validation processes.

From the perspective of the entrepreneurial university, design thinking contributes to bridging the gap between knowledge generation and value creation. It enables students to translate disciplinary expertise into actionable entrepreneurial competencies first, and then opportunity recognition and venture development processes, aligning technological feasibility with user desirability and business viability. Moreover, by institutionalizing experimentation and tolerating failure as part of learning, universities can cultivate an entrepreneurial culture. By participating in this program, students consolidate entrepreneurial cognition and collaborative capabilities within a robust educational program. In this sense, TACC does not merely teach entrepreneurship; it institutionalizes a transformational learning environment in which students progressively shift from a rule-based and passive stance to a proactive, creative, and value-oriented entrepreneurial mindset.

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We are Change.
Il linguaggio degli innovatori deep tech nel contesto europeo

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Abstract. *Lo studio investiga le modalità attraverso cui gli innovatori emergenti costruiscono la propria legittimazione, sia all'interno sia all'esterno della venture. Attraverso l'adozione di un approccio qualitativo basato sull'analisi computazionale del linguaggio dei founder di imprese deep tech in fase early stage a livello europeo, il lavoro identifica gli aspetti linguistici che caratterizzano le loro narrazioni. Dall'analisi emergono cinque temi che risultano rilevanti nella costruzione identitaria della startup come attore di cambiamento nella società e nell'economia. La startup è capace di fare leva sulle tecnologie digitali per proporre soluzioni sostenibili i cui impatti superano la dimensione del mercato. In tal modo, le startup deep tech affermano la propria legittimazione interna ed esterna come agenti di cambiamento, ed in cui il ruolo centrale non è più assegnato al founder, ma piuttosto alla startup intesa come comunità di intenti, dove significati e valori vengono costruiti congiuntamente e si riflettono nelle attività esterne della startup.*
Keywords*: Innovators, Deep tech, European Union, Entrepreneurship, Venture building*

Il contesto della ricerca. Gli innovatori si confrontano ogni giorno con l'esigenza di articolare un complesso sistema di significati che consenta di superare l'incertezza che caratterizza una nuova iniziativa imprenditoriale. Questa attività implica la costruzione della fiducia e l'accettazione di innovazioni che mettono in discussione modelli consolidati, veicolandone le caratteristiche distintive affinché ne venga compreso il significato profondo e le loro idee possano guadagnare l'accettazione esterna (Hargadon and Douglas, 2001). La struttura del linguaggio rappresenta dunque un fattore determinante per acquisire la legittimazione delle idee innovative, perché è il mezzo attraverso i quale il founder veicola il significato delle proprie idee al pubblico esterno (Cornelissen and Clarke, 2010), ed è particolarmente rilevante in presenza di idee che non sono state ancora implementate (Falchetti, 2022).

Per questo, gli studiosi di management hanno dedicato particolare attenzione all'analisi del ruolo della comunicazione degli imprenditori emergenti (McSweeney et al., 2022). Recenti lavori si concentrano in particolare sui segnali linguistici della comunicazione dei founder, dimostrando come questi rappresentino fattori capaci di influenzare gli outcome delle nuove idee imprenditoriali (Singhal and Kapur, 2023). In particolare, lo stile linguistico è un importante predittore del successo delle attività di crowdfunding in situazioni di pitching (Koh et al., 2020; McSweeney et al., 2022). Nel contesto dell'imprenditoria sociale, è stato inoltre dimostrato che l'uso di un linguaggio concreto e di uno stile interattivo, facilita i processi di fundraising (Parhankangas and Renko, 2017). Studi hanno inoltre approfondito l'aspetto del linguaggio degli imprenditori nascenti nel contesto di attività di fundraising sociale, guadando alla dimensione di genere ed al contenuto emozionale. Ulteriori studi si sono concentrati alla veicolazione di significati di innovazione e risk taking (Mckenny et al., 2018). Ulteriori studi hanno inoltre iniziato ad investigare la dimensione cognitiva legati alla narrativa utilizzata nella presentazione delle idee innovative, concentrandosi sui diversi effetti che hanno i discorsi degli innovatori sui processi valutativi dell'idea da parte degli stakeholders (Falchetti et al., 2022).

Occorre inoltre considerare che nella fase nascente il founder è chiamato ad organizzare le risorse, che in un settore emergente sono spesso scarse, e delineare i confini dell'organizzazione, facendo delle scelte che riguardano l'inserimento di nuovo personale e l'utilizzo delle risorse in condizioni estremamente incerte (Liebregts, 2025). A ciò si aggiunge l'esigenza di integrare i valori della sostenibilità nell'organizzazione nascente e di rispondere alle crescenti, ma altrettanto divergenti, aspettative degli stakeholder, bilanciando sostenibilità e performance, offerta di soluzioni adatte ad affrontare le sfide della sostenibilità, sia ambientale che sociale, e creazione di valore economico (Glinik et al., 2024).

Le aspettative esterne si riflettono anche nei comportamenti interni dell'organizzazione, trasformando le richieste che provengono dall'esterno in obiettivi organizzativi che contribuiscono a plasmare i valori e le norme interne che definiscono il corso dell'azione futura nuova venture (Hampel and Dalpiaz, 2025). Questo elemento contribuisce ad accrescere il livello di incertezza organizzativa, dal momento che le organizzazioni devono gestire risorse spesso limitate all'interno di contesti emergenti e molto instabili.

La tensione tra aspettative esterne e comportamenti interni influenza anche l'uso della retorica da parte degli innovatori come strumento di legittimazione interna e di adattamento dell'organizzazione ai feedback esterni.

La duplice prospettiva di costruzione di significati all'interno e all'esterno dell'organizzazione fa quindi parte del processo di legittimazione identitaria delle startup di fronte all'incertezza e alla crescente complessità dell'ambiente esterno.

Obiettivi dello studio. Nonostante i molti passi avanti fatti nella comprensione del ruolo del linguaggio nel processo di accettazione dell'innovazione, permangono ancora aspetti inesplorati che riguardano i contenuti della comunicazione, i

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significati e i simboli utilizzati per trasmettere il messaggio dei nuovi imprenditori, soprattutto in presenza di innovazioni disruptive.

Tali messaggi diventano fondamentali anche per comprendere il rapporto tra legittimazione esterna e costruzione interna della startup. Si tratta tuttavia di una prospettiva integrata che non è stata ancora pienamente approfondita dalla letteratura manageriale, soprattutto in specifici contesti regionali e di fronte all'incremento degli shock esterni derivanti dalle twin transition, ovvero le transizioni gemelle del green e del digitale (Uhrenholt et al., 2022), e che ridefiniscono il ruolo delle startup, soprattutto quelle che operano nel segmento deep tech.

Alla luce di tali considerazioni, il presente lavoro persegue il fine di comprendere gli elementi del linguaggio che ne determinano l'identità, con particolare riguardo agli innovatori disruptive nel contesto UE, per comprendere le narrative prevalenti e come gli innovatori articolano il rapporto tra legittimazione interna ed esterna dell'organizzazione.

Metodologia. Lo studio adotta un approccio qualitativo basato sull'analisi computazionale delle narrazioni e sull'analisi linguistica. Per l'analisi sono stati utilizzati i software LIWC22 e T-LAB Plus. Il software LIWC22 (Linguistic Inquiry and Word Count) è riconosciuto come lo strumento di analisi del linguaggio più comunemente utilizzato per indagare il rapporto tra l'uso delle parole e le variabili psicologiche (Chen et al., 2014; Malal, 2014). L'analisi con LIWC22 è stata inoltre integrata con una Textual Analysis basata sulle co-occorrenze, effettuata con il software T-LAB Plus (Lancia, 2004). Questa integrazione ha permesso di elaborare analisi di correlazione tra parole e di comprendere meglio il contesto delle narrazioni degli innovatori. La raccolta dei dati per l'analisi è avvenuta in modo automatico mediante web scraping utilizzando la piattaforma MaxQDA. In particolare, sono stati raccolti i post LinkedIn dei fondatori di imprese deep tech con sede in EU che si trovano in una fase iniziale di sviluppo, con un'attività non superiore ai 3 anni. Per la selezione delle startup, ci si è avvalsi della piattaforma Dealroom, selezionando le prime 100 startup che hanno ricevuto gli importi più elevati di investimenti tra quelle fondate nel periodo di riferimento. Per ogni startup sono stati raccolti tutti i post pubblicati negli ultimi 2 anni dal founder. Per l'analisi è stato adottato un approccio adduttivo al coding per la costruzione delle categorie teoriche (Vila-Henninger et al., 2022),

Risultati. L'analisi della struttura dei testi attraverso LIWC22 mostra l'utilizzo di un tono prevalentemente positivo da parte degli innovatori (4%). Prevale la componente emozionale e positiva del linguaggio (1,05% di linguaggio emozionale positivo contro 0,05% di linguaggio emozionale negativo). La struttura è incentrata sulla prevalenza della parola "Noi" nel testo (2,5%). Ciò anticipa l'importanza del contenuto sociale del linguaggio che presenta la percentuale più elevata di termini (10%). L'analisi delle principali parole chiave lemmatizzate (con il più elevato numero di occorrenze nel testo) e delle co-occorrenze tra parole chiave, effettuata attraverso il software T-Lab, ha consentito l'identificazione di 5 temi che descrivono il contenuto della legittimazione identitaria degli innovatori, e che sono presentati di seguito.

1) Il ruolo del fondatore come leader

Analizzando le connessioni dei lemmi (keyword) con il termine "myself" emerge la forte vicinanza con keyword che esprimono il senso di appartenenza a un gruppo e di lavoro congiunto, rappresentati da parole come "we", "cofounders", "friends", "working". Inoltre, si evince il ruolo dell'imprenditore come guida e fonte di ispirazione per gli altri, grazie al legame di Myself con parole come "inspiring". Allo stesso tempo, il legame con la parola "care" definisce anche il ruolo sociale del leader e la connessione con gli altri membri dell'impresa. Allo stesso tempo, il fondatore rappresenta la proiezione della startup verso l'esterno, come dimostrato dalle parole "eventi" e "celebrare". Questi aspetti sono evidenti se si osserva l'ego network della keyword "leadership", associata a parole come "together" e "team", segnalando l'importanza da parte dell'imprenditore della condivisione del progetto imprenditoriale sia all'interno sia all'esterno dell'impresa, in particolare con gli stakeholder istituzionali come gli "investor" e con l'ecosistema.

Fig 1 Ego network delle associazioni per la parola chiave "Leadership"



Fonte: elaborazione con TLAB

2) Il valore del team

Per quanto riguarda l'analisi di come l'imprenditore vede il mondo e gli altri, e che consente di comprendere il comportamento rispetto alla venture e il senso attribuito al team work, questa ruota attorno alla parola "Noi" legata al senso del fare insieme e quindi al ruolo che il team ha nella costruzione e nello sviluppo futuro della venture (attraverso parole come "innovation", "future", "building"). È una dimensione centrale anche nella gestione dei processi di innovazione. Tuttavia, il ruolo del team include anche gli attori esterni all'impresa, richiamati da parole come "open source" e "world wide". L'aspetto del rapporto con l'esterno emerge anche osservando la parola "team", collegata alla keyword "partner" e al "talent", e quindi alle competenze dei membri del team, a cui viene attribuita particolare rilevanza. In questo ambito emerge il ruolo del "researcher" e quindi la centralità delle attività di ricerca e sviluppo come leva di crescita.

Fig 2 Ego network delle associazioni per la parola chiave "We"



Fonte: elaborazione con TLAB

3) L'innovazione disruptive

L'innovazione è interpretata come rottura con il passato e legata al tema della tecnologia, intesa come concetto dinamico e trasformativo della realtà organizzativa, rappresentata dalla vicinanza della parola chiave "Tecnologia" ai lemmi "accelerate", "building" e "splitting". La tecnologia è centrale per comprendere il ruolo dell'innovazione. La tecnologia è considerata una leva per cogliere le opportunità di accelerazione. In particolare, il discorso si concentra sulle tecnologie di frontiera, come il "quantum". La tecnologia presenta un forte legame anche con i concetti legati allo sviluppo futuro della venture (ad esempio attraverso la vicinanza della parola "quantum" a "scaling") e con il processo di generazione dell'innovazione. Lo scaling è interpretato come superamento della frontiera dell'innovazione in cui si esprime il ruolo attivo della startup nelle attività produttive, nella costruzione di nuove soluzioni ("solutions"), di nuovi "prodotti" e nei processi.

Fig 3 Ego network delle associazioni per la parola chiave "Technology"



Fonte. elaborazione con TLAB

4) il risk taking resiliente

Il tema del risk taking si lega all'ambiente esterno, interpretato in chiave resiliente, come mostrato dalla relazione con la keyword "resilience". Il rischio viene collegato prevalentemente al concetto di rischio finanziario, inteso come motore di crescita e di innovazione e come fattore centrale per la scalabilità dell'iniziativa imprenditoriale. Per questo motivo, nel discorso diventa centrale la coltivazione della relazione con gli attori dell'ecosistema finanziario, come le banche, i fondi e i venture capital, con cui si costruisce la fiducia dialogando e stimolando l'attenzione.

Fig 4 Ego network delle associazioni per la parola chiave "financing"



Fonte: elaborazione con TLAB

Se si considera invece la correlazione con la keyword "challenge", emergono altri aspetti rilevanti: la necessità di affrontare contesti complessi che includono le dinamiche geopolitiche e che incidono sulle dinamiche del business ("pressure", "urgent") e che richiedono un approccio congiunto ("we").

5) La sostenibilità trasformativa

Il tema della sostenibilità presenta un legame con la dimensione ambientale. L'analisi delle co-occorrenze rispetto alla parola "green" rivela che questa ha una relazione stretta con le pratiche di mercato mediante il collegamento con i lemmi "ecodesign" e "fair consumption". Ciò richiama il ruolo etico della startup, la sua responsabilità verso la promozione di comportamenti di consumo (fair consumption) e verso l'obiettivo di ridurre l'impatto carbonico ("decarbonization"), ma anche verso le tecnologie green. Il legame è forte anche con alcune tecnologie disruptive richiamate in contesti elementari quali "hydrogen" e "nano technologies

Fig 5 Ego network delle associazioni per la parola chiave "Green"



Fonte: elaborazione con TLAB

Prime implicazioni teoriche e manageriali. I primi risultati del lavoro fanno emergere il ruolo peculiare degli innovatori nel contesto europeo e nell'ambito del settore deep tech, un contesto caratterizzato da elevata incertezza ma anche da un' accelerazione nei processi di innovazione. L'analisi del linguaggio fa emergere nuove categorie di significati che si affiancano alle tradizionali retoriche dell'innovatività e del rischio (Mckenny et al., 2018). Il linguaggio costruisce infatti nuovi contesti identitari che caratterizzano gli imprenditori del deep tech, proiettando la funzione dell'io imprenditore oltre la dimensione del mercato e quella sociale, tipica degli studi in contesti di crowdfunding.
La costruzione dell'identità, funzionale alla legittimazione degli innovatori, è infatti legata al ruolo determinante che questi rivestono come motori di innovazione orientata alla sostenibilità e, in particolare, alla risoluzione dei grandi problemi legati alle due transizioni del green e del digitale. Il linguaggio consente di delineare il ruolo della strategia della startup a forte connotazione tecnologica non solo come motore di crescita del valore per gli azionisti e di affermazione sul mercato, ma soprattutto come attore di trasformazione in chiave di rottura nell'economia e nella società, capace di imprimere un cambiamento positivo con soluzioni legate alla tecnologia che sono in grado di modificare le abitudini di consumo e di costruire approcci più sostenibili. Si tratta di una visione che va oltre i confini della startup stessa e di quelli del perimetro europeo, assumendo una valenza globale.

Inoltre, il linguaggio costruisce significati che legano l'interno all'esterno dell'organizzazione, in una dinamica che è di scambio continuo. Un nuovo ambito che emerge è anche il ruolo assegnato al team, che è protagonista dell'azione degli innovatori. Questo è frutto di una visione comunitaria sottolineata dal valore assegnato al "Noi" e quindi fortemente condivisa. In questo contesto, i dipendenti della startup sono parte attiva della sua crescita e promotori del suo ruolo trasformativo nella società. Negli innovatori deeptech emerge quindi una forte condivisione progettuale da cui derivano la visione e gli obiettivi della startup, piuttosto che essere frutto di un condizionamento esterno (Hampel and Dalpiaz, 2025).

Il lavoro fornisce un contributo alla letteratura sulla legittimazione delle iniziative imprenditoriali, offrendo un'analisi che si concentra sul settore deep tech e, in particolare, sul contesto europeo. L'analisi mette in risalto il ruolo del linguaggio come strumento di ricomposizione tra le aspettative interne ed esterne delle startup, e come mezzo per esprimere il ruolo della startup come attore di sostenibilità. Inoltre, il lavoro integra le tradizionali immagini retoriche con altre legate al contesto interno del team, al ruolo dell'imprenditore come leader e comunicatore e come agente di creazione di valore sostenibile nell'economia e nella società.

Il lavoro contribuisce alla letteratura sulla legittimazione delle iniziative imprenditoriali, mettendo in risalto il ruolo del linguaggio come strumento di ricomposizione tra le aspettative interne ed esterne e come mezzo per esprimere il ruolo della startup come attore di cambiamento. Inoltre, il lavoro integra le tradizionali immagini retoriche con altre legate al contesto interno del team, al ruolo dell'imprenditore come leader e comunicatore e alla sostenibilità.

Sotto il profilo manageriale, lo studio suggerisce parole chiave e contesti che disegnano il linguaggio e offrono quindi strumenti pratici agli startupper per costruire le proprie attività di comunicazione verso gli stakeholder in modo efficace. I risultati offrono agli imprenditori nascenti le chiavi interpretative per costruire una comunicazione efficace per investitori e potenziali clienti, nonché una guida per la costruzione di un linguaggio che alimenta una cultura dell'innovazione disruptive all'interno dell'impresa, attivando forze volte a proiettare la startup attraverso l'innovazione come agente di trasformazione non solo nell'economia, ma anche nella società.

I limiti dello studio. Lo studio presenta alcuni limiti che suggeriscono possibili linee di ricerca future. In particolare, l'analisi si è incentrati sui post pubblicati dagli innovatori su una sola fonte (LinkedIn). Ulteriori studi potrebbero tenere in considerazione altre risorse, come i comunicati stampa o ulteriori canali social. Inoltre, lo studio si è concentrato sul contesto europeo, ma sarebbe interessante condurre analisi comparative tra diversi contesti geografici per cogliere le differenze nel linguaggio degli innovatori.

Originalità del lavoro. Il lavoro analizza sotto una prospettiva nuova il processo di framing identitario delle startup, concentrandosi sul contesto degli innovatori deep tech a livello europeo. Inoltre lo studio si basa su un disegno di ricerca che fa uso di tecniche computazionali di analisi linguistica che mettono insieme significati, tono e simboli.

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Società Italiana di MANAGEMENT

Short papers

Track:
Innovation & Technology Management



A double-edged sword: The ambivalent role of digitalization for Italian Inner Areas sustainable development

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Abstract. *Tourism is known to be an important driver of economic growth and territorial development. Nevertheless, its benefits are not distributed evenly across regions; some destinations are facing issues that are related to overtourism and environmental pressure, while most internal areas are experiencing the opposite phenomena. They have a good cultural heritage, ripe with natural landscapes and strong local identities, but they are even struggling to fully capitalize on their resource endowment to attract stable tourism flows. In this context, digital technologies have progressively become a fundamental element in the transformation of tourism dynamics; Online platforms, social media and digital communication tools can be seen as a "double-edged sword" as on one side they can enhance the visibility of lesser-known destinations, facilitating the interaction with visitors also creating new opportunities for community engagement. On the other side, the growing digital exposure of destinations may also generate new risks, particularly for territories with limited infrastructures or vulnerable local ecosystems. Moving beyond the pro-innovation bias in tourism management, this article looks into the effects of digital visibility on supporting tourism development in Italian internal areas. More specifically, it explores how local communities perceive both the opportunities and the potential threats associated with the use of digital technologies in tourism management and promotion.*

To this end, we adopt a comparative qualitative approach focusing on four Italian regions characterized by different tourism dynamics: Campania and Basilicata in Southern Italy, and Veneto and South Tyrol in Northern Italy. These regions provide an interesting comparison between territories experiencing relatively limited tourism flows and others already facing increasing tourism pressure. Specifically, we conducted semi-structured interviews with representatives of local Pro Loco associations. These organizations play a key role in promoting local initiatives and often act as intermediaries between residents, public institutions and visitors.

Preliminary findings suggest that digital technologies represent an ambivalent phenomenon for internal areas. On the one hand, digital platforms significantly improve the visibility of peripheral destinations and it supports local actors in promoting their place's cultural and environmental resources. On the other hand, increased online exposure can catalyze rapid growth creating systemic crises, as these areas often lack the adequate managerial expertise and the infrastructures needed to manage the added complexity coming out of sudden tourism development.

Overall, the paper contributes to the ongoing debate on tourism-led, community-based, development by highlighting the complex role played by digital technologies and by providing insights into how internal areas may strategically use digitalization to foster more sustainable and resilient tourism pathways.

Keywords: *inner areas; digital technologies; tourism development; rural tourism; local communities*

Framing of the research. Tourism has traditionally been recognized as a key sector capable of fostering economic growth, generating employment and supporting local development (Du et al., 2016). However, the effects of tourism expansion are far from uniform and positive across territories (Ursache, 2015) as while the dominant narrative in rural development emphasizes the 'digital bridge' (the idea that technology overcomes geographic isolation), recent management scholars (e.g., Rullani, 2022) suggest that digitalization can also exacerbate existing vulnerabilities. Even in the more successful and developed destinations, such as the metropolitan areas, a never-ending growth of tourism flows has led to big challenges such as overtourism (Chaney & Séraphin, 2023), environmental pressure and growing tensions between residents and tourists (Della Corte et al., 2025). As a consequence, an increasing debate within both academia and policy makers has spawned the need to rethink how tourism can be considered an active player in sustainable development processes for the local area (Basile et al., 2021; Buhalis et al., 2023).

A very different situation can be observed looking at rural and internal areas. These territories often possess valuable, under-utilized, cultural heritage and strong local traditions (Wu et al., 2022), and they frequently struggle to attract stable tourism flows (Guizzardi et al., 2022). Scholars have examined the potential of the tourism industry as a driver in developing local economies, revitalizing traditions and fostering community identity (Bramwell & Lane, 2011; Tabatabaei et al., 2025). Research on peripheral tourism emphasized its vulnerability, due to limited infrastructure, seasonality and restricted visibility in global markets (Bennike & Nielsen, 2024). In 2025, Kumar, Argawala and Kumar, in their systematic literature review, studying 277 publications (1990-2023), found that the need for a stronger integration of local community in tourism, helping a sustainable resource utilization (Basile & Tani, 2024), is advocated but only rarely implemented and that communities are marginal change actors.

The academic debate has increasingly highlighted tourism as a potential driver for the revitalization of peripheral regions (Splendiani et al., 2023; Hu et al, 2025). When appropriately managed, tourism can stimulate local economic activity, reinforce community identity and contribute to the preservation of cultural traditions and local knowledge. Nevertheless, tourism development in these contexts tends to remain fragile and strongly dependent on external factors,

including accessibility, market trends and broader regional development dynamics (Soták-Benedeková et al., 2025). Recently, digital-technologies have been found to be a relevant driver of tourism-led development (Pencarelli, 2020), even in rural areas (Brandano et al., 2023; Lapuz, 2023), but some found that, in order to get their benefits, the local areas should already have a some-what high level of technology-related education and skills (Salemink et al., 2017). Online platforms, booking systems and social media channels have significantly transformed the way destinations communicate with potential visitors, making it possible for small communities to reach audiences that were previously difficult to catch (Gursoy et al., 2024). Through digital tools, local actors can promote cultural events, natural attractions and territorial identities on a much broader scale. Yet the growing digitalization of tourism also introduces new challenges. Furthermore, they may help in strengthening the local area community participation (Sigala, 2018).
At the same time, in territories with limited infrastructure or fragile socio-environmental systems, such fluctuations may generate additional pressures that are difficult to manage and may effectively prove to be detrimental (Branduini & Carnelli, 2021), such as those related to the increased risk of massification they bring to the peripheral areas as well (Kamarulzaman et al., 2025). Moreover, increasing digital exposure may amplify existing territorial disparities, create reputational risks, and require acquiring new resources, and new capabilities, that small destinations may struggle to control (Guedes et al., 2023). Therefore, the present research investigates how digitalization interacts with tourism development processes in Italian inner areas. In particular, it explores how local communities and local actors perceive the opportunities, challenges and potential risks associated with the growing role of digital technologies in the tourism sector.

Purpose of the paper. The purpose of this paper is to investigate the conditions under which digital visibility transitions from a developmental asset to a 'double-edged sword,' specifically focusing on how different community stakeholders perceive these risks. Over the last decade, tourism sector has been deeply influenced by digitalization; digital technologies influence how destinations are promoted, how travelers plan and organize their experiences, and how local communities interact with visitors (Gursoy et al., 2024). These changes have been studied in several cases to understand how they happen in mature tourism destinations, but their implications for internal area, the less accessible and often rural areas in Italy, remain comparatively unresearched. This study investigates how digital tools impact on inner areas to increase their destination visibility, to encourage community participation, and to support sustainable development. Usually digital technologies, such as digital platforms, social media and other online communication channels, offer these destinations to reach wider audiences and to promote their cultural and environmental resources to a broader audience than otherwise (Luongo et al., 2024). At the same time, this increased digital visibility may also generate new challenges for these territories. A broad, sudden online exposure can trigger unexpected tourism demand, potentially creating pressure on local area's infrastructures, environmental resources and even the well-being of local communities (Rullani, 2022). Accordingly, it becomes important to look at the digital technologies without falling in the "pro-innovation bias" highlighting not only the positive effects, but also the potential risks that may arise when fragile destinations become more visible. In this study we adopt a comparative perspective focusing on four Italian regions characterized by different tourism development trajectories. Campania and Basilicata represent regions with plenty of valuable resources, but that experience difficulties in attracting stable tourism flows. By contrast, Veneto and South Tyrol are regions where tourism is already well established and where even peripheral destinations may experience increasing visitor pressure due to the overall attractiveness of the region. Comparing these different contexts let us examine how digital technologies interact with tourism development processes in areas characterized either by limited tourism demand or by increasing tourism intensity. Such a comparative perspective also helps to understand how local actors respond to digitalization depending on the maturity of the tourism system in which they operate.
More specifically, this research has beel developed to address the following questions:
RQ1: How do local actors in internal areas use digital technologies to promote tourism and enhance destination visibility?
RQ2: How do residents and local stakeholders perceive the opportunities and potential risks associated with increased digital exposure?
RQ3: To what extent can digitization promote sustainable tourism development in peripheral regions?

Methodology. To address the ambivalent role of digitalization, this study adopts a multiple case study research design, inspired by the principles of Grounded Theory, which allows theoretical insights to emerge inductively from the empirical material (Charmaz, 2014). This research design is particularly useful for exploring the perceptions and experiences of local stakeholders to capture the "how" and "why" in complex phenomena (Yin, 2017). Specifically, qualitative methods were considered particularly appropriate for capturing the perspectives of local actors and for gaining a deeper understanding of how tourism dynamics are experienced at the community level (Phillimore & Goodson, 2004).

We selected six Italian Inner Areas characterized by diverse tourism trajectories: Bisaccia (AV), Calitri (AV), Irsina (MT), Castelmezzano (PZ) in Southern Italy, and Cison di Valmarino (TV) and Commezzadura (TN) in Northern Italy. This selection allows for a comparative analysis between areas facing "under-tourism" challenges and those managing high-pressure tourism flows.

Data were collected through 18 semi-structured expert interviews in January and February 2026. To ensure that we were able to collect data from stakeholder with different perspectives and to help data triangulation, we implemented a purposive sampling strategy in each area, starting from the president of the local area Pro-Loco (to capture the official approach to the role of digital technologies in local area tourism development), some local tourism-entrepreneur (to

capture the more business-related factors), and some other actor (pointed out by the previous two in a snowballing sampling process) selected to capture engagement with territorial digital strategies. After the first interview, participants were recruited to enable a progressive identification of additional key informants suggested by initial interviewees as particularly knowledgeable about local tourism dynamics.

The interviews, all conducted via phone, lasted between 30 and 60 minutes by two researchers at the same time. These "focused expert interviews" were transcribed to ease the following analysis, and they were later supplemented by secondary data (web-sites of attractions and businesses in the area, social media profiles) to enhance their reliability.

After each round of interviews, the collected material was coded following Charmaz's (2014) approach: initial coding to stay close to the data and focused coding to synthesize large amounts of data into the four-core dimensions that emerged during the analysis:

- Visibility vs. Vitality (the gap between digital image and local services);
- Viral Spike vs. Structural Growth (the 'firework' vs. 'engine' development models);
- The Algorithm's Distortion (the homogenization of local heritage to fit digital aesthetics);
- The Housing and Labor Paradox (the displacement of residents and workers due to digital tourism pressure).

These dimensions were then cross-referenced with the territories' digital presence to identify how digital visibility interacts with local perceptions of seasonality and authenticity.

Preliminary results. The analysis of the 18 interviews across our selection of six Italian Inner Areas pointed out that digitalization cannot be considered a "strategy", but it is a complex factor that, interacts with territorial fragility, wil enable the local area to develop only when it is met with some other relevant factors. Our findings suggest that the "double-edged sword" effect is manifested through four distinct thematic patterns:

1. Visibility vs. Vitality
2. Viral Spike vs. Structural Growth
3. The Algorithm's Distortion
4. The Housing and Labor Paradox

The first primary pattern is linked to identify the difference between digital visibility and territorial vitality. In some cases, such as Irsina, digital platforms have successfully attracted some international interest, with the positive effect to sale properties to foreign buyers attracted via digital marketplaces, but, at the same time, respondents highlighted that this increased visibility was not able to stop the decline of essential services (healthcare, schools, transport) in the local area. This creates an "empty shell" effect: the territory becomes a scenic digital backdrop for temporary residents, but it is not able to create the needed "vitality" required for permanent local life to nurtur and develop.

Then we have the theme of the model of digital development for those local area succesfully using the digital technologies, and platforms, as a way to foster local area development. In some cases they are able to create some viral spike in attention, such as the one linked to the Sponz Festival in Calitri; we called it a "spike" as it is a sporadic and high-intensity burst of digital promotion, but it is linked to some specific events. These spikes have to potential to overwhelm the local area capacity without leaving a structural legacy if they are not managed as a way to "de-spike" the flows. On the other side, we have some completely different approach where the growth is more homogeneous during the year, as exemplified by Castelmezzano. This approach relies on some "territorial orchestrator" (in the case of Castelmezzano is a local cooperative in charge of managing the Angel's Flight). Here, digital tools are used as part of a coordinated governance strategy to ensure steady, manageable flows that support long-term economic stability while the local area gradually build a all-year-round offer that is able to deseasonalize the tourism, and economic, flows.

A third theme is the one comparing the homogenization and TikTok-ification linking to the algorithms. Especially in the Northern Italy cases (Commezzadura and Cison di Valmarino), we have found a mechanism of "algorithmic pressure". Local actors, particularly entrepreneurs, expressed a perceived need to adapt traditional architecture and heritage to fit the "Instagrammable" aesthetic dictated by global platform algorithms. The local area stakeholder saw the risks of transforming authentic territorial identity into a homogenized product that are not able to express the real local area identity. Respondents noted that this is related to the requests to new tourism flows that often prioritizes aesthetic appeal over the complex, sometimes reality of rural traditions.

Eventually, there is the theme of a potential systemic paradox. Digital visibility, while attracting tourists, often displaces the local labor and residential base. As found in high-pressure over-tourism areas like Commezzadura, the presence in the ever more diffused digital short-term rental platforms (e.g., Airbnb) has increased the housing prices that in some cases are so high that seasonal workers, and young residents as well, can no longer afford to live in the area. This creates a "digital gentrification", a paradox where the territory has the digital capacity to attract guests but, if left unmanaged, it will lack the "true-to-the-place" human and social capital needed to serve them, threatening the long-term sustainability of the tourism system.

Research limitations. While this study provides useful insights on the relationship between digitalization and tourism development in internal areas, it has some limitations to acknowledge. First of all, this research is based on a qualitative research design built on a small number of semi-structured interviews with local expert such as the presidents of local Pro Loco associations. These organizations play an important role in promoting tourism initiatives and often act as intermediaries between residents, institutions and visitors. Given the limited number of interviews in each area, the

findings should be interpreted as exploratory in nature and cannot be generalized to all internal areas or tourism destinations. Another aspect to consider concerns the range of stakeholders included in the analysis as the study focuses primarily on actors directly involved in tourism promotion, and that have been reached through the Pro Loco associations. Other relevant actors, such as local entrepreneurs, accommodation providers, public administrators or residents not directly engaged in tourism activities, may hold different perspectives regarding the opportunities and potential challenges associated with digital tourism development. Including a broader variety of stakeholders could therefore offer a more comprehensive understanding of the phenomenon. A further limitation relates to the geographical scope of the research. The empirical analysis focuses on four Italian regions (Campania, Basilicata, Veneto and South Tyrol), selected to represent different tourism development trajectories, but not really able to capture the whole set of diversity of the internal areas, usually characterized by diverse socio-economic, cultural and infrastructural. As a result, the findings of this research may not fully reflect the variety of tourism dynamics that can be observed in other peripheral territories. It is also important to understand the temporal dimension of the analysis as this study captures local perceptions regarding the role of digital technologies at a specific moment in time as both tourism dynamics and digital communication strategies are evolving rapidly. Further developing this research using a longitudinal research protocol could provide a deeper understanding.

Finally, our study relies only on the perceptions and experiences of the interviewed experts without trying to look at quantitative indicators used to measure the evolution over time of tourism flows, digital engagement and/or online visibility; combining qualitative insights with quantitative data, for instance website traffic, social media interaction metrics or visitor statistics, to strengthen the empirical basis of the analysis could be beneficial in getting a better understanding of the effect of digital technologies in these areas; accordingly, future studies could adopt mixed-method approaches, expand the number of case studies and develop comparative analyses across different national contexts. Such efforts would help further clarify how digitalization influences tourism development trajectories in peripheral territories.

Managerial implications. The findings of this study suggest that managing the digital transformation of inner areas requires a holistic approach that managers and policy makers should adopt. Looking at the results adopting the four identified themes, we have that, looking at the first dimension (Visibility vs. Vitality), the primary implication is the need to develop a preliminary "territorial audit" before proceeding to design a digital promotion strategy. In developing this audit, local area managers should move beyond traditional tourism metrics (e.g., bed-nights, social media reach), to consider some sort of "Vitality Metrics" to assess the health of the local social dimension, including elements such as primary healthcare accessibility, local supply chains stability, or even how is evolving the ratio of seasonal visitors to permanent residents. Managers should pace the digital visibility to the "offline" area vitality to avoid the risk of creating an unsustainable "empty shell" where the territory remain unlivable for residents. Managers could reduce the impacts of these issues targeting their communication to specific visitor segments more aligned with the territory's current carrying capacity. Furthermore, in destinations where digital success attracts significant foreign property investment, the managerial focus must transition from the "promote the area" to "engage the resident" mindset, using digital platforms to integrate the new owners into the local community and its activities. Ultimately, governance in this phase requires an integrated planning approach where the Destination Management Organization (DMO), and municipal planners, should justify and prioritize the physical service improvements, using digital demand data as a diagnostic tool.

Regarding the second dimension (i.e., Viral Spike vs. Structural Growth), results suggest practitioners to move beyond searching for viral content to look at structural development. Managers should audit the local event to identify the sporadic bursts of digital attention not able to create lasting benefits. One key strategy is to leverage an "Orchestrator" in charge of coordinating digital efforts and shifting the narrative to highlight off-peak assets (if any) trying to to "de-spike" tourism flows. Governance should focus on shared digital protocols and unified information systems encouraging a homogeneous distribution of visitors to deseasonalize the flows.

Looking at the results for the third dimension (Algorithm's Distortion), the primary implication for practitioners is to critically assess the destination's digital presence and if it is drifting towards aesthetic homogenization. Managers should evaluate if they are forcing local heritage into "instagrammable" archetypes prioritizing visual appeal over their real cultural depth. The resulting strategy should center on a "narrative leadership", asking the local area managers to proactively curate content highlighting the complex, and sometimes un-photogenic, reality of rural traditions, while training local entrepreneurs to communicate their authentic identity rather than merely "following the algorithm". From a governance perspective, this may involve creating digital guardrails (quality labels or narrative protocols) to safeguard the territory's unique character and to ensure that digital platforms are used as educational tools, rather than as mechanisms for producing standardized global tourism products.

Lastly - i.e., for the 4th dimension "Housing and Labor Paradox" - local area managers should focus on aligning digital strategies and social sustainability. Practitioners should implement a monitoring (e.g., leveraging data from Airbnb or Booking) to track the "displacement effect" in real-time, identifying early signs of "digital gentrification" that could undermine the destination's operational capacity. Local area strategy should integrate tourism development in residential welfare policies, implying that DMOs should collaborate with local authorities to create "worker-resident housing quotas" or to incentivize hospitality networks to provide affordable accommodation for the workforce (even in the off-season periods). From a governance perspective, this asks for an active regulation of short-term rental platforms through digital licensing and zoning laws to maintain a healthy balance between tourism profitability and community livability.

Originality of the paper. This study contributes to the literature on tourism management by offering a comparative perspective on tourism-led development in internal areas, that moved, if possible, beyond the typical "pro-innovation" bias. While existing research often treats digitalization, and the related platforms, only as an opportunity for the existing rural areas to foster a development process, the present analysis challenges the implicit optimism regarding the effects of digital visibility aligning with newer approaches such as the OCO theory (Oberländer et al., 2024). Our preliminary results show that a rural area needs both managerial expertise, community support, and infrastructure, to let digital exposure become a ripe fruit to collect, without these competences, and the related capabilities and resources, digital exposure risks to act as a "double-edged sword" potentially triggering systemic crises and volatile demand rather than stable growth.

Furthermore, the research goes beyond an homogeneous treatment of "local communities" common in existing literature (Salemink et al., 2017). By comparing territories in diverse regional context – ranging from the under-tourism in Basilicata and Campania to the high-pressure ones in Veneto and South Tyrol, the study provides some evidence on how digitalization may not only impact differently in different contexts, but it might have a different impact on different local actors as well (Fan et al., 2023; Li, et al., 2026b). Our preliminary results highlight that local area communities, even in the smaller and more engaged rural areas, are not monoliths; instead our results show that these areas face internal fragmentation, with different levels of digital readiness, and with a different perception of the related risks according to both an Area-effect and a Stakeholder-effect (Li et al., 2026a). In this sense, the analysis contributes to a more nuanced understanding of how digitalization interacts with different local area contexts to reconfigure the tourism development processes in territories that are often marginal within mainstream tourism circuits.

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A Socio-Technical Perspective on Digital Transformation and Organizational Change. Empirical Evidence from C-level Executives

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Abstract. *Digital transformation aims to reconfigure processes, structures, and relationships through digital technologies, with failure rates estimated at around 70%. Adopting a socio-technical perspective, this paper conceptualises DT as the co-evolution of different variables by examining how enabling conditions interact with technological infrastructures, organisational variables, and human factors. The study addresses three questions: (1) how the transition of the IT function from cost centre to strategic driver reshapes transformational leadership behaviours; (2) which leadership mechanisms most effectively reduce cultural resistance during IT strategic repositioning; and (3) which competencies are perceived as most critical for AI-enabled DT.*

We employ qualitative content analysis of interviews with nine C-level managers. Findings show that resistance is a physiological, multi-level phenomenon signalling socio-technical misalignment rather than mere conservatism; that IT is increasingly reframed as a strategic engine, with CIOs/CTOs reporting directly to CEOs and business intelligence supporting value creation; and that cognitive and hybrid skills, combined with transformational leadership, are considered decisive. Finally, we argue that DT effectiveness depends less on specific technologies than on the alignment of technical, cultural, and leadership enablers, and highlights the need for continuous reskilling and leadership development.

Keywords: *Digital transformation; Socio-technical systems; Enabling conditions; Leadership; Skill development*

Framing of the research. Digital transformation (DT) is a pervasive phenomenon that aims to radically reconfigure processes, structures, and relationships by integrating digital technologies (Zapata et al., 2022). However, a large portion of DT projects fail to deliver expected benefits because organisational and cultural factors are underestimated with a consistent focus on technology (Kane et al., 2019; Vial, 2019). According to socio-technical theory (Trist and Emery, 1978), DT is a multidimensional process that extends beyond mere technological implementation and encompasses the soft variables of changes (Vial, 2019; Govers and van Amelsvoort, 2023). At the technical level, advanced IT infrastructures facilitate information flows, but these alone are insufficient and require integration and balancing with social variables such as organisational culture, skills, and leadership (Vial, 2019). In terms of organisational culture, evidence shows that rigid and hierarchical cultures tend to implement digital technologies superficially, reproducing obsolete decision-making patterns, whereas flexible and adaptive cultures foster continuous learning, innovation, and experimentation, thereby enhancing the transformative potential of technology and supporting digital transformation (Kim and Yu, 2024; Trenerry et al., 2021). Such cultures are also associated with higher levels of organisational and digital agility, understood as the dynamic capability to quickly sense and respond to environmental changes by leveraging digital technologies (Zhang et al., 2024).

Investing in technical skills development to cope with technological issues undermines change, whereas structured reskilling and upskilling programmes help build adaptability and reduce resistance to digital initiatives (Trenerry et al., 2021; BCG, 2024). Furthermore, leaders are enablers of DT, as they manage socio-technical interactions, frame technology as an opportunity, cultivate psychological safety, and invest in people's development (Pretorius and Smit, 2025). Leadership depends on the quality of decision-making processes in response to environmental signals and enabling conditions, which are developed through iterative cycles of sensemaking, experimentation, and learning (Weick et al., 2005). Strategic vision is a critical dimension: transformational leaders articulate a compelling direction while granting autonomy to operational units, enabling them to translate that vision into locally appropriate action (Nasution, 2024).

According to the DT literature, technical innovations, such as process innovation, can be entirely frozen by a lack of cultural support or a rigid decision-making structure (Kim and Yu, 2024; Trenerry et al., 2021). Therefore, identifying the enablers of an initiative's overall success is fundamental, but not sufficient. Recognising these factors requires a holistic perspective, as they do not operate independently but rather through feedback loops that amplify or attenuate their effects. Indeed, when the technical, organisational, and social enablers are well aligned, strong configurations emerge, facilitating systemic transformation and co-evolution, avoiding passively undergoing change or rigidly seeking to control it. A setback to change is resistance, which reveals socio-technical gaps, such as insufficient engagement or threats to autonomy (Trenerry et al., 2021). Other causes include mismatches between technical and social elements, skills deficits,

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and inconsistencies between leadership and culture. Other misalignments are reflected in the perceptual dissonance that often emerges between leaders who see digital transformation as an opportunity and employees, who may perceive it as a threat to job stability (Kane et al., 2019).

Purpose of the paper. This study aims to explore the complex interplay among technological strategy, organizational culture, leadership development, and skills development, which are crucial aspects for addressing digital transformation in contemporary organizations. Its overarching objective is to investigate the dynamics by which organizations can implement a strategic alignment between the IT function and business objectives, turning technology into a sustainable competitive advantage while overcoming resistance to change. The research questions guiding the study are the following: How does the transition of the IT function to a strategic driver reshape leadership behaviours? Which specific leadership mechanisms reduce cultural resistance? Which managerial competencies are perceived as most critical to implement AI-enabled digital transformation successfully?

Methodology. To develop the analysis, we interviewed nine C-level managers from the IT and HR departments of different Italian organisations. In more detail, we applied an iterative thematic analysis (Braun and Clarke, 2006) to present our results by reviewing all documents and identifying recurring concepts (i.e., resistance, the role of IT, skills, and leadership). Accordingly, we carefully reviewed the data by reading transcripts and forming initial ideas of recurring patterns and core themes. Next, we systematically generated initial descriptive codes inductively, such as “IT from cost to strategic driver”, “cognitive balance”, “culture of curiosity”, “cultural resistance”, “structural constraints”, “transformational leadership”, and “technical-leadership issues”. Then we grouped codes into broader sets, defining five final themes: “cultural and structural resistance”, “IT governance shift”, “Cognitive balance and hybrid skills”, “Data-driven decision-making”, and “Transformational leadership”. We presented them in narrative form, using quotations as supporting evidence.

Results. (Theme 1) Cultural and structural resistance. Interviewees consistently highlighted the physiological resistance to digital tools and structural barriers. Resistance to implementing digital tools represents a fundamental challenge in organizational transformation. Research demonstrates that resistance arises from multiple levels: individual psychological barriers, including age, fear, cultural inertia, technological complexity, and ethical considerations, which overwhelm users' cognitive capacity (Sumarlin, 2024). Employees perceive automation as a threat to their professional roles (Najari et al., 2025) and manifest fear in multiple forms, including fear of job loss due to automation and skills gap (Ramadhani, 2025). The uncertainty of change extends beyond technological issues to encompass organizational aspects, career prospects, and the legitimacy of professional roles.

Table 1 – Evidence theme 1

Evidence 1	*“(Resistance) is a physiological step in any transformation process: not everyone is able or willing to embrace change, but progress cannot be stopped. I often hear comments such as: ‘Our customers are too old to use digital tools.’ When someone says that, I reply with a personal example. When I was working in China, I had to go to a hospital for a check-up required for my visa. At the entrance, even elderly people were required to scan a QR code and enter their details online. No paper, no exceptions. I asked my colleague how older people managed to handle everything via smartphone. The answer was simple: ‘We taught them.”*
Evidence 2	*“Such resistance does not stem only from a conservative attitude, but also from structural and regulatory constraints that make it difficult to introduce radical innovations into management and operational processes”.*
Evidence 3	*“Digital transformation challenges the traditional narrative of career progression, generating pressure on staff to acquire advanced skills”.*

(Theme 2) IT governance shift. The IT department evolves from a cost centre to a strategic driver by highlighting a fundamental reconceptualization of technology's role in organisational value creation. The core of this transformation lies in the strategic role of technology, which requires deep integration into the company’s overall business strategy (Alami, 2026). This transition reflects a paradigm shift the reorganisation of managerial roles. The IT function (and its CIO/CTO roles) increasingly operates at CEO-reporting level within executive levels, with direct involvement in strategic, board-level decision-making (Deloitte, 2025). According to the literature, organisations in which CIOs possess business competence and demonstrate strategic thinking capabilities achieve superior organisational performance compared to those that treat IT as merely a technical function. This change reflects the recognition that technology strategy must be connected to business, customer, and organisational strategies (Surjana, 2025).

In addition, the literature also highlights that CIO engagement at the strategic level is particularly critical during organizational transformation initiatives. CIOs functioning as strategic partners help executive teams understand how

technology investments create new market opportunities, strengthen customer relationships, and enable business model innovation (Pham et al., 2025). This strategic involvement shifts IT from a cost-management to a value-creation focus, in which technology investments are evaluated using business-impact metrics rather than purely technical performance indicators.

Table 2 – Evidence theme 2

Evidence 1	*"The IT function has evolved from a predominantly operational function into an increasingly strategic role: today, a culture of curiosity is the most authentic form of innovation. It is not about training someone, but about building a context in which every person feels legitimised to experiment".*
Evidence 2	*"The role of IT has changed profoundly over the years. It used to be essentially a service department; today it is a department of strategy and vision, fundamental in both the short and the medium term".*
Evidence 3	*"IT has shifted from a mere cost centre to a true strategic engine. Business intelligence tools make it possible to transform immense volumes of operational data into actionable insights, demonstrating the enabling role of advanced technologies".*
Evidence 4	*"There has been a significant hierarchical shift, whereby the CIO/CTO has moved from reporting to the Finance function to reporting directly to the CEO. This change signals full awareness that technology is no longer just a cost to be minimised, but the enabling factor and driving force behind business development".*

(Theme 3) Data-driven decision-making. The integration of AI-driven BI capabilities represents a critical evolution in which organizations transition from reactive, historical data analysis to predictive, prescriptive analytics that inform real-time strategic decisions (Ramasamy, 2025). Research highlights that organizations that establish robust data governance, data quality management, and data democratization frameworks achieve substantially higher returns from BI and analytics investments. When BI systems are designed for strategic alignment, connecting data insights directly to organizational performance metrics and strategic objectives, they enable executives to shift from intuition-based to evidence-based strategic decision-making (Mamun, 2025). Organizations implementing advanced BI platforms can integrate data across diverse domains to create unified dashboards informing strategic decisions regarding portfolio optimization, geographic expansion, and investment prioritization.

Table 3 – Evidence theme 3

Evidence 1	*"To what extent will we improve customer experience, efficiency, and service quality?' This change of perspective enables us to clearly select those digital initiatives that create real value for both the customer and the company".*
Evidence 2	*"Technology can help improve data analysis, the drafting of communications, and the management of repetitive information, easing administrative work and making institutional communication more timely. However, in the political sphere, AI cannot and must not replace human thought. Ideals, vision, sensitivity, and the ability to interpret reality remain prerogatives of human beings".*

(Theme 4) Cognitive balance and hybrid skills. Organizations achieving competitive advantage in technology-enabled environments prioritize cognitive balance, curiosity, and hybrid skill development over narrow technical specialization. Cognitive balance, the integration of analytical thinking, creative insight, emotional intelligence, and ethical reasoning, emerges as a critical differentiator for organizational success in AI-dominated landscapes (King, 2025). Organizations fostering curiosity, experimentation, and continuous questioning achieve superior innovation outcomes, as psychological safety enables employees to voice ideas, take interpersonal risks, and learn from experimentation during technology adoption. Hybrid skills represent a fundamental reconceptualization in which effectiveness in AI-driven contexts depends on leaders' capacity to blend strategic vision, people-centred leadership, and technical understanding to ask informed questions (Mamun, 2025). AI deployment success relies on effective collaboration between technical developers and business strategists (Mamun, 2025).

Table 4 – Evidence theme 4

Evidence 1	*"The key competencies are not technical but cognitive: we need to balance the pursuit of maximum efficiency with the need to explore new opportunities and experiment with artificial intelligence. This requires a clear 'yes' to radical changes in training, with specific programmes provided by companies".*

Evidence 2	*"In the digital realm, true competitive advantage does not lie in the super IT expert, but in the manager who is able to steer technology with a clear business vision. Transformation projects fail when the business completely delegates to technicians, without defining concrete objectives and expected benefits. For this reason, future managers will need to combine digital literacy, critical thinking, and an innovative mindset, orienting every decision to the value generated for the customer".*

(Theme 5) Transformational leadership. It is an effective leadership approach for enabling successful digital transformation while mitigating resistance and uncertainty (Dwivedi et al., 2019). Transformational leadership operates through four core mechanisms: idealized influence (modelling commitment to vision), inspirational motivation (creating compelling future narratives), intellectual stimulation (encouraging innovation and problem-solving), and individualized consideration (attending to individual development needs) (Seltzer and Bass, 1990). The impact of transformational leadership extends particularly to psychological safety, the perception that one can take interpersonal risks within the organization without fear of punishment. Leaders who combine transformational approaches with emotional intelligence create psychologically safe environments in which employees feel secure in voicing concerns about technology implementation, admitting skill gaps, and requesting support (Budhwar et al., 2023). This psychological safety is essential in translating resistance into constructive feedback that informs better implementation strategies (Newman et al., 2017; Edmondson, 1999).

Table 5 – Evidence theme 5

Evidence 1	*"Leadership is precisely about destabilising the status quo: clearly explaining the direction, providing concrete tools, and demonstrating in practice that digitalisation is not a threat but a driver of growth, efficiency, and satisfaction for both customers and employees".*
Evidence 2	*"The introduction of more advanced digital tools or automation logics requires a gradual and shared approach. The main lever for "destabilising the status quo" is not so much the technology itself as transformational leadership, understood as the ability to communicate the vision and actively engage staff".*

Research limitations. This work-in-progress is not free of limitations. First, the findings are based on a limited number of qualitative interviews, and thus, the available evidence is purely exploratory. As a result, the interpretations advanced here require further empirical confirmation through an expanded sample and the inclusion of more diverse organizational contexts. Future research, grounded in a broader and more heterogeneous empirical foundation, is needed to validate, refine, or challenge the conceptual patterns that have emerged at this initial stage.

Managerial implications. Digitalization has progressively transformed organizational dynamics and the role of technology within firms, as IT shifts from an operational support tool to a central component of strategic decision-making and value creation (Hess et al., 2016; Gobble, 2018). Digital tools and data reshape strategic decision processes, redistributing information, power, and autonomy across organizational levels (D'Cruz, 2024). Moreover, leadership practices that promote psychological safety, curiosity, and experimentation enable employees to accept change, voice concerns, and turn resistance into learning, thereby supporting effective digital transformation (Edmondson, 1999). The interconnection of cognitive flexibility, growth mindset, and cultures of openness, supported by leaders who frame AI as a partner to human capabilities, emerges as a key driver of innovation when socio-technical systems are deliberately designed for human-AI collaboration rather than mere automation.

The first managerial implication concerns the transition of the IT function to the board level, with CIOs becoming part of the top management team and working as strategic partners rather than back-office service providers (Campana and Schott, 2025). Elevating CIOs to CEO-level reporting and aligning IT metrics with customer value, growth, productivity, and service quality reinforces technology as a value-creation lever rather than a cost centre (Arnitz et al., 2017). This change requires joint strategy processes in which business and IT leaders co-define priorities and embed analytics and technology into board-level decision-making rather than confining them to operational reporting (Luftman, 2000). Secondly, skills development must focus on hybrid competences: organisations should design continuous reskilling loops on data literacy, AI and change management, while rewarding openness, curiosity, experimentation, risk-taking and shifting from compliance-oriented training events to continuous learning ecosystems (BCG, 2024; McKinsey, 2020). Organisational cultures must legitimise experimentation and calculated risk-taking while maintaining ethical boundaries, especially in AI-enabled contexts. Strategic visions should clearly articulate how AI serves human development and organisational purpose, linking digital initiatives to long-term societal and stakeholder value (Gobble, 2018). Third, leadership programmes should explicitly cultivate transformational behaviours, vision framing, psychological safety, and individualised support, so that digitalisation is perceived as a credible path for growth rather than a threat (Edmondson, 1999). Organisations that successfully integrate these dimensions realise the transformative potential of AI while simultaneously developing human capabilities for ongoing innovation, demonstrating that

competitive advantage lies in their capacity to foster cognitive balance, curiosity-driven cultures, hybrid leadership, systematic experimentation, organisational vision, and continuous learning.

Originality of the paper. This study contributes to DT research from a socio-technical perspective. It conceptualizes technological strategy, culture, leadership, and skills as interdependent elements that co-evolve through feedback loops, and resistance as a signal of misalignment between technical and social systems. Overall, this work-in-progress proposes a unified interpretive framework that links shifts in IT governance, socio-technical alignment, leadership mechanisms, and competency evolution into a coherent explanation of sustainable digital transformation.

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Anticipating Emerging Technologies: Innovation Trajectories and Technology Transfer in an AI-Based University Spin-Off. A Longitudinal Case Study

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Abstract. *In recent years, Artificial Intelligence (AI) has increased its importance in innovation processes and digital transformation. However, the technology on which AI is based has deep roots and not limited to recent years. The innovative solutions much discussed and used in recent years are the result of research and innovation that began decades ago whose enhancement on the market could not be immediate. In this context, universities play a fundamental role in the development and dissemination of new technologies, even if not in the short term, also through the creation of academic spin-offs aimed at exploiting the results of basic and advanced research. This study analyses, over a twenty-year timespan, the evolution of a university spin-off operating in the field of AI aiming to understand how technologies developed in academic environments can progressively evolve into industrial applications. The research adopts a qualitative approach based on a longitudinal case study of a deep-tech company founded in 2007 and originating from university research activities in the fields of natural language processing and question answering systems. The study integrates different sources of information, official data, documents, interviews, and other documents and data collected over almost two decades, allowing the reconstruction of the organisation's evolutionary trajectory from the initial academic research phase to the development of artificial intelligence application platforms. The findings show how university spin-offs can contribute to the early development of emerging technologies by developing capabilities and technological solutions well before their large-scale industrial deployment.*
Keywords: *Technology Transfer; Innovation Management; Academic Entrepreneurship; University Spin-Offs; Artificial Intelligence.*

Framing of the research. In recent years, AI(AI) has become one of the main drivers of technological transformation and industrial innovation processes (Dwivedi et al., 2021). The evolution of machine learning techniques, natural language processing technologies and conversational platforms has fostered the spread of new digital applications in numerous economic sectors, helping to redefine business models, organizational processes and ways of interaction between companies and users (Plathottam et al., 2023; Gama and Magistretti, 2025).

Within this scenario, universities play an increasingly important role in contemporary innovation systems, contributing to technological development also through knowledge transfer activities and research-based entrepreneurial initiatives (Perkmann et al., 2013; Audretsch and Belitski, 2020; Makai and Rámháp, 2021). In addition to the production of scientific knowledge, many academic institutions actively participate in the development and dissemination of new technologies through technology transfer (TT) activities, collaborations with companies and the creation of new research-based business initiatives (Dabić et al., 2022; Scarrà and Piccaluga, 2022). In this context, university spin-offs represent one of the main tools through which the results of scientific research can be transformed into technological applications and market opportunities (Hayter et al., 2018; Cantner et al., 2024).

The literature on academic entrepreneurship has mainly focused on the factors that favour the creation of university spin-offs and on the role of these companies in innovation and regional development systems (Caputo et al., 2022). Less attention has been paid to the long-term evolutionary trajectories of these organizations and to the processes through which technologies developed in scientific research are progressively transformed into industrial solutions through different phases of technological and organizational development (Rasmussen et al., 2011). This aspect is particularly relevant in the field of emerging technologies, such as AI, where the transition from scientific research to industrial applications can require long times and complex processes of technological development, experimentation and adaptation to market contexts. However, the literature has devoted less attention to the processes through which deep-tech academic entrepreneurial initiatives are able to sustain technological trajectories in the long term that are still far from maturity and market interests. In particular, there is limited understanding of how university spin-offs can operate as intermediate structures capable of keeping alive, adapting and progressively reconfiguring technologies developed in scientific contexts and in times considered premature with respect to existing market demand.

In many cases, the technologies that today characterize the current phase of AI diffusion were developed and tested in academia many years before their large-scale industrial diffusion (Verspagen, 2006).

Understanding how these emerging technologies can be developed, adapted and progressively transformed into industrial applications is therefore a central theme for studies on innovation management, TTTT and technological entrepreneurship (Markman et al., 2008). In this perspective, the analysis of cases of companies born from academic

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research and developed over time offers the opportunity to observe in depth the processes through which scientific knowledge can evolve into technological innovations and application solutions.

Purpose of the paper. The aim of this work is to analyse the long-term evolution of a university spin-off operating in the field of AI in order to understand how technologies developed within academic contexts, often long before their widespread diffusion in firms and everyday applications, can progressively be transformed into successful industrial solutions through processes of technological entrepreneurship and TT (Perkmann et al., 2013).

This research analyses in detail a deep-tech company founded in 2007 as a spin-off of a medium-sized Italian university, specialized in the development of natural language processing technologies and question answering systems. The peculiarity of this case, which makes it decidedly interesting to analyse, is that the company began to develop solutions based on AI, or rather on technology that is now identified by the market as AI, well before the widespread use that many AI tools have had recently. This allows us to observe how academic basic research can contribute to the development of emerging technologies, through the emergence of entrepreneurial activity well before their large-scale diffusion in the markets. Adopting a longitudinal perspective, the study reconstructs the evolutionary trajectory of the company and identifies the main phases through which a technological project originating within a university environment may evolve into a research-based entrepreneurial initiative and subsequently into an applied technological platform (Rasmussen et al.,2011). The analysis highlights the processes through which scientific competences developed in the academic context are progressively translated into technological innovations through entrepreneurial initiatives, collaborations with universities and integration processes involving industrial actors. In addition to reconstructing the evolution of a single company, the study aims to explore how university spin-offs operating in deep-tech sectors can help sustain and shape technological trajectories during phases in which market demand is still limited or not yet clearly defined. In this perspective, the article interprets TT not as a linear transition from research to the market, but as a long-term process of technological adaptation, organizational reconfiguration and progressive alignment between scientific capabilities and emerging application contexts recognized as valuable by the market. This perspective allows the study to address the following research question: how can cutting-edge academic research developed in a phase that precedes market demand give rise to a TT process capable of generating a sustainable and successful entrepreneurial initiative over time?

From a broader perspective, the study contributes to the literature on innovation management, academic entrepreneurship and TT by highlighting the role that university spin-offs may play in the early development of new technological trajectories (Clarysse et al., 2011). In particular, the analysis of the case suggests that academic research can act as a forerunner in the development of technologies well before they are considered emerging from the market, but that it can still contribute to their maturation and subsequent diffusion within industrial systems.

Methodology. The research adopts a qualitative approach based on a longitudinal case study aimed at reconstructing the evolution of a university spin-off operating in the field of AI. The case study approach is particularly suitable for analysing complex processes of innovation and entrepreneurial development, in which organisational and technological phenomena evolve over time through non-linear dynamics (Eisenhardt, 1989).

The case analysed concerns a deep-tech company founded in 2007 as a spin-off of an Italian university and specialised in the development of natural language processing technologies and question answering systems. The longitudinal reconstruction of the case is based on the integration of different empirical sources collected between 2007 and 2025, including archival and institutional documentation relating to both the university of origin and the company, organizational and technological materials, as well as data collected as part of academic and TT activities. These sources also include three longitudinal semi-structured interviews conducted in 2023, 2024 and 2025 with company representatives. The interviews, lasting an average of about forty minutes, were recorded and transcribed. The combination of archival, documentary and interview-based sources has allowed the triangulation of empirical evidence and the reconstruction of the technological and organizational evolution of the company in the long term. For reasons of confidentiality, the name of the company and some contextual elements have been anonymised. The selection of the case is motivated by the availability of a particularly extensive information base that allows the reconstruction in detail of the technological and entrepreneurial development of the organisation over time. In addition, one of the authors observed the case longitudinally through academic and TT activities, maintaining an external position with respect to the operational and managerial activities of the company.

The analysis is based on the integration of different types of empirical sources collected over a period of approximately two decades. These include archival documents relating to the creation phase of the spin-off, institutional materials produced within the university context of origin, company documentation and information sources relating to the organisation's early technological development activities. These materials make it possible to reconstruct accurately the context in which the entrepreneurial initiative emerged and the early stages of the TT process. These sources are complemented by materials collected over time through direct interactions with the company and with the academic environment from which it originated. This information includes analyses developed in the context of research, teaching and collaboration with the organisation over several years, which have made it possible to observe the evolution of the technologies developed, the applications proposed and the business strategies adopted by the company.

The availability of information sources covering both the phase preceding the creation of the spin-off and the subsequent phases of the company's development makes it possible to adopt a longitudinal perspective on the evolution

of the case. This approach enables the reconstruction of the process through which scientific competences developed in academic environments are progressively transformed into technological applications and industrial solutions through research-based entrepreneurial initiatives. This methodological approach allows an in-depth understanding of the evolutionary dynamics that characterise research-based entrepreneurial initiatives in emerging technological domains. The empirical analysis was developed through a longitudinal interpretative approach and a thematic analysis of the main transformations observed over time. The four evolutionary phases identified have not been defined a priori but have emerged progressively from the analysis of the technological, organizational and market changes of the company and its relations with the university and industrial context. To limit possible risks of proximity bias, the analysis was based on the triangulation of independent empirical sources, including archival sources, institutional documentation and recorded and transcribed interviews.

Results. The longitudinal analysis of the case study allows us to reconstruct the evolution of a deep-tech company originating from academic research over a time span of almost two decades. The trajectory of the organization highlights how scientific knowledge developed in the university environment can be progressively transformed into application technologies through a process of entrepreneurial development characterized by different evolutionary phases. The evolution of the company can be interpreted as a sequence of four main phases that reflect the progressive transition from academic research to the development of AI application platforms.

The first phase is linked to the academic origins of the technologies developed. The initial activities are in fact rooted in a university research context in the field of natural language processing and question answering systems. In this phase, the activities are mainly oriented towards scientific research and the development of technological solutions based on semantic analysis techniques, information retrieval and automatic natural language processing.

The technologies developed in this context are aimed at the automatic understanding of queries formulated in natural language and at the search for information within structured and unstructured knowledge bases. These scientific skills constitute the technological basis that will make possible the subsequent creation of the company and represent the core of knowledge on which subsequent technological applications will be developed. It is important to underline that these research activities are developing in a period in which AI does not yet represent a widely used technological field at an industrial level. At this stage, many of the applications that characterize the AI landscape today is still mainly the subject of academic research and scientific experimentation. This element contributes to making the case analysed particularly interesting to understand how some entrepreneurial initiatives can anticipate the development of emerging technologies, developing skills and technological solutions at a very early stage with respect to their diffusion in the markets.

The second phase includes the creation of the university spin-off that represents a particularly pivotal moment in the evolutionary path of the organization coincides with. The formal establishment of the company, which took place in 2007, originates from the intention of the researchers/founders to test in a competitive and applicative environment some technologies previously developed within academic research activities. With this step, scientific knowledge gained in the university context started to shift towards an entrepreneurial perspective. Here the results of research move from an academic-confined environment towards possible operational applications, still maintaining their scientific standing.

The main objective of this TT activity was the industrial development of question answering systems. In fact, analysing the original business plan, it appears evident that these systems represent the core of the company's technological proposal. The solutions developed in the early stages are designed to interpret queries expressed in natural language and return relevant answers by combining information retrieval techniques and semantic analysis tools. These systems can be interpreted as one attempt to translate scientific knowledge produced in the academic field that was mainly use for theoretical purposes into something that could have been used within organizational contexts characterized by an intensive use of information. Furthermore, during the first years of activity, the organization's attention remained strongly focused on technological development, still highly science based. A significant share of the resources both of the university group and of the company’s employees were dedicated the improvement of the scientific knowledge that forms the basis of the solutions developed. At the same time, an activity of exploration of the possible areas of application of the technologies takes shape. This orientation is typical of deep-tech initiatives, in which the scientific dimension continues to play a central role even in the early entrepreneurial phases.

The third phase is the more market-oriented phase, with better structured interactions with potential users and concrete application contexts, came soon after: these contacts, made possible to better understand in which areas the technologies developed can generate value. Over time, technological development was accompanied by a progressive strengthening of the organizational dimension of the company. Internal expertise continues to deepen, particularly in the fields of natural language processing and semantic technologies, while the number of contexts in which such solutions are tested is increasing. A significant part of this evolution derives from the need to adapt technologies originally conceived within research environments to the operational needs of different organizational systems. In deep-tech initiatives, this process of reconfiguration is quite frequent: scientific knowledge must be progressively reworked so that it can function within complex industrial and organizational contexts. The period was characterized by a profound transformation oriented towards the progressive conversion of scientific skills and experimental technologies into solutions that can be concretely used in organizational and industrial contexts. Through the analysis of the context, it was possible to understand the different and varied uses of technology that have allowed its exploitation from a more commercial and industrial perspective. All while always maintaining a strong link with the university to which they belong. Collaboration with the

academic environment continues to fuel exchanges of knowledge between scientific research and application-oriented innovation. This continuity in relationships is one of the elements that most frequently characterize deep-tech companies born in university contexts. In this phase, TT does not take the form of a simple transfer of knowledge from the university to the market, but of an iterative process of adaptation and reinterpretation of scientific skills in relation to progressively more articulated application contexts. The expansion of the company's activities has also allowed the development of relationships with more structured industrial operators. This has allowed not only access to new resources, but also to acquire more specific managerial skills and wider commercial channels. These elements contribute to strengthening the organization's ability to operate in increasingly complex and competitive market environments. At the same time, the technological architecture of the solutions is also evolving. At this point, we are at fourth phase of evolution that describe the transition of a deep-tech company from its academic roots to a consolidated industrial platform. Systems initially focused on questions and natural language processing are progressively integrated into more articulated platforms, capable of supporting conversational interfaces and virtual assistants based on AI. From pure academic research, the company is arriving at products and services that are perfectly in line with market demands and the most advanced technological needs. This transformation highlights how the maturation of deep-tech technologies often requires long processes of realignment between scientific development, organizational capabilities and market conditions. This evolution is part of a broader transformation that has affected the field of AI in recent years. Conversational technologies and human-machine interaction systems have in fact acquired an increasingly important role in digital applications. Overall, the dynamics observed show how an entrepreneurial initiative born from academic research can develop through a continuous process of technological adaptation and organizational transformation. The case study also suggests that university spin-offs may represent particularly favourable contexts for the experimentation of emerging technologies. In such environments, scientific expertise and operational applications often tend to take shape before technologies reach large-scale industrial deployment. At the same time, the company's evolutionary path remains open. In fact, the organization continues to introduce new technological solutions and redefine its role within the innovation ecosystem in which it operates. Such a trajectory reflects the dynamic nature of many deep-tech initiatives in rapidly changing and ongoing technology environments. Overall, the four evolutionary stages identified show a progressive transition from pure academic research to the development of AI platforms that are more valued by the market and scalable. The first phase is characterized by the development of anticipatory scientific skills in the field of natural language processing and question answering systems, which constitute the technological basis of the entrepreneurial initiative in a phase in which the market was not yet ready to fully understand its application potential. The second phase coincides with the creation of the spin-off and with the first forms of entrepreneurial experimentation aimed at transforming scientific knowledge into concrete technological applications. The third phase, on the other hand, highlights a progressive process of adaptation and reconfiguration of the skills developed in the academic field through interaction with the market, the expansion of application contexts and the strengthening of the company's organizational capacities. Finally, the fourth phase shows the consolidation of more structured and industrially scalable AI platforms, also favoured by the continuity of relations with the university context and the integration with industrial partners. Taken together, the observed dynamics suggest that the evolution of deep-tech university spin-offs does not occur through linear transitions from research to market, but through cumulative processes of technological maturation, organizational adaptation and progressive alignment with emerging application contexts.

Research limitations. This study presents some limitations that are typical of research based on single case studies. In particular, the analysis focuses on the long-term evolution of a specific deep-tech company originating from academic research and operating in the field of AI. Consequently, the findings cannot be directly generalised to other organisational settings or technological sectors. A further limitation concerns the qualitative nature of the research design. Although the availability of multiple sources of information covering an extended time span makes it possible to reconstruct the company’s evolutionary trajectory in considerable detail, the interpretation of the observed dynamics inevitably remains linked to the specific characteristics of the case analysed. At the same time, the longitudinal perspective adopted also represents one of the main strengths of the study. The availability of archival materials and empirical evidence spanning different stages of the company’s development makes it possible to observe over time the technological and entrepreneurial processes that characterise deep-tech firms originating from academic research.

Future research could extend the analysis in several directions. Comparative studies involving multiple university spin-offs operating in similar technological domains could help to identify recurring patterns in the evolution of research-based ventures. In addition, quantitative analyses could contribute to a more systematic understanding of the developmental trajectories of deep-tech companies originating from academic contexts.

Theoretical and managerial implications. From a theoretical point of view, the case suggests that deep-tech university spin-offs do not only represent research commercialization tools, but also actors involved in the progressive construction and maturation of new technological trajectories. In this perspective, TT emerges as an iterative process of technological adaptation, organizational reconfiguration and progressive alignment with emerging application contexts, rather than as a simple linear transfer of knowledge from the university to the market.

The empirical results that emerged from this study allow us to identify some relevant implications for universities, public decision-makers and entrepreneurs involved in the development of entrepreneurial initiatives based on research and deep-tech technologies. The analysis of the case suggests that university spin-offs often tend to be located in the early

stages of the technological development path, when scientific knowledge is still the subject of technical refinement and application-oriented experimentation. In these circumstances, organizations born in the academic field can take on the role of intermediaries through which technologies that are still embryonic are progressively adapted and transformed into concretely usable solutions, before reaching a wider industrial diffusion. From this perspective, the strategic importance of supporting entrepreneurial initiatives originating from research activities clearly emerges for universities and TT offices, especially in sectors characterized by long and complex technological development cycles, such as in the case of AI. The case analysed also suggests that universities and TT offices should adopt support mechanisms capable of accompanying deep-tech initiatives even in the medium to long term, avoiding concentrating support exclusively in the initial stages of spin-off creation.

A further element highlighted concerns the continuity of the relationships between the academic context and entrepreneurial initiative along the different phases of organizational development. The relationship between university spin-offs and academic institutions does not necessarily end when research is transferred to the market. On the contrary, in many cases this relationship tends to continue over time, continuing to offer scientific stimuli, new research questions and further opportunities for technological exploration. The persistence of interactions between the company and the academic context seems to favour the circulation of highly specialized knowledge and, at the same time, contribute to maintaining a direct link between scientific activity and the development of application solutions. In this perspective, the link with the university does not only take on the role of the point of origin of the entrepreneurial initiative but can be transformed into a continuous source of knowledge and technological orientation. This dynamic also has significant implications for the public actors involved in the definition of innovation policies. For policy makers, the case highlights the need to develop support tools consistent with the long maturation times of deep-tech initiatives, avoiding evaluation logics exclusively oriented towards short-term results. If the interactions between academic research and entrepreneurial initiatives can be prolonged over time and generate mutual benefits, then it becomes significant to promote institutional arrangements that make it possible to build stable collaborations between research organizations and emerging companies. This is particularly important in technological sectors characterised by high scientific complexity and long and uncertain development processes. A further element concerns the organizational transformations that deep-tech initiatives tend to face as their technological and commercial activities begin to expand. Entrepreneurial projects originating within academic research are often initially focused on the scientific development of technologies. However, as these initiatives enter the markets as they enter the market, they are confronted with different organisational needs. The transition to a more structured industrial organization requires the gradual integration of managerial skills, financial capabilities and commercial infrastructures that are rarely available in the initial stages of academic initiatives. In this growth process, interaction with already established industrial players can play an important role. Collaborations with more structured companies allow access to additional resources and organizational skills that contribute to strengthening the company's technological capabilities. At the same time, such relationships can facilitate the scalability of solutions originally developed in research, making it possible to adapt them to broader application and industrial contexts.

Industrial partnerships or, in some cases, deeper forms of strategic integration can therefore represent a significant step in the path through which technologies originating in the academic context are able to reach broader market applications. Overall, the case analysis shows how the development of research-based entrepreneurial initiatives tends to be configured as a progressive process in which scientific skills, entrepreneurial experimentation and industrial collaboration gradually align over time. From an entrepreneurial perspective, the case also suggests the importance of maintaining a balance between continuity of original scientific skills and the ability to adapt to changes in application contexts and market needs. In this perspective, institutional actors interested in strengthening innovation ecosystems can benefit from policies capable of supporting these dynamics in the long term, allowing technologies derived from research to mature and transform into solid industrial applications within complex technological contexts.

Originality of the paper. The main contribution of this study consists in the longitudinal reconstruction of the development of a university spin-off active in the field of AI over a time span that extends for almost two decades. The availability of empirical material relating to such a wide period allows us to observe in greater depth how an entrepreneurial initiative born within academic research can evolve over time to become a technological organization capable of operating in structured industrial contexts. Much of the literature on academic entrepreneurship has focused on the conditions that favour the emergence of university spin-offs or on the very early stages of their development. The analysis proposed in this paper is instead placed on a longer temporal level and follows the subsequent evolution of a deep-tech company, observing how technological capabilities, organizational structures and market positioning gradually transform when the company goes beyond the initial phase strongly focused on research. This broader temporal perspective allows us to examine in greater detail the processes through which the scientific skills developed within universities are progressively translated into applied technologies and increasingly articulated technological platforms. The case analysis also allows us to observe the development of AI technologies in a historical phase prior to their large-scale industrial diffusion. A particularly important aspect concerns the historical moment in which the company started its first experimental activities. Solutions based on natural language processing and question answering systems were in fact developed at a time when many of the applications associated with AI today had not yet assumed a significant presence in industrial contexts and remained, to a large extent, confined within the perimeter of academic research. Placing the case within this scenario allows us to better grasp its scope, because it shows how some technological

trajectories began to take shape well before their subsequent affirmation on a larger scale. Precisely for this reason, following the evolution of the company over time allows us to focus on the contribution that entrepreneurial initiatives born in the university environment can offer in the initial phase of defining new technological paths. The point is not only that these companies transfer the knowledge produced in research to the outside world, but that, through experimentation, adaptation and the progressive implementation of solutions, they participate directly in the construction of the directions along which technological development will then tend to consolidate. In other words, organizations of this type can have a significant impact on the early configuration of areas that only later acquire a more extensive relevance within industrial innovation systems. From this point of view, the case suggests that companies originating from academic research should not be interpreted solely as vehicles for exploiting knowledge already available. Their function appears broader. In many cases, they contribute to creating an intermediate space in which scientific knowledge is reworked, tested and progressively oriented towards possible application developments, thus favouring the emergence of new solutions and, more generally, of new technological directions. It is precisely the longitudinal perspective that allows these processes to be read more precisely. By observing the trajectory of the company over time, it becomes possible to reconstruct the mechanisms through which university research can generate entrepreneurial initiatives capable not only of enhancing existing scientific skills, but also of accompanying their evolution, supporting the development of further technological solutions over time. In this key, these initiatives end up contributing, in a gradual but significant way, to the formation and consolidation of new technological areas.

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Artificial Intelligence in Public Services: Reshaping the Conditions of Value Creation

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Abstract. *Artificial intelligence (AI) is increasingly embedded in digital public services, with implications for how citizens access and engage with public administration. Existing research has largely focused on governance, transparency and the ethical implications of AI, while comparatively less attention has been paid to how AI may reshape interaction practices within public services.*
This paper aims to examine how the adoption of AI in digital public services may reshape interaction practices between citizens and public administrations, and how these transformations may influence the conditions under which public value is co-created or co-destroyed.
Drawing on the Estonian digital government ecosystem, the study adopts an exploratory qualitative approach based on document analysis of selected AI-enabled public service examples. Preliminary findings suggest that AI-mediated interactions may support or hinder the alignment between institutionalised service templates and the enactment of service practices. Rather than exerting uniform effects, AI appears to be associated with different configurations through which such alignment is sustained or disrupted, pointing to its context-sensitive and potentially ambivalent role in shaping public value in digital public services.
Keywords: *Artificial Intelligence; Digital public services; Public value; Value co-creation; Value co-destruction*

Framing of the research. *The growing complexity of contemporary societal challenges - environmental, social, and democratic - has intensified debates on the role of organizations in generating value for society. Within public administration research, these discussions have been articulated through the concept of public value, which emphasizes the responsibility of public institutions to align public action with socially valued outcomes (Moore, 1995; Benington, 2011). From this perspective, public administration can no longer be understood merely as a bureaucratic apparatus dedicated to service provision, but increasingly as an institutional actor oriented toward the generation of public value.*

Originally formulated by Moore (1995) and further developed within public management scholarship (O'Flynn, 2007; Bryson et al., 2014), public value extends beyond organizational efficiency and administrative performance. It is co-created through interactions among institutions, citizens, and communities (Benington, 2011), in which heterogeneous resources and capabilities are integrated to achieve collectively valued outcomes (Mazzucato and Ryan-Collins, 2022). This view aligns with public service logic, which frames services as processes emerging from interactions among multiple actors within service systems (Sergianni et al., 2026).
Building on this perspective, public services can be conceptualized as bundles of interaction practices structured through the relationship between service templates and their situated performances (Skålén, 2022). Service templates refer to the institutionalized configurations through which services are designed and organised, such as procedures, rules, digital infrastructures and interfaces, while situated performances capture how these configurations are enacted in concrete interactions (Skålén and Trischler, 2024).

While templates are intended to enable value creation, their enactment in practice may lead to either value co-creation or value co-destruction depending on how actors mobilize resources and interpret their roles (Skålén and Trischler, 2024). Value co-creation occurs when enacted practices align with the expectations, roles and resources embedded in service templates, enabling actors to integrate their knowledge and capabilities in the delivery and improvement of services (Voorberg et al., 2015; Torfing et al., 2019; Cepiku et al., 2022). Conversely, value co-destruction may occur when enacted practices diverge from the expectations embedded in service templates, generating misalignments among actors' expectations, roles, resources and modes of interaction (Engen et al., 2021; Plé and Caceres, 2010; Echeverri and Skålén, 2011). The relationship between these dimensions is therefore critical, as value depends on the extent to which situated performances align with, or diverge from, service templates (Skålén, 2022).

Against this background, the growing adoption of AI in public administration is progressively reshaping the interaction architectures through which public value is generated. AI is increasingly embedded in digital public services, where it supports administrative processes, decision-making and citizen–government interactions through automation and data-driven analytics (van Noordt and Misuraca, 2022; Aldemir and Uçma Uysal, 2025). As AI becomes embedded in service encounters, it does not simply automate existing processes but actively reconfigures how service interactions are designed and performed (Hjaltalin and Sigurdarson, 2024).

This transformation creates both opportunities for more responsive and data-informed public services and tensions related to transparency, data bias and accountability (OECD, 2025), particularly when algorithmic mediation becomes

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opaque to citizens and may undermine trust and the perceived legitimacy of service encounters (de Fine Licht and de Fine Licht, 2020). From this perspective, AI becomes analytically relevant not only for its technical capabilities or governance implications (Wirtz et al., 2019), but for how it may reshape how actors access, interpret and enact public services in practice, with implications for public value. Despite this growing body of research, existing studies on AI in the public sector remain predominantly focused on governance, ethics, and accountability issues related to algorithmic decision-making (Wirtz et al., 2019; OECD, 2025). While these perspectives are crucial, they tend to privilege an outcome- or system-level view of AI adoption, leaving underexplored how AI intervenes within the practices through which public services are enacted.

In particular, limited attention has been paid to how AI-mediated interactions reshape the alignment between institutionalized service templates and the situated performances of service practices. This matters because such alignment represents a central mechanism through which public value may be sustained or undermined within service interactions (Skålén and Trischler, 2024). By focusing on this dimension, the paper shifts attention from AI as a governance or decision-making tool (van Noordt and Misuraca, 2022) to AI as a mechanism that reconfigures interaction practices and, consequently, the conditions under which public value emerges in digital public services.

Purpose of the paper. *Building on these considerations, the paper aims to examine how the adoption of AI in digital public services reshapes interaction practices between citizens and public administrations, and how these transformations may influence the alignment between service templates and their situated performances, with implications for public value co-creation or co-destruction.*

Methodology. *This study adopts an exploratory qualitative research design based on document analysis (Bowen, 2009) to examine how AI-enabled services are embedded within digital public services and how they relate to citizen–government interaction practices. The study draws on secondary data, including official government websites, policy reports, institutional documents and prior studies describing the development of AI-enabled applications within Estonia's digital public service ecosystem.*

Estonia provides a particularly relevant empirical context because it represents one of the most advanced digital government ecosystems in Europe, characterised by highly integrated digital infrastructures and extensive online public service delivery (Lember et al., 2018; Margetts and Naumann, 2024; Salumaa-Lepik and Nisu, 2024). According to the State of the Digital Decade 2025, Estonia consistently ranks among the leading EU countries in digital public services and e-government development (European Commission, 2025).

The study examines AI-enabled public service applications, including initiatives in digital government assistance (Bürokratt), justice (Smart Court) and education (Marakratt). These empirical examples are used as analytically relevant cases to explore how AI-mediated interactions between citizens and public administrations are configured in practice, and how such configurations relate to conditions of alignment or misalignment between service templates and their situated performances. The analysis, therefore, focuses on conditions of alignment or misalignment, which prior research links to processes of value co-creation and value co-destruction (Echeverri and Skålén, 2011; Skålén and Trischler, 2024).

Empirical context: Estonia's digital public service ecosystem. *Estonia is widely recognised as one of the most advanced digital government systems in Europe (Lember et al., 2018; Margetts and Naumann, 2024; Salumaa-Lepik and Nisu, 2024). Since regaining independence in the early 1990s, the country has progressively developed a highly integrated digital governance ecosystem that supports interaction between citizens, businesses and public institutions through digital public services (Entreprise Estonia, 2025).*

The Estonian digital public service ecosystem relies on several interconnected infrastructures that enable secure identification, service access and data exchange across public institutions. Three components are particularly central to this ecosystem. The first is the national digital identity system (e-ID), which enables secure authentication and legally valid digital signatures. The second is the digital service layer, accessed through national platforms such as the national e-services portal eesti.ee, through which citizens interact with public services (with approximately 99% of public services available digitally). The third is the interoperability platform X-Road, which connects the country's distributed information systems and enables secure data exchange across public and private databases (Margetts and Naumann, 2024). An important feature of this ecosystem concerns transparency in data use. Citizens can verify which public authorities have accessed their personal data and for what purpose, as all data access and modifications are recorded through a comprehensive audit trail.

X-Road represents the core infrastructural layer enabling secure data exchange between institutions. Rather than centralising information, the platform allows hundreds of organisations across the public and private sectors to exchange data through a distributed architecture that ensures interoperability, integrity and security. Together with the national digital identity system, this infrastructure also supports the "once-only" principle, whereby citizens are not required to repeatedly provide the same information to different public authorities (e-Estonia, 2018; e-Estonia, 2023).

Building on this digitally mature public service ecosystem, Estonia has progressively expanded the adoption of artificial intelligence within public administration. Guided by the national AI strategy, approximately 80 AI-related projects had been initiated or implemented across the public sector by the end of 2020 (Ministry of Economic Affairs and Communications, 2021).

Results. *The following section presents empirically grounded examples from Estonia's digital public service ecosystem to examine how the introduction of artificial intelligence reshapes interaction practices between citizens and public administrations. The examples illustrate how AI-enabled services reconfigure key elements of public service templates and, in doing so, shape the conditions under which public value may emerge.*

Each example focuses on a particular service domain and is analysed through three analytical dimensions derived from the template–performance perspective on public service practices (Skålén and Trischler, 2024).

First, interaction configuration refers to how AI technologies reconfigure the structure of interaction between citizens and public institutions, for instance by introducing new digital interfaces or mediating communication processes.

Second, decision configuration captures how AI systems participate in decision-related processes within service interactions, including activities such as information provision, recommendation, or decision support.

Third, the analysis considers the potential alignment or misalignment of practices, referring to the extent to which AI-mediated interactions remain consistent with the expectations embedded in service templates, or instead generate divergences in how service interactions are enacted in practice.

***Example 1. Conversational AI for public services: Bürokratt**. Bürokratt is a government-wide conversational AI system used in Estonia to support citizen interaction with public services through a network of digital assistants deployed across government websites and service portals. The system allows citizens to submit questions in natural language and receive guidance on administrative procedures, services or required documentation across multiple public institutions (Ministry of Justice and Digital Affairs & Information System Authority, 2024a; Entreprise Estonia, 2025).*

***Interaction configuration.** The introduction of Bürokratt modifies the interaction configuration of digital public services by introducing conversational agents as an additional interaction interface between citizens and public administrations, thereby reshaping how service access takes place (Entreprise Estonia, 2025; Ministry of Justice and Digital Affairs & Information System Authority, 2024b). Instead of requiring citizens to navigate institutional websites and independently identify procedures and interpret service requirements, conversational agents mediate access to information across multiple public services.*

Some of the work traditionally carried out by citizens—such as locating relevant information, identifying the responsible institution or interpreting administrative guidance—is shifted to the AI system. For citizens, conversational interfaces can reduce the effort required to identify the appropriate service or procedure. For public administrations, they can centralise the management of routine information requests and reduce fragmentation across multiple institutional access points (Ministry of Justice and Digital Affairs & Information System Authority, 2024b).

From a practice perspective, the enactment of service interactions consequently shifts: rather than independently navigating administrative procedures, citizens increasingly rely on AI-mediated guidance to access and interpret public services. This influence occurs at the entry point of service practices, shaping how citizens engage with administrative procedures before interacting with formal decision processes.

***Decision configuration.** In the example of Bürokratt, AI does not perform administrative decision-making but intervenes in how access to decision processes is structured. The authority to determine eligibility, approve services or apply administrative rules remains fully under the responsibility of public institutions and existing legal procedures.*

The role of AI instead concerns how access to decision processes is structured. By mediating how citizens obtain information about procedures, documentation requirements and responsible institutions, conversational agents influence how individuals approach administrative decision points.

In this configuration, AI operates as a decision intermediary rather than a decision-maker, shaping how decision-relevant information is accessed and interpreted without altering institutional authority (Ministry of Justice and Digital Affairs & Information System Authority, 2024b).

From a practice perspective, decision-making remains institutionally controlled, while the informational pathway through which citizens reach administrative decisions becomes increasingly AI-mediated.

***Potential alignment or misalignment of practice.** Conditions of practice alignment may emerge when conversational interaction supports routine and information-based service requests. When citizens seek guidance on standard administrative procedures, documentation requirements or basic service information, conversational agents can simplify access to institutional knowledge and reduce the effort required to identify relevant services. In these situations, AI-mediated interaction can support interaction practices that are more likely to remain consistent with the accessibility and responsiveness objectives embedded in digital public service templates (Wirtz et al., 2019; van Noordt and Misuraca, 2022).*

At the same time, potential conditions of practice misalignment may arise when user requests involve more complex or context-specific situations that exceed the interpretative capabilities of conversational systems. When requests cannot be fully interpreted or when responses remain limited to predefined institutional knowledge sources, citizens may receive incomplete guidance and still need to navigate administrative procedures independently. In such situations, interaction practices may diverge from the expectations embedded in service templates, reducing the effective usability of the service (Ministry of Justice and Digital Affairs & Information System Authority, 2024b). This example illustrates how conversational AI may shape the conditions under which procedural forms of public value may emerge in digital public services. When conversational mediation effectively supports citizens in accessing and navigating services, interaction practices are more likely to remain aligned with service templates. Conversely, when this mediation fails to accommodate

more complex citizen needs, it may introduce conditions of misalignment that constrain how citizens engage with public services, potentially limiting the realisation of public value.

Example 2. E-Justice: digital infrastructures and "smart court" initiatives. *In Estonia, judicial services are accessed through a connected infrastructure that integrates case submission, information exchange and procedural communication within a single platform (Courts Data Solutions, 2024). Through the e-File system, citizens, legal professionals and courts interact within the same digital space, where procedural documents are submitted, case information is accessed and judicial exchanges are coordinated (European e-Justice Portal, 2025).*

This configuration does not simply digitise existing procedures; it reorganises how judicial processes are accessed and how information is handled across them. All procedural information enters the same digital environment, where it is stored, structured and made available for use across different stages of the process.

In practical terms, once documents are submitted into the system, they are automatically organised, indexed and made retrievable within the same environment, rather than being handled across separate files, offices or communication channels.

Within this setting, "smart court" initiatives introduce functionalities that operate in the background, supporting how procedural information is organised, retrieved and processed (Nafid and Joraiche, 2025). Rather than appearing as visible interfaces or autonomous decision-making systems, these functionalities shape how information flows within the system.

Interaction configuration. *Access to judicial services is organised around a single point of entry that structures how procedural information is submitted, retrieved and exchanged. Instead of navigating multiple institutional channels, users interact with judicial processes through a unified environment that coordinates interaction across actors and stages.*

The e-File platform enables this integration by bringing together document submission, communication and access to case-related information within one system. As a result, interaction becomes less dependent on users' ability to navigate institutional complexity and more shaped by how access to information is organised (e-Estonia, 2025)

From a practice perspective, interaction is not only simplified but also reoriented: the way information is submitted and enters the system influences how it can be used in subsequent stages of the judicial process.

In this configuration, interaction is mediated indirectly. Functionalities embedded in the system influence how information is filtered and made accessible, without operating as distinct interaction interfaces (Courts Data Solutions, 2024; European e-Justice Portal, 2025).

Decision configuration*. This reorganisation extends into the internal dynamics of judicial work. Decision configuration is shaped by how procedural information is processed and made usable within the system, rather than by changes in decision authority. In this configuration, the influence of system functionalities does not occur at the point of access, but within the ongoing processing of cases, shaping how judicial practices are internally carried out.*

Through electronic filing and integrated case management, case-related information is handled in digital form throughout judicial proceedings. Judges and court staff engage with case materials within a unified environment, rather than manually searching across dispersed documents, records or communication exchanges (Courts Data Solutions, 2024; European e-Justice Portal, 2025). From a practice perspective, the preparation of decisions depends on how information is transformed into actionable inputs. System functionalities support this transformation by enabling the classification of procedural documents, the retrieval of relevant materials and the rapid processing of large volumes of case data. These capabilities facilitate the identification of relevant elements and patterns within case materials, shaping how information is prioritised and interpreted in judicial workflows.

Decision authority remains unchanged, but the conditions under which judicial reasoning takes place are redefined. The influence of these functionalities is therefore indirect, operating through how information is processed and prioritised rather than through direct involvement in decision-making (e-Estonia, 2026a).

Potential alignment or misalignment of practices. *The integration of interaction and decision processes within a unified digital environment creates conditions that may support alignment between institutional expectations and enacted practices. By centralising procedural activities and structuring how information flows across different stages of judicial processes, the system facilitates coordination and continuity in how cases are handled (Nafid and Joraiche, 2025). In this sense, alignment emerges from the consistency between how procedural information is organised and how judicial work is carried out.*

At the same time, these conditions may also generate misalignment. Rather than arising primarily from access constraints, misalignment may emerge from how information is structured and processed within the system in relation to the practical requirements of judicial work. When procedural information is organised into predefined formats and categories, relevant elements of a case may be emphasised, simplified or overlooked depending on how they are represented within the system.

In practice, this may affect how case materials are navigated, how relevant information is retrieved and how attention is directed during the preparation of decisions. As a result, judicial actors may rely on system-structured representations of information that do not fully reflect the complexity or context of individual cases.

More critically, as information is processed and prioritised through embedded functionalities, the logic guiding these processes may not be fully visible to actors. This introduces tensions related to transparency and interpretability (Nafid and Joraiche, 2025), but also affects how judicial actors engage with and trust the organisation of case materials within

the system. In such situations, misalignment may emerge within the execution of practices, influencing how decisions are prepared, rather than from failures in access or interaction.

More broadly, the standardisation embedded in the system may not fully accommodate the variability and situated nature of judicial work, generating divergences between institutional templates and enacted practices (Skålén and Trischler, 2024).

From a public value perspective, this configuration suggests that digitally enabled judicial services may support value co-creation by enhancing coordination, consistency and efficiency in judicial processes, while also generating risks of value co-destruction when the structuring of information constrains how actors engage with case complexity in practice. Here, public value is thus contingent on the alignment between the informational structure embedded in the system and the ways in which judicial actors enact decision practices within it and engage with it in practice.

Example 3. AI in digital education: Marakratt. *Artificial intelligence has been introduced into Estonia's digital education ecosystem (e-Estonia, 2025a) through AI-enabled learning analytics and recommendation systems embedded in digital learning environments (Ministry of Justice and Digital Affairs & Information System Authority, 2024a).*

One example is the Marakratt project, which developed a proof-of-concept system designed to support personalised learning trajectories. Using machine learning techniques, the system analyses behavioural data generated through students' interactions with digital learning platforms and recommends educational materials aligned with students' learning needs, knowledge levels and interests (Ministry of Justice and Digital Affairs & Information System Authority, 2024a).

Interaction configuration. *The introduction of AI-enabled learning analytics modifies the interaction configuration of digital education services by embedding algorithmic analysis within students' engagement with digital learning environments. As students interact with learning platforms, their activities generate behavioural data that can be analysed to identify patterns of engagement, progress and potential learning difficulties (e-Estonia, 2025b).*

Within this configuration, part of the interaction work traditionally carried out by students and teachers, such as identifying relevant learning materials, monitoring progress or recognising emerging learning challenges, is partially delegated to AI-based analytical systems. Rather than relying solely on direct pedagogical guidance or independent navigation of learning resources, interaction with educational content increasingly unfolds through data-driven insights generated from students' activity within digital platforms (e-Estonia, 2026b).

From a practice perspective, the enactment of learning interaction shifts from primarily human-mediated pedagogical guidance towards a configuration in which learning activity is continuously interpreted through AI-generated analysis of behavioural data. These insights are generated as students engage with the platform, shaping interaction in real time rather than only at the point of access or after the learning activity.

Decision configuration. *In the Marakratt example AI-enabled learning analytics could contribute to the decision process by generating analytical insights derived from students' behavioural data. These systems detect patterns of engagement, progress and potential learning difficulties and can recommend learning resources aligned with individual learning trajectories.*

In this configuration, AI does not determine pedagogical decisions but influences how decision-relevant information is produced and interpreted. The system therefore contributes to the evidential basis through which educators assess learning progress and plan instructional responses, with this informational input being continuously updated as learning activities unfold (Ministry of Education and Research of Estonia, 2021).

From a practice perspective, pedagogical decisions remain educator-led, while the informational foundations on which these decisions rely become increasingly shaped by AI-generated learning analytics during the ongoing learning process.

Potential alignment or misalignment of practices. *In the Marakratt system, conditions of practice alignment may emerge when the analysis of behavioural data from digital learning platforms enables teachers to detect patterns of engagement that would otherwise remain difficult to observe. By aggregating traces of students' activity—such as time spent on learning materials, task completion patterns or repeated difficulties with specific exercises—the system makes aspects of learning interaction visible that would otherwise remain distributed across multiple digital activities.*

In such situations, learning analytics can support teachers in adjusting instructional activities or recommending alternative learning resources, thereby reinforcing the pedagogical objectives embedded in digital education services (Ministry of Justice and Digital Affairs & Information System Authority, 2024a).

At the same time, conditions of practice misalignment may arise when the recommendation mechanisms embedded in the system begin to structure how students navigate learning resources within the platform. If learning interaction increasingly follows system-generated recommendations, such as suggested materials or automatically prioritised exercises, students' engagement with educational content may become organised around algorithmically suggested pathways rather than teacher-guided exploration of learning activities.

In these situations, a tension may emerge between the pedagogical intentions embedded in the education service template and the learning practices enacted within the AI-mediated environment (Skålén and Trischler, 2024). While the Marakratt system is designed to support teachers' capacity to monitor and guide learning processes, the increasing reliance on automated analysis and recommendations may gradually shift how learning interaction is organised within the platform, potentially narrowing the range of learning activities that students encounter to those that can be captured,

analysed and prioritised by the system. From a public value perspective, when AI-supported insights expand teachers' ability to interpret and respond to student needs, this may enhance the responsiveness and adaptability of educational processes (OECD, 2025). However, when learning pathways become overly structured around what can be captured and prioritised by the system, misalignment may constrain how students engage with learning activities, with implications for the public value generated through education.

Table 1 synthesises the analytical dimensions emerging from the examples, illustrating how different configurations of AI-mediated interaction relate to distinct alignment dynamics and associated conditions for public value.

Table 1. Configurations of AI-mediated interaction and alignment dynamics in digital public services

Example	***AI / Digital feature***	***Interaction configuration***	***Decision configuration***	***Alignment dynamics***	***Implications for public value***
Bürokratt	*Network of conversational AI assistants integrated across public service portals*	*Interaction shifts from independent navigation of administrative procedures to AI-mediated conversational access to service information*	*AI does not perform decisions but mediates access to decision-relevant information, shaping how citizens approach administrative processes*	*Alignment emerges in routine and standardised requests; misalignment arises when user needs exceed the interpretative scope of predefined interaction logics*	*Potential for value co-creation through improved accessibility and navigation; risk of co-destruction when incomplete or misinterpreted guidance constrains effective service use*
E-justice (smart court initiatives)	*Integrated digital judicial infrastructures (e-File system, case management, data processing functionalities)*	*Interaction is reorganised within a unified digital environment where procedural information is submitted, accessed and exchanged across actors and stages*	*AI-enabled functionalities operate within the processing of case information, shaping how data is structured, retrieved and prioritised in judicial workflows*	*Alignment emerges through coordinated and consistent information flows; misalignment arises when standardised representations fail to capture case-specific complexity or remain opaque to users*	*Potential for value co-creation through enhanced efficiency and coordination; risk of co-destruction when information structuring constrains interpretability and limits engagement with case complexity*
Digital education (Marakratt)	*AI-enabled learning analytics and recommendation systems embedded in digital learning environments*	*Interaction is continuously mediated through the analysis of behavioural data, shaping how students engage with learning content over time*	*AI contributes to decision processes by generating real-time insights and recommendations that inform pedagogical decisions without replacing educator authority*	*Alignment emerges when AI-supported insights enhance teachers' capacity to interpret learning needs; misalignment arises when learning pathways become overly structured by system-generated recommendations*	*Potential for value co-creation through more tailored and responsive learning processes; risk of co-destruction when algorithmic structuring narrows learning trajectories and constrains student engagement*

Source: authors' elaboration.

Research limitations. *This study relies on secondary documentary sources describing AI-enabled applications within Estonia's digital public service ecosystem. While this approach enables a systematic examination of publicly documented initiatives, it does not capture the direct experiences of citizens, public officials or service professionals interacting with these systems. Future research could therefore complement documentary analysis with qualitative methods such as interviews or ethnographic observation to examine how AI-mediated interactions are enacted in everyday service encounters.*

A further limitation relates to the context-specific nature of the empirical setting. Estonia represents one of the most advanced digital governance environments in Europe, characterised by highly integrated digital infrastructures and widespread adoption of digital public services. While this context provides a particularly informative setting for examining emerging AI-enabled service configurations, the transferability of the findings to larger or more institutionally complex administrative systems remains an open empirical question. Future research could therefore explore whether similar dynamics emerge in countries characterised by different administrative traditions, levels of digital maturity or degrees of institutional trust.

Managerial implications. *The findings offer implications for public managers and policy makers involved in the implementation of AI-enabled digital public services. First, the introduction of AI systems reshapes how service interactions are organized (van Noordt and Misuraca, 2022) rather than simply automating existing procedures. As the examples show, AI technologies such as conversational agents or learning analytics systems alter how citizens access services, how interactions unfold during service encounters and how responsibilities are distributed between human and technological actors.*

Importantly, these effects are not uniform but depend on how AI is positioned within service processes. As illustrated by the examples, AI may operate at the point of access (e.g. conversational agents), within the infrastructural organisation of services (e.g. digital judicial systems), or during the ongoing enactment of service practices (e.g. learning analytics), thereby reshaping interaction in different ways.

Public managers should therefore approach AI implementation as a redesign of service interaction processes, ensuring that digital systems support rather than complicate citizen–government engagement. In this perspective, the effective design of AI-mediated interactions becomes a key condition for enabling the creation of public value through digital public services.

Second, the results highlight that AI systems in public services frequently operate as intermediaries in the production and interpretation of decision-relevant information. Rather than replacing institutional decision authority, AI technologies influence how information is gathered, structured and made visible to professionals and administrators.

This suggests that the role of AI in decision processes should be understood in relation to how it shapes the informational conditions under which decisions are prepared, rather than as a substitute for human judgement (Wirtz et al., 2019). In particular, as highlighted by the examples, AI may influence decision processes before decisions are formally enacted (e.g. by guiding access to procedures), within organisational processes (e.g. by structuring case-related information), or during ongoing activities (e.g. by continuously updating analytical insights).

For public sector leaders, this implies that the governance of AI should not focus exclusively on automated decision-making but also on the informational processes through which AI systems shape how decisions are informed (van Noordt and Misuraca, 2022).

Finally, the study suggests that the effective integration of AI in public services depends on the alignment between digitally enabled service templates and the practices through which services are enacted in everyday interactions. When AI systems support existing roles, capabilities and expectations, they may enhance the accessibility and responsiveness of public services. When such alignment is lacking, however, AI-mediated interactions may disrupt service encounters or create new barriers for users (OECD, 2025).

Across the examples, misalignment emerges in relation to forms of complexity that resist standardisation, although this operates at different stages of practice. In conversational systems, misalignment is more likely to arise at the point of interpretation, when user needs cannot be fully captured by predefined interaction logics. In infrastructural systems, misalignment emerges in the representation and processing of information, when standardised formats fail to reflect the contextual complexity of cases. In more dynamic settings, such as digital education, misalignment may arise when ongoing practices are increasingly shaped by system-generated pathways that prioritise what can be captured and analysed.

These findings suggest that AI may encounter limitations not with complexity per se, but with forms of complexity that resist standardisation, and that this depends on where AI intervenes within service practices.

Public managers should therefore pay close attention to how AI-enabled services are enacted in practice and ensure that technological innovation remains compatible with citizens' needs, professional routines and institutional objectives, as this alignment represents a key condition for sustaining public value within AI-enabled public service systems (Skålén, 2022).

Originality of the paper. *This study contributes to the emerging literature on artificial intelligence in the public sector by mobilising a practice-based perspective on AI-enabled public services. While existing research has primarily examined AI in relation to governance, transparency and algorithmic decision-making (Wirtz et al., 2019; van Noordt and Misuraca, 2022), this study focuses on how AI relates to the alignment between service templates and the enactment of service practices (Skålén, 2022; Skålén and Trischler, 2024).*

Preliminary findings suggest that AI may not simply influence service outcomes but may be associated with different mechanisms through which alignment between templates and practices is sustained or disrupted. These mechanisms appear to vary depending on where AI is embedded within service practices, such as at the point of access, within the structuring of information, or in the ongoing enactment of service activities.

By articulating these distinctions, the study extends practice-based approaches to public service research into the domain of AI-enabled services (Sergianni et al., 2026), offering a more fine-grained understanding of how AI relate to the conditions under which public value may emerge (Skålén and Trischler, 2024).

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Digital transformation in Italian museums

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Abstract. *As digital technologies are increasingly adopted by museums and are recognized as important to support the traditional multi-faced mission of cultural organizations, it is becoming relevant to understand the degree of diffusion and the underlying factors that explain the high heterogeneity in the adoption. The goal of this study is to identify which organizational characteristics and contextual factors are associated with adopting a wider range of digital technologies by combining descriptive evidence with preliminary regression analyses. Descriptive insights reveal significant heterogeneity: while some museums deploy multiple technologies, many others remain at an early stage of digital transformation. Preliminary regression models show consistent positive associations between technology adoption and several key factors. Among these, the degree of collection digitization emerges as a foundational enabler, supporting the idea that digital assets act as a platform for further innovation. Second, the presence of a digital strategy is strongly linked to broader adoption, underscoring the importance of intentional planning rather than isolated digital initiatives. Third, the number of KPIs tracked by museums correlates with higher adoption levels, suggesting that data-driven management practices help organizations evaluate needs, reduce uncertainty, and prioritize investments. In addition, access via payment, visitor volume, and city size emerge as relevant factors, indicating that financial resources, demand, and location economies can shape digital investment decisions. These findings contribute to cultural heritage literature through the lens of innovation management literature to explain digital transformation in cultural institutions. We show that internal capabilities, managerial practices, and local context support the adoption of digital technologies.*
Keywords: *digital technologies; technology adoption; museums*

Framing of the research. *Digital technologies are being increasingly adopted by museums, transforming the traditional ways of achieving their mission to preserve cultural heritage, educate the public, and contribute to social change* (Gombault et al. 2016). *Despite digital technologies are common in many museums, their diffusion and the level of quality seem to be unevenly distributed* (Leoni and Cristofaro 2021, 2022; Cavalieri et al. 2024). *This is because museums, as any organization adopting digital technologies, have to engage also in changes in several organizational dimensions (e.g. processes, values, managerial approaches)* (Hanelt et al. 2021). *These changes are challenging for any organization, and in particular for museums because of the lack of financial resources, strategic orientation, skilled human resources or low commitment of top management* (Lazzeretti et al. 2022; Nuccio and Bertacchini 2022).

Management scholars refer to the organizational changes induced by the adoption of digital technologies as digital transformation (DT) (Hanelt et al. 2021). *While in management literature DT has been widely discussed* (Hanelt et al. 2021; Verhoef et al. 2021) *and empirically investigated in industrial sectors* (Brynjolfsson and McElheran 2016; D'Agostino and Torrisi 2023), *it seems that there is more limited knowledge on how these transformations take place in museums* (Guccio et al. 2022; Taormina and Baraldi 2022). *This is partially due to museums being among the latest adopters of digital technologies* (Bertacchini and Morando 2013; Li et al. 2023). *However, DT may provide new opportunities for museums to better achieve their mission* (De Bernardi et al. 2019; Mazzamuto et al. 2024). *Therefore, it is crucial to better understand the state of adoption of digital technologies in museums and what concurrent factors explain the heterogeneity in the degree and types of technologies used.*

Purpose of the paper. *The purpose of this paper is to examine the adoption of digital technologies by Italian museums, drawing on the existing empirical evidence that highlights both the opportunities and persistent challenges facing cultural institutions. According to Rogers' theory of innovation diffusion* (Rogers 2003), *organizations adopt new technologies unevenly, depending on perceived attributes such as relative advantage, compatibility, complexity, trialability, and observability. These attributes determine different categories of adopters, from innovators to laggards. The diffusion of innovation is facilitated by mass media channels (e.g. the MiC national digitalization plan in the case of museums) and interpersonal linkages (e.g. peer network of museum directors), and it is shaped by the social system, including governance (e.g. state-owned or private museums) and geographical disparities (e.g. difference in digital infrastructures and institutional capacities across Italian regions). Since museums respond to different missions, technology adoption may be also strongly influenced by legitimacy in the eyes of funders, peers, and society* (Meyer and Rowan 1977; DiMaggio and Powell 1983). *In this sense, isomorphic processes may determine the position of the museum in the Rogers' categories of adopters.*

Recent studies show that Italian museums have increasingly invested in digital technologies (such as virtual tours, augmented reality applications, advanced collection management systems, and data-driven visitor analytics) (Leoni and Cristofaro 2021; Cavalieri et al. 2024) *to enhance accessibility, enrich the visitor experience, and strengthen engagement beyond physical boundaries. Empirical analyses conducted after the pandemic underscore how digital transformation has shifted from being a complementary activity to a strategic necessity, allowing museums to diversify audiences, experiment with new educational formats, and build resilience in the face of fluctuating in-person attendance* (Giannini and Bowen 2022; Godovykh et al. 2022). *However, the evidence also reveals significant heterogeneity across institutions:*

smaller museums often lack financial resources, digital skills, and organizational capabilities, while larger institutions tend to lead in adopting sophisticated technologies (Leoni and Cristofaro 2021, 2022; Antonucci et al. 2024; Cavalieri et al. 2024). *By tapping into this recent stream of studies, the paper aims to assess the underlying factors related to the adoption of digital technologies in the Italian museums through an original survey. In particular, this paper studies 1) the degree of adoption of digital technologies in museums and the types of technologies mostly used, both in terms of sophistication (common, intermediate and advanced) and in terms of the online-onsite dichotomy; 2) the contextual factors (e.g. organizational structures, size, ownership, location, type of museums) supporting the adoption of digital technologies.*

Methodology. *The data are based on a survey submitted to a sample of museums within the VALUE project*[1] *in the period from October 2022 to June 2023* (Mazzamuto et al. 2024). *The final sample consists of 305 museums located in Italy for which we have a completed questionnaire, out of a population of about 4500 institutions.*

The questionnaire investigated various aspects of digitalisation: i) the perceived reasons of the respondent for the adoption of new digital technologies worldwide; ii) the status of digitalization in the museum and future plans; iii) the characteristics of the museum, its visitors and the respondent.

Additional information has been collected from the census survey on Italian museums, and museum websites; in particular, this integration regarded: i) the variables related to the number of visitors, ii) whether the access to the museum is free or fee-based, and iii) alternative classification of the museums.

We firstly conduct a descriptive analysis of the main variables of interest. Secondly, we run an econometric analysis in which the adoption of digital technologies is estimated as a function of factors related to the organization and its strategy, and structural factors:

$$n.tech._i = \beta_0 + \beta_1 \boldsymbol{ORG} + \beta_3 \boldsymbol{STRU} + \varepsilon_i$$

where "n. tech.$_i$" is the number of technologies adopted by museum i. It is based on two questions related to digital services provided online and onsite. We explore different operationalization of this variable. Firstly, we use the total number of technologies, treated them as equally important. Secondly, we assign weights to each technology based on how common they are; in particular, we assign a weight of 1 to basic and common technologies, 2 to intermediate technologies, and 3 to advanced technologies. The resulting count variable is then disproportionally oriented towards more advanced technologies. These weights have been assigned on the basis of existing empirical studies and literature reviews on technological adoption in museums and cultural organizations. From these studies, it clearly emerge that some technologies are widely adopted, and are considered the first step of digital transformation in museums (e.g. websites, newsletters) (Fernandez-Lores et al. 2022), *others are common and indicate a more sophisticated level of interaction with audience (e.g. mobile apps, digital catalogue), and a third group implies high cost and complexity, and a more interactive way of addressing audience (e.g. VR, AR, gamification)* (Li et al. 2024). *Third, we use two different count variables, one for online technologies, and one for onsite technologies.*

ORG *is a set of variables related to organization and strategy. "Digitized collection" measures whether the institution i has or is about to digitalize its collections or exhibitions (dummy equals to 1 if yes, 0 if no); in line with national policies, digital cultural contents increase access and align to digital transformation of the society and the economy (PND, 2023). "Digital strategy" measures whether the institution i has a digital innovation plan (dummy equals to 1 if yes, 0 if no); indeed, strategic planning allows to better address the numerous challenges posed by the digital transformation, from technical issues to resources (both financial and human), from setting the objectives to implementing solutions* (Taormina and Baraldi 2022). *The variable "n. KPI" is built on three questions, and ranges from 0 to 3 on the bases of how many different types of data the museums collect (on visitors' satisfaction, on the pieces mostly observed, and on paths mostly visited); monitoring specific indicators suggests advanced decisions making processes, in line with data-driven approaches* (D'Agostino and Torrisi 2023). *"Digital skills" measures whether the museum possesses a high degree of skills in digital domains; indeed, skills is among the organizational dimension that support and facilitate digital transformation* (Zardini Lacedelli et al. 2019).

STRU *is a set of variables related to structural factors (internal and external) of museums: "Access via payment", "Public-owned" (Cavalieri et al 2023), "size", and dummies for nine categories ("Art", "History & Natural Science", "Science & Technology", "Ethnography & Anthropology", "Specialized", "Territory", "General", "Industrial & Business", "Others"). Finally, we control for the size of the city in which the museum is located to account for demand factor (measured in terms of population, in log); additional territorial controls are 20 dummies for Italian regions (at NUTS2 level).*

Preliminary results are presented and discussed below.

[1] The University of Catania, together with other private companies, funded from the European program PO FESR 2014/2020, has developed the system Visual Analysis for Location and Understanding of Environments (VALUE), which consists of wearable and/or mobile devices aimed at improving the visiting experience within museum spaces. To test the interest on the adoption of the system, a survey has been submitted to Italian and international museums; along with specific questions related to the VALUE system, the survey contained a set of questions related to the adoption of digital technologies.

Results. *Two questions of the survey are used to identify the digital technologies adopted by the museums, one is related to the online services[2] and the second is about onsite services[3]. Most institutions have adopted digital technologies such as websites (83.4%) and social media presence (78.2%), which are both online services. With regard to onsite services, only the Wi-Fi connection is offered by more than half the institutions (52.8%). The second most diffused in-situ service is the QR code, adopted by 48.5% of the museums.*

Table 1 shows that, on average, museums adopt 9.36 technologies, with a variance of 40.1, a minimum of 1 and maximum of 34, suggesting that the majority of museums adopt few technologies. No institution covers all the possible technologies. The coefficient of variation (CV), which indicates the dispersion around the mean, is quite hight, i.e. 68%. The distribution is asymmetric with a long tail on the right, with few museums adopting high number of services. About six online technologies are adopted on average, which is 2-times the average adoption of onsite services (i.e. 3.22). The CV allows to compare the two distributions that have different maximum number of choices; the CV of 102% for onsite is much higher than the CV of the online services, suggesting that institutions are more dissimilar in their offer of onsite services than online services. Possible reasons for that may be found in higher cost of onsite services, often based on physical devices (e.g. Wi-Fi coverage, computers or screens for interactive visits). On the contrary, the cost of many online services (e.g. the presence and use of social media, Wikipedia, etc) is significant lower. In addition, although some online services may have high cost, they play a fundamental role for attracting visitors (such as the websites, online ticketing, the use of intermediates such as travel agencies, etc), therefore the cost-benefit balance may be in favour of adoption. As expected, when counting technologies with weights for more advanced technologies, mean value is higher (14.97). The CV shows slightly higher dispersion of the distribution of total technologies, albeit less dispersed than onsite service.

Table 1 – Summary statistics of digital technologies

Variable	Mean	Median	SD	Variance	Skewness	Kurtosis	Min	Max	CV
Total technologies	9.36	8	6.33	40.10	0.99	3.66	1	34	68%
Total technologies, weighted	14.97	12	11.69	136.70	1.17	3.96	1	60	78%
Online technologies	6.13	5	4.21	17.76	0.93	3.32	1	20	69%
Onsite technologies	3.23	2	3.28	10.74	1.75	6.79	0	17	102%

By looking at the average of technology adoption by type of museums (not shown here), "Science and technologies" rank on top (i.e. 14.29 total technologies, although there are just 7 in the sample), as expected. Private-own museums (which are 31% of the total) prevail on the public-own (i.e. 10.39 vs 8.9 total technologies adopted), as the former may have higher resources and incentives to invest in digitalization. Along this line, size classes (based on the number of visitors in 2019 from ISTAT census) show that larger museums invest in a higher number of technologies.

Table 2 shows the results of count models[4], where the dependent variables are: the total number of adopted technologies (n. tech., model 1), the number of adopted technologies weighted (n. tech w, model 2), the number of adopted online technologies (n. online tech., model 3), and the number of adopted onsite technologies (n. onsite tech., model 4). The econometric results show that two of the organizational variables (i.e. digitalized collection and digital strategy) are positive and statistically significant for all the four models, which indicates that the general orientation of the institutions towards digitalization is correlated with a wider adoption of services. Instead, a more specific variable related to a data-driven organization, such as the use of data to monitor the performance (n. KPI) (Brynjolfsson and McElheran 2016) *is positive and statistically significant for total technologies (model 1 and 2), and for online services (model 3). This may be due to the fact that while digitalization of collection and digital plan are strongly supported by policies and therefore more widely spread, the use of KPI is a choice of the museum, often related to data-driven orientation and therefore is more likely to be found where the institution has a strong commitment to digitalization.*

With reference to structural variables, access via payment is positive and statistically significant in all four models; certainly, the provision of any additional service (being online or onsite) requires financial resources, and free museum may have more conservative budget. In addition, free museum may be simply more oriented to other aspects (e.g. accessibility, preservation), rather than on the adoption of technologies.

In terms of size, we observe that, in comparison to the benchmark class of less than 500 visitors, large institutions (i.e. higher than 10 thousand visitors) have positive and statistically coefficients for all model, except for onsite technologies. Larger museums have simply more resources to devote to technology adoption, but also have higher incentives to do so, e.g. to improve the organization (e.g. online tickets to avoid long queues) or increase revenue stream (e.g. through online advertising, use of tour operators, e-commerce etc), to engage in a long-term relationship with visitors (e.g. through presence on social media, blogs, Wikipedia etc), or to simply broaden services compatible to the

[2] The question is: "Which one of the following online digital services are offered to museum's visitors currently?"
[3] The question is: "Which additional digital services and tools does the museum offer to visitors in order to improve their cultural, physical, sensorial and cognitive experience of the visit onsite?"
[4] After proper testing, the assumption of overdispersion is not violated in model 1, 2, and 4; hence, negative poisson is chosen. Overdispersion is present in model 3, therefore negative binomial is preferred.

reputation of a large, well-known museum. When using the number of technologies weighted for how common it is a service, the significant level of large size is weaker (p<0.1), suggesting that probably the size is a less relevant factor for advanced technologies, and other factors may be relevant (e.g. the content of the collection, or digital readiness toward peculiar services). The relation with size is not found relevant for onsite technologies, for neither of the size classes. It may be due to the fact that the few onsite services used in the sample are more established technologies (e.g. auto guide for rent), or they may be part of a larger local infrastructure (e.g. city free Wi-Fi), therefore they are adopted with low relation to the size of the institutions.

Population of the city in which the museums is located is positive and statistically significant for total technologies (model 1 and 2), but it becomes less important for online and onsite technologies taken separately (with p<0.10 in model 3, and not significant in model 4).

Regarding the types of museums, several variables are positive and statistically significant in model 1 and 2, in comparison to the benchmark category which is Others. All these variables are statistically significant also for onsite technologies (model 4), but not for online technologies. There is a lot of diversity within the types of museums; therefore, further analyses are needed to investigate specific adoption patterns across types of institutions.

We insert the number of onsite technologies on estimation with online technologies as outcome variable (model 3), and vice versa we insert the number of online technologies on the estimation with onsite technologies as outcome variable (model 4). Both regressors turn out positive and significant, suggesting complementarity between the two types of technologies that are worthy further investigation.

Table 2 – Estimation results

	(1) Tech no.	(2) Tech no. weighted	(3) online tech. no.	(4) onsite tech. no.
	Poisson	Poisson	Neg. binomial	Poisson
Digitalized collection	0.393***	0.411***	0.306***	0.236**
	(0.0676)	(0.0843)	(0.0729)	(0.118)
Digital strategy	0.238***	0.271***	0.134*	0.283**
	(0.0712)	(0.0861)	(0.0710)	(0.130)
N. KPI	0.0899***	0.103***	0.111***	-0.00483
	(0.0302)	(0.0361)	(0.0299)	(0.0517)
Access via payment	0.312***	0.324***	0.198**	0.281**
	(0.0792)	(0.0926)	(0.0807)	(0.121)
Public owned	-0.0304	-0.0126	-0.0907	0.0966
	(0.0648)	(0.0768)	(0.0651)	(0.114)
Digital skills	0.0597	0.0899	0.0687	-0.00496
	(0.0606)	(0.0747)	(0.0595)	(0.104)
Small to medium size	0.124	0.110	0.172*	-0.0187
	(0.106)	(0.127)	(0.101)	(0.153)
Medium size	0.0873	0.113	0.165*	-0.0516
	(0.104)	(0.124)	(0.0996)	(0.155)
Large size	0.237**	0.245*	0.394***	-0.153
	(0.108)	(0.130)	(0.105)	(0.167)
Population (ln)	0.0355**	0.0407**	0.0267*	0.0304
	(0.0155)	(0.0189)	(0.0157)	(0.0271)
Art	0.0437	0.0451	0.0370	0.0574
	(0.0863)	(0.102)	(0.0897)	(0.159)
History & Natural Science	0.301***	0.322**	-0.0342	0.672***
	(0.112)	(0.134)	(0.110)	(0.168)
Science & Technology	0.498***	0.550**	0.306	0.501**
	(0.189)	(0.244)	(0.195)	(0.247)
Ethnography & Anthropology	0.0681	0.0106	0.0243	0.0810
	(0.107)	(0.115)	(0.111)	(0.169)
Specialized	0.208**	0.247**	-0.0237	0.520***
	(0.103)	(0.125)	(0.112)	(0.175)
Territory	0.324***	0.352**	0.131	0.432***
	(0.116)	(0.143)	(0.113)	(0.166)
General	0.224	0.432	-0.226	0.832*
	(0.283)	(0.349)	(0.288)	(0.500)
Industrial & business	0.369*	0.391*	0.177	0.475*
	(0.199)	(0.231)	(0.166)	(0.254)
onsite tech. no. (ln)			0.244***	
			(0.0489)	
online tech. no. (ln)				0.303***
				(0.111)
Constant	1.000***	1.336***	0.637***	-0.494
	(0.192)	(0.226)	(0.204)	(0.312)
lnalpha			-2.979***	
			(0.355)	
Observations	305	305	305	305
Adjust R^2	0.256	0.310	0.137	0.207

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Regional dummies in all models

Research limitations. *This study presents several limitations that should be acknowledged when interpreting its findings. First, the analysis relies primarily on descriptive statistics and preliminary regression models, which, while useful for highlighting relations, do not allow for causal inferences. Second, the cross-sectional nature of the data constrains the ability to capture the dynamic evolution of digital adoption over time or to disentangle potential reverse causality (e.g., whether digital technologies attract more visitors, or whether museums with more visitors invest more in technology). Third, measurement limitations may arise from self-reported variables, which could introduce bias or inconsistencies in how museums assess their digital maturity or strategic orientation. Additionally, the dataset may not fully account for organizational factors such as governance structures, skills, or top-management attitude that could influence digital investment decisions. Finally, the preliminary nature of the regression models implies that the findings should be viewed as exploratory and used to guide future investigation.*

Managerial implications. *Despite results being preliminary, the findings of this study offer several managerial implications for museum directors and policy makers seeking to accelerate digital transformation in the cultural sector. First, the positive effect of collection digitalization on the number of technologies adopted suggests that digitizing heritage assets is not merely an archival activity but a strategic enabler that unlocks further innovation. Managers should therefore prioritize structured digitization programs and allocate dedicated resources to build high-quality digital collections. Second, the strong role of a clear digital strategy indicates that technology adoption is most effective when guided by an overarching vision rather than by isolated, opportunistic initiatives, in line with management literature on digital transformation* (Hanelt et al. 2021). *Museums would benefit from defining goals, identifying target audiences, and aligning digital investments with their broader mission. Third, the association between the number of KPIs used and technology adoption highlights the importance of developing a data-driven managerial culture* (Nuccio and Bertacchini 2022). *Institutions that monitor performance systematically are better positioned to select technologies that enhance visitor engagement and operational efficiency. In addition, museums that rely on paid access, attract higher visitor flows, or are located in larger cities appear more likely to invest in digital tools, signaling the relevance of financial stability, demand, and territorial context. These insights call for tailored managerial approaches that consider resource constraints while fostering strategic, data-oriented innovation.*

Originality of the paper. *As digital transformation is increasingly embraced by cultural organizations, a stream of studies has focused on the adoption patterns, drivers and obstacles of technology adoption These studies have been focused on specific samples (e.g. small museums as in Leoni and Cristofaro, 2022, 2021), or specific technologies (e.g. Trunfio et al.* (2022) *about the effect of virtual reality and augmented reality on visitor experience). We advance existing knowledge on digital technology adoption in museums in three ways. First, by using an original survey on 305 Italian institutions. Secondly, by investigating a broad set of digital technologies and different adoption patterns. In addition to a standard count of the number of technologies, we advance existing studies firstly by assigning different weights depending how common they are, and secondly by considering separately online (e.g. website, presence on social media, online booking services, etc), and onsite services (e.g. free Wi-Fi, audio guides, presence of informative screens or computers). Although the online vs. onsite classification is not novel* (Leoni and Cristofaro 2021; Guccio et al. 2022)*, the list of technologies in this paper is more extended*[5]*. Thirdly, by conducting regression analysis in order to assess technology adoption and the relations with different factors simultaneously, we extend and complement existing evidence of the relation between technology adoption and concurrent factors in a multivariate setting.*

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Disneyfication of places: Organizing smart cities for what- and for whom?

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Abstract. *Over the past two decades, cities have increasingly embraced the smart city paradigm as a model for technological innovation, efficiency, and improved urban governance. While this transition promises enhanced services and data-driven decision-making, its broader societal implications remain underexplored. This study examines whether the advancement of smart city initiatives affects the social fabric of urban communities. Building on the concept of the disneyfication of places, we argue that the growing emphasis on technological capabilities and performance-oriented governance may unintentionally weaken the relational infrastructures that sustain civic participation and community ties.*

To investigate this relationship, we employ a dynamic panel data approach using the Generalized Method of Moments (GMM) on a longitudinal dataset of 38 Italian cities. Smart city advancement is operationalized through six indicators capturing organizational and relational dimensions of urban transformation, while social capital is measured through indicators of civic participation, volunteering, and associational activity.

Preliminary results reveal a negative association between the intensity of smart city initiatives and urban social capital. Cities that advance more rapidly along the smart city paradigm tend to experience stronger declines in civic participation and community engagement. These findings suggest a paradox of contemporary urban development: as cities become technologically smarter, they risk becoming socially thinner. The study contributes to the critical debate on smart cities by highlighting the need to rebalance technological innovation with the preservation of place-based social capital.

Keywords: *Smart cities; Social capital; Disneyfication; Urban governance; Digital Technology, Smartness*

Framing of the research. *Over the past two decades, cities have entered a profound organizational transition toward smart city models of governance and development. Defined by Bakici et al., (2012, p. 139) as a high-tech intensive and advanced city that connects people, information and city elements using new technologies in order to create a sustainable, greener city, competitive and innovative commerce, and an increased life quality, the concept of smart cities has progressively reshaped places and communities (Albino et al., 2015; Caragliu et al., 2011; Caragliu & Del Bo, 2019). In this transition, the notion of "smart" is intended to function in support of cities and their inhabitants, yet it simultaneously reconfigures interactions, institutional proximities, and broader urban dynamics (Shelton et al., 2015). Historically conceived as "polis", understood as political and social communities grounded in shared civic life, collective identity, and relational embeddedness, cities are increasingly reorganized as "urbs spectans", viewed as an urban system structured around continuous observation, data extraction, and performative governance (Gupta et al., 2020). In this configuration, smart cities operate as functional, sensor-laden, and platform-mediated environments in which digital infrastructures, real-time monitoring, and performance indicators are mobilized to optimize efficiency, connectivity, and innovation. In recent years, however, the smart city paradigm has increasingly become the subject of critical reflection. A growing body of scholarship highlights the emergence of several paradoxes associated with smart urban development, where technological advancement and data-driven governance coexist with new forms of social fragmentation, institutional distancing, and uneven urban benefits (Caragliu & Del Bo, 2022; Carlsen & Leknes, 2022; Datta, 2015; Marchesani & Kummitha, 2026; Marchesani & Masciarelli, 2026). Rather than producing universally inclusive and participatory urban environments, smart city initiatives may generate tensions between efficiency and inclusiveness, technological optimization and democratic participation, as well as between global models of urban innovation and locally embedded forms of community life (Taylor Buck & While, 2017; Fromhold-Eisebith & Eisebith, 2019).*

This transformation has deeply altered how cities define what it means to be "smart." Rather than asking for "whom" smartness is pursued, urban strategies increasingly emphasize what cities can do to be. As a result, smartness becomes a category defined by technical capabilities and advanced applications, rather than by social embeddedness or civic outcomes. In this line, a growing critical literature suggests that this process risks producing a form of urban depersonalization (Datta, 2015; Hollands, 2020; O'Reilly & Reed, 2011), that we conceptualize as the "disneyfication of place". Early critical accounts of disneyfication (Choi, 2012; Warren, 1994) describe how places are transformed into aseptic, standardized, and consumption-oriented environments, where complexity, conflict, and local specificity are progressively erased. In these accounts, urban spaces are redesigned to be efficient, attractive, and easily consumable, but increasingly detached from the lived experiences, identities, and social ties that historically constituted them. Contemporary smart cities, we suggest, represent a technologically updated manifestation of this logic that is not themed around entertainment, but around innovation, efficiency, and digital excellence. As a result, the city risks losing its relational and political core, replacing it with a standardized and instrumental vision of urban development (Grossi &

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Pianezzi, 2017). In this sense, smart cities may increasingly operate as curated and performative environments in which technological sophistication becomes a visible symbol of progress, while the social infrastructures that sustain civic life risk being progressively marginalized (Hollands, 2020; Yang, 2020).

In the Italian context, this shift is particularly visible. As anticipated by Vanolo (2014, p. 984), the rhetoric of smartness increasingly operates as a "non-critical consensus, sustained by celebratory narratives, media enthusiasm, and a lack of structured opposition". Smart city strategies are often presented as inherently desirable, progressive, and inevitable, leaving little space for reflexive debate about their social consequences (Kummitha & Crutzen, 2017; Pooley et al., 2005; Marchesani et al., 2026). Indeed, social consequences often directly reshape place-based communities by influencing patterns of civic participation, weakening proximity between citizens and urban institutions, and reconfiguring modes of interaction between residents and local authorities, while simultaneously marginalizing alternative visions of the city and obscuring questions of inclusion, exclusion, and collective meaning (Shelton et al., 2015). Smart cities are no longer primarily "polis" but increasingly function as the "smart" per-se, thereby disconnecting with citizens and communities.

This shift has important implications for social capital in places. Building on Putnam's (2001; 2000) seminal work, social capital refers to the networks, norms, and trust that enable coordination and cooperation for mutual benefit within a community. In Bowling Alone, Putnam (2000) documented the long-term erosion of social capital in American society, linking it to declining civic participation, weakened community ties, and reduced institutional trust. More recent organizational research echoes these concerns. Marquis et al. (2013), in Golfing Alone, show how organizational elites and corporations increasingly decouple from local communities, contributing to the hollowing out of community-based organizations and civic life . In this ongoing work, we argue that the disneyfication of place (through the smart city paradigm), represents a contemporary manifestation of this erosion. While the smart transformation of cities promises connectivity and efficiency, they may simultaneously weaken the relational infrastructures that sustain place-based communities. As cities become smarter in technical terms, they risk becoming thinner in social terms, less connected to residents' identities, practices, and collective life. Building on these insights, we posit the following research question:

RQ: As cities advance along the smart city paradigm, do they undermine social capital by prioritizing what cities can do over whom they are meant to serve?

To address this question, we empirically examine the relationship between the advancement of smart cities and changes in urban social capital. Recognizing that social capital typically evolves slowly over time (Ceci et al., 2019; Marino et al., 2025; McGraw, 2012), we investigate whether smart city transitions accelerate their erosion. In doing so, we assess how organizational smart-led transformations of cities reshape place-based social relations.

Purpose of the paper. *The purpose of this study is to investigate the societal consequences of the organizational transition toward smart city models of governance and development. While the smart city paradigm has been widely associated with technological progress, efficiency, and improved urban services, less attention has been devoted to its potential implications for the social fabric of cities. Building on the concept of "disneyfication of places," this paper examines whether the increasing prioritization of technological capabilities, performance indicators, and digital infrastructures may unintentionally weaken the relational infrastructures that historically sustain civic participation, trust, and community ties. Specifically, the study explores whether cities that advance more intensively along the smart city paradigm experience a progressive erosion of place-based social capital. By empirically analyzing the relationship between the development of smart city initiatives and changes in urban social capital, the paper aims to contribute to the debate on the organizational and societal implications of smart urban transformations. In doing so, the study contributes to the growing critical debate surrounding the smart city paradigm in recent literature (Caragliu & Del Bo, 2022; Kummitha, 2018; Marchesani & Kummitha, 2026; Vanolo, 2014), questioning whether contemporary smart city trajectories risk privileging what cities can technologically do over whom they are ultimately meant to serve .*

Methodology. *To empirically investigate the relationship between smart city advancement and social capital, we follow the approach proposed by Lee and Yu (2014) and employ a dynamic panel data model estimated through the Generalized Method of Moments (GMM). This approach is particularly suitable for capturing the dynamic evolution of social capital over time while addressing potential endogeneity issues. The analysis relies on a longitudinal dataset of 38 Italian cities observed over multiple years, selected through a probability-proportional-to-size sampling strategy (Levy & Lemeshow, 2008) to ensure representativeness across geographic areas, population size, and levels of economic development. Building on the smart city literature (Caragliu & Del Bo, 2019; Marchesani & Ceci, 2025; Marchesani & Kummitha, 2026), smart city initiatives are operationalized through six indicators capturing both organizational and relational dimensions of urban transformation: Public R&D Investments, Digital Public Services, Smart Practices (SEAP), Green Governance, Public Engagement, and Open Data Initiatives. While some of these dimensions reflect internal organizational restructuring and process reconfiguration within municipal administrations (Mora, 2023) others capture new forms of interaction between cities, users, and local communities enabled by digital infrastructures (Yeh, 2017).*

Social capital is measured following established approaches in the literature (Laursen et al., 2012; Laursen & Salter, 2006; Nakano & Washizu, 2021) through five indicators capturing civic participation and community engagement, namely Non-Profit Associations, Electoral Participation, Cultural Participation, Crime Rate, and Volunteering Activities. Finally, consistent with research on urban agglomeration and city-level dynamics (Glaeser, 2000; Glaeser & Gottlieb, 2009), the models include a comprehensive set of control variables capturing structural urban conditions, including city

size, economic development, migration flows, GDP, total firms, employment levels, airport presence, population, and education. These controls allow us to disentangle the effect of smart city advancement from broader demographic, economic, and infrastructural dynamics shaping urban communities.

Results. *Preliminary results indicate a negative association between the advancement of smart city initiatives and urban social capital. Cities exhibiting higher levels of smart city initiatives show a stronger decline in social capital, particularly in the upper quartiles of smart city initiatives intensity. This pattern is especially pronounced in larger and more economically developed cities, where the acceleration of smart initiatives coincides with sharper reductions in civic participation, volunteering activities, and associational density. These findings suggest that the rapid diffusion of smart city practices may unintentionally amplify existing structural trends of social disengagement rather than counteracting them. In particular, the growing emphasis on technological infrastructures, data-driven governance, and performance-oriented urban management appears to be associated with a gradual weakening of relational forms of civic life. Overall, the preliminary evidence supports our conceptual argument that as cities become smarter in functional and technological terms, they risk becoming socially thinner, increasingly detached from community-based practices, collective participation, and relational forms of urban life.*

Research limitations. *This study presents several limitations that open avenues for future research. First, the empirical analysis focuses on Italian cities, which may limit the generalizability of the findings to other national contexts characterized by different institutional arrangements, governance models, and levels of digital transformation. Comparative studies across countries or regions could provide a broader understanding of how smart city development interacts with local social structures. Second, while the study relies on multiple indicators to capture both smart city advancement and social capital, these constructs remain inherently complex and multidimensional. Future research could further refine the measurement of social capital by incorporating additional qualitative or perception-based indicators that capture citizens' sense of belonging, trust, and engagement with local institutions. Third, the analysis focuses on the macro-level relationship between smart city initiatives and urban social capital. Future research could explore the micro-level mechanisms through which digital infrastructures, platform governance, and data-driven urban management influence everyday forms of civic participation and community interaction. Such investigations may provide a deeper understanding of how smart-led transformations reshape the social fabric of cities over time. Fourth, the study adopts a quantitative longitudinal approach that captures structural trends over time but does not directly observe how citizens perceive or experience smart city transformations. Future research could complement these findings through qualitative methods, such as interviews, ethnographic observations, or participatory studies, to better understand how digital urban policies reshape everyday urban life and civic engagement. Finally, while the models account for a broad set of structural controls, smart city transformations are embedded within complex institutional and cultural environments that may shape their social consequences. Future research could further investigate the moderating role of local governance practices, participatory policies, and institutional trust in shaping the relationship between smart city initiatives and the evolution of urban social capital.*

Managerial implications. *The findings of this study carry implications for policymakers, urban planners, and public managers involved in the design and governance of smart city initiatives. While the smart city paradigm is often framed as a pathway toward efficiency, innovation, and improved urban services, our results suggest that the pursuit of technological advancement is not socially neutral. In particular, an excessive emphasis on digital infrastructures, performance indicators, and technology-driven governance may unintentionally weaken the relational infrastructures that sustain civic participation, trust, and community engagement within cities.*

For urban policymakers, these findings highlight the need to reconsider the balance between technological development and social embeddedness in smart city strategies. If cities prioritize technological capabilities without simultaneously reinforcing civic participation and community ties, smart initiatives risk contributing to a gradual erosion of social capital. In this sense, the emerging logic of the "disneyfication of places" suggests that cities may increasingly be organized as curated, standardized, and performance-oriented environments designed to optimize efficiency and visibility rather than to nurture community life and collective identity.

From a governance perspective, smart city policies should therefore move beyond a purely technology-centered approach and incorporate mechanisms that actively support civic engagement, local associations, and participatory governance. Strengthening community-based initiatives, fostering inclusive forms of digital participation, and maintaining strong connections between local institutions and citizens become essential components of sustainable urban transformation.

Ultimately, the results call for a broader redefinition of what it means for a city to be "smart." While the logic of urbs spectans may enhance efficiency, monitoring, and optimization, the long-term resilience and vitality of cities continue to depend on the logic of polis, where citizens, communities, and social relations remain at the center of urban development. Reintegrating this human-centered perspective into smart city strategies may help prevent the unintended social consequences associated with the disneyfication of contemporary urban environments.

Originality of the paper. *This study contributes to the emerging critical debate on smart cities by introducing the concept of the disneyfication of places as an organizing logic through which contemporary smart city transformations can be interpreted. While most smart city research emphasizes technological innovation, efficiency, and service improvement, this paper shifts the focus toward the societal consequences of these transformations. By linking the advancement of smart city initiatives to the erosion of urban social capital, the study bridges the literature on smart cities, organizational studies, and social capital. Empirically, it provides one of the first longitudinal analyses examining how smart city development relates to changes in civic participation and community engagement at the city level. In doing so, the paper offers a novel perspective on smart urban development, highlighting the potential paradox whereby cities may become technologically smarter while simultaneously becoming socially thinner.*

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Education for sustainability as a pedagogical, psychological and sociological paradigm: A transdisciplinary survey between Italy, Tanzania and Spain

MARIO D'AVINO[1]

Abstract. *The ecological transition represents one of the greatest global challenges of the 21st century, requiring educational systems to assume a strategic role in forming the cognitive, ethical and socio-emotional competencies necessary to address socio-ecological crises. This paper explores sustainability as a pedagogical, psychological, sociological, and managerial paradigm, examining how schools in Italy, Tanzania, and Spain translate sustainability policies into daily practices and organizational innovation.*

Using a mixed-methods design (document analysis, ethnographic observation, 82 interviews, 1,245 questionnaires, and 3 case studies), the study highlights schools as sustainability ecosystems capable of organizational learning and community value creation. An Integrated Model of Pedagogical Sustainability (IMPS) is developed across three contribution levels—conceptual, empirical, and managerial.

Nevertheless, significant territorial diversities emerge, revealing barriers related to governance, cultural resistance and inequalities. The paper's originality lies in the development of an integrated model of pedagogical sustainability that connects curricular, psychological and sociological dimensions in a unified framework. This integration is motivated by the recognition that effective sustainability education requires not only innovative curricula, but also the psychological conditions that support agency and wellbeing, and the sociological structures that enable participation and school–territory cooperation.

Within this perspective, the study offers five specific contributions:

1. *it establishes a transdisciplinary link between pedagogy, sustainability psychology and environmental sociology;*
2. *it provides comparative empirical evidence from three different countries;*
3. *it proposes a replicable mixed-methods design applicable in diverse educational settings;*
4. *it advances a conceptual and operational model to guide educational innovation;*
5. *it introduces a framework for policy development and school–community integration.*

Overall, the study strengthens the bridge between theory and practice, showing how schools can become key drivers of sustainability through coordinated pedagogical, psychological and sociological action.

Keywords: *sustainability education; pedagogy; sustainability psychology; environmental sociology; mixed methods; international comparison*

Introduction and Background. Sustainability education represents a shift from environmental awareness to organizational transformation. Global frameworks such as the UN 2030 Agenda, UNESCO ESD Roadmap (2020-2030), and EU GreenComp (2022) have shaped curricula, teacher competencies, and institutional governance. However, three gaps persist:

1. Limited evidence of how schools implement sustainability frameworks.
2. Weak integration of pedagogical, psychological, and managerial perspectives.
3. Scarce international comparisons across diverse socio-economic contexts.

This study positions education for sustainability as a management innovation process, viewing schools as hybrid organizations that learn, adapt, and engage communities.

Framing of the research. *Over the last twenty years, sustainability has transformed from a sectorial theme into a comprehensive paradigm structuring global, European and national educational policies. Frameworks such as the 2030 Agenda, the UNESCO Education for Sustainable Development (ESD) programmes and, at the European level, the GreenComp Recommendation (2022) have imposed profound changes in curricula, teaching methodologies and the professional identities of educators. Schools are now explicitly called to promote systemic thinking, ecological awareness, civic participation and emotional competencies necessary to address climate change, social inequalities, biodiversity loss, demographic transitions and new risks.*

Within this landscape, the concept of pedagogical sustainability emerges as a complex and multidimensional category. Unlike mere environmental education, pedagogical sustainability integrates ecological, social, economic and cultural dimensions and focuses on the ability of educational systems to innovate, regenerate and orient themselves toward the future. It involves designing learning environments that cultivate agency, responsibility, cooperation and participatory citizenship.

In parallel, contributions from sustainability psychology—drawing on authors such as Goleman, Bandura, Lewin—

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highlight the role of emotional literacy, motivation, collective efficacy, pro-environmental attitudes and behavioural regulation. Psychological factors are decisive in determining whether educational inputs translate into sustainable behaviours. Similarly, environmental sociology (Beck, Morin, Schnaiberg) underscores the importance of structural conditions, power relations, territorial inequalities and governance systems in shaping the capacity of institutions to act sustainably.
Despite this rich theoretical background, several gaps persist. First, empirical research still struggles to capture how schools concretely interpret and implement sustainability policies. Secondly, few studies connect pedagogical, psychological and sociological dimensions within a unified analytical framework. Thirdly, international comparisons remain limited, even though sustainability is profoundly influenced by cultural, socio-economic and territorial contexts. This research addresses these gaps by proposing a transdisciplinary investigation across three distinct contexts—Italy, Tanzania and Spain—aimed at understanding how sustainability is constructed, perceived and acted upon within educational ecosystems.

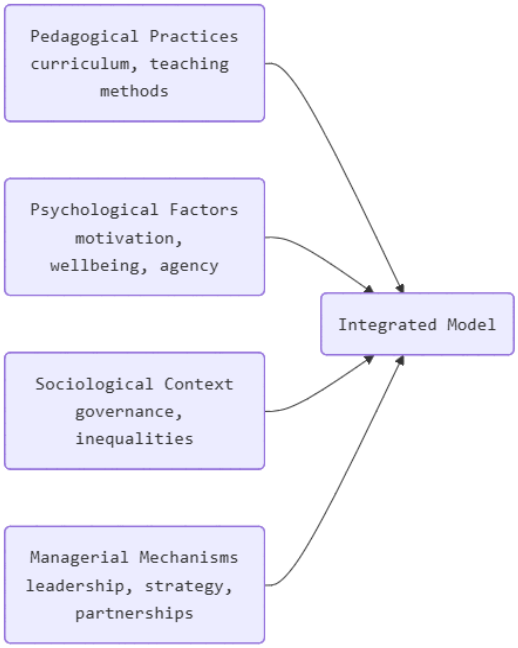
Purpose of the paper. *The paper has four main objectives:*

1. *Pedagogical objective:*
   Analyse how school curricula, extracurricular activities and organizational practices promote sustainability competencies, with particular attention to teaching methods, spaces, materials and partnerships.
2. *Psychological objective:*
   Investigate the effects of sustainability education on students' socio-emotional wellbeing, motivation, perceived efficacy and forms of ecological and social agency.
3. *Sociological objective;*
   Explore how schools interact with local communities, institutions and environmental actors, shaping participatory governance processes and contributing to territorial sustainability.
4. *Comparative objective:*
   Understand how different territorial, cultural and socio-economic conditions influence both the design and implementation of sustainability education and the acquisition of sustainable competencies. The final purpose is to build an integrated model of pedagogical sustainability able to guide teacher training, policy frameworks and school-territory collaboration.

Dimension	Theoretical Focus	Key Authors
Pedagogical	Learning design, agency, future orientation	Sterling, Morin, Tilbury
Psychological	Motivation, self-efficacy, emotional literacy	Bandura, Goleman
Sociological	Governance, inequality, reflexive modernity	Beck, Schnaiberg
Managerial	Organizational learning, leadership, networks	Senge, Fullan

These dimensions converge into the Integrated Model of Pedagogical Sustainability (IMPS), where management acts as the connector that enables learning, participation, and innovation.

Figure 1. Integrated Model of Pedagogical Sustainability (IMPS)



Methodology. *The research employs a Mixed Methods Approach, ensuring analytical depth and methodological triangulation.*

1. Document analysis
A systematic analysis was conducted on:
- *international frameworks (Agenda 2030, UNESCO ESD);*
- *European policies (GreenComp);*
- *national legislation (Italian Law 92/2019 on Civic Education);*
- *regional and local guidelines;*
- *strategic reports (WWF, ARPA, SNPA, ASviS).*

This phase provided the normative and conceptual structure necessary to interpret empirical data.

2. Ethnographic investigation
Ethnographic fieldwork involved visits to schools in Italy, Tanzania (particularly in the Kilolo district in collaboration with RUCU and Fondazione Tovini) and Spain. Observations focused on:
- *classroom practices and relational dynamics;*
- *school governance;*
- *collaborations with NGOs, local authorities and environmental bodies;*
- *routines related to waste, mobility, food, urban green and energy consumption.*

This approach enabled the identification of tacit and culturally embedded practices often not captured by formal documentation.
3. Semi-structured interviews
Interviews were conducted with:
- *teachers and school leaders;*
- *local and national administrators;*
- *representatives of institutions (Carabinieri Forestali, Navy);*
- *NGOs (WWF, local environmental associations);*
- *university experts and training officers.*

Topics addressed included visions, problems, barriers, opportunities and future trajectories.

4. Quantitative questionnaires
Surveys were administered to:
- *school students (primary to upper secondary);*
- *teachers;*
- *university students (future teachers).*

Variables investigated:
- *sustainability attitudes and representations;*
- *daily pro-environmental behaviours;*
- *sense of personal and collective efficacy;*
- *perceived impact of school projects;*
- *socio-emotional wellbeing indicators.*

5. Participant observation
Participation in public meetings, institutional consultations and territorial assemblies allowed the observation of participatory processes and governance dynamics related to sustainability.

6. Case studies
Three emblematic cases were studied:
- *WWF: environmental education projects and student engagement models.*
- *Carabinieri Forestali: biodiversity protection and legality education.*
- *Navy: marine education, civic responsibility and ecological awareness.*

These cases function as replicable models of school–territory integration.

7. International comparison
Cross-country comparison highlights cultural, structural and pedagogical differences, offering a global-local perspective on sustainability education.
A convergent mixed-methods approach combines qualitative and quantitative evidence to capture both systemic and perceptual dimensions.

Method	Tool	Data Collected
Document Analysis	Policy and institutional texts	37 documents
Ethnography	Classroom and school observations	102 hours

Method	Tool	Data Collected
Interviews	Semi-structured, 45 min avg	82
Surveys	Online questionnaires	1,245 respondents
Participant Observation	Public meetings, assemblies	17 total
Case Studies	WWF, Carabinieri Forestali, Eco-Schools Spain	3 cases

Samples

- Schools: 38 (Italy = 15, Tanzania = 10, Spain = 13)
- Respondents: Students (70%), Teachers (25%), Administrators (5%)
- Sampling: Purposive stratified by region, school type, and governance model

Data Analysis Procedures

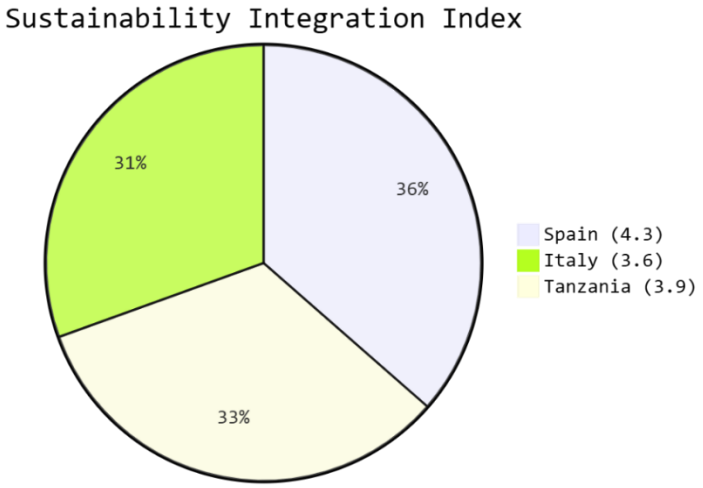
- *Qualitative*: NVivo 14 coding (thematic analysis, cross-country matrices)
- *Quantitative*: SPSS 28 (ANOVA, correlations, composite indices 0–5)
- *Integration*: Joint data displays for pattern convergence

Results.

Schools as Sustainability Ecosystems

Schools with distributed leadership and strong partnerships perform better in sustainability integration.

Figure 2. Sustainability Integration Index by Country



Spain shows systematic integration of policy and practice; Tanzania demonstrates contextual sustainability rooted in everyday survival practices; Italy presents strong policy frameworks but regional variability.

Competency Development

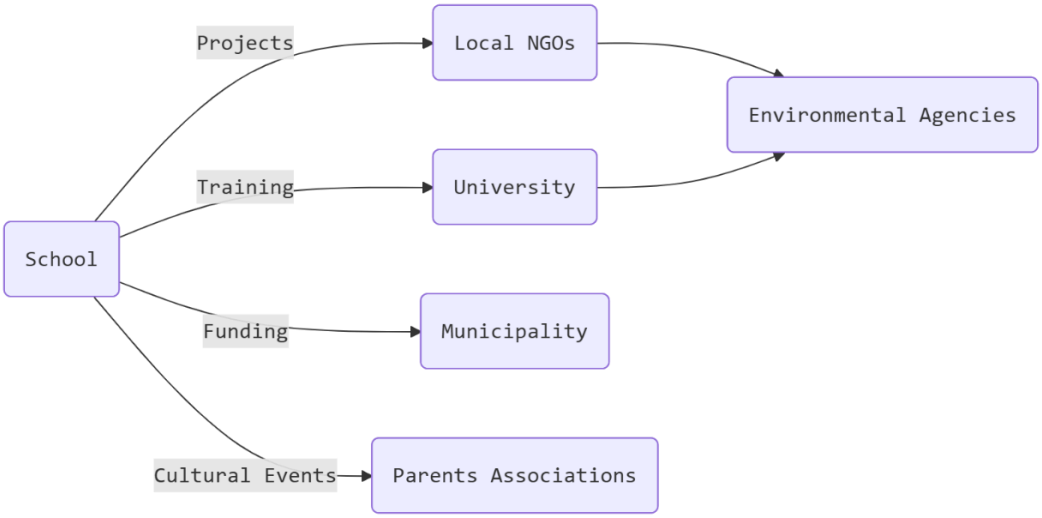
Figure 3. Heatmap – Growth in Core Student Competencies (%)

Competence	Italy	Tanzania	Spain
Systemic Thinking	72	77	78
Agency & Self-Efficacy	65	70	74
Emotional Regulation	58	67	65
Global Citizenship	68	73	79

Higher competency growth correlates with stronger participatory practices ($r = 0.64$, $p < .01$).

Comparative Governance Models

Figure 4. Network Diagram – School–Community Partnerships



The Spanish network shows densest connectivity; Tanzania's model is community-centric; Italy's is policy-driven but fragmented.

Cross-Country Comparative Matrix

Category	Italy	Tanzania	Spain
Policy Framework	Strong national law, uneven enforcement	Minimal policy, pragmatic actions	Regional plans, national coherence
Leadership Model	Individual, principal-centered	Communal and collective	Shared and institutionalized
Teacher Training	Fragmented, voluntary	Informal, NGO-based	Structured CPD programs
Governance	Top-down, variable	Local consensus	Network-based
Key Innovation	Curriculum projects	Food and water sustainability	Eco-school certification system

Discussion: Managerial Implications

Education for sustainability acts as a management innovation, reshaping schools as learning organizations and public value creators.

- Micro level: teachers as change agents using project and design-thinking methods;
- Meso level: schools as learning organizations with participatory governance;
- Macro level: systems promoting network governance and evidence-based decision-making.

Key conditions for impact:

1. Distributed leadership and reflective principals.
2. Teacher professional development aligned to GreenComp.
3. Institutionalized stakeholder partnerships.
4. Monitoring systems linking education outcomes to SDGs.

Policy Recommendations

Target Area	Key Recommendation
Teacher Education	Embed sustainability competencies into national frameworks
Leadership Training	Introduce strategic management and ESD modules
Governance	Develop regional Sustainability Networks with joint KPIs
Evaluation	Implement SDG-linked performance indicators
Financing	Promote public-private partnerships for sustainable infrastructure

Limitations and Future Research

- National heterogeneity limits direct comparability.
- Translation and cultural bias may affect data interpretation.
- Future phases will expand sampling, include longitudinal impact assessment, and explore digital sustainability competencies.

Managerial implications. *The study supports:*

- *the design of teacher training aligned with GreenComp;*
- *the creation of local sustainability networks;*
- *evidence-based school governance;*
- *cross-sectoral projects integrating NGOs, institutions and environmental bodies;*
- *development of territorial sustainability plans.*

Conclusions. Education for sustainability represents both a pedagogical transformation and a strategic managerial challenge. The IMPS framework offers an integrative model linking learning, wellbeing, governance, and leadership. Italy, Tanzania, and Spain illustrate distinct yet complementary trajectories—policy-driven, community-based, and system-integrated—demonstrating that sustainability thrives where educational innovation and managerial governance converge.

The research demonstrates that education for sustainability is both a pedagogical and managerial transformation process. Schools that adopt distributed leadership, organizational learning and community partnerships generate measurable gains in student wellbeing, agency and civic participation.

The Integrated Model of Pedagogical Sustainability (IMPS) thus offers a practical and theoretical contribution for managers, educators and policymakers—turning schools into laboratories of sustainable innovation.

The findings of this study reaffirm that education for sustainability (EfS) must be understood not solely as a pedagogical innovation but as a comprehensive organizational and managerial transformation. Schools are no longer confined to their traditional instructional role; they operate as complex adaptive systems, where learning, governance, psychological wellbeing, and community engagement intersect in the pursuit of the Sustainable Development Goals (SDGs).

Across the three research contexts—Italy, Tanzania, and Spain—common structural and cultural patterns emerge, yet their trajectories reveal the intricate interplay between global frameworks and local enactments.

In Italy, the normative apparatus for civic and environmental education provides a solid conceptual foundation; however, implementation depends on local leadership and the capacity of schools to navigate fragmented governance. Tanzania illustrates a different paradigm—sustainability as a lived, community-embedded necessity, where schools act as anchor institutions fostering resilience and social cohesion in contexts of resource scarcity. Spain, in contrast, demonstrates a mature and systemic approach: regional environmental plans, participatory governance, and consistent teacher training have consolidated a networked model of educational sustainability.

From a managerial perspective, these findings contribute to the understanding of schools as learning organizations (Senge, 1990) and public value institutions. The capacity to mainstream sustainability depends on the presence of distributed leadership, collaborative cultures, and continuous professional learning communities. Leadership is not restricted to formal authority but emerges as collective competence, nourished by relational capital and reflective practices. The evidence suggests that effective sustainability governance in education systems is shaped by a triadic equilibrium among policy coherence, organizational learning, and stakeholder participation.

At a more theoretical level, the Integrated Model of Pedagogical Sustainability (IMPS) articulates the nexus between pedagogy, psychology, sociology, and management. The model sees sustainability education as a *transdisciplinary ecosystem of value creation*, where cognitive, emotional, and structural resources co-evolve.

- The pedagogical dimension ensures curricular innovation and experiential learning.
- The psychological dimension sustains motivation, wellbeing, and agency.
- The sociological dimension embeds equity, governance and participation.
- The managerial dimension orchestrates these components into an adaptable and accountable system.

This integrative approach expands existing ESD research by anchoring it in organizational theory and management studies—fields that provide the analytical tools to understand how change is institutionalized and how sustainability becomes organizational routine rather than isolated pedagogical initiatives.

Empirically, the study demonstrates that students exposed to integrated sustainability curricula develop higher levels of complex thinking, emotional regulation, and civic engagement. Such competencies translate into enhanced wellbeing and a stronger sense of agency—the psychological prerequisites for sustainable behavior. These outcomes reinforce the argument that sustainability education simultaneously cultivates individual competences and collective capabilities, bridging micro-level learning with macro-level governance.

Moreover, this research underscores the importance of multilevel governance in education management. Nations and regions that institutionalize horizontal collaboration—connecting ministries, municipalities, NGOs, and academic institutions—generate more coherent ecosystems of sustainability. The Spanish experience illustrates a governance model in which schools, municipalities, and civil actors co-design educational strategies, resulting in improved alignment between policies, resources, and outcomes.

From a policy standpoint, EfS should thus be regarded as a domain of strategic management for public institutions, requiring structured investment, evaluation mechanisms, and transparent accountability. Integrating GreenComp competencies into national curricula, accrediting sustainability in teacher education, and defining measurable sustainability indicators are no longer optional reforms—they are imperatives for systemic transformation.

Future research should pursue longitudinal studies of how sustainability becomes embedded in institutional culture and how it transforms leadership identities. Expanding the comparative design to include non-European and Global South contexts will further illuminate the social and cultural variability of sustainable education as a management paradigm.

Ultimately, this paper contributes to the emerging vision of the school as a sustainability ecosystem—a microcosm of the sustainable society it seeks to build. As the evidence suggests, schools that learn to manage complexity, foster wellbeing, and mobilize collective agency are not only educating for sustainability—they are practicing it. The pedagogical, psychological, sociological, and managerial dimensions thus converge into an operational reality where education ceases to be preparation for the future and becomes, instead, a living practice of sustainable transformation in the present.

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E-Government Service Quality as a Driver of Digital Inclusion

GIUSEPPE BONGIORNO[1], MARIA COLURCIO[2], OLIMPIA MEGLIO[3]

Abstract. *This paper examines how the quality of e-government service delivery shapes digital inclusion in citizens' interactions with public administrations. Grounded in a public service perspective, the study conceptualizes the quality of digital public services as a feature of the service environment that can influence not only the overall use of online public services, but also the distribution of access across social groups. The analysis focuses on different dimensions of digital inclusion: interaction with Public Authorities, perceived barriers to digital interaction and the educational gap in the use of digital public services. Using a panel dataset covering 36 European countries over the period 2012–2022, the study employs a Two-Way Fixed Effects model to assess the relationship between e-government service quality and inclusion outcomes. The findings indicate that higher lagged quality of e-government service delivery is associated with a reduction in the educational gap in digital service use. This equalizing effect is more pronounced in countries characterized by greater fragility in digital skills. These results suggest that improvements in the design and enabling conditions of digital public services can support a more inclusive pattern of digital transformation. The paper contributes to research on public value, digital inclusion, and e-government by showing that the benefits of digitalization depend not only on citizens' individual capabilities, but also on the quality of the public digital service ecosystem in which interactions take place.*
Keywords: *Digital public services; Digital inclusion; Service quality; Public service Logic.*

Framing of the research. The digital transformation of public administration is increasingly reshaping how public organizations design, deliver, and manage services (Mergel et al., 2019). Digital public services can be interpreted as value propositions embedded in broader service ecosystems, whose design characteristics shape citizens' opportunities to access and benefit from services (Petrescu, 2019; Eriksson et al., 2020). This broader perspective is important because it shifts analytical attention from technology adoption alone to the conditions under which digital public services create value for citizens (Yang et al., 2024). Building on this perspective, Public Service Logic (PSL) offers a useful framework for addressing this issue by arguing that value is not produced unilaterally by public organizations (Osborne, 2018; Osborne et al., 2021). Applied to digital government, this implies that online public services should be understood not merely as technological tools or administrative channels, but as service environments whose design can facilitate or constrain citizens' capacity to benefit from public services. These strands of literature provide a coherent foundation for understanding how the design and delivery of digital public services influence not only their uptake, but also their inclusiveness (Morte-Nadal and Esteban-Navarro, 2025). This perspective becomes especially relevant when considered alongside the literature on digital inclusion. Rather, it encompasses a wider set of organizational and institutional changes that affect administrative processes, service delivery models, and the nature of citizen government interactions (Haug et al., 2024). In this context, PSL emerges as a particularly suitable analytical lens to grasp these dynamics. PSL conceptualizes public services as processes through which value emerges through interactions between public organizations, citizens, and other actors operating within service systems (Osborne, 2018; Osborne et al., 2021). From this perspective, public organizations are not seen as direct creators of value. Instead, they offer value propositions that enable citizens to generate value through their engagement with public services in everyday life contexts (Osborne et al., 2021, 2022). Furthermore, PSL highlights that value creation unfolds within broader public service ecosystems, where multiple actors integrate resources in order to achieve desired outcomes (Petrescu, 2019; Eriksson et al., 2020).

At the same time, the literature on the digital divide has extensively documented how disparities in access to technology, levels of digital skills, and broader socio-economic resources shape individuals' ability to participate effectively in digital environments (Mesa, 2023). These inequalities do not only affect whether individuals can access digital services, but also influence how they experience and use them. In this regard, existing research has also emphasized that the design of administrative procedures and service interfaces may generate administrative burdens, which can take the form of learning, compliance, and psychological costs that discourage citizens from accessing public services (Moynihan et al., 2015). In digital contexts, such barriers may lead individuals to rely on intermediaries or other people to complete online administrative procedures, thereby limiting their autonomy in interacting with public administrations. Within digital government settings, the quality of service provision becomes a crucial factor in shaping these dynamics. It encompasses multiple dimensions, including usability, accessibility, and the interoperability of systems, as well as the availability of enabling infrastructures such as digital identification systems and secure data exchange mechanisms (European Commission, 2025). These elements play a central role in influencing citizens' perceptions of convenience, ease of use, and trust when engaging with digital public services (Scott et al., 2016; Campmas et al., 2022). Despite the relevance of these aspects, much of the existing literature has primarily focused on explaining patterns of digital service

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adoption, while comparatively fewer studies have examined whether improvements in the quality of digital supply also contribute to reducing barriers to access or to narrowing inequalities between different social groups (Liu et al., 2025).

Purpose of the paper. The purpose of this paper is to examine whether improvements in the quality of digital public service provision are associated with more inclusive patterns of interaction between citizens and public authorities. In particular, the study investigates the extent to which higher quality in eGovernment service delivery may influence not only the overall use of digital services, but also the degree to which such use is distributed more evenly across different social groups.

In line with a Public Service Logic perspective, we conceptualise digital public service quality as a value proposition that may facilitate citizens' ability to access and use services. From this standpoint, the quality of digital provision is not simply a technical attribute, but a key enabling condition that can shape how citizens engage with public services and generate value through their interactions.

This developmental paper assesses whether eGovernment supply quality is associated with digital inclusion through two complementary channels, namely an intensive margin, understood as higher average usage, and an equalising margin, reflected in lower perceived barriers and a smaller educational gap. This focus aligns with perspectives that evaluate digital transformation not only by efficiency gains but also by its contribution to public value and socially inclusive outcomes (Moore, 1995; Hartley et al., 2017). It also speaks to digital divide research emphasising that inclusion depends on both individual capabilities and the conditions that shape effective access, including barriers to use (van Dijk, 2020; Lythreatis et al., 2022), and to inclusive innovation arguments that link innovation to "no one left behind" objectives (Osborne et al., 2016; Bovaird and Löffler, 2012).

Building on the European Commission's eGovernment Benchmark framework, we incorporate gap measures to capture the distributional dimension of inclusion and test the following hypotheses:

H1: Higher e-government supply quality is associated with greater online citizen–public authority interaction.

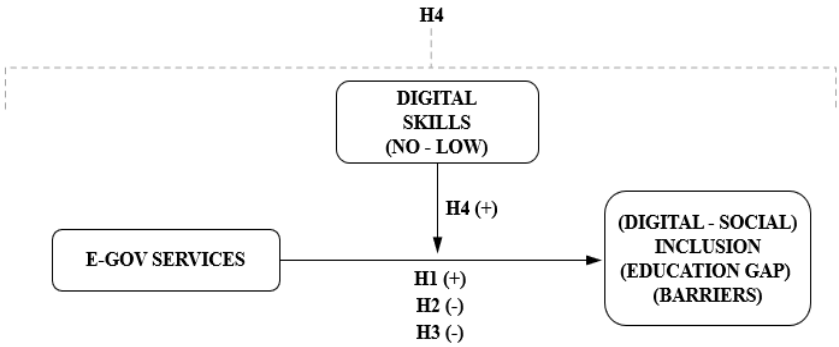
H2: Higher e-government supply quality is associated with a reduction in barriers to use.

H3: Higher e-government supply quality is associated with a reduction in the education divide in online interaction with public authorities.

H4: The negative association between supply and the education divide is stronger in contexts with a higher share of the population with no or low digital skills.

The conceptual model (Figure 1) links eGov supply quality to digital inclusion through two complementary channels. The intensive margin concerns the intensity of online use/interaction with public authorities (D1). The equalising margin concerns constraints and inequalities in access, captured by perceived barriers (D4) and by the education gap in interaction (LogGap). We further posit that the equalising margin is contingent on digital skills fragility: the effect of supply on LogGap is moderated by the share of citizens with low or no digital skills.

Figure 1 – Conceptual model



Source: Authors' elaboration

Methodology. This study employs a longitudinal panel dataset encompassing 36 European countries over the period 2012 to 2022. Data on the quality of e-government service provision are drawn from the European Commission's eGovernment Benchmark, which we combine with Eurostat measures of citizens' online interaction with public authorities, perceived barriers to autonomous digital use, and educational inequalities in digital participation. The analytical strategy is based on Two-Way Fixed Effects models, allowing us to exploit both cross-country and temporal variation in these indicators (Wooldridge, 2025).

Empirically, the dataset includes 36 countries across 11 years, resulting in a total of 377 potential country-year observations. The actual number of observations varies depending on the specification and outcome due to missing data, primarily arising from Eurostat series on digital skills prior to 2015. The models are estimated using R-Studio, incorporating country and year fixed effects along with robust standard errors, clustered by country or, in more conservative specifications, two-way clustered by both country and year (Croissant and Millo, 2019).

To assess the quality of digital public service provision in the context of eGovernment, we rely on two main dimensions—User Centricity and Key Enablers—operationalized through their average values (M_UC and M_KEY).

The former captures the overall quality of the user experience, referring to how far information and services are accessible online, supported through digital channels, and compatible with different devices, while the latter reflects the availability of the core infrastructures that enable digital delivery, such as eID, eDocuments, authentic sources, digital mail, and security systems.

To provide a more comprehensive measure, we also construct a composite indicator of eGovernment supply, obtained as the average of these two dimensions. Inclusion is then examined from two complementary perspectives: on the one hand, we consider actual usage through the indicator Interaction (Interaction PA12), which measures the share of individuals who have interacted online with public authorities over the past 12 months; on the other hand, we account for structural constraints through Barriers_people, capturing the extent to which individuals rely on intermediaries to access digital services. Building on this, we further explore inclusion by introducing an inclusion gap aimed at identifying inequalities between individuals with different educational levels. More specifically, we focus on the educational gap in online interactions with public authorities, derived from Interaction PA12: values approaching zero indicate a more inclusive system, as they signal similar levels of use across groups, whereas positive values reveal that individuals with higher education levels make greater use of digital services, pointing to lower distributive inclusion; conversely, a reduction in this value suggests a narrowing of the gap and a more even distribution of access.

From this perspective, the analysis goes beyond the mere observation of usage rates by explicitly considering whether digital services effectively reach more disadvantaged groups. Digital skills (Digital skills – no-low) are included as a moderating factor and, given data constraints, are defined as the country-level average share of individuals with no or low digital skills, a choice that captures a more structural dimension of digital vulnerability while also limiting issues related to missing data in annual series. Finally, the model controls for two relevant contextual factors—the logarithm of GDP per capita (log(GDP)) and broadband coverage above 30 Mbps (broadband >30)—in order to account for differences in economic development and in the availability of digital infrastructure, both of which are likely to influence the use of online public services. All details regarding the variables used are provided in the "Websites" section.

Results. The analysis reveals that higher quality in digital public service provision is linked to both lower barriers to autonomous digital interaction and narrower educational inequalities in citizens' engagement with public authorities. These equalising effects are particularly pronounced in contexts characterised by greater digital skills fragility.

To gain a deeper understanding of these patterns, we first examine citizens' interactions with public authorities over the previous twelve months and subsequently explore the barriers to use, focusing particularly on cases where a citizen does not manage digital interactions directly and relies on intermediaries. Across various model specifications, the evidence appears more consistent for the equalising margin than for the intensive margin. Moreover, the moderation patterns suggest that the association between supply quality and inclusion strengthens as digital fragility increases. Interpreted cautiously, the results align with the idea that improvements in enabling conditions may reduce frictions that disproportionately constrain lower-capability groups, thereby promoting a more equitable distribution of access (van Dijk, 2020; Lythreatis et al., 2022). Given the observational nature of the study, these findings are treated as developmental evidence rather than causal estimates.

The findings indicate that the societal significance of high-quality digital public services lies in their potential to reshape both the distribution of access and citizens' autonomy in service use. Focusing more closely on the empirical patterns, higher levels of supply quality are associated with reduced reliance on intermediaries and a smaller educational gap in digital interactions, particularly in contexts characterised by heightened digital skills fragility. Rather than concentrating solely on measures of uptake or transaction volumes, the evidence emphasizes the importance of understanding how digital service systems influence citizens' capacity to engage with public administration independently and on their own terms.

From this perspective, digital public services can be interpreted as institutional arrangements that determine not only access to administrative transactions but also the conditions under which citizens experience inclusion or exclusion in service encounters. Accordingly, improvements in digital service quality may effectively alleviate structural frictions in citizens' interactions with public administration, contributing to more equitable patterns of participation within digitally mediated public service systems. Taken together, the results highlight meaningful structural relationships between the quality of digital service systems and outcomes of inclusion. Table 1 summarizes the results.

Table 1 - Integrated Summary of TWFE Results on E-Government Service Quality, Online Interaction, and Digital Inclusion

Supply measure	*Specification*	*β supply (SE)*	*γ interaction (SE)*	*Marginal effects*	*N*	*Model notes*
		A. *Online interaction with public authorities (D1)*				
User Centricity	*Baseline; no controls*	*0.632 (0.468)*	—	—	*360*	*Within R^2 = 0.005; country FE + year FE*
Key Enablers	*Baseline; no controls*	*0.467 (0.304)*	—	—	*360*	*Within R^2 = 0.008; country FE + year FE*
Composite supply index	*Baseline; no controls*	*0.965** (0.451)*	—	—	*360*	*Within R^2 = 0.013; country FE + year FE*

B. *Dependency-related barriers to online service use (D4 / Barriers_people)*						
User Centricity	*Baseline; no controls*	*−0.502** (0.207)*	—	—	*316*	*Within R² = 0.012; country FE + year FE*
Key Enablers	*Baseline; no controls*	*−0.146 (0.237)*	—	—	*316*	*Within R² = 0.003; country FE + year FE*
Composite supply index	*Baseline; no controls*	*−0.457 (0.411)*	—	—	*316*	*Within R² = 0.010; country FE + year FE*
C. *Educational gap in online interaction (InclusionGap)*						
Key Enablers (t−1)	*Controls; country-clustered SE*	*−0.0297** (0.0118)*	*−0.0044** (0.0019)*	*Q1 = −0.015 Q2 = −0.030** Q3 = −0.045****	*261*	*Controls: log GDP per capita, broadband >30 Mbps; country FE + year FE*
Key Enablers (t−1)	*Controls; two-way clustered SE (country + year)*	*−0.0297** (0.0132)*	*−0.0044*** (0.0017)*	*Q1 = −0.015 Q2 = −0.030** Q3 = −0.045****	*261*	*Country FE + year FE*
Key Enablers (t−1)	*No controls; country-clustered SE*	*−0.0272** (0.0136)*	*−0.0040*** (0.0015)*	*Q1 = −0.011 Q2 = −0.025* Q3 = −0.045****	*289*	*Country FE + year FE*
Composite supply index (t−1)	*Controls; country-clustered SE*	*−0.0431* (0.0254)*	*−0.0055* (0.0033)*	*Q1 = −0.025 Q2 = −0.043* Q3 = −0.062***	*261*	*Controls: log GDP per capita, broadband >30 Mbps; country FE + year FE*
Composite supply index (t−1)	*Controls; two-way clustered SE (country + year)*	*−0.0431* (0.0260)*	*−0.0055 (0.0036)*	*Q1 = −0.025 Q2 = −0.043* Q3 = −0.062***	*261*	*Country FE + year FE*
Composite supply index (t−1)	*No controls; country-clustered SE*	*−0.0433* (0.0258)*	*−0.0076*** (0.0025)*	*Q1 = −0.012 Q2 = −0.040 Q3 = −0.078****	*289*	*Country FE + year FE*

Note. TWFE estimates with country and year fixed effects in all specifications. For sections A and B, coefficients refer to a +10-point increase in contemporaneous supply quality and no time-varying controls are included. For section C, supply is lagged by one period (t−1) and moderated with digital skills fragility. β denotes the supply coefficient, γ the interaction term, and ME the marginal effect of supply at the first, second, and third quartiles of the moderator. Controls include log GDP per capita and broadband coverage above 30 Mbps. Robust standard errors are reported in parentheses. Significance levels: *** p < 0.01, ** p < 0.05, * p < 0.10.
Source: Authors' elaboration.

Coefficients for M_UC and M_KEY are positive but do not reach conventional levels of statistical significance in these baseline specifications without controls, remaining directionally consistent with H1. The coefficient for the composite index is positive and statistically significant: a 10-point increase in the composite supply measure is associated with an average increase of 0.97 percentage points in online interaction. Net of fixed effects, temporal variation in supply explains a limited share of within-country variation in use, consistent with strong country-specific inertia. The User Centricity coefficient is negative and statistically significant in the baseline specification: a 10-point increase in User Centricity is associated with about 0.5 percentage points fewer citizens reporting dependency-related barriers. Results support H3 and the moderation pattern in H4: lagged supply quality is associated with a lower InclusionGap, and the equalising effect strengthens as digital skills fragility increases. For Key Enablers (t−1), the main supply coefficient is negative and significant in all specifications with controls. At the mean value of the moderator, a 10-point increase in lagged Key Enablers is associated with a reduction in InclusionGap of about 0.030 units. The interaction term γ is negative and consistently significant, indicating that the equalising effect is stronger in countries with a higher share of citizens with low digital skills. This trend is also reflected in the marginal effects by quartile shown in Table 1.

Research limitations. Future research could further investigate how specific features of digital service design shape inclusive value creation across diverse public service contexts. Three main limitations of the current study suggest directions for a structured research agenda. First, although we employ country-level panel estimates, unobserved time-varying factors and potential reverse causality may still influence the results. Second, indicators related to dependency or intermediation do not capture the full range of obstacles that shape inclusion (van Dijk, 2020; Lythreatis et al., 2022). Third, missing data in certain series, particularly digital skills prior to 2015, reduces the effective sample size in some models and underscores the preliminary nature of the evidence.

Building on these limitations, future studies should expand the analysis by incorporating alternative measures of inequality alongside the educational gap and by further testing the robustness of the findings (van Dijk, 2020; Lythreatis et al., 2022). Research could also disentangle the specific contributions of user-centredness and key enabling factors, drawing on insights from both the digital divide and inclusive innovation literature (van Dijk, 2020; Osborne et al., 2016). In addition, quasi-experimental and mixed-method approaches may help clarify whether improvements in supply-side

digital government measures translate into more equitable access and engagement with public services (Moore, 1995; Hartley et al., 2017).

Managerial implications. The findings of this study carry several practical and social implications for public managers and policymakers engaged in digital transformation initiatives. Practically, the results highlight the importance of prioritising usability, accessibility, and user-centred design in the development of digital public services. From a societal perspective, the evidence that higher-quality digital public services are associated with narrower inequalities in access and use underscores the critical role of service system design in promoting more inclusive digital transitions.

First, the societal value of investments in digital government should extend beyond merely increasing the availability of services to enhancing the quality of service interactions from the user's perspective (Van Deursen and Van Dijk, 2019). In this regard, initiatives that improve usability, clarify procedures, and ensure interoperability across digital systems can play a key role in enabling citizens to engage more autonomously with public administration. Second, the stronger link between high-quality digital services and reductions in educational inequalities highlights the necessity of adopting an inclusion-oriented approach to service design. Digitalisation alone does not automatically ensure equitable access; public organisations must deliberately consider how service interfaces, procedural requirements, and support mechanisms influence citizens' ability to participate in digitally mediated service encounters. This approach aligns closely with Public Service Logic perspectives, which view public organisations as facilitators of value creation within service systems (Osborne, 2018; Osborne et al., 2021).

Third, the moderating role of digital skills fragility indicates that improvements in digital public service quality may yield the greatest benefits in contexts where structural barriers to digital participation are more pronounced (Scheerder et al., 2017). This underscores the importance of integrated policy strategies that combine investments in service design, digital infrastructure, and citizens' digital capabilities. Enhancing the usability, accessibility, and navigability of digital services may therefore be particularly critical for reducing inequalities in effective service use. These insights are consistent with emerging policy orientations that emphasise user-centred and inclusive design principles as core elements of digital public service development in the digital era (OECD, 2022). Rather than treating inclusion as a downstream effect of technological innovation, public organisations should embed considerations of accessibility and autonomy of use directly into the architecture of digital service systems. From a Public Service Logic perspective, this entails recognising digital public services as enabling environments that shape citizens' opportunities to generate value in their interactions with public administration (Osborne, 2018; Osborne et al., 2021; Sergianni et al., 2026).

Originality of the paper. This paper contributes to research on service systems, digital government, and digital inclusion by conceptualising the quality of digital public services as an enabling condition that shapes citizens' opportunities for value creation in their interactions with public organisations. The novelty of the contribution is particularly evident in the integration of the digital skills–inclusion gap model, which highlights how structural digital vulnerabilities interact with service quality to influence patterns of access. Furthermore, the study contributes to the literature on digital inclusion by shifting attention from determinants at the individual level toward the characteristics of public service provision itself, underscoring the central role of service design and enabling conditions in fostering more equitable digital participation. In addition, this paper provides empirical evidence within the Public Service Logic literature, demonstrating that the quality of digital public service provision, understood as a public value proposition, can directly influence citizens' ability to access and effectively engage with public services. Furthermore, this study underscores the importance of considering structural and institutional factors, emphasizing that inclusive access to digital services depends as much on how public services are designed and delivered as on the skills and resources of the users themselves. Finally, we contribute to the literature on digital inclusion by shifting attention from individual level determinants of technology use to the role of public service provision itself, thereby emphasizing the importance of structural and institutional factors in shaping inclusive access to digital services.

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Exploring the interplay between dynamic capabilities and contextual factors for circular innovation ecosystem emergence: An agent-based modeling approach

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Abstract. *The emergence of Circular Innovation Ecosystems (CIEs) is increasingly recognized as crucial for enabling circular economy transitions, yet the mechanisms driving their formation remain under-theorized. This paper develops a theoretical framework explaining CIE emergence as the result of the interplay between macro-level contextual conditions and micro-level organizational capabilities. Specifically, it integrates insights from the literature on Sustainable Entrepreneurial Ecosystems and Dynamic Capability theory within a multi-level perspective. To explore these dynamics, the study adopts an Agent-Based Modeling approach that simulates interactions among heterogeneous actors and opportunities embedded in a sustainability-oriented ecosystem context. CIE emergence is operationalized through network-based metrics capturing ecosystem structure and circular interaction patterns. The study contributes to ecosystem research by proposing a computational approach to theory building and by identifying mechanisms linking firm-level capabilities with system-level circular innovation outcomes.*
Keywords: *Dynamic capabilities; Circular innovation ecosystem; Sustainable entrepreneurial ecosystem; Agent-based modeling; Multi-level perspective; Complex systems.*

Framing of the research. The ecosystem concept, originally developed in biological and natural sciences, has progressively been adopted in business and economic research, particularly in debates on innovation and entrepreneurship (Granstrand & Holgersson, 2020; Stam & Van de Ven, 2021). This conceptual shift reflects the growing recognition of the complexity and interdependence among heterogeneous actors and elements involved in the generation and diffusion of innovation. Within this perspective, innovation processes are increasingly understood as collective and systemic phenomena, emerging from interactions among firms, institutions, and other stakeholders (Roundy et al., 2018; Russell & Smorodinskaya, 2018).

At the same time, the focus of entrepreneurship and innovation research - both in academia and in practice - has gradually expanded beyond purely economic objectives toward the creation of social and environmental value (Dean & McMullen, 2007). This shift has contributed to the emergence of concepts such as sustainable entrepreneurship (Cohen & Winn, 2007) and sustainable innovation (Bos-Brouwers, 2010). Ventures operating under these logics differ from conventional firms in both their business models and performance metrics, as they incorporate the "triple bottom line" of economic, social, and environmental outcomes and often adopt circular rather than linear production and consumption models (Urbinati et al., 2017).

The convergence of these two streams of research has led to the notion of circular ecosystems, defined as communities of heterogeneous and interdependent actors that collectively generate system-level sustainable outcomes characterized by circular processes such as recycling, reuse, and resource reduction (Aarikka-Stenroos et al., 2021). Within the innovation literature, this perspective has further evolved into the concept of Circular Innovation Ecosystems (CIEs). Building on the broader notion of innovation ecosystems - defined as evolving configurations of actors, activities, artifacts, institutions, and relationships shaping the innovative performance of individual actors or populations of actors (Granstrand & Holgersson, 2020) - CIEs explicitly integrate circular economy principles into collaborative innovation processes (Thakur & Wildon, 2024).

Given their roots in biological and ecological domains, as well as complex systems theory, ecosystem emergence and evolution are typically understood as the result of dynamic and multi-level interactions among diverse actors and structural conditions (Holland, 1997). However, in the case of CIEs, the processes through which such systems emerge and develop over time remain relatively under-theorized. Similar to innovation ecosystems, CIEs arise from the interaction between macro-level contextual conditions and micro-level characteristics of ecosystem actors. At the organizational level, for instance, SMEs' degree of sustainability orientation in innovation practices is often shaped by these multi-level influences as reflected in the different SME typologies proposed by Klewitz & Hansen (2014). Resistant SMEs largely disregard sustainability-related pressures, whereas reactive SMEs respond adaptively to regulatory or stakeholder demands. Anticipatory SMEs adopt forward-looking strategies that anticipate emerging opportunities related to sustainability. Innovation-based SMEs integrate environmental and social considerations into the design of new products and services, while sustainability-rooted SMEs embed the triple bottom line directly into their business models, explicitly addressing environmental, social, and economic challenges. These heterogeneous orientations influence the ability of firms to engage in ecosystem-level sustainability transitions.

At the macro level, the broader institutional and market environment plays a crucial role in shaping the emergence of sustainable innovation activity. Sustainable ventures often operate under more challenging conditions, facing higher financial and institutional barriers than conventional firms, even though their propensity for risk-taking remains

comparable (Hoogendoorn et al., 2019). Market imperfections - such as negative externalities, inefficient pricing mechanisms, and information asymmetries - have historically contributed to environmental degradation but have also created opportunities for new entrepreneurial models based on radical innovation and alternative business approaches (Muñoz & Cohen, 2018). Empirical evidence further highlights the importance of contextual conditions in shaping sustainable entrepreneurship and innovation. For example, examining the foundations of sustainable entrepreneurship in Canada, Tunisia, and Cameroon, Spence et al. (2011) show that while entrepreneurs' commitment to sustainability is strongly influenced by individual values and entrepreneurial intent, cultural and normative frameworks significantly shape how sustainability is interpreted and enacted. Similarly, Sunny & Shu (2019) find that in the U.S. clean-technology sector regulatory policies positively influence the emergence of sustainable ventures, whereas financial incentives alone do not produce a significant effect. In addition, spatial proximity to industrial clusters appears to facilitate venture creation through knowledge spillovers, human capital mobility, and access to specialized services. Building on these insights, recent research has identified four categories of barriers that may hinder the emergence of CIEs. These include contextual barriers linked to regulatory and institutional conditions; economic barriers related to the cost and financial feasibility of circular initiatives; cultural barriers associated with societal attitudes toward sustainability; and technical barriers concerning knowledge, skills, and technological capabilities (Dorrego-Viera et al., 2025). Addressing these barriers typically requires coordinated action among multiple ecosystem actors, including public institutions, universities, firms, and civil society organizations.

Alongside these contextual dynamics, a growing body of literature emphasizes the importance of micro-level factors such as orchestration capabilities in circular ecosystem development (Aryee et al., 2025). Ecosystem orchestration refers to the ability of central actors to integrate and coordinate resources, activities, and relationships within the ecosystem in order to adapt to changing environmental conditions (Kanda et al., 2025). In the context of circular ecosystems, orchestration involves managing circular consumer offerings, coordinating circular supply-chain activities, and developing effective partnership strategies (Sandberg, 2023). Because of the complexity and interdependence characterizing circular value creation, no single firm can achieve the transition toward a circular economy independently; instead, ecosystem-wide orchestration mechanisms - such as standardization, nurturing, and negotiation - are necessary to facilitate collective transformation (Parida et al., 2019). Complementing this perspective, Block et al. (2026) adopt an organizational capability-based approach, highlighting the role of dynamic capabilities in the development of circular business models. Authors show that dynamic capabilities influence circular value propositions both directly and indirectly, with the strength of these effects depending on the level of stakeholder pressure faced by firms. Their findings also suggest that changes in operational capabilities are necessary to support broader transformations toward circular business models.

Building on these strands of literature, this paper aims to integrate ecosystem-level and organization-level perspectives in order to develop a conceptual framework explaining how the interplay between contextual conditions and organizational capabilities can lead to the emergence of CIEs.

Purpose of the paper. The main purpose of this paper is to develop hypotheses for theory-building on the emergence of CIEs. Specifically, the study addresses the following research question: "How does the interplay between contextual (macro-level) factors and organizational (micro-level) capabilities influence the emergence and development of CIEs?".

To address this question, we first develop a theoretical framework that integrates two complementary perspectives for mapping contextual conditions and organizational capabilities. This approach aligns with the Multi-Level Perspective framework in sustainability transitions research (Geels 2011), which emphasizes how systemic transformations emerge from the interaction of processes operating at different analytical levels.

With regard to contextual conditions, the paper builds on the concept of Sustainable Entrepreneurial Ecosystems (SEEs). According to Cohen (2006), SEEs can be defined as "an interconnected group of actors in a local geographic community committed to sustainable development through the support and facilitation of new sustainable ventures" (p. 3). Within this perspective, the development of sustainable ventures is seen as a key mechanism not only for generating economic growth and employment but also for improving environmental quality, public health, and social welfare. Building on the broader concept of entrepreneurial ecosystem stemming from strategic management and regional development research (Acs et al., 2017), SEEs emphasize the role of localized economic, institutional, and social conditions in enabling sustainability-oriented entrepreneurial activity. As highlighted in a recent comprehensive review by Joel et al. (2026), at least four distinct streams of research have emerged within the SEE literature. This paper draws on the stream that conceptualizes SEEs as an evolutionary extension of entrepreneurial ecosystems toward a sustainability orientation. Based on this view, the development of an ecosystem-level sustainability orientation is seen as a key driver of ecosystem evolution. Ecosystem governance and sustainability orientation can therefore be interpreted as elements of the regime level in the multi-level perspective, encompassing cultural, institutional, and socio-technical structures that shape how embedded actors align their practices and coordinate collective action. In this sense, sustainability orientation functions as a form of meta-coordination that both reflects and reshapes prevailing regime rules. It operates through governance structures, stakeholder interactions, sustainability-oriented ecosystem dimensions, feedback mechanisms between ecosystem outcomes and orientation, and the role of sub-ecosystems in reinforcing the sustainability trajectory of the broader ecosystem (Joel et al., 2026).

Strong structural and cognitive dimensions within ecosystems facilitate resource generation, reinforce relational ties, and build trust among ecosystem members (Theodoraki et al., 2018). These dynamics foster shared values and collective

visions, enabling SEEs to evolve as learning systems that continuously identify and exploit sustainable opportunities (O'Shea et al., 2021). Recent empirical studies have further examined the factors influencing the sustainability orientation of ventures operating within SEEs. For instance, Khatami et al. (2021) show that ecosystem pillars such as policy, finance, and institutional support positively affect the development of sustainable entrepreneurial innovations, whereas cultural and human capital factors may exert weaker or even negative effects. Similarly, Bischoff (2021) highlights the role of regional entrepreneurial and collaborative networks in promoting sustainable innovation and entrepreneurship. Consistent with these findings, the orientation of ecosystem actors - particularly their ability to recognize sustainability-oriented opportunities, collaborate for sustainable innovation, and develop or access markets for sustainable products - emerges as a key determinant of SEE performance (DiVito & Ingen-Housz, 2021). Within this context, successful firms adopting sustainable business models can play a particularly important role. These firms, described by Tiba et al. (2020) as "lighthouses", help other actors identify and exploit sustainability-oriented entrepreneurial opportunities.

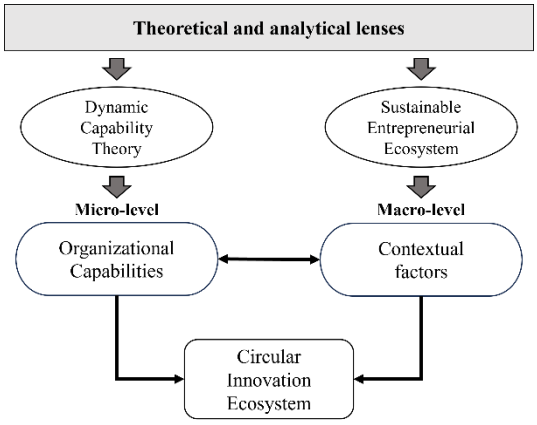
Taken together, these insights suggest that policy, cultural, social, and technological dimensions of SEEs both shape and are shaped by the actions of ecosystem actors, influencing their sustainability orientation and their capacity to engage in multi-stakeholder innovation processes. Under these conditions, SEEs may provide a fertile context for the emergence of CIEs. This perspective is consistent with recent research suggesting that different ecosystem types - such as SEEs and CIEs - while analytically distinct, are not mutually exclusive. Rather, they often coexist and interact within broader configurations characterized by nested ecosystem structures, where multiple ecosystem logics overlap and reinforce one another (Ceci et al., 2026).

In relation to organizational capabilities, this paper adopts Dynamic Capability (DC) Theory as a primary analytical lens (Teece et al., 1997; Teece, 2007). DCs are defined as an organization's higher-level ability to sense, seize, and transform internal resources and external opportunities in order to create and sustain competitive advantage (Teece et al., 1997). An emerging and growing body of literature has begun to connect sustainability and DCs (Buzzao & Rizzi, 2021; Inigo et al., 2017). In the context of sustainability, it is not sufficient for firms to develop only technical or operational capabilities to implement Environmental, Social, and Governance (ESG)-related activities (Dzhengiz & Niesten, 2020). Equally important are DCs that enable firms to strategically integrate sustainability considerations into their core activities, rather than treating them merely as compliance requirements (Liang et al., 2022). Building on this perspective, Block et al. (2026) argue that both innovation management and sustainability research highlight the central role of organizational capabilities. In particular, capabilities are seen both as a key ingredient for business model innovation (Hock-Doepgen et al., 2025) and as a critical driver of firms' ability to transform their business models toward circularity (Bocken & Geradts, 2020). Conversely, the lack of relevant capabilities has been identified as one of the main barriers to the adoption of circular economy practices at the firm level (García-Quevedo et al., 2020).

Despite these advances, the relationship between DCs and sustainability has been predominantly examined at the organizational (micro) level. This study contributes to extending this perspective to the ecosystem level. In doing so, it aligns with recent work by Spilotro et al. (2026), which highlights the role of DCs in navigating the complex interplay between digital transformation, AI integration, and organizational adaptation within innovation ecosystems.

Figure 1 illustrates the research design connecting these two strands of research to address our research question.

Figure 1: Research design.



Methodology. In order to develop hypotheses for theory-building on the emergence of CIEs, this study adopts an Agent-Based Modeling (ABM) approach. ABM represents a simulated system composed of autonomous and interacting agents, where each agent typically represents an individual entity that acts according to a set of theoretically defined behavioral rules, interacting with both other agents and the simulated environment over time (Macal & North, 2005). This approach enables researchers to observe the large-scale consequences of theoretical assumptions about agent behavior when iterated dynamically over extended periods of time. Such characteristics make ABM particularly suitable for investigating complex phenomena characterized by distributed agency and dynamic interactions, such as ecosystem emergence.

The use of autonomous agents has indeed increasingly become an analytical lens for theorizing about emergence, agency, and the organization of complex systems (Kauffman & Clayton, 2006). Recent applications can also be found in the field of entrepreneurial and innovation ecosystems. For instance, Carayannis et al. (2016) employ ABM simulations to examine the regional effects of institutions and knowledge acquisition on new venture formation within entrepreneurial ecosystems, while Engler & Kusiak (2011) use ABM to represent inter-organizational dynamics in innovation ecosystems and explore their implications for the global economy.

ABM is particularly suited to the purpose of this study given the central role of agency in CIEs. As highlighted by Aarikka-Stenroos et al. (2021), the actions of ecosystem actors are not solely contingent on actor-level outcomes. Instead, they are shaped by the specific roles that actors occupy within the ecosystem. Actors' agency varies according to their position and role within the ecosystem. Because roles are interdependent, some actors exert greater influence on ecosystem dynamics, while others perform more supportive functions.

Using ABM for theory-building represents a relatively novel approach in management and organizational studies, although it has already been shown to generate important insights into complex organizational phenomena and contribute to theory development (Gómez-Cruz et al., 2017). The approach builds on earlier sociological and psychological research, where ABM has been used to capture and theorize complex, dynamic, and interactive processes in social systems, including studies on group dynamics and organizational behavior (Smith & Conrey, 2007; Smaldino et al., 2015). In the context of this study, the adoption of an ABM approach provides a novel way to develop theoretically grounded hypotheses linking bodies of literature that have not yet been systematically integrated in empirical research.

Specifically, we consider a set of agents $V_I = \{1, \dots, n\}$, representing different types of actors typically forming innovation ecosystems (e.g., private companies, public organizations, universities and research centers, civil society organizations, and intermediary actors). Each agent i is associated with a vector of attributes $\overrightarrow{a_i} = (a_{i,1}, \dots, a_{i,h})$. In addition, we define a set of opportunities $V_J = \{1, \dots, m\}$, where each opportunity j is characterized by a vector of attributes $\overrightarrow{b_j} = (b_{j,1}, \dots, b_{j,k})$, and by a saturation level representing the maximum number of agents that can interact with that specific opportunity. In the proposed design, the agents' behavior depends on both their attributes and their DCs, while the opportunity space is determined by the characteristics of the SEE in which the actors are embedded. In this way, the simulations explicitly model the multi-level interplay between organizational capabilities (framed through DC Theory) and contextual conditions (captured through the SEE framework).

At each time step, a set of opportunities enters the system. Agents interact with these opportunities and with other agents according to the functional rules governing their behavior. Links between two actors at time t can arise either through first-order interactions, when two actors directly interact based on their attributes and DCs, or through second-order interactions, when two actors become connected because they have interacted with the same opportunity.

The monitoring of CIE emergence is based on system-level network metrics computed at the end of each iteration. These metrics assess both (i) the ecosystem nature of the system and (ii) its circularity. The set of metrics for the first dimension draws on previous work by Ancona et al. (2023) and includes indicators such as network density, assortativity, and small-worldness. The second set of metrics aims to capture the cyclicity of relationships within the network and includes measures such as the number of cliques and the clustering coefficient. The simulation therefore evaluates how the dynamic interplay between contextual conditions and organizational capabilities progressively leads to the emergence of CIE structures under different configurations of outcome metrics.

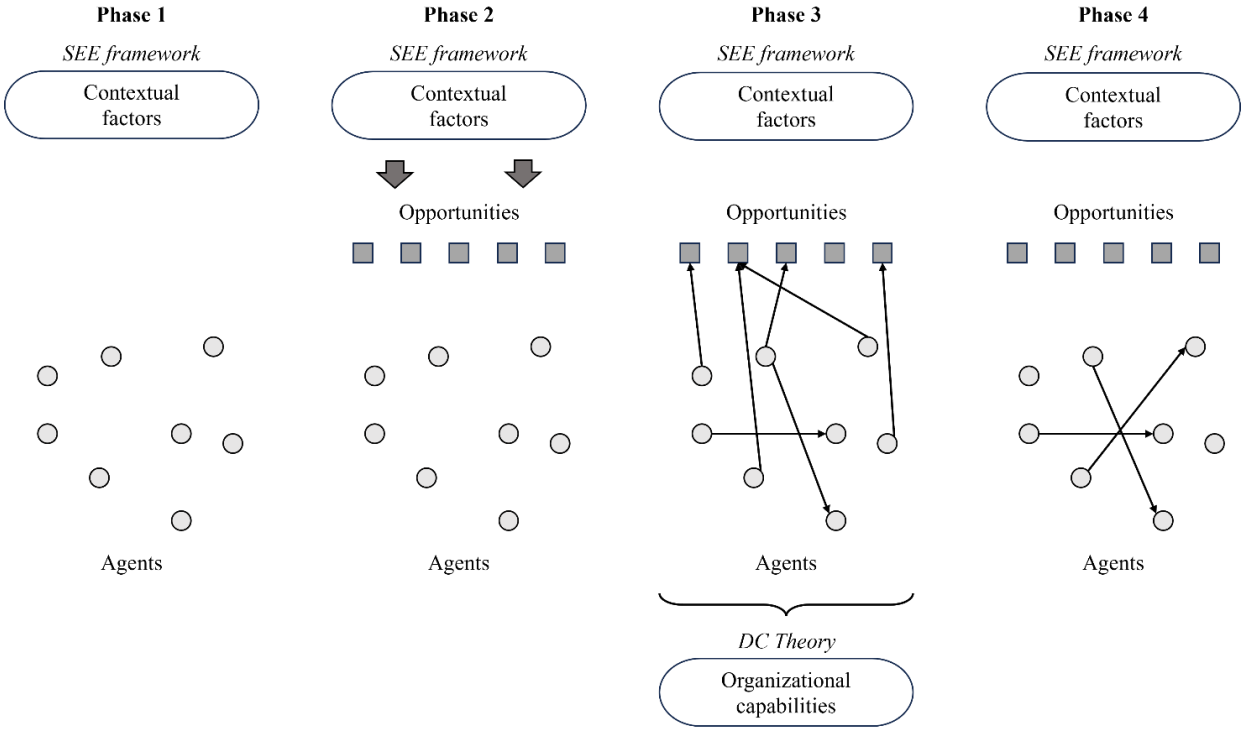
The model requires several parameters to be specified and varied across simulation runs, including the number of agents, the frequency of opportunities (i.e., the number of opportunities generated at each iteration), the maximum size of the opportunity space, and the number of iterations.

Finally, the simulation design will be initialized and calibrated using empirical evidence where available and grounded in existing theoretical insights. In particular, the behavioral rules governing agent interactions will be defined through the computational operationalization of the DC framework proposed by Shang et al. (2020), covering the three dimensions of sensing, seizing, and reconfiguring.

For clarity, the main phases of the model within each iteration are illustrated in Figure 2.

Expected results. The simulation is expected to show how the emergence of CIEs depends on the dynamic interplay between contextual ecosystem conditions and the DCs of individual actors. In particular, the model is expected to demonstrate that favorable contextual configurations within SEEs - such as supportive policy environments, strong collaborative networks, and sustainability-oriented institutional frameworks - expand the opportunity space for circular innovation. At the same time, actors endowed with stronger DCs (i.e., sensing, seizing, and reconfiguring) are expected to be more effective in identifying and exploiting these opportunities and in forming collaborative relationships. As these interactions exhibit over time, the system is expected to evolve toward increasingly dense and clustered network structures, signaling the emergence of CIEs. Overall, the simulation should illustrate how micro-level organizational capabilities and macro-level contextual factors jointly shape the emergence and structural configuration of CIEs, contributing to the development of new theoretical frameworks and hypotheses.

Figure 2: Main phases of the model within each iteration.



Research limitations. The proposed model relies on an agent-based simulation approach, which necessarily simplifies real-world dynamics by representing actors and interactions through stylized behavioral rules. Although these rules are grounded in established theoretical frameworks, the results obtained are contingent on the model's specifications and underlying assumptions. Moreover, the behavior of the agents and the representation of the entire system may not fully capture the complexity and heterogeneity of real ecosystem actors and institutional environments. However, this is inherent to the research design of the study, which adopts a theoretical and exploratory perspective aimed at generating hypotheses on a topic that connects bodies of literature not yet systematically integrated in empirical research. Further studies could therefore combine simulation approaches with empirical data on ecosystem actors and circular innovation initiatives to refine the model and assess its external validity.

Managerial implications. The findings of this study are expected to offer several implications for managers, ecosystem orchestrators, and policymakers seeking to promote circular innovation. First, the study highlights the importance of developing DCs that enable organizations to sense sustainability-related opportunities, mobilize resources, and reconfigure existing processes to support circular business models. Firms exhibiting these capabilities are more likely to participate in collaborative circular innovation initiatives. Second, the study suggests that the emergence of CIEs cannot be achieved solely through initiatives at the organizational level but requires supportive ecosystem conditions. Policymakers and ecosystem intermediaries should therefore foster institutional environments that encourage collaboration, facilitate knowledge exchange, and reduce barriers to sustainability-oriented innovation. Finally, the model highlights the importance of multi-actor coordination in enabling circular transitions. Ecosystem leaders and orchestrators may play a critical role in connecting actors, aligning incentives, and facilitating collective experimentation around circular opportunities, thereby accelerating the emergence of CIEs.

Originality of the paper. This paper contributes to the literature by integrating two research streams that have so far remained largely disconnected, namely SEEs and DC theory. By combining these perspectives within a multi-level analytical framework, the study advances the understanding of how contextual ecosystem conditions and organizational capabilities jointly influence the emergence of CIEs. In doing so, it extends prior contributions in innovation and entrepreneurship research that have adopted a DC perspective to investigate pre-incubation practices in entrepreneurial ecosystems (Nana et al., 2026) and the relationship between DCs and open innovation environments for university-industry collaborations (Crupi & Mortara, 2025). A second key contribution lies in the methodological approach. The paper adopts an ABM framework to explore the emergence of ecosystem structures from the interactions of heterogeneous actors, providing a computational approach to theory building in ecosystem research. This allows the study to model the complex and dynamic interactions between actors, opportunities, and contextual conditions that characterize circular innovation processes. Finally, the study contributes to the growing literature on circular ecosystems by proposing a network-based operationalization of ecosystem emergence and by identifying potential mechanisms linking individual capabilities with system-level outcomes.

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Integrating Digitalisation and Sustainability in sport business: An Institutional Analysis in Professional Football

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Abstract. *Professional football is increasingly exposed to institutional pressures encouraging the simultaneous advancement of sustainability and digitalisation agendas, often referred to as the "twin transition". While governing bodies and policy frameworks promote the alignment of green and digital objectives, little is known about how football clubs interpret and operationalise these expectations in practice.*
Drawing on Institutional Theory, this study examines how professional football clubs interpret and implement sustainability and digitalisation under institutional pressures.
The research adopts a qualitative design based on semi-structured interviews with professionals responsible for sustainability-related activities within clubs competing in four major European leagues: the English Premier League, the German Bundesliga, the Italian Serie A and the Spanish LaLiga. While data collection and analysis are still ongoing, preliminary findings suggest that sustainability engagement within football clubs is strongly shaped by regulatory requirements and sectoral governance frameworks. At the same time, organisational-level factors such as governance capacity, internal coordination, resource availability and digital maturity appear to mediate how clubs respond to these pressures. Early evidence indicates that sustainability–digital integration within professional football tends to emerge through differentiated and incremental organisational responses rather than through uniform or transformative change.
Keywords: *Institutional Theory; Twin Transition; ESG; Football; Sport; Gioia Method*

Framing of the research. The sustainability transition has become a central strategic and governance challenge for organisations across industries (Chatzistamoulou, 2023; Mäkitie et al., 2023). In this context, sustainability is increasingly understood as a process requiring structural reconfiguration of organisational routines, capabilities, and inter-organisational relationships (Lazaretti et al., 2020).

Professional sport, and European football in particular, represents a relevant empirical setting for examining these dynamics, as clubs operate under conditions of high institutional visibility, legitimacy pressure, and stakeholder complexity that increasingly characterise organisations facing ESG-related transformation across multiple industries. These characteristics make professional football particularly useful for examining how organisations respond to sustainability pressures in contexts where legitimacy, stakeholder expectations and governance complexity strongly interact. Football clubs operate within a highly institutionalised environment characterised by strong regulatory oversight, intense public visibility, and persistent commercial pressures (De Bock et al., 2023; Relvas et al., 2010; Todaro et al., 2025). Professional football constitutes an institutionalised field shaped by governing bodies (UEFA, leagues and federations), commercial partners, fan communities, and broader society (Lozano & Barreiro-Gen, 2023). At the European level, professional football is governed through a multi-actor system in which authority and responsibility are distributed across a broad stakeholder ecosystem (Geeraert et al., 2013; Viglia et al., 2023). The central role of UEFA has gradually expanded from competition organisation to the development of regulatory frameworks, strategic programmes, and sectoral policies (de Witte & Zglinski, 2022; Dimitropoulos et al., 2016). European Football Clubs (EFC, formerly the European Club Association – ECA), European Leagues, FIFPRO, and national governing bodies further contribute to the institutional complexity of European football governance, generating overlapping and sometimes competing demands that clubs must interpret and prioritise at the organisational level.

Within this institutional environment, football organisations have increasingly been exposed to a growing set of expectations related to environmental, social and governance (ESG) issues, reflecting broader societal pressures toward sustainability and responsible organisational behaviour. While governing bodies and international organisations increasingly promote sustainability agendas aligned with the United Nations Sustainable Development Goals (SDGs) and the European Union's Green Deal, empirical research consistently shows that sustainability engagement across sport organisations remains fragmented and often weakly embedded in core organisational processes (Cury et al., 2023; McCullough, 2023). Sustainability therefore represents one of the domains in which the configuration of multiple actors and institutional expectations becomes particularly visible, as concerns related to social responsibility, governance and long-term organisational viability increasingly intersect with sporting and commercial objectives (Trendafilova & Ziakas, 2025; Walker & Parent, 2010). In this sense, professional football offers a useful setting for examining how organisations navigate competing institutional demands under conditions of strong public scrutiny and governance complexity. Accordingly, the evolution of sustainability in professional football can be interpreted as a process of institutionalisation rather than a simple diffusion of voluntary organisational practices (Anagnostopoulos et al., 2014).

Within this institutional setting, sustainability has progressively evolved from a set of discretionary and philanthropic initiatives towards a more formalised and multidimensional agenda. Early engagement with sustainability was predominantly rooted in community engagement, social inclusion, and charitable activities (Breitbarth & Harris, 2008; Fernández-Villarino, 2021). UEFA has played a central role in this process by progressively embedding sustainability

within its policy architecture, moving from awareness-raising initiatives towards more structured forms of coordination, monitoring and accountability (Dimitropoulos et al., 2016; Konstantopoulos et al., 2024). The introduction of binding regulatory mechanisms, most notably Financial Fair Play and its subsequent evolution into the Club Licensing and Financial Sustainability Regulations, marked a significant shift towards the formal regulation of financial sustainability (Martín-Magdalena et al., 2024). This led to a broader reconfiguration of sustainability in football, extending beyond social responsibility initiatives towards a more comprehensive governance agenda encompassing ESG dimensions (Lozano & Barreiro-Gen, 2023).

By contrast, the digital transformation of professional football has followed a more fragmented and functionally oriented trajectory. Sport has a long-standing tradition of using technology to support athletic performance and tactical decision-making, with digital technologies quickly expanding across multiple dimensions, including fan engagement, media ecosystems, data analytics and operational management (Miah, 2017; Ströbel et al., 2021). Existing research suggests that the adoption of digital technologies is mainly driven by functional, performance-related or administrative needs, rather than embedded within a coherent governance or sustainability-oriented framework (Ehnold et al., 2021). As a result, digitalisation has often developed as a set of domain-specific solutions addressing discrete organisational challenges, with limited integration into broader sustainability strategies (Nylén & Holmström, 2015; Robertson et al., 2012). In organisational contexts such as professional football clubs, these innovations often take the form of monitoring, optimisation or decision-support tools, which may generate indirect sustainability-related benefits, such as reducing resource waste or improving risk management, while primarily reinforcing existing organisational trajectories rather than enabling substantive change (Holopainen et al., 2024).

Studies on digitalisation and sustainability highlight a persistent "implementation gap" between the potential of digital tools to enable sustainability transitions and their actual use in practice (Guandalini, 2022). This tension is particularly evident in the European Union's policy discourse on the "Twin Transition", which conceptualises digital and green transformations as mutually reinforcing processes (Kovacic et al., 2024; Tabares et al., 2025). Within this framework, digital technologies are expected to enable sustainability-oriented change by improving monitoring, transparency, coordination, and performance measurement. However, empirical studies advocate in-depth investigation on the implementation of these synergies (Diodato et al., 2023; Mäkitie et al., 2023). In particular, further research is needed to understand how sustainability and digitalisation become integrated within organisational practices and governance structures.

Institutional Theory provides a robust lens for addressing this gap. Building on the foundational work of Meyer & Rowan (1977) and DiMaggio and Powell (1983), Institutional Theory explains how organisations conform to rules, norms and expectations in order to secure legitimacy within highly institutionalised organisational fields. As Scott (2008) notes, organisations often align their structures and practices with institutional expectations to gain legitimacy, while Oliver (1992) highlights how organisations acquire social acceptability and endorsement through conformity to institutional norms. Legitimacy can be as critical for organisational survival as efficiency, especially in highly institutionalized fields (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). These pressures are commonly distinguished as coercive, stemming from formal regulations and external mandates such as UEFA rules or non-financial reporting requirements (Daddi et al., 2021; Posadas et al., 2023); mimetic, arising under conditions of uncertainty when organisations model their practices on peers perceived as successful or legitimate (Hernández-Hernández et al., 2023; Krell et al., 2016; Yang & Kang, 2020); and normative, associated with professionalisation processes and the diffusion of shared standards, norms and expertise within organisational fields (Daddi et al., 2021; Krell et al., 2016). Organisations exposed to similar pressures may nevertheless respond differently depending on internal capacities, governance arrangements and organisational interpretation processes (Dowling et al., 2024; Greenwood et al., 2014), giving rise to heterogeneous and often incremental organisational responses.

Within the European policy context, the interaction between sustainability and digitalisation has increasingly been articulated through the concept of the Twin Transition, which refers to the deliberate coupling of green and digital transformations in order to accelerate structural change and enable broader societal and organisational transformation (Montresor & Vezzani, 2023; Tabares et al., 2025). Digital technologies are framed as key enablers of sustainability-oriented change by enhancing monitoring, transparency, coordination and performance measurement (Diodato et al., 2023), while sustainability objectives provide the normative orientation guiding the development and use of digital technologies (Christmann et al., 2024). From an institutional perspective, this concept offers a useful framework to examine how sustainability and digital innovation are shaped by field-level pressures and legitimacy concerns. In highly institutionalised fields such as professional football, coercive, mimetic, and normative pressures influence not only whether clubs engage with such initiatives, but also how sustainability and digitalisation become organisationally coupled, often giving rise to incremental and uneven forms of implementation oriented toward optimisation, legitimacy, and compliance rather than transformative change.

Institutional Theory therefore helps explain variation in how clubs configure sustainability–digital integration under shared pressures. Despite the growing policy emphasis on integrating sustainability and digitalisation, empirical evidence on how this interaction is interpreted and enacted within professional football clubs remains limited (Guandalini, 2022; Rith & Spinelli, 2024). This study addresses this gap by exploring how clubs translate institutional sustainability and digitalisation pressures into organisational responses within a highly institutionalised field.

Purpose of the paper. Building on the institutional perspective outlined above, this study aims to investigate how professional football clubs engage with sustainability and to what extent digitalisation is substantively integrated into their ESG strategies under institutional pressures. Accordingly, the study addresses the following research question: How do professional football clubs interpret and implement sustainability and digitalisation under institutional pressures?

To address this question, the study investigates clubs competing across four European football contexts (England, Germany, Italy and Spain) through a qualitative research design based on semi-structured interviews with sustainability managers, and other key informants. By analysing clubs' organisational structures, governance arrangements, sustainability, and digital strategies through the lens of Institutional Theory, the paper provides an empirically grounded investigation of how sustainability and digitalisation are jointly enacted at the organisational level within professional football clubs.

At the time of writing, data collection is still ongoing, particularly with regard to clubs competing in the English and German leagues, as the research seeks to develop a balanced comparative sample across the four national contexts.

Methodology. The study adopts a qualitative research design to examine how sustainability and digitalisation are interpreted and institutionally embedded as interrelated ("twin") processes within professional football clubs. A qualitative approach is particularly suited to capturing complex organisational dynamics and context-dependent interpretations in highly institutionalised and value-laden environments such as professional sport (Yin, 1981, 2009, 2018). It also enables the exploration of how organisational actors interpret sustainability and digital technologies while navigating tensions between economic imperatives, operational constraints and legitimacy demands (Eisenhardt, 1989; Greenwood et al., 2011).

The empirical setting of the study consists of professional football clubs competing across four major domestic championships: English Premier League, Bundesliga, Serie A and LaLiga. These leagues belong to the group of the so-called "Big-Five" European competitions and represent highly visible institutional environments where sustainability expectations are increasingly formalised and publicly debated (Ludvigsen & Petersen-Wagner, 2023). Clubs across these leagues operate within a shared European institutional framework shaped by UEFA regulations and broader sustainability agendas, providing analytically informative settings for examining club responses under shared European institutional conditions and supporting analytical transferability (Kiselakova et al., 2020). At the same time, the four contexts also present relevant institutional and governance differences, providing a valuable comparative setting for examining how clubs interpret and implement sustainability and digital transformation under institutional pressures.

The study targets the full population of clubs competing in the above-mentioned leagues. Clubs are being contacted using publicly available information, professional networks and direct outreach via email, LinkedIn and telephone. Interviews are conducted with organisational actors holding roles formally or informally associated with sustainability; where no dedicated sustainability position exists, interviews are conducted with staff identified by the club as responsible for sustainability-related activities. At the time of writing, the dataset includes an initial set of 14 interviews conducted with clubs competing in Serie A and LaLiga, evenly distributed across the two leagues, covering organisations with different ownership structures, governance arrangements and sustainability positioning. Additional interviews with clubs, leagues and federations in Germany, France and England are currently being incorporated as part of the ongoing comparative extension of the project. Respondents include sustainability and CSR managers, operations and facilities managers, public affairs staff, and other senior organisational actors involved in sustainability-related activities.

Preparatory work was undertaken to refine the research focus and develop an interview guide consistent with the study's institutional perspective on the twin transition. This phase combined a review of academic literature, practitioner documents (e.g., club reports, federation strategies and league publications), and exploratory interviews with key informants. This documentary analysis helped identify key governance frameworks, institutional priorities and areas of convergence or ambiguity in the way sustainability and digital transformation are articulated within the sector. Exploratory discussions with experts provided preliminary insights into how sustainability and digitalisation are interpreted within the football ecosystem and contributed to refining the structure of the interview guide. This covers core thematic areas including sustainability governance and organisational arrangements, perceived institutional pressures, implementation challenges, and the role of digital and technological tools.

Building on this preparatory phase, semi-structured interviews are being conducted as the primary data collection method, allowing participants to articulate their experiences and perspectives in their own terms, while enabling the researcher to probe organisational practices and interpretations related to the twin transition (Patton, 2002). Interviews are conducted primarily via Microsoft Teams, and generally last between 30 and 60 minutes. Participants are asked in advance for permission to record and transcribe the interviews, which is granted in most cases. Transcripts are checked for accuracy prior to analysis.

Data analysis focuses on an iterative coding process following the Gioia methodology, proceeding in multiple, iterative stages, moving from informant-centric to more abstract theoretical categories (Gioia et al., 2013). In a first stage, interview material is coded using in vivo, first-order codes that preserve participants' own language and interpretations of sustainability, digitalisation and related organisational practices. In a second stage, first-order codes are progressively grouped into second-order themes, with Institutional Theory used as an interpretive lens to support abstraction and theorisation. The coding framework is iteratively refined as additional interviews are incorporated into the dataset. In a final stage, second-order themes will be consolidated into aggregate dimensions capturing recurring patterns in how clubs

interpret and enact sustainability–digital integration under institutional pressures, while allowing for variation across organisational contexts.

Results. Preliminary analysis of the interview material provides initial insights into how professional football clubs interpret and enact sustainability and digitalisation within their organisational practices. Although the data collection and coding process are still ongoing, the analysis conducted so far suggests several recurring patterns concerning how clubs respond to sustainability-related institutional pressures and how digital technologies are incorporated into these processes, giving rise to differentiated and predominantly incremental organisational responses.

Overall, emerging evidence indicates that sustainability engagement within professional football clubs is strongly influenced by a combination of institutional pressures originating from sport governing bodies as well as broader regulatory frameworks operating at European and national level. These include licensing requirements and governance standards imposed by football authorities, alongside emerging corporate sustainability regulations and reporting obligations – such as the European Corporate Sustainability Reporting Directive (CSRD) – which increasingly apply to organisations across sectors and are progressively shaping expectations around transparency and ESG accountability.

Sustainability initiatives are frequently described by interviewees as responses to formal requirements linked to licensing systems, reporting obligations and compliance with evolving governance standards. In this context, sustainability often appears to be framed primarily as a condition for organisational legitimacy and participation in professional competitions rather than as a fully integrated strategic priority. Clubs commonly describe sustainability-related activities in procedural terms, particularly in relation to environmental reporting, certification and regulatory compliance. At the same time, regulatory requirements may also function as internal leverage mechanisms, enabling sustainability managers or responsible staff to mobilise organisational support and justify new initiatives within the club.

Beyond coercive regulatory pressures, preliminary findings also point to the importance of mimetic and normative dynamics within the football ecosystem. In situations characterised by uncertainty regarding sustainability expectations or implementation pathways, clubs appear to rely on observation and informal benchmarking of peer organisations. Sustainability practices also appear to be shaped through processes of field learning, whereby clubs monitor initiatives undertaken by other clubs and selectively adapt them to their own organisational context. Such dynamics may contribute to the gradual diffusion of shared practices and expectations across the field, reinforcing normative understandings of what constitutes appropriate sustainability engagement in professional football. However, these processes rarely translate into radical experimentation or disruptive innovation. Instead, they tend to support incremental adjustments aligned with practices already perceived as legitimate within the sector, reinforcing convergence around institutionally accepted approaches to sustainability.

Preliminary findings also highlight the importance of internal governance capacity and organisational coordination in shaping how sustainability initiatives are implemented. While many clubs have introduced formal sustainability or CSR roles, the organisational positioning and strategic influence of these roles vary considerably. In several cases, sustainability responsibilities remain weakly embedded within the organisational structure, often combined with other administrative or operational functions. This configuration may reflect forms of symbolic organisational arrangements, whereby sustainability roles are formally established but only partially integrated into decision-making processes. Limited governance capacity may also constrain the development of cross-departmental coordination mechanisms necessary to translate sustainability commitments into concrete actions. At the same time, some clubs appear to experiment with coordination practices aimed at aligning sustainability-related activities across organisational units, suggesting early attempts to strengthen governance arrangements and institutionalise sustainability more systematically within the organisation.

A further recurring pattern concerns the way sustainability is interpreted through the historical social role of football clubs and their long-standing CSR traditions. Many organisations continue to associate sustainability primarily with social engagement, community initiatives and educational programmes, particularly those linked to youth academies and grassroots activities. In these contexts, sustainability is frequently framed in value- and identity-based terms, emphasising football's social influence and responsibility toward local communities and supporters. While such initiatives contribute to generating symbolic legitimacy and positive stakeholder engagement, they may also reinforce a path dependency in which sustainability remains largely associated with philanthropic or community-oriented activities rather than being fully integrated into transversal ESG governance and strategic decision-making processes.

Resource availability and infrastructural constraints further shape how sustainability initiatives are enacted in practice. Preliminary interview evidence suggests that clubs often prioritise initiatives that are economically feasible and capable of delivering organisational benefits, particularly in terms of efficiency improvements or cost reductions. In this context, sustainability-related decisions are frequently filtered through a business-case logic that emphasises financial viability and operational feasibility. Environmental benefits may therefore emerge as indirect outcomes of efficiency-oriented investments rather than as the result of explicitly sustainability-driven strategies. In addition, structural constraints such as ageing facilities, infrastructure limitations or restricted control over stadium ownership may limit the scope of environmental initiatives, reinforcing incremental rather than comprehensive sustainability pathways.

Finally, the relationship between digitalisation and sustainability appears to be characterised by a significant degree of organisational decoupling. While digital technologies are widely used across football organisations in areas such as performance analysis, fan engagement or operational management, their integration into sustainability strategies remains uneven and often indirect. Preliminary findings suggest that sustainability-related data are frequently fragmented across

organisational units and collected through manual processes, limiting the development of integrated digital infrastructures capable of supporting systematic ESG management. At the same time, some clubs report the adoption of specific digital tools – such as monitoring systems or energy-efficiency technologies – that contribute to environmental performance improvements primarily through operational optimisation. In these cases, digitalisation contributes to sustainability outcomes indirectly through operational optimisation rather than being embedded within intentional sustainability-oriented digital strategies. Clubs also appear to adopt certain digital solutions that are relatively easy to implement and capable of generating visible social benefits, particularly in areas related to accessibility and fan inclusion.

Taken together, these emerging patterns suggest that, under institutional pressures, sustainability and digitalisation are predominantly integrated through incremental organisational adjustments rather than through radical transformation. Sustainability and digital technologies are often incorporated into existing organisational structures and operational routines in ways that allow clubs to respond to institutional expectations while preserving organisational stability. At the same time, preliminary evidence indicates that governance capacity, organisational resources and internal coordination mechanisms mediate the extent to which clubs ~~are able to~~ move beyond compliance-oriented and functionally driven approaches toward more integrated sustainability–digital configurations.

Preliminary observations from the comparative analysis across the four national contexts suggest that institutional environments may shape how clubs interpret sustainability pressures and digital transformation. Differences in governance traditions, regulatory frameworks and organisational models across European football leagues may therefore influence the conditions under which sustainability and digitalisation are implemented. Further analysis will explore these dynamics in greater depth as additional interview data are incorporated into the study.

Research limitations. This study should be interpreted in light of several limitations. First, the research is currently ongoing and the empirical analysis presented in this paper is based on preliminary evidence. Data collection is still in progress; consequently, the patterns discussed in the results section should be interpreted as emerging tendencies rather than definitive findings.

Second, the study is based on an in-depth qualitative analysis of a limited number of professional football clubs operating within top-tier leagues. While this approach allows for rich, contextualised insights into organisational processes and institutional mediation, it necessarily constrains the generalisability of the findings. Future research could extend this analysis to a broader range of clubs, including lower-tier organisations or clubs operating in different national and regulatory contexts, to assess the extent to which the patterns identified here hold across varying institutional environments.

Third, the study focuses on professional football as a specific organisational field characterised by strong performance pressures, regulatory oversight and resource asymmetries. These features may shape the predominance of incremental innovation observed. Comparative studies across sports or industries could clarify whether the configurations identified are field-specific or reflect broader patterns of sustainability–digital integration.

Fourth, the analysis relies primarily on interview data, which captures managerial perceptions, interpretations and narratives rather than direct observations of practices or performance outcomes. Although this is consistent with the study's interest in institutional interpretation and organisational mediation, future research could complement qualitative insights with longitudinal or mixed methods designs. Such approaches may enable a more systematic examination of how sustainability–digital configurations evolve over time and whether incremental forms of twin transition progressively develop into more coordinated arrangements under changing institutional or organisational conditions.

Managerial implications. The findings of this study offer several implications for managers and decision-makers operating within professional football organisations, as well as for governing bodies and institutional actors seeking to foster sustainability and digital transformation across the sector. First, the analysis suggests that institutional pressure alone is insufficient to generate meaningful sustainability–digital integration. Regulatory requirements, licensing criteria and reporting obligations play an important role in legitimising sustainability and triggering initial organisational responses. However, when such pressures are not accompanied by adequate governance capacity and internal coordination, sustainability initiatives are likely to remain symbolic or procedurally driven. Compliance should therefore be treated as a starting point rather than an end point. Investing in basic governance structures can enhance clubs' ability to translate external demands into more integrated operational practices.

Second, the findings highlight the importance of organisational mediation as a managerial lever. Clubs facing similar institutional environments may display markedly different outcomes depending on how sustainability and digitalisation are internally organised. Managers can actively shape these outcomes by strengthening coordination across functional silos, particularly between sustainability, operations, facilities, marketing and data-related functions. Even modest interventions, such as interdepartmental meetings or shared ESG data responsibilities, can support more integrative arrangements.

Third, preliminary findings from the ongoing study highlight the need for managers to reframe digitalisation as a potential enabler of sustainability governance, rather than as a purely technical or performance-oriented domain. Extending experimental approaches used in performance analytics to sustainability challenges, particularly data integration and monitoring, may strengthen digital–ESG alignment.

Finally, the findings also carry implications for governing bodies and football institutions. While regulatory frameworks and licensing requirements play an important role in legitimising sustainability and stimulating initial organisational engagement, the preliminary results suggest that compliance-based approaches alone are unlikely to generate deeper sustainability–digital integration. Policy frameworks may therefore benefit from complementing regulatory pressure with initiatives that support organisational learning, coordination and capacity development across clubs. In particular, leagues and governing bodies may play a key role in facilitating knowledge exchange, promoting shared practices and supporting collective learning processes across the field. Such coordination mechanisms may be especially valuable in areas such as ESG data collection, monitoring and reporting, where digital solutions could support sustainability objectives but often remain fragmented across organisations.

Originality of the paper. This ongoing study contributes to Institutional Theory and to the emerging literature on the twin transition by challenging the assumption of a direct and deterministic relationship between institutional pressures and sustainability–digital transformation outcomes. While prior research often implies that stronger coercive, normative or mimetic pressures should lead organisations towards more integrated or transformative sustainability–digital configurations, the preliminary findings of this study suggest that such a relationship is mediated by organisational-level mechanisms, including governance capacity, internal coordination, resource availability and digital maturity.

By highlighting the mediating role of organisational processes, the study aims to advance institutional perspectives on sustainability in sport, providing empirical insights into how sustainability and digitalisation interact within a highly institutionalised and performance-driven organisational field. In doing so, it also extends twin transition scholarship into the context of professional sport, a domain that remains relatively underexplored in the literature. Preliminary evidence suggests that sustainability–digital integration within professional football tends to emerge through differentiated and incremental organisational responses rather than through uniform or transformative change.

By foregrounding organisational mediation, the study refines institutional accounts of sustainability in sport by explaining why similar pressures may generate different patterns of sustainability–digital configurations within the same field.

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Managing uncertainty and irreversibility in quantum computing adoption: a systematic literature review

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Abstract. *This study analyses how technological, organizational, and environmental factors influence the strategic timing of quantum computing (QC) adoption in business settings. To fill the scarce systematization of the literature on the transition of QC from experimental object to integrated managerial capacity, the work adopts a systematic literature review conducted according to the PRISMA protocol and using the Technology–Organization–Environment framework with the Real Options Theory for content analysis in an integrated way.*
The results show that the adoption of QC is not a binary choice, but a progressive commitment process in which management modulates the timing, intensity and depth of the investment according to uncertainty and irreversibility. Alignment between use cases and quantum capabilities, interoperability with legacy systems, centralized governance, economic and financial flexibility, internal capabilities, regulatory framework and ecosystem partnerships emerge as key determinants of option value.
The study thus contributes to the managerial literature by showing that the competitive advantage does not depend on early adoption in itself, but on the ability to build selective, reversible and scalable experimental trajectories.
Keywords: *Quantum computing; Quantum technologies; TOE; Real Option; Systematic literature review*

1. Introduction. The emergence of quantum computing (QC) as a technology with high computational capacity is fueling significant expectations about the reconfiguration of decision-making processes and enterprise information architectures. The physical properties that characterize QC make it potentially suitable for addressing optimization and simulation problems with greater efficiency than classical paradigms, with direct implications for business management (Ajagekar & You, 2019; Phillipson, 2024). In this context, the literature points to a particularly relevant application potential in areas such as finance, healthcare, logistics and the pharmaceutical industry (Egger et al., 2020; Zinner et al., 2021; Jeyaraman et al., 2024; Shamsuddoha et al., 2025). Furthermore, some contributions frame QC as a potential technological response to regulatory issues related to the green transition, hypothesizing benefits for efficiency and, consequently, opportunities for competitive differentiation in ESG performance (Maraveas et al., 2024; Lo & Shih, 2021; Chatterjee et al., 2023). Attention to these prospects is also reflected in public policies: governments and institutions support quantum innovation through dedicated programs, aiming to accelerate its development trajectory and industrialization (Sood & Chauhan, 2023; Ansere et al., 2023).

Despite the theoretical benefits attributed to quantum technologies (QT), their development remains at a relatively early stage. This condition is attributable to an interrelated set of risks that condition investment decisions, slow technological maturation, and, consequently, limit the diffusion of its applications; at the same time, companies that monitor QTs with a view to industrial implementation are also confronted with interdependent complexity factors that tend to hinder or postpone their adoption. Nguyen (2025) highlights the multidimensional nature of these risks: uncertainty about the timing of technology maturation translates into market uncertainty, especially in relation to the predictability of revenues, and, cumulatively, into a high financial risk due to the low predictability of returns on investment. On the industrial adoption side, further constraints derive from the high development costs, the complexity of integration with legacy infrastructures and systems, the lack of specialized skills and the absence of a sufficiently mature and stable legislative-regulatory framework (Egger et al., 2020; Shamsuddoha et al., 2025). The latter element amplifies the risk of conversion and adaptation costs should future regulatory adjustments become necessary, contributing to the slowdown in the large-scale adoption of QT in the industrial sector. These elements impact with varying degrees of intensity on the uncertainty and irreversibility of the investments that companies are required to plan regarding the implementation of QC in the corporate environment.

The evidence that clarifies how QC is transformed from an experimental object to a computational engine permanently integrated into managerial processes is still poorly systematized. In particular, the limitation of the literature concerns not only the identification of the factors that influence the adoption of QC, but also the understanding of how these factors orient the strategic timing of adoption. Hence the following research question:

RQ: How do technological, organizational and environmental factors influence the strategic timing of the adoption of QC in business contexts?

To fill this gap, the present study integrates the lens of Technology, Organization, Environment (TOE) (Tornatzky et al., 1983), a well-established framework for the analysis of the adoption of digital innovations at the organizational level

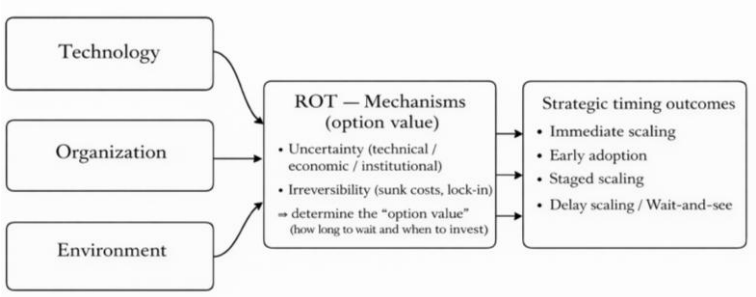
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(Nguyen et al., 2022) and widely used in different technological contexts (Bany Mohammad et al., 2022; Schwaeke et al., 2025), with the lens offered by Real Options Theory. This integration makes it possible to interpret the adoption of emerging technologies not as a binary decision, but as a sequence of commitments functional to the adoption of QC with reference to which management may or may not assume wait-and-see attitudes depending on the degrees of uncertainty and irreversibility that characterize the commitments themselves. In this perspective, TOE factors operate as determinants of option value as they influence the degree of uncertainty and irreversibility of QC investments; the combined effect of uncertainty and irreversibility of QC investments allows the strategic timing of adoption to be derived.

2. Technology–Organization–Environment (TOE) model and integration in Real Options key. To interpret the adoption of QC as an organizational phenomenon, and therefore as a set of strategic choices involving infrastructures, data, skills and ecosystem assets, the present study adopts the TOE framework (Tornatzky et al., 1983), one of the most accredited theoretical frameworks for the analysis of the adoption of digital innovations at the enterprise level (Nguyen et al., 2022). The TOE allows to conceptualize the adoption and implementation of emerging technologies as a joint outcome of three sets of conditions: (i) technological, related to operational compatibility, complexity, as well as availability and operational characteristics of technical infrastructures; (ii) organisational, related to the availability of financial and human resources, centralised governance mechanisms and a corporate culture open to innovative processes; (iii) environmental, attributable to competitive pressures, regulation, supply chain dynamics, availability of partners willing to collaborate synergistically (Baker J., 2011). The robustness of the model lies in its holistic framework, which makes it possible to make evidence from different contexts comparable and, at the same time, to adapt the specific factors to the different technological domains while preserving a stable analytical structure (Baker J., 2011; Bany Mohammad et al., 2022; Schwaeke et al., 2025). Consistently, previous studies have validated its usefulness in heterogeneous digital environments: Schwaeke et al. (2025) use it to analyze the adoption of Artificial Intelligence in SMEs; Bany Mohammad et al. (2022) for Business Intelligence Technologies in the Banking Industry; Zhu et al. (2002) to map enabling and limiting factors for e-business. The choice of TOE is further motivated by its greater relevance compared to models centered on the single user, such as the Technology Acceptance Model (TAM**)** and UTAUT, which are less suitable for capturing the dimension of strategic commitment, the allocation of resources and the infrastructural reconfiguration typical of organizational adoption decisions. Similarly, the TOE appears preferable to the Task-Technology Fit (TTF), which is more oriented towards explaining the impacts of technology on performance (Goodhue & Thompson, 1995).

However, in the case of QC, it is not enough to identify or "list" the factors that influence adoption: what remains unclear is how these factors guide managerial commitment and, above all, how they affect the strategic timing of QC adoption. Hence the need to integrate the TOE with the logic of Real Options Theory (McGrath, 1997), which makes it possible to interpret the adoption of technologies characterized by high uncertainty not as a binary choice, but as a sequence of progressive commitments within which management can decide to adopt a more or less interventionist approach depending on the degrees of uncertainty and irreversibility that affect the investment itself (fig. 1). In operational terms, the logic of real options makes it possible to treat TOE factors as determinants of option value, guiding managerial commitment and the time trajectory related to the adoption of QC.

Fig. 1: TOE and ROT integration



Source: authors' elaboration

3. Methodology. In order to achieve the research objective, a systematic literature review (SLR) was conducted, an approach that allows to accurately and rigorous exploration of the accumulated knowledge on an emerging phenomenon and to synthesize it into robust conceptual categories (Troisi et al., 2024; Polese et al., 2017). In the case at hand, the SLR has made possible a critical reconstruction of the state of the art on the adoption of QC in business contexts, as well as the systematization of the evidence in an explicitly managerial decision-oriented perspective. To ensure transparency and quality of reporting, the review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol.

The bibliographic search was carried out using a combination of keywords designed to ensure adequate coverage of the topics under investigation. The string adopted is as follows: *("quantum comput" OR "quantum algorithm*" OR "quantum technolog*") AND (Management OR "business management" OR "firm management" OR governance OR Strateg**). To ensure completeness and robustness of the analysis, the research was conducted jointly on the Web of

Science and Scopus databases; the presence of keywords was checked in the title, abstract, and keywords sections (Schwaeke et al., 2024).

In line with the aims of the review and the need to ensure rigor of the results, studies that comply with the following criteria were included: (i) peer-reviewed contributions in English published in scientific journals or conference proceedings in the 2020–2025 time frame; (ii) works that analyze QC in relation to adoption, implementation, readiness and investment decisions, with a focus attributable to at least one of the Technology, Organization or Environment dimensions; (iii) contributions of a predominantly technical-engineering or physical-mathematical nature have been included as long as they have implications consistent with the domains of the TOE framework and with the interpretative logic of Real Option. Papers without managerial implications and studies in which QC was treated without adequate treatment of determinants or adoption/implementation processes such as to allow a coherent coding with respect to the TOE dimensions and the Real Option Theory were excluded. Inclusion and exclusion criteria were systematically applied throughout the screening process. Screening was conducted by multiple reviewers autonomously, with conflict resolution through consensus. In procedural terms, the selection took place in two phases: a first scan based on title and abstract, followed, for the documents deemed suitable, by a second screening phase by full-text (Pedrini & Ferri, 2019).

The included contributions have been subjected to a two-level content analysis and coherently designed with an integrated use of the theoretical lenses of the TOE and the Real Option Theory. First, based on the TOE framework, an initial coding scheme was built divided into the three dimensions technology, organization and environment. In this phase, each contribution was codified along the three dimensions of the model and, within each of them, the recurring themes were identified and progressively consolidated, to obtain an interpretative taxonomy consistent with the literature on the adoption of innovations. Secondly, the themes that emerged from the TOE analysis have been recoded in line with the Real Option Theory, in order to transform the descriptive taxonomy into a reading oriented towards the strategic timing of the adoption of the aforementioned technology. In particular, the integration with the perspective of real options has made it possible to reinterpret technological, organizational and environmental factors as determinants of the breadth and configuration of the decision-making range, making it possible to link the evidence of the literature not only to the presence of barriers and enablers, but also to the conditions that make it rational to anticipate, postpone, modulate or interrupt the commitment in the adoption process.

4. Results. The bibliographic search produced 1053 documents; of these, only 84 were included in the analysis (Fig.2). The 84 articles included in the review outline a constellation of elements that companies are called upon to monitor and, where necessary, actively govern to support the implementation of QC in organizational contexts. In line with the TOE framework, the evidence has been systematized along the technological, organizational and environmental dimensions. In line with the Real Options analysis, the work is not limited to tracing these factors back to mere "determinants of adoption": for each TOE element, empirical and conceptual evidence has been extracted and interpreted that allows it to be read as a determinant of option value*,* i.e. as a variable capable of affecting the uncertainty, the irreversibility of the implementation trajectories. The joint action of these channels makes the strategic timing of QC adoption intelligible, highlighting when it is rational to enter early, when it is preferable to wait, when it is appropriate to scale progressively or abandon the investment.

RQ 1: How do technological, organizational and environmental factors influence the strategic timing of the adoption of QC in business contexts?

Effective adoption of QC depends on the alignment between the business problem and the quantum platform available (Liu et al., 2025). When the structure of the problem, operational flows and performance objectives are consistent with the capabilities of the quantum ecosystem that can be governed by the company, the benefits are more plausible and, above all, assessable ex ante (De Stefano et al., 2024; Serrano et al., 2024; Liu et al., 2025), these circumstances also produce effects of mitigation of dependence on technology providers and mitigate the stop-and-go dynamic (Bozejko et al., 2024). In this perspective, the alignment between problem and technology reduces the technical uncertainty of QC, increasing the predictability of the application value and limiting exposure to investments in unsuitable applications (De Stefano et al., 2024; Serrano et al., 2024; Liu et al., 2025). It follows that a preliminary evaluation of the quantum-suitable use cases has a direct impact on the strategic timing of the adoption of the aforementioned technology, allowing the transition from wait-and-see or exploratory logics to interventionist logics.

The implementation of QC in the company requires an assessment of the ability to integrate with existing information and operational systems: reliable outputs and reduction of bottlenecks require data logistics that ensure information in the "right format" and at the "right time" (Egger et al., 2020; Zhou, 2025; Chen et al., 2025). The presence of interoperability reduces technical and operational uncertainty, making integration times and complexities more predictable and allowing management to avoid costly interventions on architectures and processes, which are difficult to recover in the event of a negative outcome (Aljaafari & Alotaibi, 2023; Zhou, 2025).

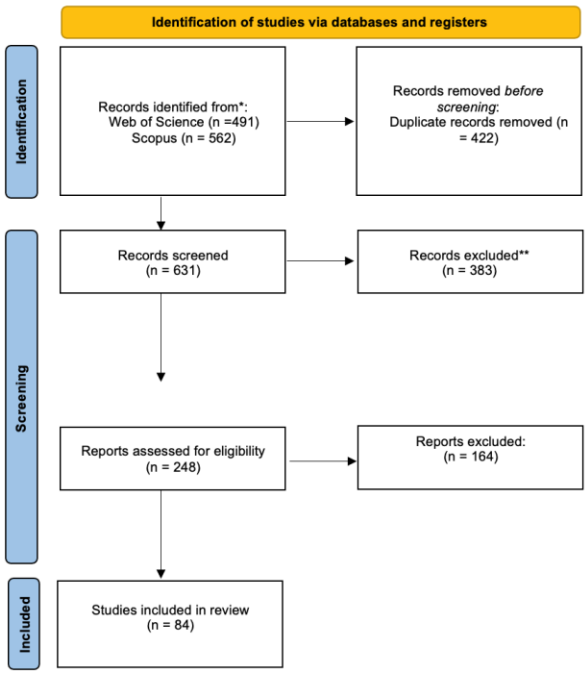
Finally, noise and decoherence impair effective performance and make many current systems suitable only for relatively simple tasks or otherwise dependent on error mitigation strategies (Liu et al., 2025; Chen et al., 2025). It follows that adoption decisions are driven less by "peak power" and more by the ability to ensure acceptable and replicable performance in support of complex operations (Egger et al., 2020; Zhou, 2025). Limited operational reliability increases technical uncertainty and makes investments related to deep QC integration riskier; For this reason, companies are faced

with the need to adopt an exploratory or wait-and-see approach in order to avoid incurring high risks and at the same time accumulate knowledge thanks to the first exploratory applications.

The effective adoption of QC also depends on management's ability to integrate quantum solutions into information and operational systems, translating technological complexity into coherent organizational choices (Cranganore et al., 2024; Coccia, 2024). This requires centralized governance mechanisms of quantum resources, hybrid workflows and response times (Cheng et al., 2025); along this path, some capabilities are decisive, including thermal management (Brahmbhatt et al., 2024; Salmangoli et al., 2024) and the design of efficient architectures in light of high energy demand, with attention to costs and emissions (Gill et al., 2024). The literature also recalls possible side effects and the need for responsible practices, including the construction of ethical and transparent databases (Carbajal-Pina & Acur, 2024; Li, 2025). In this framework, centralized QC governance tends to reduce organizational uncertainty by directing the prioritization of use cases, defining shared criteria for evaluating pilot projects and assigning clear responsibilities, with effects of mitigating ambiguity in use and internal conflicts and greater predictability of the adoption path (Cranganore et al., 2024; Coccia, 2024; Bozejko et al., 2024; Cheng et al., 2025). Therefore, the need emerges for management to preliminarily define the organizational governance of the QC, avoiding proceeding in a fragmented way, with misaligned pilot projects and ambiguous responsibilities, which would fuel situations of chaos and uncertainty; in this sense, the centralized governance of the QC indirectly makes it possible to reduce the risk of irreversible resources being used in disorderly or premature way. In essence, centralized government avoids adding to technical uncertainty further internal uncertainty, produced by decision-making.

On this basis of governance there is a second critical dimension, related to the economic and financial sustainability of the implementation of QC, as this involves a complex cost structure, determined by hardware and licenses, staff training, thermal infrastructure, R&D and maintenance, which requires careful planning and strict control of resources to mitigate the associated economic uncertainty (Zheng et al., 2023; Aljaafari & Alotaibi, 2023; Liu et al., 2025; Chen et al., 2025). To mitigate exposure and risk, access to quantum capabilities through "as-a-service" models and cloud solutions is frequent, reducing CAPEX and preserving economic, financial and organizational flexibility (Wilkens & Moorhouse, 2023).

Fig. 2: Flow chart PISMA 2020



Source: authors' elaboration

Finally, the feasibility of adoption is closely linked to the human resources and skills available: the literature highlights a marked scarcity of adequately trained personnel (Shahid & Hassan, 2023; Khan et al., 2025; Malinverno & Blasco Alberto, 2025) and the need for multidisciplinary teams capable of integrating quantum skills with business objectives and constraints (Cheng et al., 2025). In response, many companies launch training programs and capability building initiatives in contexts where skills remain limited and geographically concentrated (Hilkamo et al., 2021; Zhai et al., 2024; Gill et al., 2024; Paglieri et al., 2025); however, conservative cultures and internal resistance can slow adoption even in the presence of favorable technical and financial conditions (Chen et al., 2025). At the same time, robust expertise reduces the technical uncertainty associated with QC, allowing more accurate assessments of strategic alternatives and reducing the risk of premature choices along particularly complex trajectories characterized by high degrees of irreversibility (Cheng et al., 2025).

Incentives and institutional constraints influence the timing, application areas and intensity of investments in QC (Baiutulmal & Adem, 2023; Alubaidi, 2023; Joshi, 2024; Zhou, 2025; Zafar, 2025). Regulatory fragmentation generates pacing problems and hinders experimentation (Carbajal-Pina & Acur, 2024), favoring waiting strategies aimed at avoiding conversion costs (Carbajal-Pina & Acur, 2024; Zafar, 2025) and opening up spaces for regulatory arbitrage (Joshi, 2024; Baitulmal & Adem, 2023). In highly regulated sectors, moreover, validation and audit processes tend to slow down experimentation (Zhou, 2025; Zafar, 2025). It follows that an uncertain or fragmented regulatory framework increases institutional uncertainty and potential irreversibility, as it increases the cost of error; at the same time, regulation can be enabling when QC strengthens security and compliance (Gupta et al., 2023).Alongside the institutional dimension, sustainability is another aspect to consider quantum capabilities are sometimes interpreted as levers to optimize the use of resources and reduce emissions (Maraveas et al., 2024; Chatterjee et al., 2023), as well as a basis for possible competitive differentiation in ESG (Lo & Shih, 2021; Chatterjee et al., 2023). Such promises, however, need to be evaluated considering the energy consumption associated with quantum systems (Leclerc et al., 2023; Gill et al., 2024; Li, 2025), introducing uncertainty about the net balance between environmental benefits and energy costs, especially in the presence of infrastructure and energy decisions that are difficult to reverse.

In this context, the ability to manage uncertainty and complexity also depends on the configuration of the ecosystem: companies develop collaboration networks to govern the costs and complexity of quantum innovation (Zafar, 2025; Chen et al., 2025; Coccia & Roshani, 2024). Universities play a central role in both developing evidence-based practices and exploring new use cases (Lebrun-Gallagher et al., 2022; Zhao et. al, 2023; De Stefano et al., 2024; Khan et al., 2025), contributing to the dissemination of knowledge and the reduction of technical uncertainty (Ansere et al., 2023; Brahmbhatt et al., 2024). In parallel, venture capital supports hardware, industrial use cases, and start-ups (Lebrun-Gallagher et al., 2022; Zhao et al., 2023; Kshetri, 2024). Since quantum infrastructures require a joint public-private effort (Sood & Chauhan, 2023), insufficient public investment in applied research can be a bottleneck for industrial scalability (Malinverno & Blasco Alberto, 2025). Overall, partnerships reduce uncertainty through access to expertise and shared experimentation and can mitigate financial irreversibility through pooling of resources; however, it is necessary to oversee the risk of degeneration in forms of relational lock-in.

5. Discussion and implications. The results of the review show that the adoption of QC cannot be interpreted as a binary decision between adoption and non-adoption, but rather as a process of progressive commitment, in which management modulates the timing, intensity and depth of the investment according to how technological, organizational and environmental factors affect the uncertainty and irreversibility of company commitments (Table 1). In this work, the joint use of the TOE framework with Real option analysis allows to overcome the predominantly classificatory approach of the first model and to define an analytical device capable of explaining when the company is rationally induced to anticipate entry, postpone the investment, proceed in phases or interrupt the implementation process of the QC. More precisely, TOE factors emerge as determinants of option value, as they simultaneously affect the uncertainty and irreversibility of adoption trajectories. It follows that the timing of the adoption of the QC does not depend only on the perceived technological attractiveness, but on the possibility, for the company, to build margins of decision-making reversibility in a context still characterized by technological immaturity, regulatory instability and scarcity of skills.

The results show that the technological dimension orients strategic timing mainly through three mechanisms: the degree of consistency between use cases and quantum capabilities available, interoperability with legacy systems and processes, and the computational reliability of the solutions that can be adopted (De Stefano et al., 2024; Serrano et al., 2024; Liu et al., 2025; Egger et al., 2020). When these conditions are favourable, uncertainty is reduced and it becomes more rational to initiate forms of early adoption; otherwise, the value of waiting increases and makes a more prudent and gradual adoption strategy more justifiable, which is also functional to favor an initial positioning of the company and capability building. This suggests that the potential competitive advantage of QC does not lie, at least in this evolutionary phase, in the early adoption itself, but in the ability to accurately select the application domains in which the technology presents a favorable relationship between experimentability, integration cost and expected value.

The organizational dimension shows, in turn, that the adoption of QC depends less on the mere availability of resources and more on the ability of the firm to transform technical complexity into manageable decision-making architectures (Cheng et al., 2025; Aljaafari & Alotaibi, 2023). The presence of centralized coordination mechanisms, multidisciplinary skills, integration capabilities and economically flexible solutions, such as cloud or "as-a-service" access, reduces the irreversibility of commitment and makes disciplined experimentation possible. In this perspective, internal governance is not only an enabling condition for adoption, but a real mechanism for regulating the timing of the investment: organizations with robust skills and shared criteria for evaluating pilot projects can learn more quickly, correct the path and decide more accurately when to increase or reduce exposure. On the contrary, cultural resistance, scarcity of talent and infrastructural rigidity increase the risk of premature errors, transforming QC into a resource-intensive and low-recoverability investment.

The environmental dimension is also decisive in defining the strategic timing of the adoption of QC. The results show that regulatory framework, institutional pressure, ecosystem configuration, and ESG policies operate not as simple context variables, but as forces that redefine the relative convenience between anticipation and expectation in QC implementation (Baiutulmal & Adem, 2023; Alubaidi, 2023). In particular, regulatory fragmentation and validation processes typical of highly regulated sectors increase the cost of error and, therefore, the value of the referral option; conversely, the presence

of partnerships with universities, investors and public actors mitigates uncertainty, makes risk shareable and expands the range of trajectories that can be tested. Also relevant is the fact that sustainability emerges as an ambivalent driver: on the one hand, QC is associated with promises of efficiency and competitive differentiation in an ESG key; on the other hand, high energy demand and uncertainty about the net environmental balance prevent the technology from automatically assuming the "green" superiority. This result is particularly important because it shows that, in emerging technologies, institutional and environmental legitimacy does not necessarily coincide with an immediate convenience to adoption but requires progressive and contextualized verification processes.

Tab. 1: Summary of the results

TOE dimension	*Category*	*Evidence*	*Determinant of the option value*	*Implication on strategic timing*
Technology	**Technology alignment**	The effectiveness of adoption depends on the alignment between the business problem and the capabilities of the quantum platform. High alignment uses cases reduce technical uncertainty related to QC deployment and make application value clearer.	A high level of technology alignment reduces technical uncertainty and increases clarity of the potential value of the investment.	Management tends to anticipate adoption in cases of high technological alignment, while adopting a wait-and-see or exploratory logic when such alignment is low.
Technology	**Interoperability with legacy systems**	QC must integrate with existing information systems to operate as an additional and permanently integrated computational engine in the company. This requires data management that is consistent with the peculiarities of quantum systems and legacy systems.	Interoperability with legacy systems reduces the technical and operational uncertainty associated with implementing QC.	When interoperability is high, management can adopt QC more quickly, limiting integration risks and avoiding costly interventions on architectures and processes.
Technology	**Operational reliability**	Noise and de-consistency limit QC performance, making it useful especially for simple tasks and accompanied by error mitigation strategies.	Limited operational reliability increases technical uncertainty and makes investments related to deep QC integration riskier.	Management tends to adopt it prudently, focused on limited applications, until signs of greater stability emerge. This approach also allows you to accumulate experience in the use of QC.
Organization	**Centralized government**	Successful adoption of QC depends on management's ability to graft the technology into existing systems, managing resources, hybrid workflows, and response times.	Centralized government reduces organizational uncertainty by defining a common trajectory and mitigating the risk of adoption being driven by isolated or opportunistic initiatives.	The timing of adoption depends on how this reduction in organizational uncertainty combines with technological and external uncertainties. In the presence of high technological risks, it is advisable to proceed in phases; otherwise, a direct strategic investment is possible. In the presence of strong external uncertainty, a wait-and-see logic prevails.
Organization	**CAPEX/OPEX management**	QC involves a complex cost structure due to hardware, licenses, qualified personnel, infrastructure, R&D, therefore requires rigorous planning. This plurality of items makes it difficult to estimate ex ante the actual cost of adoption and its sustainability over time.	A CAPEX-intensive cost structure increases the irreversibility of investments and increases their risk in conditions of uncertainty. In contrast, *as-a-service* models reduce irreversibility and make costs more observable and distinguishable over time.	If irreversibility is low, even in the presence of high uncertainty, the company can invest early to position itself, since the exit is less expensive. On the other hand, when irreversibility is high, the timing must be more prudent and depends on the nature of the uncertainty.
Organization	**Capability**	Implementing QC requires addressing a marked shortage of skills and knowledge: multidisciplinary teams and dedicated training programs are needed, while cultural resistance can slow adoption.	The development of knowledge and skills in QC directly reduces uncertainty, because it improves the company's ability to understand, evaluate and govern complex strategic alternatives. While not eliminating irreversibility, it reduces its inefficient exposure, limiting the risk of premature commitments on technological and organizational trajectories that are difficult to reverse. At the same time, capability building involves a specific and partially irreversible investment share, which nevertheless serves as a risk-reducing mechanism for more challenging future decisions.	Capability building reduces technical uncertainty and increases the company's ability to govern irreversible investments; consequently, it tends to favour early but sequential adoption and, only when it makes the results sufficiently predictable, opens the way to a direct commitment.
Environment	**Regulatory framework**	Regulatory fragmentation and uncertainty affect the timing, scope and intensity of QC adoption, hampering transnational experimentation.	The legislative and regulatory framework affects uncertainty, as it makes the conditions, times and areas of adoption of the QC predictable. It also affects irreversibility because, when it is unstable or fragmented, it increases the risk that investments already made will have to be reconverted or adapted, transforming part of the costs into sunk costs.	An uncertain and fragmented regulatory framework fuels external uncertainty and increases the risk of repurposing investments already made; this pushes management to take a wait-and-see attitude towards the implementation of QC.
Environment	**Relationships-partnerships from an ecosystem perspective**	Networks with universities and technological and financial partners foster experimentation, management practices and the dissemination of knowledge.	Strategic relationships and partnerships reduce uncertainty through access to expertise, shared validation, and collective learning; they also reduce irreversibility, as they allow costs and resources to be distributed, limiting the company's direct commitment.	The development of strategic partnerships tends to favour an early and gradual entry, thanks to the reduction of uncertainty and the mitigation of the degree of irreversibility.

Source: Authors' elaboration

On a theoretical level, the study offers at least three implications. Firstly, it extends the TOE framework by introducing a temporal and decision-making dimension that usually remains implicit: technological, organizational and environmental factors explain not only the probability of adoption, but also the sequence with which the company builds its commitment. Secondly, the integration with Real Options Theory makes it possible to overcome static readings of the adoption of emerging technologies, showing that, in view of the current level of technological development, the strategic value of QC depends on the possibility of preserving flexibility, progressively learning and limiting the irreversibility of investments. Thirdly, the work contributes to the literature on innovation management by highlighting that, in the presence of radical and immature technologies, competition is not played exclusively on the speed of adoption, but on the ability to govern uncertainty through organizational architectures, collaborative ecosystems and temporally calibrated entry choices. In this sense, the research proposes a reading of the adoption of QC as a process of strategic orchestration of uncertainty, rather than as a simple technical implementation.

From a managerial point of view, evidence suggests that companies should avoid both indiscriminate wait-and-see approaches and excessively rigid advance commitments. An investment logic by options appears more appropriate, articulated in limited pilot projects, rigorous selection of use cases, development of quantum suitability metrics, access to flexible infrastructures and progressive construction of internal capabilities functional to a profitable use of QC. It follows that management should oversee at least five levers: the choice of use cases with high technological coherence; the preparation of a central governance capable of coordinating experimentation and learning; the containment of economic irreversibility through cloud or as-a-service models; the development of interdisciplinary teams that integrate technical and business skills; and the construction of external partnerships useful for sharing knowledge, costs and risk. At the same time, policy makers are called upon to reduce institutional uncertainty through standards, guidelines and programs to support applied experimentation, to prevent regulatory fragmentation from slowing down the transformation of QC from a technological promise to a truly scalable industrial capacity.

6. Conclusions. In conclusion, this study shows that the adoption of QC does *not* represent a dichotomous choice, but a process of progressive commitment, whose strategic timing depends on the interaction between technological, organizational and environmental factors. The integration between the TOE framework and Real Options Theory makes it possible to highlight how these factors not only influence the probability of adoption, but also the convenience of anticipating, postponing or modulating the investment. In particular, the alignment between *use cases* and quantum capabilities, interoperability with legacy systems, the availability of internal expertise, economic and financial flexibility, centralized governance and the quality of the institutional ecosystem emerge as decisive conditions to reduce uncertainty and irreversibility. It follows that, in the current phase of QC maturation, the competitive advantage does not lie in early adoption per se, but in the managerial ability to build reversible, selective and scalable experimental trajectories. The contribution of the work consists, therefore, in having shown that the real strategic issue, for companies, is not whether to adopt the QC, but when and under what conditions to do it rationally and effectively.

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Network Structures in Homogeneous Open Innovation Ecosystems: Evidence from Heterogeneous Accelerator Context

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Abstract. This extended abstract explores the application of network theory to compare structural dynamics and differences of heterogenous startup accelerators within open innovation ecosystems. The literature reveals gaps in the application of network theory to startup accelerators and innovation ecosystems, with limited use of formal network metrics such as centrality degree, clustering, or betweenness centrality. Instead, qualitative evidence dominates, and direct comparisons of local versus global accelerators within the same industry-tech ecosystem lack. Drawing on social network theory, orchestration resource theory and entrepreneurial ecosystem framing, the study investigates how accelerator maturity influences network architecture, clustering, brokerage roles and technology diffusion. Using a mixed-methods approach with network mapping from 3000 international startups operating in the fashion technology ecosystem in Italy, the research aims to demonstrate how distinct network structures shape innovation flows and startup scalability. More specifically, we hypothesize that mature accelerators exhibit higher degree of centrality and betweenness, positioning startups as brokers across diverse technological clusters. Conversely, younger local accelerators function as concentrators: while their geographically bounded networks offer high cohesion and protection, they may constrain a global vision. Consequently, while mature programs leverage diversification for resiliency, local ones rely on intra-supply chain density. Having a geographically limited network, its value will be to close ranks around the startup, protecting it, but potentially limiting its diffusion.

These findings will provide actionable insights for startups, venture capitalists, investors, and institutional stakeholders focused on regional development and knowledge transfer. The theoretical framework positions the study at the intersection of entrepreneurship, innovation management, and social network analysis, contributing to the ecosystem startup research. By focusing on Italy's dual accelerator landscape, it illuminates pathways for ecosystem orchestration, aligning with UN Sustainable Development Goal 9.

Keywords: startup accelerators; network theory; innovation ecosystem; open innovation; resource orchestration; entrepeneurship ecosystems.

Framing of the research. In an era defined by rapid technological advancements and interconnected global markets, open innovation has emerged as a pivotal paradigm for fostering innovation and competitiveness, particularly in large companies but also within startup ecosystems (Yulianto & Supriono, 2023). Unlike traditional closed models that rely solely on internal R&D, open innovation emphasizes the bidirectional flow of knowledge—sourcing external ideas and commercializing internal innovations through external pathways—to accelerate value creation (Enkel et al., 2009). Studies of innovation management focus on how corporations rely on ecosystem resources to generate innovation (Cukier & Kon, 2018). This approach is especially relevant for startups, where resource constraints amplify the need for collaborative networks to bridge knowledge gaps, access complementary assets, validate products, and scale operations (Bogers & West, 2012).

In the context of open innovation, the startup ecosystem has witnessed an exponential growth, driving increasing interest in accelerators programs. Startup accelerators have emerged as critical engines within innovation ecosystems, providing early-stage ventures with mentorship, funding, and a network, to facilitate rapid scaling and survival. Accelerators are positioned as facilitators of social capital, spillovers, and inter-organizational ties shaping innovation (Fehder, 2019; Dumont, 2018). In these contexts, open innovation manifests through orchestrated ecosystems where participants co-create value via inter-organizational ties (Isabelle, 2013).

Defined as fixed-term, cohort-based programs providing mentorship, funding and networking, accelerator programs connect startups with investors, peers and potential stakeholders. They operate as dynamic social structures where actors – including founders, mentors and corporations – interact to generate value through knowledge flows and opportunity recognition. Yet, accelerators vary significantly not much on sector-specific innovations, but on scope: nascent local programs often focus on community building and problem-specific support, while mature global-wide editions leverage on an established network for startup cross-border scalability.

Nevertheless, the stage of maturity of an accelerator raises questions about structural differences of these programs affect startups, and in turn, the innovation ecosystems. Yet their efficacy relays on underlying network dynamics, for example the strength of ties, patterns of brokerage, and flows of information that support the social capital.

Network Theory provides a lens for framing this research. Originating from sociology (Granovetter, 1973) and extended to entrepreneurship (Aldrich & Zimmer, 1986), it posits that innovation emerges not in isolation but through relational ties that facilitate knowledge diffusion, resource access, and opportunity recognition (Burt, 2004). In startup

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contexts, accelerators act as network orchestrators, creating ego-networks where startups (ego) connect to alters (mentor, investors, institutions, peers), via ties of varying strength (Carnovale, 2014; Carnovale & Yeniyurt, 2015). Despite accelerators proliferation, the application of network theory to dissect their structure remains underdeveloped (Baraldi et al., 2019; Ancona et al., 2023). Nevertheless, social network theory offers powerful lenses to map how accelerators embed within broader ecosystems of universities, institutions and investors.

Recent literature underscores the relevance of the intersection among social network theory, resource orchestration theory and entrepreneurial ecosystem framing (Neumeyer & McKenna, 2016; Theodoraki & Catanzaro, 2022; Spigel & Harrison, 2018). Resource Orchestration Theory (ROT) posits that firms actively manage resources through structuring (acquiring/redeploying), bundling (integrating), and leveraging (exploiting) processes to generate value (Sirmon et al., 2011). In accelerators, this manifests as orchestrating network ties: local programs structure regional resources (Marcone, 2018), while global ones bundle different "alters" for leveraging opportunities (Fehder, 2019). Complementing ROT, Entrepreneurial Ecosystem (EE) theory (Stam, 2015) situates accelerators within systemic interactions—networks, institutions, and culture—that enable or constrain innovation.

Studies on US accelerators show that network density correlates with funding success (Hallen et al., 2020), while European-based analysis reveals regional disparities in tie formation (Borgatti et al. 2013). In Italy, fashion tech accelerators exemplify the Italian localized networks, emphasizing district-based supply chain collaborations (Marcone, 2018). However, these studies remain descriptive, rarely applying formal metrics like degree centrality (number of ties), betweenness centrality (brokerage positions), or clustering coefficients (subgroup cohesion) to compare accelerator maturities (Stone, 2018). A meta-review of 150 accelerator studies found that only 15% employ network analysis, with most focusing on outcomes (e.g., survival rates) rather than structural antecedents and maturity effects on network resilience (Drover et al., 2017).

The literature reveals a clear research gap in applying network theory to analyze innovation startup ecosystems beyond just fashion tech, particularly in comparative studies of heterogeneous accelerators with different maturity stage (Hausberg & Korreck, 2020). While past studies investigated startup innovation, open innovation in SMEs or in corporate accelerators, and general startup ecosystems, none systematically use network metrics (centrality, clustering, tie strength) to quantify how accelerator maturity shapes ecosystem structure, knowledge flows, and startup success across different markets and regional disparities. Moreover, no comprehensive studies apply network theory to dissect how open innovation ecosystems form around tech accelerators in manufacturing districts, comparing local versus global scopes and different operational maturities, in a context characterized by medium-sized firms, funding disparities, and sustainability transitions, like Italian ones.

Past studies predominantly employed qualitative case analyses, with few quantitative approaches and comparative analysis (Del Sarto et al., 2020). No studies analyzed accelerator characteristics (local nascent, global mature), startup ecosystem roles specific to fashion tech, accelerator heterogeneity, or network structures using metrics like centrality or clusters. Also, past evidence provides results overlapping with incubators and calls for systemic work beyond corporate accelerators (Pauwels et al., 2016; Leitão et al., 2022).

Purpose of the Paper. Accelerators, as ecosystem epycenters, adopt open innovation approaches to facilitate external knowledge flows, exchange of resources, partnerships and collaborations. The Italian fashion manufacturing system is affected by fragmentation and the production geographically dislocated in districts shape a diffused entrepreneurship difficult to track and potentially yielding divergent network configurations and innovation outputs. Moreover, innovation development and technology adoption may vary according to accelerator maturity and ecosystem context, raising questions about how network configurations mediate open innovation outcomes (Dumont, 2018).

This research addresses a critical gap in applying network theory to open innovation accelerators, within the context of the fashion technology ecosystem in Italy, where evidence draws from contexts of medium-sized firms, regional supply chains, international entrepreneurship, and targeted accelerators.

In Italy, the startup landscape is particularly dynamic, especially within the fashion value chain. Italy's fashion industry stands as a global cornerstone, renewed for its creative heritage and manufacturing excellence, yet it faces significant pressures from technological rapid advancements, sustainability demand, increasing due diligence regulations, supply chain disruptions, and competitive globalization (Di Maria et al., 2023). Fashion technology — encompassing digital innovation, blockchain for supply chains, circular business models, and digital platforms — represents a pivotal evolution in startup ecosystems, where agile ventures integrate technology to offer redefinen production systems, design, consumption, and reprocessing business models. Empirical research on network tie formation within Italian high-end fashion ventures highlights how new ventures pursue open innovation in this context (Butticè et al., 2023). Moreover, the Italian entrepreneurial ecosystem remains characterized by a fragmented regional structure and a predominance of family-owned small and medium-sized enterprises (SMEs), which affect innovation and networking patterns (OECD, 2019; Ghinoi, 2021). Studies on innovation-driven SMEs show that networking abilities and dynamic capabilities are critical for competitive performance, reinforcing the importance of collaborative ties in traditional ecosystems (Vrontis et al., 2020).

The primary purpose of this paper is to apply network theory to comparatively analyze the structural configurations of nascent local versus mature global accelerators in the Italian startup ecosystem, elucidating how maturity influences network properties and, consequently, open innovation outcomes for startups and the broader ecosystem.

While accelerators are recognized as key actors for networking (Del Sarto et al., 2020), empirical evidence on structural differences by maturity and outreach is scant. For instance, Stone (2018) calls for social network theory applications to accelerators, yet few studies compare local-global variables (Fehder, 2019; Hausberg & Korreck, 2020).

Drawing on network structures orchestrated within EEs, our study seeks to address the following research question: "How do network structures differ between heterogeneous startup accelerators in shaping an open innovation ecosystem?"

Specifically, the study pursues the following objectives:

1. Map and quantify ego-network structures (centrality, density, tie strength) in heterogeneous accelerators operating in a homogeneous environment.
2. Examine how these structures facilitate knowledge flows, brokerage opportunities, and scalability, addressing gaps in maturity-comparative analyses.
3. Derive implications for accelerator design and policy, particularly in regional contexts like Italy, where the ecosystem fragmentation limits growth.
4. Investigate how ROT processes (e.g., tie bundling) and EE elements (e.g., policy support) moderate network-outcome links.

Methodology. This study employs a mixed-methods design, combining quantitative Social Network Analysis (SNA) with qualitative insights, and compare two Italian accelerators operating in the fashion technology ecosystem: a nascent local program (year-1, regional focus) and a mature global edition (6th cohort, international partnerships, cross-industry scope). Purposive sampling targets about 3000 startups mapped and scouted via the accelerators from 2019 to 2025.

Primary data were collected from digital trace sources (e.g. CRM tools) and accelerator databases documenting startup participation in each cohort. Social network analysis methods provide the quantitative tools necessary to examine these relationships (Borgatti et al, 2013; Ozman et al., 2018; Hallen et al., 2020). Startups reported their ties to alters — including mentors, peers, and investors — along multiple dimensions, such as existence, strength, and type. This allowed the measurement of network metrics like degree centrality, betweenness centrality, and clustering coefficients. In this study, we observed the following metrics:

- Degree Centrality: Number of direct ties per ego.
- Betweenness Centrality or brokerage: Brokerage positions bridging clusters.
- Clustering Coefficient: Subgroup cohesion.
- Density: Overall tie proportion (comparing local vs. global ecosystems).
- Structural holes: Identifying where connections between universities and the market are lacking is essential for suggesting intervention policies.
- Small-World Properties: Path length and clustering ratio.

Following SNA, comparative case studies complement statistical elaborations. In-depth interviews selected for representativeness (n=20; 10 per accelerator, including founders, mentors) explore tie formation processes, using thematic analysis (Braun & Clarke, 2006) in NVivo, informed by open innovation frameworks (Chesbrough, 2020).

Expected Results. Based on theoretical propositions and preliminary data from two Italian accelerators operating in the fashion-tech ecosystem, the study anticipates distinct network structures by maturity and heterogeneity, with implications for innovation dynamics and network relationships.

Specifically, preliminary results revealed structural differences in terms of degree of centrality and brokerage. Mature global accelerators exhibit higher average degree of centrality driven by international mentors and alumni. We expect a higher degree of betweenness in global programs, positioning accelerated startups as brokers in diverse technological clusters. Thanks to its maturity, the global program has bridges to reach different markets, thus startups are not constrained in terms of end users of their technological solutions. On the contrary, the local-young accelerator will act as a concentrator. Having a geographically limited network, its value will be to close ranks around the startup, protecting it, but potentially limiting its global scope and reach.

We also expect differences in terms of clustering and density. Local- young program shows lower clustering due to nascent ties, but higher homophily (sector-specific, e.g., fashion knitwear). Global density is higher, fostering efficiency. In terms of tie strength, weak ties dominate global networks, enhancing exploration, while local emphasizes strong ties for trust-building among stakeholders. On resiliency, while mature accelerator leverage on diversification, young-local leverage on cohesion and intra-supply chain relationships.

Regarding innovation outcomes, we expect that maturity operates as an amplifier. Global programs accelerate open innovation via brokerage (e.g., international funding links), while locals foster incremental gains in regional supply chains. If a key investor leaves, the network is extremely fragile, unless the accelerator allows it to quickly pivot to new funding models. Nevertheless, EE integration reveals local programs' strength in cultural cohesion but vulnerability to institutional gaps (e.g., funding access).

Research limitations. While the Social Network Analysis (SNA) methodology provides rigor, we recognize several limitations linked to the unit of analysis and the generalizability of results. The focus on two Italian accelerators limits extrapolation to non-European contexts or non-tech sectors. Also, Italy's regional fragmentation may overstate local challenges. Future studies could expand to firms or comparative US or Asian cases.

In terms of methodological constraints, SNA's static snapshots overlook temporal dynamics (e.g., tie evolution over cohorts). Qualitative interviews provide depth, but self-reported ties risk recall bias, potentially inflating strong ties in local networks (Krishnan & Krishna, 2024).

Originality: Accelerators are pivotal in fostering startup scaling, regional venture spillovers, and ecosystem vitality, yet understanding their network driven dynamics is essential for optimizing innovation support. This extended abstract proposes a novel network theory application to Italian accelerator ecosystems, promising structural insights into maturity's role in open innovation. By addressing gaps through mixed methods, the research advances theory and practice, equipping stakeholders to forge scalable networks amid global challenges.

This paper's originality stems from its comparative application of network theory to accelerator maturity in homogeneous context, filling a methodological and empirical gap. Unlike descriptive studies which predominates EE literature (Pauwels et al., 2016; Guijarro-García et al, 2019; Hausberg & Korreck, 2020), it integrates SNA metrics. Moreover, the maturity lens addresses call for structural comparisons, examining how accelerator networks evolve across local and global contexts and maturity (Blair et al., 2020; Hallen et al., 2020). Recent studies applying advanced network metrics demonstrate how tie strength and structural holes interact to influence radical innovation (Liu et al., 2025; Zhang et al., 2025), highlighting the continuing relevance of structural network theories beyond classical formulations (Burt, 2004).

We contribute to theoretical advancement in the ecosystem maturity model in startup ecosystems by quantifying tie-mediated flows and hypothesizing maturity as a moderator, but with a novel focus on accelerators as units of analysis rather than purposively selected startups.

Managerial Implications. The findings offer actionable implications for accelerator managers, startup founders, policymakers, and investors in Italy and beyond, emphasizing network optimization for innovation and scaling.

For example, to accelerator managers, we suggest to nascent local programs to prioritize strong-tie building (e.g., regional SME partnerships) to boost clustering. Conversely, mature global editions must leverage brokerage and increasing centrality by involving alumni and mentors via investment in digital platforms.

Startup founders should prioritize strategic tie selection. Those participating in local programs should focus on strong ties for validation and benefitting mostly from emulating supply chain openness to build networks, targeting supplier ties for rapid capability gains under resource constraints. In global accelerators, startups can cultivate weak ties for funding. Founders should aim for brokerage roles, diversifying sectors to exploit structural holes and potentially doubling partnerships.

These implications highlighting Italy's EE potential for hybrid models in developing and promoting open innovation, according to cultural cohesions and regional technology development. Also, findings will illuminate patterns in network formation, innovation facilitation, and comparative insights, laying groundwork for targeted ecosystem enhancement.

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Perceptions of Electronic Health Record within digital health services ecosystem and the role of Artificial Intelligence

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Abstract. *This ongoing work investigates how citizens engage with digital health services and how these tools support the management of prevention, diagnosis, treatment and monitoring. The study explores the role of the Italian Electronic Health Record (EHR) within this evolving ecosystem, comparing its perceived value with privately offered digital health platforms. A qualitative exploratory approach based on focus groups was adopted to identify expectations, barriers and drivers influencing adoption. The analysis generated preliminary thematic categories and highlighted areas that require further empirical testing. Emerging insights suggest patterns of perceived utility, usability gaps, trust dynamics and differing attitudes toward AI-enabled functionalities. Although digital services are appreciated for their functional usefulness, the quest for informational autonomy frequently induces uncertainty and cognitive burden. This ongoing study aims at contributing to a deeper understanding of patient–technology interaction in digital healthcare ecosystems, providing the conceptual groundwork for future quantitative investigations and for the development of user-centred digital health strategies.*
Keywords: *digital health, electronic health record, artificial intelligence, patient-centered care, service delivery, focus group*

Framing of the research. *The increasing digitalization of health services (eHealth), combined with the progressive introduction of Artificial Intelligence (AI) based systems, is reshaping the healthcare ecosystem by redefining roles, processes and ways of interaction between patients and healthcare professionals. Osei-Frimpong et al. (2018) show that access to online health information prior to the consultation with their doctor can be associated with more active patient engagement during the clinical encounter, supporting interaction and participation in shared decision-making processes (Tursunbayeva and Renkema 2023). In this way, patients take an increasingly active role in their care pathway by using digital tools to obtain information, monitor their health status and communicate with professionals across different touchpoints. However, McColl-Kennedy et al. (2025) highlight that the introduction of a digital touchpoint alone is not sufficient to automatically generate effects on patient engagement. The literature on patient journey also highlights that the experience is never linear but is characterized by different expectations, emotions and needs (Lemon and Verhoef 2016; Davies et al. 2023). In fact, the way in which the eHealth ecosystem is designed and the context in which it is delivered can affect the methods of use, the degree of integration and the perceived usefulness of users (Swan et al. 2024; McColl-Kennedy et al. 2025).*

The entry into force of the European Health Data Space (EHDS) aims to promote the creation of public infrastructures that improve access to health information and strengthen the role of citizens in managing their own data. In Italy, the EHR represents the main institutional access point to the healthcare system, designed to collect and make available the patient's documentation. It also includes a personal notebook that allows citizens to independently record information related to their health, following the logic of co-participation in service delivery and co-production of data. The EHR represents one of the new digital touchpoints that can contribute to reconfiguring the interaction between patients and healthcare professionals, including the way the clinical encounter with the doctor is prepared and experienced. Despite the strategic role attributed to the EHR, usage data collected in Italy between April and June 2025 and available on the website of the Ministry of Health show low levels of adoption, with significant variations across regional macro-areas (north-west 29%, north-east 56%, centre 11%, south 11% and islands 9%). Only 26% of Italian citizens have consulted their EHR at least once. These access levels suggest a perceived gap between the institutional role attributed to the platform and its actual use by citizens (Cascini 2025).

Literature on technology acceptance suggests that perceived usefulness and perceived ease of use are central dimensions in adoption decisions. In the present study we want to preliminarily investigate whether these constructs emerge as meaningful areas to be explored in the narratives of the participants (Davis 1989; Venkatesh et al. 2003). Similarly, literature on the servicescape (Bitner 1992; Gallan et al. 2013) demonstrates how the integration of physical and digital elements can affect patient perceptions and behaviors, helping to support greater trust and satisfaction. Moreover, studies on patient portals show that the mere availability of a platform does not necessarily coincide with its actual use (Hoogenbosch et al. 2018; Portz et al. 2019). Understanding the ways in which citizens compare the EHR with other digital services already used, assessing whether it is perceived mainly as complementary or substitutive, helps to describe the behavior of users according to the role attributed to the tool in relation to the eHealth ecosystem.

Finally, a further dimension to consider is the role of AI. European data indicate that its diffusion in the healthcare context is mainly focused on clinical diagnostic tools rather than conversational or patient support chatbots (WHO 2025),

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highlighting an imbalance towards back-office interventions compared to its implementation within more relationship-oriented touchpoints. This asymmetry is consistent with the literature showing that many applications are still linked to favoring efficiency dynamics aimed at optimizing workflows and simplifying decision support processes (Eke and Shuib 2025). Literature suggests that the explainability of AI systems can increase trust and improve acceptance. In addition, patient engagement literature emphasizes that the perception of control and trust is critical for activation and informed participation. However, it is still necessary to investigate whether perceptions of the role of AI may change in relation to the role attributed to different digital tools (Hibbard et al. 2004; Osei-Frimpong et al. 2018; Hou et al. 2024).

Purpose of the paper. *The study conducts an exploratory analysis of perceptions of EHR in relation to the broader ecosystem of digital health services (eHealth ecosystem) in supporting the management of personal healthcare pathway. The aim is to describe the role attributed to the various eHealth tools used and known to participants, with a view to understanding whether the prevailing consensus regards the FSE as a complementary platform or as a tool with alternative functionalities within the ecosystem. Subsequently, the study focuses on the reasons given by participants when describing their choice to use private solutions rather than the public tool. Finally, we explore perceptions regarding the integration of AI into the eHealth ecosystem to observe whether positive or negative attitudes towards AI are consistent with the role attributed to the tool. To pursue these objectives, the study is structured around the following three main research questions:*

RQ1. How do citizens describe the role of the eHealth services ecosystem within their care pathway?
RQ2. What role do participants attribute to the EHR and how does it compare with the other eHealth services used?
RQ3. How is the perceived AI role within eHealth ecosystem?

Methodology. *The research adopts a qualitative exploratory approach, taking a realist-interpretative perspective, to investigate the perceptions reported by participants as an expression of concrete experiences rooted in their daily lives. This orientation is in line with the definition of experiential approach proposed by Braun and Clarke (2006). Consistent with this perspective, in the present study the Technology Acceptance Model (TAM) has not been used as a priori deductive framework but only recalled in the interpretative phase (Davis 1989).*
Data collection took place through online focus groups, preceded by a screening questionnaire. The survey was distributed using various online platforms, with Prolific being specifically chosen for its ability to provide a reliable, diverse and highly profiled panel of respondents. This feature was essential for carrying out targeted and rigorous sampling, enabling us to select the most suitable profiles and enhancing the heterogeneity of the focus groups (Brachten et al. 2021; Tomaino et al. 2023). All participants provided informed consent before starting the questionnaire. Confidentiality and voluntary participation were guaranteed throughout the process.

The pre-screening questionnaire focused on the measurement of digital literacy, use of eHealth services, knowledge and use of the EHR, perceptions and difficulties related to digital services and the hourly availability for participation in the focus group. The inclusion criteria established a priori and consistent with the objectives of the study, required that participants: (i) used or had used eHealth services, (ii) knew but not necessarily had used the EHR, (iii) had provided availability for at least one of the time slots provided by the focus group. Furthermore, in line with Berger (2015), it was decided not to include health professionals in the focus group, as this could have introduced an asymmetry capable of influencing the responses of the participants.

Overall, the pre-screening questionnaire collected a total of 31 responses. The average level of digital literacy, measured on a 7-point Likert scale, was in the upper-middle range (mean: 5.76). The application of the exclusion criteria identified 13 eligible participants. Table 1 presents the frequency percentages of the socio-demographic variables of the overall sample in a structured format. Values indicated as 'N/A' correspond to respondents for whom it was not possible to collect socio-demographic information, as they were excluded at the preliminary stage for failing to meet the inclusion criteria relating to the use of digital services or knowledge of the EHR (n=7 for criterion i; n=5 for criterion ii), or because they did not provide consent to the processing of personal data (n=2). However, the frequencies do include respondents who did not meet only the criteria relating to time availability (criterion iii; n=3), for whom the questionnaire had still recorded the necessary socio-demographic information. Consequently, the specific demographic metrics described below refer to the group of 17 respondents. Within this group, the average age is 39 years (median: 32; range: 20–65 years). The gender distribution is balanced, with an equal percentage of males and females (47.06%) and a minimal share of participants who selected "I prefer not to answer".

Two focus groups were organized between February and March 2026, consisting of six participants each and lasting about 90 minutes. The meetings took place via the Microsoft Teams platform. The choice of online format is consistent with Stewart and Shamdasani (2017), which recognizes how these methods guarantee quality compatible with face-to-face meetings, offering logistical flexibility. The focus groups were moderated by one of the members of the research team, with a background in marketing. The discussion was conducted following a protocol that defined the themes and guiding questions for the focus group. The meetings were recorded with the consent of the participants and transcribed separately by the two researchers, to reduce the risk of omissions and allow a comparison between the transcripts.

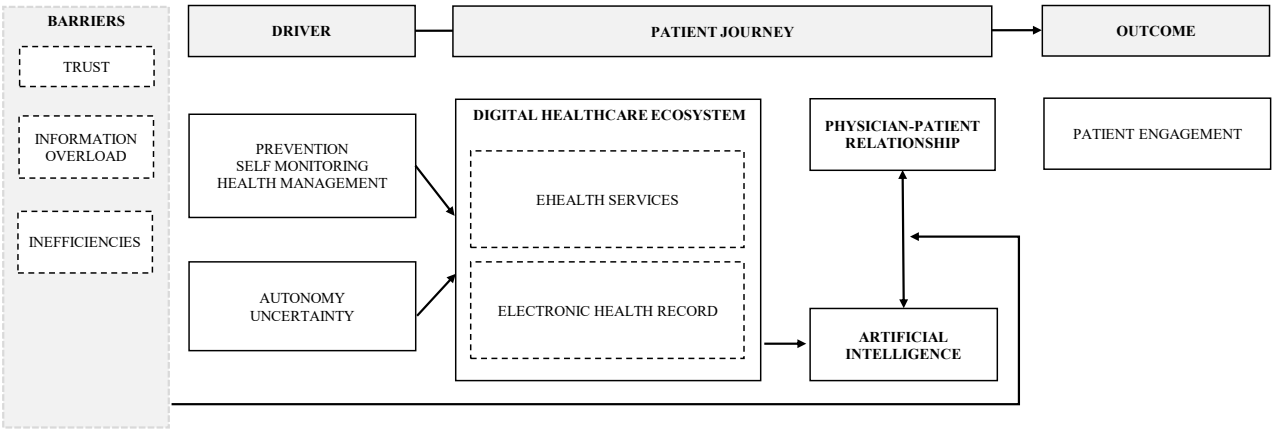
Tab. 1: General profile of the sample collected in the pre-screening phase

General sample profile (n=31)			
Gender	**Freq. % (n)**	**Education**	**Freq. % (n)**
N/A	46.67% (14)	N/A	45.16% (14)
Female	25.81% (8)	Master's degree (or single-cycle specialist degree)	35.48% (11)
Male	25.81% (8)	Postgraduate diploma	9.68% (3)
I prefer not to answer	3.23% (1)	High school diploma or equivalent	6.45% (2)
Age	**Years (n)**	Bachelor's degree	3.23% (1)
Mean	39.00 (17)	**Employment**	**Freq. % (n)**
Median	32.00 (17)	N/A	45.16% (14)
Consent	**Freq. % (n)**	Self-employed	12.90% (4)
Yes	93.55% (29)	Employee in private company	12.90% (4)
No	6.45% (2)	Student	9.68% (3)
Willingness to participate	**Freq. % (n)**	Employee in a public company	9.68% (3)
N/A	45.16% (14)	Not employed, looking for employment	6.45% (2)
Yes	45.16% (14)	Retired	3.33% (1)
No	9.68% (3)	**Residence**	**Freq. % (n)**
Use of eHealth services	**Freq. % (n)**	N/A	45.16% (14)
N/A	6.45% (2)	North-Eastern Italy	25.81% (8)
Yes	70.97% (22)	Central Italy	16.13% (5)
No	22.58 % (7)	North-Western Italy	6.45% (2)
EHR Knowledge	**Freq. % (n)**	Southern Italy	3.23% (1)
N/A	29.03% (9)	Insular Italy	3.23% (1)
Yes	54.84% (17)		
No	16.13% (5)		

Data were analyzed by Thematic Analysis (TA) following the six steps described by Braun and Clarke (2006). This method was chosen for its theoretical flexibility and for its adequacy in identifying recurring patterns within a qualitative dataset. The coding was mainly conducted inductively and semantically, privileging the explicit meaning of the participants' statements, in line with a realist perspective and following the principles of Gioia et al. (2013) methodology. The relevance of the topics was evaluated in relation to its ability to contribute to the understanding of research questions. In line with Berger (2015), the researchers explained their theoretical backgrounds and their positions, which were monitored through moments of cross-review of the codes and critical discussion to avoid overinterpretations consistent with their initial theoretical expectations. Following Finlay (2002), reflexivity was understood as a continuous practice during the analysis phases. Coding decisions were discussed to verify that the interpretations were indeed rooted in the participants' accounts and not the result of overinterpretations driven by the researchers' backgrounds.

Results. *The analysis of the extracts and codes identified from the two focus groups made it possible to identify a series of recurring themes relating to the ways in which patients relate to digital health services and the Electronic Health Record. Two main drivers were identified in the discussions that motivate patients to use digital tools for managing their health. At the same time, participants highlighted structural features and barriers of the system that could influence its adoption. The concepts that emerged are summarized in the interpretative framework presented in Figure 1.*

Fig. 1: Interpretative framework (Source: authors' own elaboration)



Participants' journey through digital healthcare generally begins with a desire for greater control over information. Internet and digital platforms represent a parallel access point to understand symptoms or which clinical path to follow, in support of the doctor's consultation:

> *"If I find myself in a situation where I need medical advice, maybe first I rely on a doctor, but the second opinion, if we can call it like that, I go and find it online. I try maybe to ask for information from artificial intelligence or forums, things like that." (P10)*
>
> *"I feel safer, because the research I am going to do is a side search." (P08)*

However, this information autonomy generates a strong sense of uncertainty. The assortment of authoritative information sources creates confusion and cognitive overload. Participants seek online confirmation to manage anxiety but often end up increasing their disorientation:

> *"I look for everything, even the specific, even the most complex things. However, I try to understand them, I try to check what other people's experiences have been" (P09)*
>
> *"Very often we are also uninformed when we go to find information online, because in the end anyone can potentially pass themselves off as an expert, professor." (P10)*

A second driver for the adoption of digital health tools that emerged from the analysis of user experiences concerns self-monitoring. Attention to this aspect is not limited to moments of illness but is integrated into daily habits:

> *"Prevention becomes fundamental [...] can [referring to digital health tools] guide me in prevention quite precisely." (P01)*
>
> *"There is also the diet: what I eat. However, I try to eat healthily, so foods such as vegetables and fruit, avoiding foods that are too processed." (P02)*

The tendency to monitor one's parameters can become more systematic with advancing age or with the increase in personal awareness:

> *"I'm not saying that attention to my health is an obsession, but certainly in recent months I have greatly expanded everything, that is the monitoring of my health conditions in many respects [...] In my case, the monitoring was not constant, as I have already said. In the sense that it was absent until a few years ago. I have imposed it on myself in recent years." (P03)*
>
> *"I became interested in health only in the last period I began to think about the consequences of some of my addictions [show cigarettes] [...] I have been aware of this for some time now and I am trying to eliminate this type of addiction" (P04)*

Citizens attribute eHealth services to a predominantly functional role in responding to these needs. The eHealth ecosystem is evaluated positively when it guarantees convenience and simplification. Digital services have a positive value when they reduce waiting times, streamline bureaucracy and allow immediate and shareable management of clinical information:

> *"Now they have implemented the function whereby you can book directly from the online counter without going to the physical counter. This is very convenient because it speeds up so many processes." (P10)*
>
> *"Digital Experience is mainly limited to downloading the results of the analyses, then the reports that are online using your credentials." (P01)*

Within this ecosystem, the EHR plays a different role. The data confirms that the EHR is mainly used from a passive perspective. Participants consider it a simple archive dedicated to the preservation of reports and describe a limited use in time:

> *"My use is a very marginal and episodic use [referring to EHR]. So, at the moment there is no systematic use of the tool." (P03)*
>
> *"In addition, I found the possibility of having the vaccination record updated very convenient. [referring to EHR]" (P11)*

The experience also focuses on consultation. The current system configuration does not facilitate the continuous integration of data and limits its systemic role within a proactive care pathway. The digital experience of users is hindered by structural limitations of the national health system. The regional fragmentation of different platforms, functionalities and the complexity of interfaces generate frustration. The demand for autonomy imposed by digital services often turns into a burden that disorients the user:

> *"Autonomy, that is, being totally abandoned, allows me the term, having to juggle alone, perhaps even in areas where one does not know." (P08)*
>
> *"The regional platform [referring to EHR] that manages the whole booking discourse does not work." (P03)*
>
> *"If a person does not trust the health system, they will hardly be motivated to download an application that allows them to manage or view their health data. […] There is a certain prejudice against Italian healthcare, which is often described as very inefficient." (P06)*

The digital divide itself as a problem related to skills and age:

> *"[referring to EHR] there could also be a problem, in quotes, related to a large portion of the population, i.e. older people. In my opinion, it is difficult to ask, for example, an eighty-year-old person to use an application of this type." (P06)*
>
> *"If, as P06 said, some of us have reported difficulties in using these tools [referring to EHR], despite the fact that I spend practically the whole day using technologies of this type, let alone the people P06 referred to. So,*

in addition to making these tools work well, you also need to understand if they are really within everyone's reach or not." (P03)

The lack of knowledge regarding advanced functionalities of the EHR highlights a lack of institutional communication. The patient notebook is only one of many clear examples of this inefficiency making it perceived as impractical:

"Honestly, I didn't know the notebook. In fact, even when you mentioned it earlier, it seemed interesting to me and I immediately went to look for some information." (P04)

Perceptions of AI in digital healthcare services are twofold. Users recognize technology's potential but express concerns regarding privacy protection. AI is seen as a useful solution for simplifying navigation within portals:

"If by artificial intelligence we mean, for example, a chatbot that helps me better understand the tool I have available, then I embrace it without problems." (P04)

"I think it could support general practitioners, who often have a very large number of patients. Support of this type could speed up diagnoses and also help in reading reports." (P05)

Concerns arise in relation to decision-making autonomy and sensitive data. Users require the maintenance of strict human oversight over the diagnosis processes:

"In my opinion, it must be reiterated that artificial intelligence is not completely objective." (P06)

"As for the current use of data through artificial intelligence, I would be in favor of this taking place on input from the doctor or patient and not through massive use of data." (P03)

Excessive digitization risks isolating the user. This dichotomy highlights the limits of purely technological autonomy and the danger of distancing oneself from the care system:

"More autonomy for sure, because everything is much easier. […] [referring to digital health services] perhaps disconnects us from what is the human side and that interaction that we would have with the doctor and therefore could lead to distrust. In my opinion, this is the step." (P10)

Finally, citizens are asking for technology to facilitate the therapeutic relationship without ever interrupting it. When digital tools cause overload or distance, their perceived value inevitably collapses:

"That is, bookings, the online electronic file, all these now digital tools, rather than being substitute tools for our doctor, in my opinion they should be a bridge of communication." (P08)

In summary, the results of the thematic analysis highlight an ecosystem of digital health services in which new forms of autonomy and health management coexist with structural limits and barriers of use, helping to configure hybrid interaction between patients, digital technologies and health professionals.

Research limitations. *This study has some limitations. Firstly, the research is based on a small qualitative sample, so the results cannot be considered representative of the general population. The exploratory nature of the paper is aimed at generating initial evidence that can be deepened in subsequent works. Secondly, data collection took place through online focus groups, an approach that may limit the observation of non-verbal cues present in face-to-face interactions (Stewart and Shamdasani 2017). In addition, the study focuses on the Italian context and perceptions related to the EHR. Therefore, the results should be further explored in different contexts and through complementary research methods. Finally, as explained in Finlay (2002) and in Braun and Clarke (2006), although cross-checking and critical discussion were employed, the processes of coding and identifying themes reflect, to some extent, the researchers' interpretative choices.*

Managerial implications. *The eHealth ecosystem must be designed with a view to facilitating and not replacing human contact. Users want to manage their health independently but need constant guidance so as not to feel abandoned. When developing a new digital channel, policymakers must structure the way in which information is presented to citizens in a manner consistent with other channels and appropriately modulated, to avoid cognitive overload for the patient. Currently, individual healthcare platforms are more effective than the Electronic Health Record as they address specific needs and offer features that are easily understandable.*

It is necessary to carry out targeted institutional communication efforts to redefine the role of the Electronic Health Record. Although the system was originally designed to compile a patient's medical history and actively support them, it is now perceived merely as an archive and is therefore used solely in a passive way. Furthermore, the fragmentation of the various regional platforms prevents the adoption of a common language and interface capable of integrating notification systems, reminders and functions for collecting data from wearable devices. The development of a shared national platform is necessary to effectively guide patients.

Finally, Artificial Intelligence is primarily seen as an opportunity, but it triggers resistance linked to privacy and the delegation of decision-making. Healthcare managers must direct investment towards optimizing administrative procedures, providing proper patient guidance via virtual assistants and utilizing alert systems to flag clinical anomalies. Decision-makers must avoid proposing systems designed to provide clinical advice or to replace the doctor. This approach is perceived by patients as ineffective and triggers strong resistance. Acceptance of such automated tools occurs only in extreme cases, namely when the patient's pre-existing distrust of medical staff outweighs their concerns regarding the protection of their personal data.

Originality of the paper. *The originality of this study lies in its qualitative exploration of the Italian digital healthcare ecosystem through the combined lens of technological acceptance models and the patient journey. It investigates not only*

how the tool is used, but also the relational, emotional and cognitive dynamics underlying its adoption. The research introduces the "paradox of autonomy" concept, demonstrating how excessive and poorly implemented digitalization can isolate the patient, generating mistrust towards the entire healthcare system.

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Preparing the Competitive Ground: Overlap in Knowledge Activities and Technological Entry

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Abstract. *Technological competition increasingly unfolds in the knowledge arena, where firms position themselves through patenting rather than direct market confrontation. In this context, technological entry serves as a central mechanism of exploratory search. Building on research that extends multimarket competition to knowledge-based rivalry, we conceptualize multi-country overlap in knowledge activities, defined as the extent to which a focal firm and its rivals patent in the same national jurisdictions, as a form of multipoint contact in technological competition, and we examine how it shapes firms' technological entry decisions. We distinguish between entry into technological domains that are new to the focal firm but already established by rivals and entry into unexplored domains that are new to both the focal firm and its rivals. Drawing on the logic underlying the mutual forbearance hypothesis, we examine whether repeated contact with the same rivals across national patent jurisdictions restrains technological entry when competition unfolds through anticipatory knowledge positioning rather than product market competition. Using an original panel of 1,619 firm-year observations from the woodworking machinery industry, we find that greater multi-country overlap is associated with higher entry intensity along both dimensions, with a stronger effect for entry into unexplored domains. These findings show that, in technological competition, multipoint contact can stimulate both technological convergence and differentiation, providing support for the mutual forbearance hypothesis when the competitive battlefield is the technological arena.*
Keywords: *Technological Competition; Multimarket Competition; Mutual-Forbearance Hypothesis; Technological Entry; Exploratory Search*

Framing of the research. In today's highly dynamic and competitive environments, an increasing share of rivalry has shifted to the technological arena, where firms compete by shaping, defending, and expanding their technological positions across overlapping domains (Arts et al., 2023; Yan et al., 2020; Xia et al., 2025). In this context, patenting has become a central strategic instrument through which firms engage in technological competition (Leten et al., 2016). The logic of rivalry in this arena differs from that of product markets, where competitive actions are typically conceived as direct attacks on rivals' positions (Bloom et al., 2013; Smith et al., 2005). Instead, patenting represents a strategic commitment to technological trajectories that allows firms to stake claims, preserve freedom to operate, and position themselves for potential future confrontation (Clarkson & Toh, 2010; Mihm et al., 2015). Patenting decisions shape the technological landscape on which future rivalry may play out by influencing technological positions and subsequent competitive options (Hong, 2024). Through patenting, firms expand the option set for subsequent product launches and secure bargaining power in anticipation of rivalry that materialize later in downstream markets (Cappelli et al., 2023; Gaessler et al., 2025).

Within this setting, technological exploration—the search for novel technological opportunities—is central to firms' ability to adapt and renew their knowledge bases under competitive pressure (Cattani, 2005; Rosenkopf & Nerkar, 2001). A key mechanism of such exploration is technological entry, defined as the firm's entry into a technological domain in which it has not previously been active (Malerba & Orsenigo, 1999). Technological entry enables firms to reposition their technological portfolios and respond to evolving competitive conditions. Understanding how firms organize technological entry in response to rivalry is therefore critical. We conceptualize this phenomenon as "setting the stage for the battle" in the technological arena—that is, firms configuring their technological search before direct market confrontation unfolds. Despite its importance, the analysis of the antecedents of technological entry (Candiani et al., 2022; Chuang et al., 2023; Stagni et al., 2021) remains a fertile area for further research, particularly under conditions of overlapping knowledge activities among competitors.

Prior research has proposed several approaches to understand how rivalry under technological competition shapes firms' exploration through entry decisions (Anand et al., 2009; Hsu & Cohen, 2022). A prominent line of work focuses on multimarket competition, conceptualizing rivalry as repeated interactions with the same competitors across multiple arenas (Yu & Cannella, 2013). The mutual forbearance hypothesis has been the dominant explanation in this literature, suggesting that firms sharing multiple competitive footholds tend to moderate aggressive behavior because actions in one arena may trigger retaliation in others (Giachetti et al., 2024; Korn & Baum, 1999). While mutual forbearance has been shown to explain a variety of market outcomes (Baum & Korn, 1996; Fuentelsaz & Gomez, 2006; Young et al., 2000), empirical evidence is mixed, and its applicability appears contingent on the type of competitive action and contextual

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conditions (Giachetti et al., 2025; Theeke & Lee, 2017; Ryu et al., 2020). The implications of the mutual forbearance hypothesis when rivalry takes place fully through technological competition remain an open space for further inquiry. This study addresses this gap.

Purpose of the paper. Building on recent work that extends the notion of multipoint contact to competition for knowledge-based resources (Berry, 2020; Berry & Donnelly, 2025), we conceptualize multi-country overlap in knowledge activities, captured by shared patent jurisdictions, as a key mechanism of competitive interdependence in technological competition. Because firms' decisions about where to protect and enforce intellectual property reflect strategic considerations about current and anticipated rivalry, shared patenting locations provide a meaningful indicator of overlapping competitive exposure (An et al., 2025; Lanjouw et al., 1998). Against this background, we examine whether the logic underlying the mutual forbearance hypothesis extends to rivalry that unfolds primarily within the technological arena and how cross-domain rivalry shapes firms' technological entry decisions. We therefore formalize the following research question: How does a firm's multi-country overlap in knowledge activities with its rivals relate to the type and intensity of technological entry?

Technological entry represents a central competitive response in knowledge-based rivalry. When expanding their technological assets, firms choose whether to enter technological domains already developed and protected by rivals but in which the focal firm has not been active yet, or to explore domains that are new to both the focal firm and its competitors, as reflected in their patenting activities. Drawing on Rosenkopf and Nerkar's (2001) typology of exploratory search, we distinguish between entry into rivals' domains and entry into unexplored domains. The former involves convergence toward technological areas where the focal firm has not been active, but rivals are already established, whereas the latter reflects exploration beyond existing organizational and industry trajectories (Cattani, 2005; Lee et al., 2024). We argue that greater multi-country overlap intensifies both forms of technological entry, with a stronger effect for entry into unexplored domains.

Methodology. The final sample comprises 1,619 firm-year observations in an unbalanced longitudinal panel covering 118 companies and more than 10,000 inventions across more than 400 technological areas and 50 patent jurisdictions from 2005 to 2022, resulting in an original dataset that combines organizational patent data, financial, and bibliographic information. Given the longitudinal structure of the data and the count nature of both dependent variables, with a large mass at zero and substantial firm-level heterogeneity over time, we estimate random effects Negative Binomial models. This choice follows two considerations. First, the distributions of the outcomes are inconsistent with the equidispersion implied by Poisson models: variance to mean ratios are well above one, Poisson goodness of fit tests reject the implied variance restriction, and unexplored entry is characterized by a prevalence of zeros. A Poisson specification would therefore impose an overly restrictive variance structure and mechanically understate uncertainty. We accordingly adopt the Negative Binomial formulation. Second, repeated observations within firms likely share persistent, time-invariant unobservables that shape entry intensity. A random effects structure captures firm-specific heterogeneity while retaining the ability to estimate time-invariant characteristics and to exploit both within-firm and between-firm variation. The comparison against a pooled alternative supports non-negligible panel-level heterogeneity. Because coefficients from nonlinear count models are not directly interpretable as changes in expected counts, we summarize results using Average Marginal Effects (AMEs), which express magnitudes on a relevant scale and facilitate comparisons across specifications and across the two dependent variables (Long & Mustillo, 2018). To align inference with this scale of interpretation and account for within-firm dependence, we computed bootstrap standard errors and confidence intervals for the sample AMEs using a firm-clustered bootstrap with 1,000 replications.

To test whether the focal effect differs in magnitude across the two entry outcomes, we estimate a stacked Negative Binomial regression that pools the two outcomes within a single model and allows the effect of Multi Country Overlap in Knowledge Activities to vary across outcomes. This approach is necessary because it keeps the conditioning set, timing, and distributional assumptions identical across outcomes, produces outcome-specific sample AMEs from the same estimated model, and enables a direct formal test of whether the two marginal effects differ rather than relying on informal comparisons across separate regressions.

Results. Our study examines whether the mutual forbearance hypothesis holds when rivalry occurs in the technological arena. We conceptualize multi-country overlap in knowledge activities as firms' repeated encounters across patent jurisdictions, and we link this form of competitive interdependence to technological entry, distinguishing between entry into domains that are new to the focal firm but already established by rivals and entry into domains that are unexplored. In our longitudinal analysis in the woodworking machinery industry, multi-country overlap in patent jurisdictions systematically coincides with higher entry intensity along both exploratory paths. Altogether, the main and additional analyses, as well as the robustness checks, provide strong support for the main findings that not only technological search targeted at rivals' technological domains is associated with higher subsequent entry, but also entry directed toward pristine technological trajectories. Moreover, the latter appears particularly responsive, with a systematically larger magnitude when competition across the same patenting countries intensifies, supporting the mutual forbearance hypothesis as a benchmark mechanism in technological competition. This implies that, when competitive stakes are shaped by anticipatory knowledge positioning rather than immediate product market attacks, multipoint contact does not translate into a broad restraint on technological search. Instead, overlap is associated with heightened exploratory activity: firms

both move toward rivals' established technological domains and expand into previously unexplored domains. Importantly, the relationship is systematically stronger for entry into domains that are new to both sides, making the connection to mutual forbearance explicit: repeated encounters across jurisdictions may increase firms' awareness of their mutual exposure and of the risk of costly retaliation through patent opposition, enforcement, or litigation, thereby encouraging exploratory expansion into less contested technological space rather than concentrating entry primarily in rivals' established areas.

Research limitations. The analysis focuses on a single industry, the woodworking machinery sector. While this setting is original and well-suited for observing patent-based rivalry, it is also a mature context with distinctive competitive and industry life-cycle features that may shape how firms strategize and respond to rivals. Accordingly, the theoretical and managerial implications should be treated with caution in terms of generalizability. We encourage future work to replicate our arguments in settings with different technological regimes and appropriability conditions.

Second, our evidence relies on a long longitudinal panel, which inevitably raises issues of data availability and completeness, which are mirrored in modelling choices such as the inclusion of time invariant controls. We are working to expand the dataset and further improve completeness by integrating additional sources.

Third, our framework isolates rivalry in the technological arena, yet firms often coordinate upstream knowledge positioning with downstream product market competition (Xia et al., 2025). A fuller account would connect multi-country overlap and technological entry to market entry, product launches, and enforcement actions within a unified framework.

Finally, we acknowledge potential endogeneity concerns, as several constructs are derived from the patent record and may co-evolve with unobserved firm attributes. We mitigate this risk through lag structure, panel modeling, alternative empirical specifications, and timing and falsification tests. However, future versions of the work could strengthen identification by exploiting exogenous shocks to jurisdiction attractiveness or enforcement intensity.

Managerial implications. On the managerial side, our analysis highlights the importance of considering two strategically interrelated aspects of patent-based competition. The technological dimension captures where firms are building capabilities and which trajectories they are signalling and committing to, while the jurisdictional dimension captures where those efforts are being secured, monitored, and potentially contested (An et al., 2025; Hötte, 2023). Managing patent-based rivalry therefore requires aligning where the firm explores with where it seeks protection, because overlap across jurisdictions can both expand the information available from rivals and alter the intensity of competitive exposure, shaping whether exploration is more likely to converge on rivals' domains, differentiate into less contested spaces, or do both in parallel.

Originality of the paper. Our work advances several theoretical contributions at the intersection of competitive dynamics, with particular attention to the multipoint contact literature, and organizational search strategy, with a focus on exploratory technological search. Primarily, by reconnecting with a recent and emerging line of research that extends multipoint contact beyond product markets, we advance a knowledge-based account of multipoint rivalry centered on patent jurisdictions as arenas of interfirm rivalry (Berry, 2020; Berry and Connelly, 2025). Prior work has bridged multimarket contact and innovation-related outcomes and has begun to theorize multipoint rivalry in knowledge and technology settings (Hsu and Cohen, 2022; Ryan Charleton and Galavan, 2024; Ryu et al., 2020), yet, to the best of our knowledge, we are the first to develop and test a framework in which both the competitive stimulus and the focal response are technology based. By doing so, we show how a classic prediction such as the mutual forbearance hypothesis can translate, in the technological arena, into a relative restraint from head-to-head entry into rivals' established domains as rivalry unfolds across shared patent jurisdictions.

Second, we extend the discussion on exploratory search by theorizing and distinguishing two directions of technological entry that have typically been treated in an aggregated form. Although prior research has generated rich insights into exploratory search, it left room to further clarify how competitive interdependence relates to qualitatively distinct directions of technological entry and to the intensity with which firms pursue them (Stagni et al., 2021).

Finally, we propose a framework for technological competition in which rivalry is structured not only by overlap in technological domains but also by overlap across patent jurisdictions as distinct footholds where firms make costly commitments to protect and monitor knowledge. This line of inquiry increasingly recognizes that competition can shift upstream into knowledge activities, and it also invites further theorizing on how predictions about restraint and escalation translate when rivalry is not centered on product markets (Chuang et al., 2023). By moving the unit of overlap from product markets to patent jurisdictions and linking it to technological entry, we show how cross country interdependence shapes exploratory search in ways that differ from classic market-based rivalry, and we open a platform for future work to connect knowledge-based competition to other strategic responses in patent strategies, including enforcement, opposition, and litigation, as well as to downstream market outcomes.

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Sustainability Reporting as a Governance Template for Public Value Co-Creation Practices in Public Service Ecosystems

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Abstract. *Public administrations are increasingly required to address complex societal challenges—including sustainability transitions, digital transformation, and social inclusion—that extend beyond the boundaries of single organizations. Addressing such challenges requires governance approaches capable of coordinating heterogeneous actors and integrating diverse resources within complex public service ecosystems. In this context, sustainability reporting has progressively gained relevance as a mechanism through which public organizations communicate their environmental, social, and economic impacts. However, research has mainly conceptualized sustainability reporting as an instrument of transparency, accountability, stakeholder communication, and organizational learning (Adams & Larrinaga, 2019), while paying limited attention to how reporting frameworks interact with the governance practices through which public value is generated in public service ecosystems. Drawing on a practice-based perspective on public value creation, this paper conceptualizes sustainability reporting as an institutionalized template that interacts with public value co-creation practices within public service ecosystems. Building on the framework of public value co-creation practices (PVCPs) proposed by Skålén and Trischler (2025), public services are interpreted as bundles of practices composed of templates—intended configurations embedded in governance arrangements—and performances, representing the situated enactments of those configurations by actors within specific contexts. The study adopts a qualitative exploratory design based on semi-structured interviews with municipal actors managing sustainability reporting initiatives, focusing on two Italian cases selected to capture contrasting reporting orientations: the Sustainability Report of the Municipality of Udine and the "Bilancio POP" initiative of the Municipality of Messina. Documentary materials, including sustainability reports and institutional documents, are used as contextual sources to support the interpretation of interview evidence. The findings suggest that sustainability reporting operates not only as a disclosure instrument but also as a governance template that interacts with the practices through which sustainability initiatives are coordinated within public administrations. At the same time, the performance of reporting templates varies depending on the municipality's institutional context and governance orientation.*

By bridging sustainability reporting research with practice-based approaches to public value creation, the study contributes to the literature by examining how sustainability reporting templates interact with public value co-creation practices through their situated enactment. The results show that reporting templates may reinforce governance arrangements or be reinterpreted by public actors to address local governance priorities, highlighting the context-dependent relationship between institutionalized reporting frameworks and the practices through which sustainability governance is enacted within public service ecosystems.

Keywords: *sustainability reporting; public value; public service ecosystems; co-creation practices; governance innovation*

Framing of the research. Public administrations increasingly operate within complex socio-institutional environments characterized by interconnected societal challenges such as climate change, social inequality, and sustainable economic development. Addressing these challenges requires governance approaches capable of mobilizing diverse actors and coordinating collective action across institutional boundaries. In recent years, sustainability has progressively emerged as a central strategic orientation guiding the transformation of public organizations and their governance practices (Aleixo et al., 2018; Fissi et al., 2021; Lima et al., 2023).

In this context, sustainability reporting has gained growing relevance within the public sector. Traditionally, such reporting practices have been interpreted primarily as instruments of transparency and accountability aimed at communicating the environmental, social, and economic impacts of public organizations to stakeholders. Public administrations increasingly adopt structured reporting frameworks—such as the Global Reporting Initiative (GRI)—to disclose sustainability strategies, performance indicators, and policy outcomes. However, more recent debates in sustainability accounting and public management suggest that reporting processes may also perform internal and relational governance functions, supporting strategic alignment, organizational learning, performance improvement, and stakeholder engagement (Adams & Larrinaga, 2019; Osborne et al., 2022). This implies a shift from viewing sustainability reporting only as an external disclosure mechanism toward understanding it as a governance infrastructure that may shape how sustainability priorities are interpreted, coordinated, and enacted within public organizations. These developments reflect a broader transformation in public management scholarship from organization-centered perspectives toward more relational and ecosystem-oriented approaches to value creation. Recent theoretical developments emphasize that public value emerges through interactions among multiple actors—including public organizations, citizens, private firms, and civil society organizations—operating within interconnected governance systems (Benington & Moore, 2011; Osborne et al., 2022). Within this perspective, public administrations increasingly assume roles as facilitators, coordinators, and

orchestrators of collaborative processes that mobilize the knowledge, capabilities, and resources of diverse actors operating within complex governance networks (Benington & Moore, 2011; Osborne et al., 2022).

Within this shift, the concept of public service ecosystems (PSE) has gained increasing attention as a framework for understanding how value is generated through processes of resource integration across heterogeneous actors and institutional levels (Vargo & Lusch, 2016; Trischler & Charles, 2019). In such ecosystems, public organizations increasingly act as orchestrators that facilitate coordination among actors contributing to the generation of collective outcomes. Recent developments in service research further extend this perspective by introducing a practice-theoretical understanding of public services. According to Skålén and Trischler (2025), public services can be understood as bundles of public value co-creation practices (PVCPs). In this paper, public value co-creation practices are understood as relational configurations through which actors collectively define, negotiate, and enact sustainability-related value within the public service ecosystem. From this perspective, practices do not simply refer to internal organizational routines or administrative procedures, but to socially situated configurations of meanings, rules, resources, and actions through which public value is produced, negotiated, and sometimes contested.

These practices consist of two key components: templates, which represent the intended configurations of practices embedded in institutional arrangements, governance structures, and organizational routines; and performances, which correspond to the situated enactments of these configurations by actors in everyday governance processes. Importantly, it is through such performances that value outcomes ultimately emerge, potentially generating both value co-creation and value co-destruction depending on how actors interpret and enact the practices involved (Echeverri & Skålén, 2021). From this perspective, sustainability reporting can be interpreted not merely as a managerial tool but as an institutionalized template that interacts with public value co-creation practices within public service ecosystems. Reporting frameworks may therefore operate as templates that define intended governance arrangements—through sustainability priorities, indicators, and reporting structures—while their actual effects depend on how they are enacted through the situated performances of public actors.

Despite the growing relevance of practice-based perspectives in public service research, the role of sustainability reporting within these dynamics remains relatively underexplored. Most studies continue to focus on disclosure standards, reporting quality, and accountability mechanisms, leaving open the question of how reporting infrastructures interact with the practices through which public value is generated within governance ecosystems. In particular, limited attention has been paid to how sustainability reporting templates are translated into situated governance performances and how such performances may reinforce, adapt, or transform public value co-creation practices in specific local contexts. Investigating how sustainability reporting templates are interpreted and enacted through situated performances may therefore provide valuable insights into the mechanisms through which sustainability-oriented public value is co-created, negotiated, and occasionally co-destroyed within contemporary public service ecosystems. This represents the central theoretical gap addressed by the paper: while sustainability reporting and public value co-creation have been widely discussed as separate streams of research, their interaction within public service ecosystems remains insufficiently theorized.

Purpose of the paper. Building on these theoretical developments and on the research gap outlined above, this paper examines the interaction between sustainability reporting templates and public value co-creation practices within public service ecosystems, adopting a practice-based perspective on public value creation. Specifically, the study conceptualizes sustainability reporting as an institutionalized governance template interacting with public value co-creation practices within governance processes. Rather than merely documenting organizational outcomes, reporting systems may contribute to structuring governance processes by defining strategic priorities, codifying indicators, and articulating shared understandings of sustainability objectives. However, consistent with a practice-based perspective, the study does not assume a deterministic influence of reporting frameworks on governance practices. Instead, sustainability reporting is examined as a template that interacts with existing public value co-creation practices through their situated enactment within specific institutional contexts.

The purpose of the study is, therefore, to explore how sustainability reporting templates are interpreted, adapted, and performed within public service ecosystems. In particular, the study investigates how reporting frameworks and governance practices mutually shape one another through their everyday performances, potentially reinforcing, transforming, or leaving unchanged existing sustainability-oriented governance arrangements. The paper addresses the following research question: How do sustainability reporting templates interact with public value co-creation practices within public service ecosystems through their situated performances? To address this question, the study adopts a comparative case study approach focusing on two sustainability reporting initiatives implemented by Italian municipalities: the Sustainability Report of the Municipality of Udine and the "Bilancio POP" initiative of the Municipality of Messina. These cases provide an empirical setting for examining how contrasting reporting orientations—managerial monitoring and citizen-oriented communication—are enacted and how public actors interpret, adapt, or incorporate these templates into existing sustainability-related governance practices.

More specifically, the study aims to contribute to the emerging debate on governance infrastructures that support sustainability-oriented transformations within public administrations. While sustainability reporting has traditionally been examined primarily as an accountability and disclosure mechanism, its interaction with public value co-creation practices within public service ecosystems remains underexplored (Adams & Larrinaga, 2019; Osborne et al., 2022). By adopting a practice-based perspective, this study shifts the analytical focus from reporting outputs to the interactions between reporting frameworks and the practices through which sustainability governance is enacted. By conceptualizing reporting

systems as templates that shape how sustainability priorities are articulated and operationalized within public organizations, this study seeks to provide a new perspective on the managerial and governance functions of sustainability reporting within public service ecosystems. Furthermore, the paper aims to advance current discussions on public value creation by examining how governance instruments influence the practices through which public value is collectively generated. In this context, sustainability reporting is analysed not only as a managerial device but as a governance arrangement whose effects depend on its situated performance within local public service ecosystems.

Methodology. This study adopts a qualitative research design aimed at exploring the interaction between sustainability reporting templates and public value co-creation practices within public service ecosystems. A comparative case study approach was selected as it enables the investigation of complex governance phenomena within their real-life contexts (Yin, 2018).

Two cases of sustainability-oriented reporting initiatives implemented by Italian municipalities were selected through purposive sampling. The cases were identified through a preliminary screening of publicly available municipal sustainability reporting initiatives and selected because they represented two contrasting reporting orientations. The Municipality of Udine represents a structured approach to sustainability reporting aligned with international standards such as the Global Reporting Initiative (GRI), while the Municipality of Messina developed the "Bilancio POP" as an innovative and simplified reporting format aimed at improving accessibility and citizen engagement. The selection of these cases follows a theoretical sampling logic aimed at capturing variation in the ways sustainability reporting is designed and implemented within local public administrations. While both municipalities share a commitment to sustainability-oriented governance, they differ in terms of reporting format, institutional objectives, and stakeholder engagement strategies. This variation provides a suitable empirical setting for examining how different sustainability reporting templates interact with existing public value co-creation practices and how such interactions are enacted through situated performances within local public service ecosystems. The Italian municipal context offers a particularly relevant setting for this investigation, as local governments play a key role in implementing sustainability policies and translating broader sustainability agendas into concrete territorial initiatives.

Data collection was primarily based on semi-structured interviews with actors involved in the preparation and communication of sustainability reporting initiatives within the two municipalities. Overall, twenty interviews were conducted between November 2024 and December 2025 with municipal officials, administrative staff, and actors directly involved in sustainability-related reporting activities. Respondents were selected because of their direct knowledge of the design, implementation, or communication of the reporting initiatives. Interviews were conducted with municipal officials and administrative staff engaged in sustainability-related activities in order to capture their perspectives on the objectives, functions, and practical use of sustainability reporting within the administration. Data collection continued until the interviews provided sufficient thematic convergence around the main analytical categories, although the exploratory nature of the study and the limited number of cases are acknowledged.

The interviews explored how sustainability reporting processes are organized, how sustainability priorities and indicators are interpreted by public actors, and how reporting frameworks are incorporated into the practices through which sustainability initiatives are coordinated across departments and communicated to stakeholders. Particular attention was devoted to understanding how actors perceive and enact the relationship between sustainability reporting templates and the public value co-creation practices through which sustainability governance is implemented within the local public service ecosystem. All interviewees were informed about the purpose of the study, and confidentiality was ensured through anonymization of individual quotations and institutional roles where necessary.

Documentary sources—including sustainability reports, institutional documents, and publicly available materials produced by the municipalities—were used as contextual material to support the interpretation of the interview evidence and to provide background information on the institutional setting in which reporting practices are developed and communicated. The empirical material was analysed through qualitative content analysis, an interpretive analytical approach widely used in qualitative social science research to systematically examine patterns of meaning within textual data (Krippendorff, 2018; Schreier, 2012). Qualitative content analysis allows researchers to identify recurring themes and interpret how actors construct and make sense of organizational practices within specific institutional contexts (Mayring, 2014; Hsieh & Shannon, 2005). In line with this approach, interview transcripts were analysed iteratively in order to identify patterns in how sustainability reporting templates are interpreted and incorporated into governance practices. The five dimensions reported in Table 1 were derived through a combined deductive and inductive process: the distinction between templates and performances was informed by the PVCP framework, while the specific dimensions emerged from cross-case coding of interviews and documents. The analysis focused on examining how reporting frameworks define sustainability priorities, indicators, and communication formats, and how these elements influence the practices through which public actors coordinate sustainability initiatives within the municipalities. This analytical process enabled the identification of situations in which sustainability reporting templates reinforce existing governance practices, are reinterpreted by actors within the local context, or contribute to reshaping sustainability-oriented governance arrangements through their situated performances.

Results. The analysis indicates that sustainability reporting can be interpreted as an institutionalized template that interacts with public value co-creation practices within public service ecosystems. In both cases examined, reporting systems articulate intended configurations of sustainability practices by defining strategic priorities, codifying indicators,

and structuring interactions among actors. However, rather than deterministically structuring governance practices, the empirical evidence shows that these templates interact with existing public value co-creation practices and are interpreted and enacted differently across institutional contexts.

The findings are primarily derived from the qualitative analysis of semi-structured interviews conducted with municipal actors involved in sustainability-related activities and reporting processes. Documentary materials—including sustainability reports and institutional documents—were used to contextualize the reporting initiatives implemented by the municipalities and to support the interpretation of interview evidence. The analysis focused on how public actors interpret the role of sustainability reporting within governance processes and how reporting frameworks interact with the public value co-creation practices through which sustainability initiatives are coordinated and communicated within the municipal administration. Across both cases, sustainability reporting functions as a reference infrastructure that interacts with sustainability-oriented public value co-creation practices. Sustainability reports typically articulate thematic policy areas—such as environmental protection, social inclusion, and sustainable urban development—supported by performance indicators that allow administrations to monitor progress toward sustainability objectives. Interview evidence suggests that these reporting frameworks often provide a shared interpretive structure through which municipal actors coordinate sustainability-related activities across departments. As one municipal officer involved in the preparation of the sustainability report in Udine explained: "The report helps us connect activities across departments. Sustainability is not only an environmental issue—it involves mobility, social policies, urban planning. The report provides a structure that allows us to see how these initiatives relate to each other."

This evidence indicates that reporting templates provide shared interpretive resources through which actors coordinate sustainability-related practices and align departmental activities with broader sustainability objectives. However, the performance of reporting templates differs significantly between the two municipalities. In the Municipality of Udine, sustainability reporting primarily performs a managerial coordination and monitoring function. The reporting framework is aligned with internationally recognized standards such as the Global Reporting Initiative (GRI) and emphasizes the systematic monitoring of sustainability indicators across policy domains. These indicators support internal coordination by enabling administrative units to track policy implementation and evaluate sustainability initiatives over time. As one administrative officer noted: "The indicators are useful because they allow us to see where we are improving and where we still need to intervene."

Interview evidence indicates that, in this context, reporting templates are largely incorporated into existing administrative routines that support internal monitoring and policy evaluation. Sustainability reporting therefore reinforces established governance practices by strengthening performance monitoring mechanisms and facilitating coordination among administrative units engaged in sustainability-oriented initiatives. In contrast, the "Bilancio POP" initiative implemented by the Municipality of Messina reflects a different interpretation of sustainability reporting. Rather than prioritizing performance monitoring, the reporting framework emphasizes accessibility and citizen-oriented communication. The Bilancio POP presents municipal activities through simplified narratives and visual representations designed to make sustainability initiatives more understandable to citizens. As one official involved in the initiative explained: "Traditional reports are often too technical. The idea of Bilancio POP was to create a document that citizens could actually read and understand."

Interview data suggest that, in this case, reporting practices are interpreted primarily as instruments for improving transparency and strengthening communication between the municipality and citizens. Rather than functioning mainly as an internal monitoring tool, the reporting framework becomes a communicative device through which municipal actors explain policy initiatives and their societal relevance.

In this context, actors reinterpret the reporting template by adapting it to the communicative needs of the local governance environment, thereby reshaping how sustainability-related public value co-creation practices are enacted.

The comparative analysis, therefore, suggests that sustainability reporting templates generate different governance performances depending on how they are interpreted and enacted by public actors. While both municipalities adopt reporting frameworks that articulate sustainability objectives and policy initiatives, their practical roles differ across contexts. Table 1 summarizes how the sustainability reporting template is interpreted and performed differently across the two municipalities. The dimensions included in the table reflect the main analytical categories emerging from the cross-case analysis and connect the empirical evidence to the distinction between templates and performances.

Taken together, the findings suggest that sustainability reporting functions as a governance template that interacts with public value co-creation practices rather than determining them unilaterally. In some instances, reporting templates reinforce existing governance arrangements; in others, actors reinterpret and adapt reporting frameworks to align them with local governance priorities and stakeholder expectations. Thus, the contribution of sustainability reporting to public value co-creation depends on the fit between the formal reporting template and the situated governance practices through which it is performed. Overall, the findings point to an ongoing process of adjustment between reporting templates and governance practices, suggesting a possible co-evolution between institutionalized reporting frameworks and the public value co-creation practices through which sustainability governance is enacted.

Table 1. Sustainability Reporting Templates and Performances in Public Service Ecosystems.

Dimension	Sustainability Reporting Template (Intended configuration)	Performance – Municipality of Udine	Performance – Municipality of Messina
Strategic orientation	Reporting frameworks define sustainability priorities and policy areas	Supports internal alignment of municipal departments around sustainability objectives	Frames sustainability initiatives through narratives aimed at explaining municipal actions to citizens
Role of indicators	Sustainability indicators provide structured reference points for monitoring initiatives	Indicators are used extensively for internal monitoring and evaluation of policy outcomes	Indicators play a limited role and are complemented by simplified explanations of municipal initiatives
Governance coordination	Reporting templates structure how sustainability initiatives are organized and communicated	Reporting reinforces coordination across administrative units and policy domains	Reporting supports communication between the municipality and citizens
Stakeholder engagement	Reporting frameworks identify relevant stakeholders and communication channels	Engagement primarily occurs within the municipal administration	Strong emphasis on accessibility and citizen-oriented communication
Governance function	Reporting templates guide how sustainability-related practices are organized within the administration	Sustainability reporting strengthens managerial monitoring and policy evaluation	Sustainability reporting operates as a transparency and public communication tool

Research limitations. This study presents several limitations. First, the analysis focuses on two municipal cases within the Italian public administration context, which limits the generalizability of the findings. Second, the research relies primarily on qualitative interview data supported by documentary materials, which may not fully capture the lived experiences of actors involved in the enactment of reporting practices. In particular, the qualitative evidence may only partially reflect the situated dynamics through which sustainability reporting templates interact with public value co-creation practices within local governance ecosystems. Future research could expand the analysis by examining additional cases across different institutional contexts and by incorporating broader qualitative data collection strategies involving a larger number of interviews and organizational actors.

A further limitation concerns the institutional specificity of the two case studies analysed. Both municipalities operate within the Italian administrative and regulatory framework, which shapes how sustainability reporting practices are designed, implemented, and interpreted within local governments. As a result, the findings should be interpreted with caution when considering their transferability to public administrations operating within different governance systems or regulatory environments. Different institutional environments may generate alternative configurations of interaction between sustainability reporting templates and the public value co-creation practices through which sustainability governance is enacted.

Additionally, the empirical material is based on a limited number of interviews with actors involved in sustainability reporting initiatives, which may restrict the diversity of perspectives captured in the analysis. While the interview data provide valuable insights into how public actors interpret and incorporate reporting frameworks into governance practices, a larger number of interviews across different organizational levels and stakeholder groups could provide a more comprehensive understanding of how sustainability reporting templates are interpreted and enacted within public service ecosystems. Future studies should also include the perspective of intended beneficiaries, particularly citizens, to examine how citizen-oriented reporting initiatives are perceived, used, and evaluated.

Future research could therefore extend this investigation by adopting longitudinal and multi-case research designs that examine how sustainability reporting practices evolve over time across different institutional contexts. Comparative studies involving municipalities from different countries or governance systems may also provide valuable insights into how institutional environments influence the design and performances of sustainability reporting templates within public service ecosystems. Longitudinal analyses may be particularly valuable for examining how sustainability reporting templates and public value co-creation practices gradually adjust to one another, shedding further light on the possible co-evolution between governance templates and the practices through which sustainability-oriented public value is enacted.

Managerial implications. The findings offer several implications for public managers and policymakers involved in sustainability governance. First, sustainability reporting should not be treated solely as a compliance mechanism but rather as an institutionalized governance practice that interacts with existing public value co-creation practices within public service ecosystems. Second, public managers should recognize that reporting templates may be interpreted and enacted differently by actors within the ecosystem. Designing reporting systems that foster stakeholder engagement and shared understanding may help reduce misalignments between templates and performances. From a practice perspective, the

effectiveness of sustainability reporting depends not only on its formal design but also on how actors incorporate reporting templates into the everyday practices through which sustainability initiatives are negotiated and coordinated. Finally, sustainability reporting can be interpreted as an innovation infrastructure for public governance, enabling coordination, knowledge sharing, and organizational learning within public service ecosystems.

The findings of the two case studies highlight how different interpretations of sustainability reporting can lead to distinct governance practices within public administrations. In the Municipality of Udine, the reporting framework primarily supports internal coordination and performance monitoring, enabling administrative departments to align their activities with sustainability objectives through standardized indicators. In contrast, the Bilancio POP initiative implemented by the Municipality of Messina demonstrates how reporting systems can also function as tools for strengthening transparency and citizen engagement. These different performances illustrate that the managerial value of sustainability reporting depends not only on the reporting framework itself, but also on how public actors interpret and enact the reporting template within their governance context. Monitoring-oriented approaches may therefore be more suitable for internal coordination, whereas citizen-oriented approaches may be more effective when accessibility and public communication are strategic priorities.

For public managers, this suggests the importance of approaching sustainability reporting not merely as a technical exercise of data collection and disclosure, but as a strategic governance instrument capable of shaping organizational practices. The design of reporting frameworks should therefore consider not only the technical requirements associated with sustainability indicators but also the broader organizational and relational dynamics through which sustainability initiatives are coordinated across departments and communicated to stakeholders. In particular, fostering collaboration among administrative units and creating opportunities for dialogue with external stakeholders may enhance the capacity of reporting systems to support public value creation processes. Encouraging reflexive use of reporting frameworks within organizations may also enable public actors to adapt reporting templates to evolving governance challenges, thereby strengthening the alignment between sustainability reporting and public value co-creation practices.

More broadly, sustainability reporting can function as a platform for organizational learning within public administrations. By encouraging systematic reflection on sustainability priorities, reporting processes can help public organizations identify policy gaps, evaluate the effectiveness of sustainability initiatives, and support continuous improvement in governance practices. Through these learning dynamics, sustainability reporting may gradually evolve together with the governance practices in which it is embedded, fostering ongoing adjustment between reporting templates and the practices through which sustainability-oriented public value is enacted.

Originality of the paper. This study contributes to the literature by integrating research on sustainability reporting with practice-based perspectives on public value creation. First, it conceptualizes sustainability reporting as an institutionalized template that interacts with public value co-creation practices within public service ecosystems. Rather than treating reporting systems as external managerial instruments, the study interprets sustainability reporting as part of the broader set of practices through which sustainability governance is organized and negotiated within public administrations.

Second, the study advances the understanding of sustainability reporting as a governance infrastructure capable of shaping how actors coordinate sustainability initiatives in complex institutional environments. By interpreting sustainability reporting through the lens of public value co-creation practices, the study shifts the analytical focus from reporting outputs to the governance practices through which sustainability initiatives are enacted. While previous research has primarily examined sustainability reporting as a tool for transparency and accountability, the findings suggest that reporting systems may also operate as institutional templates embedded within the practices through which actors interpret sustainability priorities and coordinate collective action within public service ecosystems.

Furthermore, the study contributes to practice-based approaches to public management by empirically illustrating how governance instruments influence the performances of public actors within institutional contexts. The comparative analysis of the two municipal cases demonstrates that sustainability reporting templates may generate different governance outcomes depending on how they are enacted in practice. More specifically, the findings show that reporting templates may reinforce existing governance practices, be reinterpreted to accommodate local priorities, or contribute to reshaping sustainability-oriented practices through their situated enactment.

In this sense, the paper highlights the importance of distinguishing between the formal design of governance instruments and their situated performances within organizational settings. This distinction allows the study to move beyond a deterministic view of governance instruments and conceptualize the relationship between reporting frameworks and governance practices as dynamic and context-dependent. Finally, by bridging sustainability reporting research with the literature on public service ecosystems and public value co-creation practices, the study expands the theoretical understanding of how governance infrastructures support sustainability-oriented transformations in the public sector. The findings point toward mutual adjustment between sustainability reporting templates and public value co-creation practices, suggesting the possible co-evolution of institutionalized reporting frameworks and governance practices within public service ecosystems.

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The Influence of Virtual Tours in the Tourism Industry: An Investigation into Consumer Perceptions and Behavior

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Abstract. *This study analyzes the impact of virtual tours (VTs) on consumer behavior in the hospitality and tourism sector, comparing the effectiveness of these immersive tools with traditional visualization methods based on static images. The research adopts a theoretical perspective grounded in the Stimulus–Organism–Response (S-O-R) model, examining how the technological properties of interactivity and virtuality influence users' cognitive and emotional states. From a methodological standpoint, the study employs a quantitative experimental approach based on an A/B test conducted with a sample of 198 participants. The collected data were analyzed using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method and the Van Westendorp Price Sensitivity Meter (PSM) to measure willingness to pay (WTP). The empirical results show that the integration of virtual tours generates higher levels of hedonic gratification, utilitarian value, and perceived information. A particularly relevant finding concerns willingness to pay. Contrary to expectations, the group exposed to static images showed a higher optimal price point (€65 compared to €55). This result can be interpreted considering the greater informational transparency provided by virtual tours, thereby limiting the so-called "risk factor" that consumers tend to implicitly incorporate into evaluations based on less comprehensive static images. The study contributes to the literature on digital management and tourism marketing by offering managerial implications for the development of communication and pricing strategies based on value perception and informational transparency.*
Keywords: *Virtual Reality, Virtual Tour, Consumer Behavior, Willingness to Pay, S-O-R Model, Tourism Management, PLS-SEM.*

Framing of the research. Virtual Reality (VR) represents a widely debated conceptual construct in the literature, whose use is sometimes heterogeneous and not univocal. The term is used to describe both technological systems capable of generating synthetic experiences and the experience itself, up to being assimilated into a form of communication comparable to language. The association of VR with specific hardware configurations is problematic due to rapid technological evolution and the heterogeneity of systems included under the same label (Beck et al., 2019). On the theoretical level, VR has been interpreted as an expression of the human desire for escape and exploration of alternative worlds. It is defined as a computer-simulated environment that allows the user to experience a sense of presence in a space different from the physical one (Desai et al., 2014). Beyond the escapist dimension, VR is characterized by multisensory stimulation and the interaction opportunities offered to the user (Guttentag, 2010). Virtual reality differs from other modal forms in terms of immersion and presence (Beck et al., 2019). Immersion constitutes an objective dimension, linked to the technological characteristics of the system, while presence is a subjective dimension, referring to the perception of "being there" in the virtual environment (Mel Slater and Wilbur, 1997). Immersion depends on four determinants: inclusion (exclusion of physical reality), surrounding environment (panoramic vision), sensory extent, and intensity (resolution and fidelity). The goal of VR is to maximize these dimensions to increase perceived presence. Empirical evidence shows that more advanced technologies favor higher levels of immersion and engagement, positively affecting the overall experience (Beck et al., 2019). In the tourism sector, VR presents significant transformative potential. Its applications range from planning to management, from marketing to education, and even to heritage conservation and accessibility (Beck et al., 2019). VR allows virtual visits to remote, dangerous, or inaccessible locations, reducing physical and cognitive barriers. However, questions remain regarding the authenticity of virtual experiences and their ability to fully replace traditional tourism. VR is generally considered a complementary or enriching tool for real experience.

From a technological standpoint, virtual environments can be generated through three-dimensional synthetic content or via 360-degree panoramic images and videos (Marasco et al., 2018). The latter, while offering limited interaction possibilities compared to fully computer-generated environments, are particularly suitable for representing large spaces and accommodation facilities, ensuring a high degree of verisimilitude. The literature distinguishes three main categories of systems based on their level of immersion. Non-immersive virtual reality (niVR) involves the use of traditional screens, such as in desktop VR, where interaction is mediated through devices like a mouse and keyboard (Beck et al., 2019). Semi-immersive virtual reality (siVR), on the other hand, relies on large screens or projection-based environments, such as CAVE systems, and is often designed for multi-user experiences (Cruz et al., 1992). Finally, fully immersive virtual reality (fiVR) makes use of head-mounted displays (HMDs), which isolate the user from the real world and provide a fully immersive experience (Slater and Sanchez-Vives, 2016). The classification is based on the degree of exclusion of

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physical reality: the greater the perceptual isolation, the higher the level of immersion. Fully immersive technologies allow dynamic updating of the visual field based on the user's movements and favor high-intensity individual sensory experiences. Numerous studies have analyzed the impact of VR on travel intentions and attitudes toward destinations. Flow theory (Huang et al., 2012) highlights how interactivity, perceived skills, and presence mediate the relationship between interest and behavioral intentions. Similarly, the Technology Acceptance Model (TAM) shows that perceived usefulness, ease of use, emotional engagement, and enjoyment influence the intention to use a particular VR technology (Davis, 1989; Disztinger et al., 2017). In fully immersive VR, spatial presence and social presence are determinants for attitude change and visit intention (Jung et al., 2016; Tussyadiah et al., 2018). Immersive experiences generate higher levels of physiological engagement compared to non-immersive systems and can improve the affective image of the destination. However, promotional effectiveness depends on the aesthetic quality of the content and its consistency with the target audience. Integration between VR and traditional marketing tools is also recommended (Jung et al., 2016; Tussyadiah et al., 2018).

Among emerging critical issues is the so-called "simulator sickness," associated with low-quality devices or inadequately designed content, a phenomenon that requires further investigation. Moreover, the growing diffusion of immersive technologies has sparked interest among tourism operators and destination management organizations. Virtual tours act as strategic communication tools on online booking platforms, accommodation websites, and territorial promotion campaigns. The possibility of offering an experiential preview of spaces allows potential visitors to develop a more concrete perception of the tourist offer.

From a consumer behavior perspective, the use of virtual environments can reduce the informational uncertainty that characterizes many tourism decisions. Virtual tours contribute to strengthening the expectation formation process and improving the perceived quality of online information. Some studies also highlight that immersive technologies can influence how tourists mentally construct the image of a destination (Beck et al., 2019; Hyun and O'Keefe, 2012). Virtual exploration of environments allows the perception of spatial and atmospheric elements that are difficult to communicate through static images or textual descriptions. This aspect contributes to increasing the user's emotional and cognitive engagement during the search and planning phase of the trip.

The research is anchored in the Stimulus–Organism–Response (S-O-R) model (Jacoby, 2002), where the properties of the medium (interactivity and virtuality) act as Stimuli influencing the internal state of the user (Organism), determining a behavioral Response. This framework is integrated with the Technology Acceptance Model (TAM) (Disztinger et al., 2017), focused on usefulness (UTIL) and ease of use (EOUSE). The model also includes Flow Theory (Huang et al., 2012), which describes the state of optimal engagement during virtual exploration. The integration of these three theoretical approaches allows for a more comprehensive interpretation of consumer behavior in the context of immersive technologies applied to tourism. The Stimulus–Organism–Response model indeed allows analyzing how the technological characteristics of digital tools influence users' perceptions and internal evaluations. At the same time, the Technology Acceptance Model provides a consolidated perspective to understand the mechanisms determining the adoption of new technologies by consumers (Jacoby, 2002; Loureiro et al., 2019; Mehrabian & Russell, 1974).

Finally, Flow Theory (Huang et al., 2012) introduces the ideal engagement state that a user experiences during exploration of a virtual environment. According to this theory, flow is triggered when the user perceives a balance between their navigation skills and the opportunities offered by the virtual environment, allowing a state of intense engagement to develop, which encourages prolonged interaction with digital content. This state of cognitive and emotional immersion can help strengthen the attitude toward the tourist product and increase the likelihood of favorable behaviors. Willingness to Pay (WTP) is defined as the maximum reservation price a consumer is willing to pay based on perceived utility (Kalish et al., 1991). The present study favors Van Westendorp's Price Sensitivity Meter (PSM) (Van Westendorp, 1976). This method allows identifying the acceptable price range through the intersection of four perceptual thresholds: Cheap, Expensive, Too Cheap, and Too Expensive.

Purpose of the paper. The main objective of the research is to comparatively analyze the effectiveness of virtual tours versus traditional static photographs within the communication and advertising of tourist accommodations. Specifically, the study aims to investigate whether the superior informational richness offered by virtual reality influences the attitude and behavior of potential consumers, translating into a higher booking intention. In addition, the paper aims to empirically assess the monetary value attributed to technological innovation, evaluating whether potential customers are willing to accept a higher price positioning (Willingness to Pay) for accommodation.

Methodology. The core of the empirical investigation is based on the implementation of an A/B test, a technique widely used in marketing and web design to compare two variants of the same digital environment (Kumar, S., 2021). The A/B test allowed the sample of participants to be divided into two distinct groups: one group was exposed to the "experimental variant" (Ad A), characterized by the exclusive presence of a virtual tour. The other group viewed the "control variant" (Ad B), which presented the same accommodation illustrated solely through a gallery of traditional static photographs. This clear separation ensures that any differences in responses can be attributed exclusively to the technological difference of the advertisement. To guarantee a random and balanced distribution of online traffic between the two scenarios, the study used the software allocate.monster (Fergusson, A., 2016). Data were collected through the administration of a structured questionnaire. In social sciences, the questionnaire is the preferred tool for extracting standardized information that can subsequently be translated into matrices suitable for statistical processing. For this study, questionnaires were

administered via Google Forms. The questionnaire items were developed based on measurement scales that had already been validated in the academic literature on consumer behavior and immersive technologies. Participants were asked to evaluate a series of statements related to the constructs under investigation using a 7-point Likert scale, where 1 corresponded to "strongly disagree" and 7 to "strongly agree." The study explored multiple latent constructs within the S-O-R (Stimulus–Organism–Response) theoretical framework (Jacoby, 2002). In particular, interactivity (INTER) (Wu, 2005) and virtuality (VIR) (Babin and Burns, 1998) were considered technological stimuli. Empathy (EMPATIA) was also included as a relevant psychological dimension (Abreu et al., 2021). Furthermore, several variables were examined as cognitive and emotional reactions of the organism, namely ease of use (EOUSE) (Gefen et al., 2003), utilitarian gratification (UTIL) (Rese et al., 2017), information (INFORMAT) (Hausman and Siekpe, 2009), and hedonic gratification (HEDONIC) (Rese et al., 2017).

Finally, the study analyzed attitudes (ATT), behavioral intention (BI), and purchase or booking intention (INT) as outcome responses within the framework (Qin et al., 2021), along with participants' perception of and sensitivity to accommodation price (PRICE) (Chhabra, 2015). Before disseminating the questionnaire, a pilot test was conducted involving a group of university professors and students. A total of 198 usable questionnaires were collected, of which 92 were assigned to the virtual tour variant and 106 to the photographic variant. In the virtual tour variant, participants were shown a virtual tour of a hotel room, allowing interactive exploration of the environment. In the photographic variant, participants were presented with a series of photographs of the same accommodation, without the possibility of navigating the space virtually. To limit the risk of Common Method Bias (CMB) associated with self-administered questionnaires, the collected data were subjected to Harman's single-factor test using the statistical software IBM SPSS. The total variance level of 48.3% was below the critical threshold of 50%. Therefore, Common Method Bias did not pose a threatening issue (Vishwanath, 2017).

Descriptive statistics were calculated using the Gretl software. For each of the two samples, means, medians, min-max values, and standard deviations were computed. The analysis showed that the mean responses for the virtual tour advertisement were generally higher, except for the price variable. At the same time, a correlation matrix was created to study the direction and intensity (from -1 to +1) of preliminary linear relationships between variables. In this study, several hypotheses were tested to understand the relationships between the variables under investigation (Qin et al., 2021):

H1: The perception of the virtuality of the viewing experience positively influences the internal states of the consumer, particularly hedonic gratification, perceived informativeness, and ease of use.

H2: Consumers' internal states positively influence attitudes toward the use of virtual tours (vs static photos).

H3: A positive attitude toward the use of virtual tours increases the behavioral intention to use this technology in the booking process.

H4: A higher behavioral intention to use virtual tours increases the intention to book the accommodation.

H5: The use of virtual tours (vs static photos) negatively influences the Willingness to Pay (WTP) for accommodation.

These hypotheses were tested using Structural Equation Models (SEM) and analyzed with SmartPLS4 software. The choice of the PLS (Partial Least Squares) approach, a "soft" modeling technique, is justified by the relatively modest sample size, the primary objective of predictive accuracy rather than strict validation of a prior theory, and the absence of stringent normality requirements for the data (Benitez et al., 2020; Wong, 2013). Within the PLS-SEM environment, the analysis processed two logical dimensions: the "outer model" (which assesses the reliability and validity of relationships between latent constructs and their specific questionnaire items) and the "inner model" (which illustrates causal paths and the direct impacts between independent exogenous variables and dependent endogenous variables). The results produced by SmartPLS4 provided standardized regression coefficients (path coefficients, to determine the strength and direction of causal effects) combined with the explained variance values to define the rejection or acceptance of the individual theoretical assumptions.

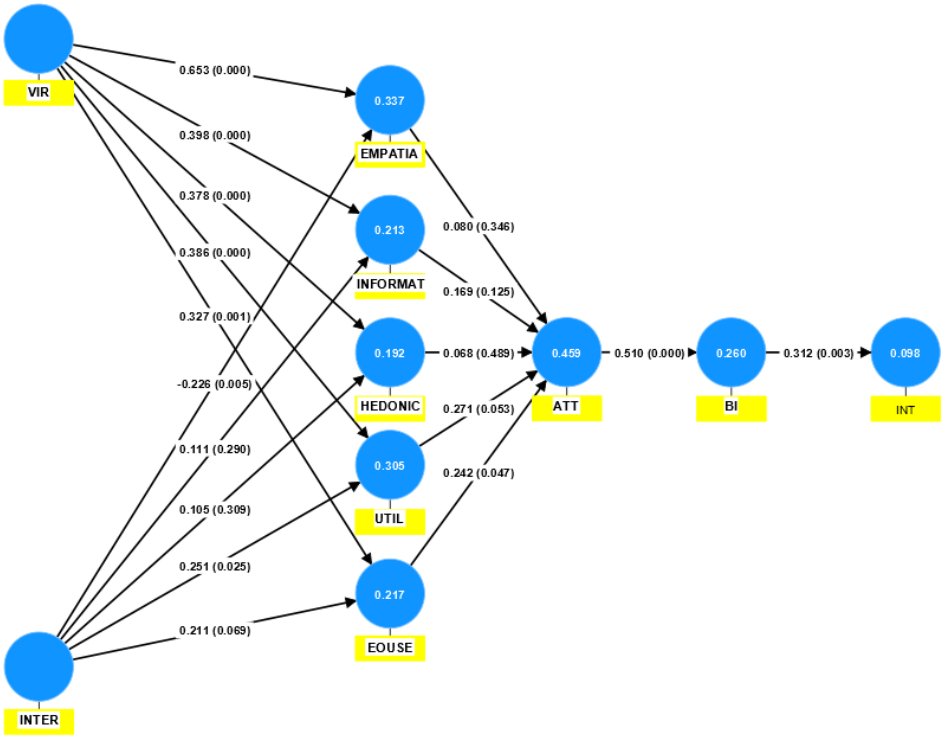
Van Westendorp Method: Testing the final hypothesis (H5) required a different and separate tool from SEM. Measuring consumers' exact reservation price is complex; to circumvent distortions from hypothetical bias inherent in classic "contingent valuation" (Backhaus et al., 2005; Wertenbroch and Skiera, 2002) and the restrictions of the complex BDM lottery mechanism (Becker–DeGroot–Marschak). The study applied Van Westendorp's Price Sensitivity Meter (PSM). Van Westendorp's PSM is an exploratory questioning methodology that considers four cognitive thresholds: the price at which the accommodation begins to be considered "cheap" but reassuring, "expensive" but bearable, "too expensive," and finally "too cheap" (threshold at which doubts about the actual quality of the property arise). The data obtained on these four monetary dimensions, segmented between virtual tour users and static photo users, were tabulated and processed using Microsoft Excel. By processing and graphically superimposing the cumulative frequency curves, it was possible to define a rigorous "acceptable price range" between the Marginal Cheapness Point (PMC) and the Marginal Expensiveness Point (PME). Excel intersections revealed the fundamental Optimal Price Point (OPP) for the two scenarios, i.e., the mathematical point where the sensations of "too expensive" and "too cheap" exactly balance, providing an indisputable economic comparison to measure the actual monetary value generated by the two different accommodation presentations.

Data were collected in 2023 through an online survey administered as part of an A/B testing procedure: 92 participants were exposed to an advertisement featuring a virtual tour, while 106 evaluated an advertisement consisting exclusively of photographic images. The analysis of the collected data made it possible to outline a detailed sociodemographic profile of the sample. With regard to gender, a slight female predominance emerges, with 115 women

and 82 men. From an age perspective, the population is predominantly young: the most represented age group is between 18 and 33 years (106 participants), followed by a gradual decline in the subsequent age categories, with only a marginal presence of individuals over 65. In terms of educational attainment, the majority of participants hold a high school diploma (118), while a significant proportion have obtained a university degree (54). Fewer individuals report lower secondary education (19) or postgraduate qualifications, such as a master's degree or PhD (6), indicating an overall medium-to-high level of education within the sample. The analysis of occupational status reveals a heterogeneous composition, with a notable presence of students (77) and employees (61), followed by self-employed professionals (21) and, to a lesser extent, other categories such as manual workers, homemakers, shopkeepers, and retirees. Regarding marital status, most respondents are single (133), while 64 are married. Consistently, the distribution of the number of children shows a predominance of individuals without children (127), followed by those with one or two children (57), whereas larger families are only minimally represented. Finally, the analysis of annual income indicates a concentration in the lower-to-middle income brackets: a substantial portion of the sample reports an income below €20,000, while only a very limited number of participants report incomes above €50,000.

Results. The descriptive analysis reveals significant differences between accommodation presentation via virtual tour (VT) and via static photographs. In particular, mean scores for perceived informativeness (INFORMAT: *M*_VT = 24.6 vs. *M*_Photos = 20.6) and ease of use (EOUSE: *M*_VT = 25.1 vs. *M*_Photos = 22.7) are higher in the virtual tour group. Similarly, hedonic gratification (HEDONIC: *M*_VT = 24.4 vs. *M*_Photos = 20.3) and perceived empathy (*M*_VT = 27.4 vs. *M*_Photos = 21.3) also exhibit higher mean values in the experimental group. Harman's single-factor test for common method bias (Podsakoff et al., 2003) returned a value of 48.43%, below the conventional 50% threshold, thus suggesting the absence of systematic bias in the collected data. The structural model was then estimated using PLS-SEM, specified according to the Stimulus–Organism–Response (S-O-R) paradigm, to test the research hypotheses. The results of the structural model estimation are graphically summarized in Figures 1 and 2.

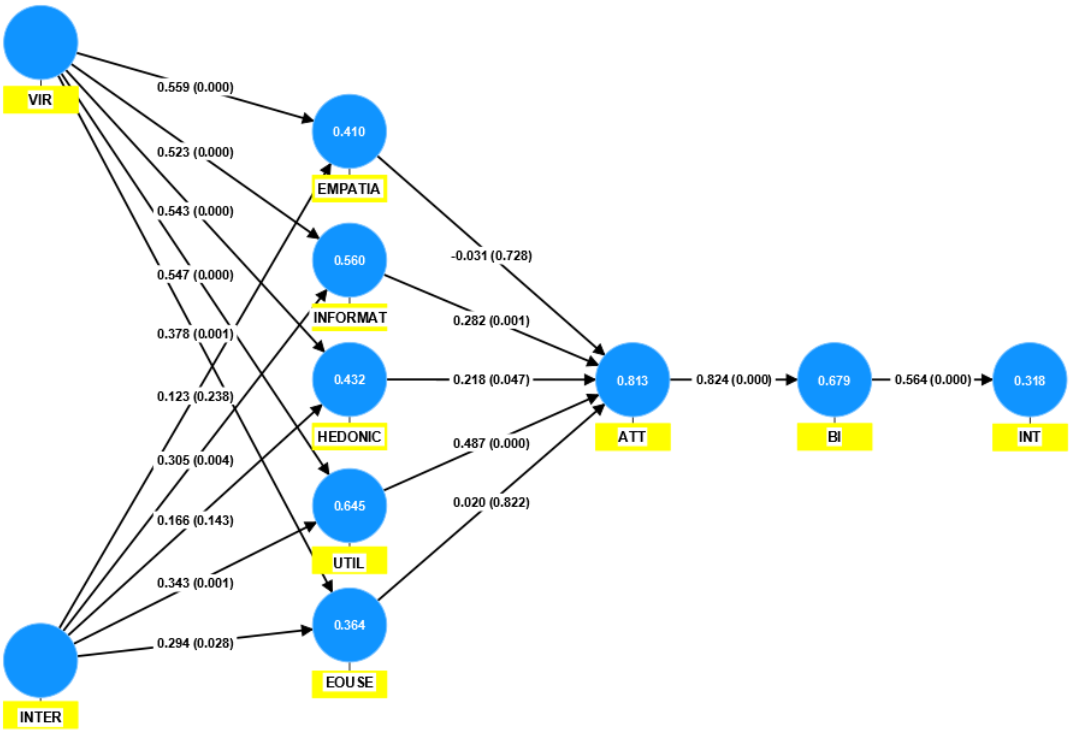
Figure 1. PLS-SEM results for static photos



The results support H1, indicating that the perceived virtuality of the viewing experience positively influences consumer internal states, specifically hedonic gratification, perceived informativeness, and ease of use. H2 is also supported, as consumers' internal states positively influence attitudes toward the use of virtual tours relative to static photographs: informativeness and hedonic gratification exert a significant positive effect on attitude (ATT), with a higher path coefficient in the VT group (β = 0.578) compared to the photo group (β = 0.493). The results further confirm H3, showing that a more favorable attitude toward virtual tours increases behavioral intention to adopt this technology in the accommodation evaluation process. In turn, behavioral intention is positively associated with booking intention, thereby confirming H4: the path coefficient for behavioral intention (BI) reaches a notable value in the VT group (β = 0.417), suggesting that virtual experience contributes to strengthening the consumer's behavioral response. Finally, the analysis of willingness to pay (WTP), conducted using the Van Westendorp Price Sensitivity Meter, supports H5. The results indicate that WTP is lower for accommodation presented via virtual tour than via static photographs. Specifically, the

estimated optimal price point (OPP) for accommodation viewed through a virtual tour is €55, compared to €65 for presentation via static photos.
This finding suggests that the virtual tour may function as a tool of enhanced informational transparency. While static photographs allow for a degree of idealization of the offering, the virtual tour presents the environment more completely and realistically, thereby reducing informational asymmetry. However, this increased transparency may also constrain the formation of overly positive expectations not fully warranted by the experience. In the sample analyzed, composed predominantly of young individuals with relatively modest income levels, this effect appears to operate as a price-moderating mechanism rather than as a driver of price premium.

Figure 2. PLS-SEM results for virtual tour



Research limitations. The study is limited by the small sample size and the hypothetical bias inherent in the Van Westendorp method (absence of real transactions). Moreover, the concentration of participants in the "Millennial/Gen Z" age group with lower incomes limits the generalizability of the results to luxury or corporate market segments.

Managerial Implications. The results of this study offer twofold implications for tourism marketing professionals and hospitality managers.

First, the virtual tour emerges as a powerful conversion and experiential marketing tool. Integrating virtual reality systems, even non-immersive, web-based ones, into accommodation listings represents a significant competitive advantage for capturing potential customers' interest. By enhancing perceived informativeness, ease of use, and hedonic gratification, virtual tours can effectively translate favorable attitudes into actual booking intentions. Managers should therefore adopt these technologies not as mere aesthetic additions to their websites, but as strategic instruments to reduce perceived risk during the travel planning phase, thereby substantially improving the pre-stay user experience.

Second, careful attention to pricing strategy is warranted. The findings related to H5 deliver a crucial insight: managers should not assume that the availability of a virtual tour alone justifies higher room prices. The results indicate that a listing supported by high-quality traditional static photography can anchor consumers' optimal price point at a higher level (OPP = €65) compared to a virtual tour presentation (OPP = €55). The strategic implication, therefore, points toward a hybrid approach. Virtual tours should be leveraged to increase conversion rates by making the property more attractive and transparent to potential guests. At the same time, for positioning in premium and luxury segments, meticulous high-quality static photography remains essential to sustain a higher willingness to pay. In this sense, the two presentation formats should be conceived as complementary rather than substitutive, each serving a distinct function within the overall communication and pricing strategy.

Originality of the paper. The distinctive value of this research lies in the rigorous integration of the S-O-R framework (analyzed via PLS-SEM) with the Van Westendorp metric. The paper empirically documents the discrepancy between

the excellence of the technological user experience and the contraction of monetary willingness to pay, providing an original contribution to the understanding of the value of digital transparency in tourism.

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Twin transition in Italian firms: the role of supply chains

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Abstract. *The twin transition, combining digital transformation and environmental sustainability, has become a central priority of European industrial policy. While existing research has examined how digital technologies enable environmental sustainability at the firm level, less attention has been devoted to the role of supply chains in shaping firms' sustainability investments. This study investigates whether and how firms' participation in supply chains influences environmental sustainability investments within a digital-for-green twin transition framework. Using firm-level data, we analyse the effect of participation in multiple supply chains and the role of specific supply chain contexts, namely circular economy and ICT-related supply chains. The results show that participation in supply chains positively affects sustainability investments, but the relationship is non-linear: while moderate exposure to multiple supply chains increases the likelihood of environmental investments, excessive exposure generates coordination costs that reduce these benefits. Moreover, participation in circular economy and ICT supply chains further supports sustainability investments. The findings highlight the role of supply chains as key mechanisms through which firms access knowledge, technologies and capabilities supporting the twin transition.*
Keywords: *green; digital; twin transition; supply chains; AI; circular economy*

Framing of the research. The European policy agenda has supported digital investments and environmental sustainability as part of an integrated "twin" transition (TT) aimed at fostering a competitive, fair and sustainable future (EU, 2022). A growing body of research emerged exploring dynamics, drivers, and effects of the TT along two main lines (Antonietti et al. 2026): I) "Digital for green" (e.g. Montresor & Vezzani, 2023; Biggi et al., 2025), and ii) "Greener digital" (e.g. Al Kez et al, 2022). Both digital (Ciffolilli & Muscio, 2018; Martinelli et al., 2021) and green (Truffer & Coenen, 2012) technologies are highly spatially embedded, being their development dependent on the local presence of related and enabling technologies, actors, and capabilities (e.g. Cicerone et al., 2023).

Firms therefore operate within territorially embedded innovation systems, interacting with proximate partners such as suppliers, customers and knowledge institutions. At the same time, firms are embedded in supply chains (SCs) that connect geographically dispersed actors across multiple stages of production. Understanding how firms coordinate these local and global relationships is therefore central to explaining how technological and sustainability transitions unfold within production systems (Di Maria et al., 2022; Del Giudice et al. 2021). The operations and supply chain management literature increasingly recognises that sustainability challenges cannot be addressed by individual firms alone but require coordination across supply chain partners. Supply chain operations play a pivotal role in achieving sustainability objectives by coordinating material, information and financial flows across production networks (Jia et al., 2025). In particular, SC collaborations enable firms to access complementary resources, knowledge and capabilities that support environmental innovation and sustainability-oriented practices (Bowen et al. 2001; Vachon & Klassen, 2008; Di Maria et al. 2022; Cainelli et al., 2015).

Recent contributions have studied the role of SC in fostering sustainability, while accounting for digitalisation. For instance, Jia et al. (2025) show that the degree of supply chain concentration affects firms' sustainability performance in a non-linear way, with excessive dependence on a limited number of partners initially constraining sustainability outcomes but potentially enabling stronger sustainability performance once deeper collaborative relationships are established. These findings suggest that the structure of supply chain relationships may significantly influence firms' ability to implement sustainability strategies. At the same time, knowledge and information exchanges across supply chain partners are crucial for enabling innovation and organisational learning. The knowledge management literature highlights how external knowledge acquisition and inter-organisational knowledge networks enhance firms' innovation capabilities and support the development of new technological solutions (Jimenez-Jimenez et al., 2019).

Moreover, Di Maria et al. (2022) assess the impact on circular economy of different types of Industry 4.0 technologies where SC integration acts as a mediator; in particular, the mediator effect is found only for smart manufacturing technologies, and not for data processing. Del Giudice et al. (2020) assess the impact of circular economy practices on firm performance for a circular supply chain, where big-data-driven supply chain acts as moderator. Not surprisingly, the majority of studies in SC management literature have focused on circular economy, which is widely recognized as a path towards environmental sustainability (Aarikka-Stenroos et al., 2022). However, the evidence on the role of SC within a general digital-for-green TT setting is less explored. Indeed, relations within SC may enable not only closed loops of materials and resources that may reduce waste and pollution, but they may provide a wide array of inputs that are correlated also to other sustainability investments by firms (e.g. pollution and CO_2 monitoring, use of renewable energy, transportation efficiency, green finance, certification, staff training, etc). In addition, the SC management literature has identified the difficulties to manage multiple partners (i.e. "tiers", including indirect, upstream, and sub-suppliers) (Sarkis et al., 2019); however, as far as we know, SC management literature has said little about the possible the nonlinear relation between multiple SCs and sustainability investments (an exception is e.g. Jia et al. 2025).

Purpose of the paper. Taking the perspective of digital-for-green TT, this work aims at understanding the role of firms' participation in supply chains in shaping environmental sustainability investments. In particular, we address whether the number of SCs in which the firm participate may affect the probability of investing in environmental sustainability, since multiple SCs can amplify the source of information related to products, processes, practices related to sustainability, as well as to stimulate compliance to environmental regulation and standards. However, the benefits of supply chain participation may not increase linearly. While exposure to multiple supply chain networks can expand firms' access to information and complementary capabilities, excessive exposure may also generate coordination costs, governance complexity and redundant knowledge flows. Managing relationships across multiple supply networks may therefore become increasingly demanding, potentially reducing firms' ability to effectively absorb and integrate sustainability-related knowledge. Building on this reasoning, we posit that participation in multiple supply chains may exhibit a non-linear relationship with sustainability investments, whereby the benefits associated with knowledge access and capability development may eventually be offset by coordination costs and diminishing informational returns. This argument resonates with recent evidence showing that supply chain structures may influence sustainability outcomes in non-linear ways, as firms balance the benefits of collaboration with the costs of managing complex supply networks (Jia et al., 2025).

Along with exposure to multiple SCs, sustainability investments may benefit from the participation of the firm in a green SC, such as the circular economy (Wong et al. 2018). Circular economy is widely recognized as a path towards environmental sustainability in SC management literature because of the necessity to coordinate with suppliers upstream and downstream to "close the loop" of material and resources flows, to innovate products and processes, to educate clients and respond to stakeholders' requests (Aarikka-Stenroos et al., 2022).

In addition to the specific circular economy supply chain, also ICT plays a pivotal role. Within the digital-for-green TT, digital technologies are considered enablers of the green transition (e.g. Biggi et al. 2025). Digital investments may improve efficiency and reduce emissions (e.g. through smart energy management), optimize resource use (e.g. through digital twins, and AI-driven optimization of materials use or logistics), and support circularity across sectors (e.g. through better traceability and transparency). We posit that participation in the ICT supply chain provides fastest access to key technologies that are used to facilitate the green transition.

Methodology. Data are drawn from the Permanent Census of Italian firms, conducted between November 2002 and March 2023 by the Italian Institute of Statistics (ISTAT, 2023). The dataset includes about 170 thousand firms with at least 2.5 employees. Smaller firms are sampled, while firms with more than 19.5 represent the total population. The sectors of activities are manufacturing, trade, and services. Agriculture, public administration, and associations are excluded (i.e. Ateco 01, 02, 03, 84, and 94). We estimate a model where the outcome binary variable is the investment in environmental sustainability ("Green"), as function of digital investments "AI-digital" (i.e. whether the firm has used AI for processes, goods and services innovation), the number of supply chains in which the firm is involved ("SC") and its squared term to assess non-linearity, and a set of controls (size, R&D investments, human capital, collaboration, governance, formal and informal agreements, and provincial and sectoral fixed effects). In addition, a second model qualifies the type of supply chains in which the firm is involved by inserting two binary variables for the participation in circular economy supply chain (SC_EC), and the supply chain related to infrastructure and telecommunication services (SC_IT), respectively.

We run econometric analysis (logit) for two models described above:

[1] $Green_i = f(AI\text{-}digital_i, SC_i, SC\text{^}2_i, \mathbf{X_i})$

[2] $Green_i = f(AI\text{-}digital_i, SC_CE_i, SC_IT_i, \mathbf{X_i})$

Preliminary results are presented and discussed below.

Results. Table 1 shows the summary statistics for the variables used in the models. In line with other studies (Montresor & Vezzani, 2003), the sustainability investments are carried out by a minority of firms (38%). The use of AI for innovation is declared only by 4% of the firms. In terms of number of supply chains, all firms contribute to at least 1 supply chain, up to 28, and the average is quite low, i.e. 1.56. The most common supply chains are related to the traditional specialization of the Italian economy, e.g. agri-food (18%), construction (18%), vehicles (12%), tourism and leisure (10%), clothing (9%), furniture (8%), machinery (8%). The two supply chains (Circular Economy, and ICT) are chosen by 4% and 3% of the firms, respectively, and are among the least diffused. By looking at the frequency of firms by sector and by supply chains, it is evidence that the majority of firms tend to contribute to the supply strictly related to its sector, and the participation to multiple supply chains is a rather rare event. For example, 85% of firms in "Food production" sector (NACE 10) declared to participate to the Agri-food supply chain [1].

[1] This is SC n. 1, defined as "Plant and animal production for human or animal consumption as food, beverages, and tobacco. Includes machinery and equipment dedicated to the supply chain, and pesticides."

Table 1 – Summary statistics, n. obs. 174,534

Variables	*Mean*	*SD*	*Min.*	*Max*
Green	0.38	0.38	0	1
AI-digital	0.04	0.04	0	1
SC	1.56	156	1	28
SC_EC	0.04	0.04	0	1
SC_IT	0.03	0.03	0	1
R&D investments	0.05	0.05	0	1
HK	0.62	0.62	0	1
Collaboration	0.52	0.52	0	1
Agreements	0.18	0.27	0	1
Governance	0.27	0.72	0	1
n. employees	47.99	515.11	2.5	120,215.9

Pair-wise correlations among selected variable in table 2 show that "Green" is related to all four regressors discussed before. As for the digital variable ("AI-Digital"), the positive and statistical significance of the correlation coefficient (0.140) recall the role of digital investments (and AI, specifically) as enabler of the sustainability transition (Montressor and Vezzani, 2023, Findik et al., 2023; Sjödin et al., 2023). As for the variables related to supply chains, the number ("SC") is positively correlated to sustainability, as pointed out in the SC management literature (Vachon and Klassen, 2008). AI use and the number of SC are positively correlated, although with a low coefficient (0.09), in line with the emerging literature on how AI may contribute to operation management (e.g. Mithas et al, 2022). The two specific supply chains (CE and IT) are positively correlated to sustainability, with different levels of strength. As expected, the contribution of the firm to circular economy supply chain is somewhat important for sustainability investments; also here the coefficient is not very high (0.106), probably due to the general low diffusion of CE supply chain in the sample. However, the firms that contribute to this supply chain are more engaged in sustainability. The contribution of the ICT supply chains is less strong for sustainability (0.038). Looking at the correlation for AI use, as expected, the correlation coefficient with "SC_EC" is even lower than for the number of SC, suggesting that the firms more engaged in the use of AI are not necessarily the ones that participate in the circular economy supply chain. Instead, such firms are more likely to contribute to ICT supply chain, as the correlation coefficient between AI-Digital and SC_IT is 0.08.

Table 2 – Selected pair-wise correlations

	Green	*AI-Digital*	*SC*	*SC_EC*	*SC_IT*
Green	*1*				
AI-Digital	*0.140***	*1*			
SC	*0.131***	*0.093***	*1*		
SC_EC	*0.106***	*0.029***	*0.318***	*1*	
SC_IT	*0.038***	*0.084***	*0.293***	*0.078***	*1*

*p-value<0.10 *; <0.05 **; <0.01 ****

Regression analyses of equations [1] and [2] allow to deepen such relations in a multivariate setting, as well as to assess the non-linearity of "SC". Table 3 shows the results of logit models for selected variables. The controls not shown are all positive and statistically significant, with the exception of "governance" that is never significant.

Model 1 in table 3 shows the results of estimating [1]. "AI-digital" is positive and significant, confirming the digital-for-green TT. The positive sign of "SC", and the negative sign of its squared term "SC^2" point to an inverse U-shaped relation with "Green". In line with our expectation, the exposure of the firm to multiple supply chains amplifies information sharing that can be used to improve product, process, and expertise related to sustainability. This multiple exposure can also entail compliance with environmental regulation of different supply chains, that ultimately stimulate investments in sustainability. At higher level of the number of supply chains to which the firms participate, the beneficial effects diminish and the effects of "SC" turns to negative, pointing to the difficulties of managing multiple SCs (Sarkis et al., 2019). Possible reasons for diminishing returns may be that the participation in many SCs brings higher coordination costs which may render information flows less present or less effective. In addition, additional SCs may also convey repetitive knowledge already accessed in other SCs. Finally, some regulations may be common to multiple SCs, therefore after a certain number of SCs the inducement-effect of law compliance may vanish.

Model 2 in table 3 shows the results of estimating [2]. "AI-digital" is positive and significant also in this setting. The two variables "SC_EC" and "SC_IT" are both positive and statistically significant. For the circular economy partners, this result points to the important role of green SC to foster sustainability, as highlighted by SC management literature (Aarikka-Stenroos et al., 2022). In particular, increased circularity requires the redesigning of technologies, products, services, operations, and business models. We also find that participation in the ICT supply can boost green transition. Digital technologies within supply chains are important enablers of sustainability investments (Schilling and Seuring,

2024). As observed in the pair-wise correlations, the effect of participation in circular economy supply chain is larger than the ICT supply chain, suggesting that, although present also for ICT SC, the linkage between CE SC and green investments is stronger.

Table 3 – Results: logit

DV: Green (1/0)	Model 1			Model 2		
	b	se	sig.	b	se	sig.
AI-digital	0.653	(19.50)	***	0.674	(20.17)	***
SC	0.124	(16.68)	***			
SC^2	-0.004	(8.54)	***			
SC_EC				0.717	(20.69)	***
SC_IT				0.075	(2.18)	**
Adj-R2		0.29			0.29	
Obs.		174,534			174,534	

*p-value<0.10 *; <0.05 **; <0.01 ****

Controls included: ln of n. employees, R&D investments, HK, Collaboration, Agreements, Governance, provincial and sectoral fixed effects.

Research limitations. The analysis provides valuable insights on how participating in supply chains is related to green transition, when also the digital transition is accounted for. However, some limitations apply. First, the cross-sectional data prevents us from providing any evidence of a causal relation. Second, endogeneity issues may arise, for example in the form of reverse causality: firms more engaged in green investments are more likely to participate in multiple supply chains to search for diverse inputs for their environmental activities, and specifically to engage with suppliers already operating within circular economy; similarly, the "greener" firms may be willing to search for IT inputs to sustain their activities, in line with the digital-for-green twin transition. Third, we discuss different mechanisms that explain why participation in multiple supply chains should increases the likelihood of sustainability investments, treating each supply chain as equal; however, supply chains differ in their greenness, hence the participation in specific supply chains may be more impactful than simple a higher number of supply chains. Unfortunately, we are not able to measure the environmental sustainability of the supply chains. Fourth, firms may participate in supply chains with different degree of integration, that may affect the amount and type of inputs they receive; yet, we are not able to measure how deep the firm is involved in the supply chain.

Managerial implications. The results suggest that participation in supply chains can be a powerful mechanism for accessing sustainability-related knowledge, technologies and practices, but that the benefits of such participation are not unlimited. Managers should therefore view supply chains not merely as transactional arrangements but as strategic environments for capability development, where collaboration with partners can facilitate the diffusion of environmental practices and digital solutions. At the same time, firms should be aware that excessive participation in multiple supply chains may generate coordination costs, managerial complexity and redundant knowledge flows that can hinder effective sustainability investments. Managers should therefore carefully balance the breadth of their supply chain relationships, prioritizing those partnerships that provide the most relevant technological and sustainability-related knowledge. Moreover, the study underscores the critical role of digital supply chains and ICT-related partnerships in supporting environmental sustainability. Participation in ICT supply chains can facilitate access to digital technologies that enable greener operations, such as smart energy management systems, digital twins, and AI-based optimization tools. Managers should therefore consider digital partnerships not only as drivers of operational efficiency but also as key enablers of environmental sustainability, supporting data transparency, emissions monitoring and resource optimization across supply networks. Finally, the findings suggest that successfully navigating the twin transition requires firms to strategically orchestrate both digital and environmental capabilities across their supply networks. Managers should therefore develop governance mechanisms that facilitate knowledge sharing, coordination and joint problem-solving with supply chain partners. In doing so, supply chains can evolve from simple coordination structures into platforms for collective capability building, enabling firms to respond more effectively to the technological and environmental challenges associated with the twin transition.

Originality of the paper. The study builds on firm-level literature on TT, and in particular, on the stream of literature that has looked at the digital-for-green relation (Montresor & Vezzani, 2003; Biggi et al. 2025). We extend this model by looking at the role of participation in supply chains. The literature on supply chain management has addressed the relation between supply chain and environmental performance (Bowen et al. 2001; Vachon & Klassen, 2008; Di Maria et al. 2022), since supply chain partners contribute to the development and adoption of new environmental practices, products/services, and provide complementary resources and capabilities (e.g. Cainelli et al., 2015; Kesidou & Demirel, 2012; Aarikka-Stenroos et al., 2022). Recent contributions have studied the role of SC in fostering sustainability, while accounting for digitalisation (Di Maria et al. 2022). However, the evidence on the role of supply chains in a twin transition context is less explored (an exception is e.g. Jia et al. 2025 for Chinese listed companies). This study advances the existing empirical evidence by showing that supply chains are important inputs for sustainability investments because of the

exposure to multiple sources of knowledge, practices, regulations etc. In addition to providing such evidence, the study addresses the issue of the non-linearity of this relation: the contribution of supply chain exposure diminishes at higher level, suggesting that the participation in supply chains entails also costs (e.g. coordination cost of diverse supplies/clients, risk of redundant knowledge, compliance cost for too many regulations). As third element of originality, this study addresses two specific supply chains that may affect green sustainability, the EC and the IT.

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Short papers

Track: Marketing



Agentic Commerce and the Future of FMCG Marketing: Managerial Perspectives from Emerging AI-Mediated Marketplaces

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Abstract. *The emergence of generative artificial intelligence and autonomous software agents is giving rise to an "agentic economy" in which AI systems increasingly act on behalf of consumers by interpreting preferences, navigating digital marketplaces, and executing transactions. By reducing communication frictions between consumers and firms, agentic technologies have the potential to fundamentally reshape market interactions and commercial ecosystems. This transformation is particularly relevant for the fast-moving consumer goods (FMCG) sector, where marketing strategies have traditionally relied on brand visibility and consumer engagement to influence purchase decisions. In an agent-mediated marketplace, however, AI agents may prioritize functional attributes such as price, ratings, availability, and delivery speed over traditional brand cues. This work-in-progress study explores the strategic implications of agentic commerce for FMCG marketing through qualitative interviews with senior managers from leading consumer goods companies across food and non-food categories. The study aims to identify emerging opportunities and challenges for FMCG firms as consumer decision processes increasingly become mediated by AI systems.*
Keywords: *agentic commerce; agentic economy; FMCG marketing strategy; AI-mediated consumer decision-making; AI in Marketing; Algorithmic Marketplaces.*

Framing of the research. Recent advances in generative artificial intelligence are enabling the emergence of what has been described as an "agentic economy", in which autonomous AI agents are increasingly capable of interpreting human intent, interacting with digital infrastructures, and executing complex tasks on behalf of users (Rothschild et al., 2025). In such an environment, consumers may rely on personal AI assistants to communicate preferences, search for information, evaluate alternatives, and interact with firms through automated digital systems. This shift has the potential to reduce communication frictions between consumers and businesses and to reorganize how market interactions occur (McKinsey, 2026). The growing diffusion of these technologies is giving rise to "agentic commerce", a new paradigm in which AI systems actively participate, or even autonomously conduct, key stages of the purchasing process (BCG, 2025). Rather than manually navigating digital interfaces, consumers may increasingly delegate activities such as product discovery, comparison, negotiation, and transaction execution to AI agents capable of scanning multiple platforms and identifying optimal choices based on user preferences and contextual information. In this sense, AI agents may become a primary interface between consumers and digital markets, potentially transforming how demand is expressed and how firms compete for visibility (Davenport et al., 2020).

Industry analyses suggest that the implications of this shift may extend beyond incremental improvements in digital commerce (McKinsey, 2025). AI agents embedded in consumer devices and digital ecosystems could fundamentally reshape how products and services are discovered, evaluated, and purchased, automating many of the activities traditionally performed by human consumers (McKinsey, 2026). As a result, purchasing processes may become increasingly mediated by algorithmic systems capable of continuously learning from user data and optimizing decisions across a wide range of alternatives. These developments raise important questions for marketing scholars and practitioners. In particular, when AI agents act as intermediaries between consumers and firms, the mechanisms through which brands attract attention and influence purchase decisions may change significantly. For instance, algorithmic systems may prioritize structured product attributes (such as price competitiveness, product ratings, delivery speed, and inventory availability) over traditional branding cues that typically influence human consumers (Alecsiou et al., 2025). Consequently, firms may need to rethink how marketing strategies, product information, and digital infrastructures are designed in order to remain visible and competitive in AI-mediated marketplaces.

These questions are particularly relevant in the fast-moving consumer goods (FMCG) sector, where purchasing decisions have historically been influenced by brand equity, packaging design, retail shelf visibility, and promotional activities. FMCG markets are characterized by frequent purchases, relatively low consumer involvement, and intense competition among brands operating in categories such as food, home care, and personal care. In such environments, brand recognition, retailer presence, and competition between national brands and private labels have traditionally played a crucial role in shaping consumer choice and category dynamics (Ailawadi & Keller, 2004; Dhar & Hoch, 1997).

However, if product discovery and evaluation are increasingly conducted by AI agents rather than human consumers, the sources of competitive advantage in FMCG markets may evolve. In agent-mediated marketplaces, product visibility may depend less on traditional communication strategies and more on how effectively firms structure and communicate product information to algorithmic systems (Alecsiou et al., 2025). At the same time, firms may need to develop new

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technological capabilities and digital infrastructures capable of interacting with AI-driven commerce ecosystems. Despite the growing relevance of these developments, academic research on the marketing implications of agentic commerce remains limited, particularly within the context of consumer goods industries. While existing studies have examined the use of artificial intelligence in marketing analytics (Davenport et al., 2020), personalization (Huang and Rust, 2021), and operational decision-making (Huang and Rust, 2021), less attention has been devoted to how autonomous AI agents may reshape consumer decision processes and competitive dynamics in consumer markets.

Against this background, this study explores how firms operating in FMCG markets perceive and interpret the emergence of agentic commerce and how they may adapt their marketing strategies in response to AI-mediated purchasing processes. By examining managerial perspectives from multinational consumer goods companies operating in food and non-food categories, the research aims to identify early strategic interpretations and emerging responses to a transformation that may significantly reshape the future of marketing management.

Purpose of the paper. Building on the emerging discussion on the agentic economy and AI-mediated marketplaces, the purpose of this study is to explore the strategic implications of agentic commerce for fast-moving consumer goods (FMCG) firms. While the growing diffusion of AI agents is expected to reshape how consumers search for, evaluate, and purchase products online, the consequences of this transformation for marketing management remain largely underexplored, particularly in industries characterized by frequent purchases, strong brand competition, and complex retail ecosystems. The FMCG sector provides a particularly relevant empirical context for investigating these dynamics. Traditionally, firms operating in categories such as food, home care, and personal care have relied heavily on brand equity, packaging design, retail visibility, and promotional strategies to influence consumer choice (Keller, 1993; Dhar & Hoch, 1997; Chandon et al., 2009). However, as product discovery and evaluation increasingly occur through AI-mediated systems, the mechanisms through which brands gain visibility and competitive advantage may evolve (Davenport et al., 2020; Huang and Rust, 2021). When AI agents act as intermediaries between consumers and firms, purchasing decisions may increasingly depend on how algorithmic systems interpret and compare product attributes such as price, ratings, availability, and delivery conditions.

Against this background, this work-in-progress study investigates how FMCG companies perceive and interpret the rise of agentic commerce and how they may adapt their marketing strategies in response to AI-mediated purchasing processes. In particular, the study focuses on managerial perspectives from multinational consumer goods firms operating across food and non-food categories, with the aim of capturing early strategic interpretations and emerging responses to this technological transformation.

More specifically, the research addresses the following questions:

- ***(RQ1)*** *How do FMCG managers interpret the emergence of agentic commerce and its potential implications for consumer purchasing processes?*
- ***(RQ2)*** *How might AI agents reshape traditional mechanisms of brand visibility and differentiation in AI-mediated marketplaces?*
- ***(RQ3)*** *What strategic and organizational responses are FMCG firms considering in order to adapt to agent-mediated commerce ecosystems?*

By addressing these questions, the study aims to generate early empirical insights into how marketing strategies, brand management practices, and digital infrastructures may evolve as AI agents become increasingly involved in consumer decision processes and digital commerce environments.

Methodology. Given the exploratory nature of the research and the limited academic literature on agentic commerce in FMCG markets, this study adopts a qualitative research design aimed at capturing managerial interpretations and emerging strategic responses to AI-mediated commerce.

The empirical investigation is based on semi-structured interviews with senior managers operating in the fast-moving consumer goods (FMCG) sector, covering both food and non-food categories. Interview participants are selected using a convenience sampling approach, leveraging the researchers' access to industry professionals working in multinational consumer goods companies. The current sample includes four top managers from global firms operating in food and nutrition markets (e.g., Nestlé and Mars) as well as companies active in home and personal care categories. Additional interviews with executives from leading FMCG companies are planned in the next phase of the research in order to further expand the empirical base and deepen the analysis. The four informants currently included in the sample hold senior-level positions (director or head level) in functions directly relevant to the research questions — namely marketing, digital transformation, and innovation — across firms operating in food and nutrition and home and personal care categories, ensuring strategic visibility on both consumer-facing activities and the digital infrastructures underpinning them. To preserve confidentiality, firms and informants are anonymized in the presentation of findings.

The interview protocol focuses on three main areas:

(1) managerial perceptions of the emergence of AI agents and agentic commerce,
(2) expected implications for consumer purchasing processes and brand visibility, and
(3) strategic responses that firms may adopt to remain competitive in AI-mediated marketplaces.

Interviews are conducted with managers involved in functions such as marketing, digital transformation, and innovation, allowing the study to capture different organizational perspectives on the role of AI in shaping future commerce ecosystems. The collected data will be analyzed through thematic analysis, following an inductive coding

approach aimed at identifying recurring themes, emerging strategic patterns, and managerial interpretations of agentic commerce within the FMCG sector. As this research is currently work in progress, the empirical material will continue to be expanded through additional interviews with industry managers in order to refine the emerging insights and develop a richer understanding of how FMCG firms are preparing for AI-mediated consumer markets. The three thematic blocks of the protocol map directly onto the three research questions: managerial perceptions of agentic commerce address RQ1, the expected implications for consumer purchasing processes and brand visibility correspond to RQ2, and the strategic responses considered by firms relate to RQ3. Within each block, open-ended questions invited informants to elaborate on their interpretations, supported by follow-up probes to deepen relevant themes as they emerged. Interviews are recorded, transcribed, and complemented with secondary industry sources discussing the diffusion of agentic commerce and AI-driven marketplaces in order to contextualize and triangulate the empirical insights. Data analysis follows the Gioia methodology for qualitative research (Gioia et al., 2013), which allows researchers to build theoretical insights grounded in informant perspectives while progressively developing higher-order interpretations through the iterative identification of first-order concepts, second-order themes, and aggregate dimensions.

Results. The thematic analysis surfaced three aggregate dimensions through which managers interpret the strategic implications of agentic commerce in FMCG markets. These dimensions, summarized in Table 1, are developed below as distinct analytical themes.

Consumer Disintermediation. A first dimension emerging from the interviews concerns the progressive insertion of AI agents between consumers and brands, which managers interpret as a structural shift in how demand is expressed. Informants describe a near future in which routine purchasing — particularly grocery replenishment and recurring household consumption — is increasingly delegated to AI assistants that interpret preferences, organize shopping, and execute transactions on behalf of users. As one informant observes, "consumers may increasingly rely on AI assistants to organize their shopping and evaluate alternatives," while another notes that "the interaction with the brand could happen through the AI assistant rather than through the consumer interface." This dynamic is read by managers as the convergence of two trends: the maturation of autonomous agents on the supply side, and the consolidation of convenience-driven consumption on the demand side. The implication is that the locus of consumer–brand interaction shifts away from the traditional consumer interface and toward an algorithmic intermediary — disintermediating not the retailer, as in earlier waves of digital commerce, but the consumer herself as the active decision-maker.

Algorithmic Re-encoding of Brand Value. A second dimension captures how managers expect competitive mechanisms to change when product evaluation is performed by algorithmic intermediaries rather than by human consumers. Informants consistently describe a transition from symbolic and affective brand cues — packaging, shelf prominence, promotional visibility — toward structured, machine-readable attributes. As one manager from the home and personal care category puts it, "an AI agent will compare products differently from a human consumer: price, ratings, delivery time," adding that "the traditional shelf advantage may not exist in algorithmic environments." Managers interpret this not as the disappearance of brand value, but as its translation into a different code: trust signals, certifications, structured nutritional or performance data, and aggregated consumer feedback become the new currency of competition. Brand equity, in this reading, is re-encoded into attributes that algorithmic systems can parse, rank, and compare, with consequences for how differentiation is achieved and sustained.

Agent-Readiness as Strategic Capability. A third dimension concerns the organizational and technological transformations that managers consider necessary to operate in AI-mediated marketplaces. Informants describe agent-readiness as a composite capability spanning data architecture, digital infrastructure, and cross-functional coordination. One manager emphasizes the need to "build a consumer-responsive system that anticipates demand and uses data to guide decisions," while another stresses that "brands will need structured product information that digital systems and AI can interpret." Managers interpret these requirements as going beyond incremental digitalization: they imply integrating marketing strategy with product data systems, interoperable APIs, and digital catalog architectures, while developing new competencies at the intersection of marketing, IT, and data functions. In this view, agent-readiness emerges as a strategic capability in its own right — a precondition for visibility and competitiveness in commerce ecosystems where algorithmic intermediaries, rather than human consumers, increasingly determine which products are surfaced and selected.

Table 1 - Preliminary Data Structure (in progress)

First-order evidence	***Second-order themes***	***Aggregate dimensions***
"Consumers may increasingly rely on AI assistants to organize their shopping and evaluate alternatives." (Nestlé manager)	*Delegation of shopping tasks to AI agents*	*Consumer Disintermediation*
"The interaction with the brand could happen through the AI assistant rather than through the consumer interface." (Nestlé manager)	*AI as intermediary in consumer–brand relationships*	*Consumer Disintermediation*
"Food purchasing is increasingly driven by convenience and speed. AI agents	*Automation of routine purchase decisions*	*Consumer Disintermediation*

could easily optimize these decisions." (Mars manager)		
"Consumers' lives are busier than ever and increasingly demand convenience and efficiency in food choices." (Mars manager)	*Acceleration of convenience-driven consumption*	*Consumer Disintermediation*
"An AI agent will compare products differently from a human consumer: price, ratings, delivery time." (Home & Personal Care manager)	*Algorithmic evaluation of product attributes*	*Algorithmic Re-encoding of Brand Value*
"The traditional shelf advantage may not exist in algorithmic environments." (Home & Personal Care manager)	*Reduced role of traditional visibility cues*	*Algorithmic Re-encoding of Brand Value*
"We need to build a consumer-responsive system that anticipates demand and uses data to guide decisions." (Danone manager)	*Data-driven responsiveness to consumer demand*	*Agent-Readiness as Strategic Capability*
"Brands will need structured product information that digital systems and AI can interpret." (Danone manager)	*Structured product data for AI systems*	*Agent-Readiness as Strategic Capability*

As the research is currently work in progress, additional interviews with managers from multinational FMCG firms will be conducted in the next phase of the study to further refine the emerging themes, strengthen the empirical evidence, and deepen the understanding of how companies across different FMCG categories are preparing for the transition toward AI-mediated commerce ecosystems.

Research limitations. This study presents several limitations that should be acknowledged. First, the research adopts a qualitative and exploratory design, which aims to generate early insights rather than provide generalizable findings. While this approach is appropriate given the novelty of agentic commerce, the results should be interpreted as indicative rather than conclusive.

Second, the empirical material relies on a convenience sampling strategy, based on the researchers' access to managers in multinational FMCG firms. Although the sample includes experienced professionals from leading companies operating in food (e.g., Nestlé and Mars) and non-food categories, it may not fully capture the diversity of perspectives across the broader FMCG ecosystem, including smaller firms, retailers, or digital platform providers.

Third, the study focuses on managerial perceptions and expectations regarding agentic commerce rather than on fully developed or widely implemented practices. As highlighted by recent industry reports, many organizations are still in the experimentation or pilot phases of adopting AI agents, with large-scale deployment remaining relatively limited. Consequently, the findings reflect how managers interpret an emerging technological transformation rather than how agentic commerce is currently shaping consumer behavior in practice.

Finally, the research concentrates on the FMCG sector, which may limit the transferability of insights to other industries characterized by different purchasing dynamics, product involvement, or decision-making processes. Future research could extend the analysis to other sectors and incorporate additional empirical evidence, including consumer-side perspectives and longitudinal data, to better understand how agentic commerce evolves over time.

Managerial implications. The emergence of agentic commerce raises profound implications for managers operating in consumer goods industries. As AI agents increasingly act as intermediaries between consumers and firms, the mechanisms through which products are discovered, evaluated, and purchased may fundamentally change. In the emerging agentic economy, interactions between consumers and businesses are expected to increasingly occur through autonomous digital agents capable of interpreting preferences, exchanging information, and completing transactions on behalf of users. This transformation suggests that market interfaces may progressively shift from consumer-facing digital environments toward AI-mediated ecosystems in which algorithmic agents play a growing role in organizing demand and mediating commercial interactions.

For FMCG managers, this transformation implies a shift from consumer-facing marketing to agent-facing marketing strategies. In traditional digital commerce environments, firms design marketing activities to capture the attention of human consumers across multiple touchpoints, including advertising, packaging, brand storytelling, and retail visibility. In contrast, in agent-mediated marketplaces, AI systems may increasingly influence or execute purchasing decisions by prioritizing structured product attributes such as price, ratings, availability, nutritional information, or delivery speed. Product visibility and competitiveness may therefore depend less on persuasive communication and more on how effectively brands structure and communicate machine-readable information to algorithmic intermediaries capable of scanning, comparing, and selecting products on behalf of consumers.

Second, the rise of agentic commerce requires FMCG firms to rethink the digital infrastructure of marketing and commerce systems. Industry analyses suggest that companies will increasingly need to develop "agent-ready" digital

ecosystems, including structured product data architectures, interoperable APIs, and commerce interfaces capable of interacting directly with AI agents. In such environments, product data quality, metadata completeness, and digital catalog structures may become key determinants of algorithmic visibility. For firms operating in highly competitive categories such as food, home care, and personal care, ensuring that product information can be accurately interpreted and compared by AI systems may therefore become a critical capability for maintaining market presence.

Third, agentic commerce may also alter the strategic role of brand management. While strong brands have traditionally relied on emotional engagement, symbolic meaning, and consumer recognition, algorithmic intermediaries may evaluate products according to more functional and comparable criteria. However, this does not necessarily imply the decline of branding. Rather, brand equity may evolve into a signal of trust, reliability, and credibility within AI-mediated decision environments. In contexts where AI agents increasingly filter and recommend products, trusted brands may still play a key role in shaping algorithmic recommendations, particularly when agents rely on indicators such as brand reputation, product reliability, or consumer feedback as signals of quality.

Finally, the findings suggest that managers must develop new organizational capabilities to operate in AI-mediated markets. Many companies are already experimenting with AI across supply chains, consumer analytics, and operations in order to build more responsive and data-driven organizations. However, the transition toward agentic commerce may require deeper organizational transformations, including closer collaboration between marketing, IT, and data teams and the development of new competencies related to algorithmic visibility, AI governance, and digital ecosystem management. In particular, firms may need to integrate marketing strategy with data architecture and digital infrastructure design in order to ensure that product information and brand signals remain visible and interpretable within AI-driven commerce systems.

While the aggregate implications of agentic commerce apply broadly across FMCG markets, the empirical insights suggest that their managerial relevance may vary across product categories. For example, in food markets, AI agents may increasingly support routine grocery purchasing decisions and optimize recurring consumption patterns, while in home and personal care categories algorithmic systems may place greater emphasis on functional product attributes such as performance indicators, product ratings, and comparative evaluations. Building on the aggregate dimensions emerging from the Gioia analysis, Table 2 summarizes below the main managerial implications of agentic commerce for FMCG firms and highlights key priorities for managers operating in food and non-food categories.

Table 2 - Managerial Implications of Agentic Commerce for FMCG Firms

Aggregate dimension (from Gioia analysis)	***Implications for FMCG marketing***	***Category-specific considerations***	***Managerial priorities***
Consumer Disintermediation	*Consumer journeys may increasingly be mediated by AI assistants that search, compare, and purchase products on behalf of users. Brand interactions may therefore occur through algorithmic intermediaries rather than directly with consumers.*	***Food**: AI agents may optimize recurring purchases such as grocery replenishment, where convenience and routine consumption are central (Mars, Nestlé insights).* ***Home & Personal Care**: agents may facilitate comparison of functional attributes such as product performance, sustainability, and price.*	*Structure product information for machine interpretation and improve digital product metadata to increase visibility in AI-mediated marketplaces.*
Algorithmic Re-encoding of Brand Value	*AI agents may evaluate products using structured attributes such as price, ratings, delivery speed, nutritional information, or performance indicators rather than traditional branding cues such as packaging or shelf visibility.*	***Food**: attributes such as ingredients, nutritional values, or dietary compatibility may become increasingly relevant in algorithmic comparisons (Danone insights).* ***Home & Personal Care**: product reviews and functional performance indicators may play a greater role in AI-driven recommendations.*	*Strengthen structured product data, ensure transparency of key product attributes, and optimize digital discoverability across commerce platforms.*
Agent-Readiness as Strategic Capability	*Competing in AI-mediated marketplaces requires infrastructures that allow AI systems to access and interpret product information*	***Food**: integration of demand forecasting, personalized nutrition data, and digital retail systems.* ***Home & Personal Care**:*	*Develop agent-ready infrastructures (APIs, digital catalogs, product data systems) and foster cross-functional collaboration*

	and interact with digital commerce ecosystems.	*product data standardization and interoperability with digital retail platforms.*	*between marketing, IT, and data teams.*

Taken together, these implications suggest that the rise of agentic commerce represents not only a technological shift but also a managerial transformation, requiring FMCG firms to rethink the foundations of marketing strategy in markets increasingly mediated by intelligent agents.

Originality of the paper. This study contributes to the emerging debate on AI and marketing in the context of the agentic economy by examining the implications of agentic commerce within the fast-moving consumer goods (FMCG) sector. While recent research has highlighted how autonomous AI agents may transform digital commerce by acting on behalf of consumers and reducing communication frictions between consumers and businesses, the marketing implications of this transformation remain underexplored in academic literature.

The originality of this research lies in bringing the concept of agentic commerce into the domain of FMCG marketing, a context in which purchasing decisions have historically been influenced by brand equity, packaging, retail visibility, and consumer engagement. Existing industry analyses suggest that AI agents may increasingly mediate product discovery and purchase decisions by prioritizing functional attributes such as price, ratings, and product availability. However, little research has examined how these dynamics may affect branding strategies and competitive positioning in consumer goods markets. Furthermore, the study adopts a managerial perspective grounded in qualitative insights from industry practitioners, including managers from multinational FMCG firms operating across food and home and personal care categories. By capturing how managers interpret and prepare for the rise of agentic commerce, the research provides early empirical insights into a phenomenon that is still emerging in practice.

In doing so, the paper responds to the growing call for research exploring the intersection between artificial intelligence and marketing strategy, particularly from a managerial perspective. By investigating how FMCG firms may need to rethink brand visibility, digital infrastructures, and strategic capabilities in AI-mediated marketplaces, the study contributes to understanding how marketing management may evolve in the era of agentic commerce.

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Algorithmic Recommendations and Consumer Decision-Making: Experimental Evidence from a Food Product Study

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Abstract. *Recommender systems have become a key component of digital marketing strategies, enabling firms to personalize consumer experiences and influence purchasing decisions. This study examines whether similarity-based recommendation mechanisms can affect consumer perceptions and substitution intentions. An experimental design was implemented in the food sector using biscuit products as a controlled consumption context. Participants evaluated four biscuits based on nine sensory attributes, including sweetness, chocolate intensity, crunchiness, and texture. A similarity analysis based on Euclidean distance was conducted to identify the product most comparable to a newly introduced biscuit, simulating the logic of a content-based recommender system. The results show that the recommended product was perceived as highly similar and that most participants were willing to accept the suggested substitution. These findings provide empirical evidence on the behavioral relevance of attribute-based recommendation mechanisms.*
Keywords: *recommender systems; algorithm; sensory; food; consumers; digital environment*

Framing of the research. *Recommender systems have become a central component of digital marketing strategies, significantly influencing consumer behavior and online purchasing decisions. As highlighted by Djakasaputra et al. (2021), digital marketing tools are increasingly used to enhance consumer engagement, increase sales, reduce costs, and strengthen brand image. Within this technological landscape, recommender systems represent one of the most impactful applications of artificial intelligence, as they enable firms to personalize interactions and influence purchasing decisions. Bachri et al. (2023) emphasize that digital marketing technologies affect customer satisfaction through their influence on purchase decisions, particularly when personalization mechanisms are effectively implemented.*

Personalization is widely recognized as a strategic advantage in electronic commerce. Wind and Rangaswamy (2001) introduced the concept of "customerization" arguing that digital environments allow firms to move from mass communication to individualized offerings. Postma and Brokke (2002) further explain that personalization improves performance by delivering immediate and relevant information to consumers, thereby increasing the likelihood of additional sales. Similarly, Srinivasan, Anderson, and Ponnavolu (2002) demonstrate that personalized online experiences strengthen customer loyalty and long-term engagement. In this context, recommender systems operationalize personalization by suggesting products based on user preferences, browsing history, or behavioral patterns. According to the e-Tailing Group (2003), the ability to provide tailored recommendations is one of the most promising tools for improving online retail performance. Recommendations may derive from user-generated content or algorithmic systems; West et al. (1999) note that both peer reviews and system-generated suggestions shape consumer perceptions and influence decision-making.

A foundational definition of recommender systems was proposed by Resnick and Varian (1997), who described them as systems that aggregate user input and deliver recommendations to potentially interested individuals. Their work highlighted the importance of collective intelligence in digital environments. Burke (2002) later expanded this definition, including a broader range of systems that suggest items regardless of the specific algorithmic mechanism employed. This evolution reflects the growing sophistication of recommendation technologies, which now rely on advanced data processing and predictive modeling techniques.

The literature identifies several typologies of recommender systems. Content-based filtering recommends items similar to those previously preferred by the user, relying on product attributes and individual interaction history. While this approach ensures high levels of personalization, it may limit exposure to diverse alternatives. Collaborative filtering, in contrast, is based on similarities among users, assuming that individuals with comparable behaviors will share preferences. Although highly effective in large datasets, collaborative filtering faces the "cold start" problem when limited data are available. To address these limitations, hybrid systems combine multiple techniques to enhance predictive accuracy and recommendation diversity. Additional models include knowledge-based systems, demographic-based systems, and utility-based systems, each designed to adapt recommendations to specific contexts and decision environments.

Beyond their technical functioning, recommender systems exert a significant influence on consumer behavior across the customer journey. Liu et al. (2022) underline how digital environments facilitate the sharing of reviews and opinions, which directly affect purchase intentions. Adam et al. (2022) further highlight the role of digital platforms in shaping brand image through interactive engagement. Recommender systems contribute to awareness by introducing new products, enhance engagement by increasing interaction time, and facilitate conversion by reducing uncertainty and

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perceived risk. Continuous personalization also reinforces loyalty by encouraging repeat purchases and long-term relationships with the brand.

From a psychological perspective, recommender systems reduce cognitive effort and simplify decision-making processes. By presenting curated options, they mitigate information overload and increase confidence in purchase decisions. At the same time, repeated exposure to specific products may influence the formation of preferences, suggesting that algorithms not only reflect but also shape consumer tastes. This dynamic reinforces their strategic relevance within digital marketing.

However, the literature also highlights important ethical and social implications. The extensive collection and processing of personal data raise concerns about privacy and trust. If consumers perceive data practices as intrusive or opaque, their confidence in the platform may decline. Furthermore, the lack of transparency in algorithmic processes—often described as "black box" systems—can affect perceptions of fairness and autonomy. Another concern relates to the potential creation of filter bubbles, where users are repeatedly exposed to similar products, limiting diversity and exploration. Algorithmic bias represents an additional structural risk, as systems trained on biased data may reproduce or amplify existing inequalities.

Overall, the literature demonstrates that recommender systems are powerful strategic tools capable of enhancing personalization, increasing customer satisfaction, and improving firm performance. Drawing on the foundational contributions of Resnick and Varian (1997) and Burke (2002), as well as the broader digital marketing framework discussed by Wind and Rangaswamy (2001), Postma and Brokke (2002), Srinivasan et al. (2002), Djakasaputra et al. (2021), Liu et al. (2022), Adam et al. (2022), and Bachri et al. (2023), it becomes evident that recommendation technologies play a crucial role in shaping modern consumption experiences. At the same time, their effectiveness must be balanced with ethical responsibility, transparency, and careful data management to ensure sustainable and trust-based relationships between firms and consumers. In terms of gaps: while recommender systems have been widely studied in online retail environments, less research has explored how attribute-based similarity recommendations influence consumer substitution behavior in offline experimental settings.

Purpose of the paper. *The primary objective of this study is to analyze the role and impact of recommender systems within digital marketing, with particular emphasis on their influence on consumer behavior and purchasing decisions. As digital environments become increasingly data-driven and personalized, understanding how algorithmic recommendation mechanisms shape consumer perceptions, preferences, and choices has become both academically relevant and strategically important for firms.*

This research aims to bridge the theoretical discussion on recommender systems with empirical evidence by examining how personalized suggestions affect consumers in a controlled experimental context. Specifically, the study seeks to investigate whether algorithm-based recommendations can meaningfully influence product evaluation, perceived similarity, and substitution intentions. By focusing on a practical application within the food sector, the research moves beyond abstract theoretical models and explores how recommendation logic operates in a real consumption setting.

Another key objective is to assess the feasibility and effectiveness of a simplified recommender system built on product similarity analysis. Through the evaluation of specific product attributes—such as sweetness, crunchiness, and texture—the study examines whether consumers are willing to substitute a new product with a recommended alternative that shares similar characteristics. This approach allows for a deeper understanding of how attribute-based filtering mechanisms may guide consumer decisions.

Ultimately, the study aims to contribute to the broader academic debate on the behavioral impact of digital personalization tools. By combining theoretical insights with experimental findings, the research seeks to evaluate not only the technical applicability of recommender systems but also their practical implications for consumer autonomy, decision-making processes, and marketing strategy development.

Methodology. *This study adopts an experimental research design to evaluate the impact and feasibility of a simplified recommender system based on product similarity. The research focuses on the food sector, specifically on different types of biscuits, in order to simulate a realistic consumer choice context while maintaining control over product attributes.*

The experimental approach is based on the collection of primary data through a structured questionnaire. Participants were asked to evaluate four different biscuit products: three well-known products (Gocciole, Gocciolotti, and Frollini) and a new product (Grottoli). The objective was to analyze perceived similarity between the new product and the existing ones, simulating the logic of a content-based recommender system.

The evaluation was conducted using nine analytical variables representing key sensory and product characteristics: sweetness, chocolate intensity, crunchiness, butteriness, hardness, compactness, texture consistency, dryness, and saltiness. Respondents expressed their assessments using a rating scale, allowing for quantitative comparison across products. These attributes were selected to reflect measurable and comparable product features, enabling the construction of a similarity analysis based on aggregated consumer perceptions.

Following data collection, a similarity analysis was performed to determine which of the three existing products was most comparable to the new product (Grottoli). The similarity comparison was conducted by analyzing the average ratings assigned to each attribute and measuring the distance between products across the nine variables. The product with the smallest overall difference in attribute ratings was identified as the most similar alternative.

Based on these results, a simplified recommender system logic was simulated: if Grottoli were unavailable, the system would recommend the product with the highest similarity score. To evaluate the practical applicability of this mechanism, participants were asked whether they would consider substituting Grottoli with the recommended product. This step allowed for the assessment of substitution intention and perceived acceptability of algorithm-based recommendations.

The methodology therefore integrates quantitative similarity analysis with behavioral evaluation, linking algorithmic logic to consumer decision-making processes. By focusing on attribute-based comparison, the study replicates the functioning of a content-based filtering system in a controlled experimental setting. This approach makes it possible to examine not only the technical feasibility of recommendation mechanisms but also their influence on consumer perceptions and purchase intentions.

Overall, the chosen methodology ensures internal consistency between theoretical framework and empirical investigation, providing measurable evidence on how recommender systems may guide product substitution decisions in a realistic consumption context.

Results. *The experimental design consisted of three main phases: the initial sensory evaluation of three biscuit products, the introduction of a fourth product for comparative analysis, and the validation of the recommendation through a substitution willingness assessment. The overall objective was to identify the biscuit most similar to the newly introduced product and to determine whether consumers would accept the recommendation generated through the similarity analysis. The experiment involved 60 participants, who were asked to evaluate three different biscuit products. The biscuits considered in the first stage of the experiment were:*

Gocciole (Pavesi – Barilla Group)

Gocciolotti (Balocco)

Frollini with chocolate chips (Le Bon – MD supermarkets)

Participants were required to taste the biscuits while blindfolded in order to minimize brand influence and avoid biases related to packaging, marketing, or brand reputation. This methodological choice ensured that the evaluations were based solely on the sensory characteristics of the products rather than on external cues.

Each participant evaluated the biscuits according to nine analytical sensory attributes: Sweetness- Chocolate flavor intensity- Crunchiness- Butteriness- Hardness- Compactness- Texture consistency- Dryness- Saltiness. The ratings were collected through a structured questionnaire using numerical scales that allowed participants to assign a score to each attribute.

Sensory Evaluation of the Initial Biscuit Set

After collecting the responses from participants, the dataset was organized and prepared for statistical analysis. The first step consisted of computing the average score for each sensory attribute for every biscuit. These averages represent the collective perception of the product characteristics among the respondents. The calculation of these averages was performed using the statistical software RStudio, which allowed efficient manipulation and processing of the dataset.

The mean values obtained represent the aggregated sensory profile of each biscuit. These profiles serve as the basis for the similarity comparison conducted in the following phase of the analysis. The descriptive statistics generated from the dataset made it possible to observe the general sensory tendencies associated with each product. Some biscuits displayed higher levels of sweetness or chocolate flavor, while others showed different structural characteristics such as greater crunchiness or dryness. Such variations are important because they form the basis of the similarity analysis that underpins the recommendation system developed in the study.

Introduction of the Fourth Biscuit and Data Collection

In the second phase of the experiment, a new biscuit was introduced into the analysis: Grottoli, produced by Divella. The objective of introducing this fourth product was to test whether it could be recommended to consumers based on its sensory similarity to the biscuits previously evaluated. To ensure methodological consistency, the Grottoli biscuit was presented to a subset of participants who had already taken part in the initial evaluation. Specifically, the second questionnaire was administered to the first 20 participants from the initial sample.

As in the previous tasting session, participants were blindfolded during the sensory evaluation to prevent brand recognition or visual cues from influencing their judgments. Participants were again asked to evaluate the product according to the same nine sensory attributes used in the first phase. Maintaining the same evaluation criteria ensured that the data collected were directly comparable with the evaluations of the other biscuits. This methodological approach allowed the researchers to generate a sensory profile for Grottoli biscuit and subsequently compare it with those of the other products included in the study.

Fig.1: The 4 kinds of biscuits



Similarity Analysis Between Biscuit Products

After obtaining the mean sensory profiles for all biscuits, the next step consisted of measuring the degree of similarity between the Grottoli biscuit and the other products.

The comparison was performed using Euclidean distance, a mathematical measure commonly used in data analysis to determine the similarity between vectors. In this context, each biscuit was represented as a vector containing the mean scores of the nine sensory attributes. The Euclidean distance between two biscuits can therefore be interpreted as the overall difference between their sensory profiles. A smaller distance indicates a higher level of similarity between the two products. The similarity analysis was conducted through three pairwise comparisons:

Gocciole vs Grottoli
Gocciolotti vs Grottoli
Frollini MD vs Grottoli

Each comparison involved extracting the relevant variables from the dataset and computing the mean values for the two biscuits being analyzed. The resulting vectors were then used to calculate the Euclidean distance.

Similarity Between Gocciole and Grottoli

The first comparison examined the relationship between Biscuit 1 (Gocciole) and Biscuit 4 (Grottoli).

The mean sensory values for Gocciole were calculated for all nine attributes, producing the following profile:

Sweetness: 4.60
Chocolate flavor: 4.90
Crunchiness: 5.00
Butteriness: 4.45
Hardness: 4.25
Compactness: 5.70
Consistency: 6.00
Dryness: 2.85
Saltiness: 1.70

These values reflect the average perception of the biscuit's sensory characteristics among the participants.

The Grottoli biscuit, by contrast, displayed a different sensory profile:

Sweetness: 6.10
Chocolate flavor: 3.55
Crunchiness: 4.45
Butteriness: 4.90
Hardness: 4.55
Compactness: 4.95
Consistency: 5.00
Dryness: 3.00
Saltiness: 2.90

The Euclidean distance between the two vectors was calculated using RStudio. The resulting value indicated a moderate level of similarity between the two biscuits, suggesting that while they share some sensory characteristics, their overall profiles are not identical.

Formula of the Euclidean distance: $$d(P,Q) = \sqrt{\sum_{i=1}^{n}(q_i - p_i)^2}$$

The Euclidean distance between Gocciole and Grottoli sensory vectors was 2,7735.

Similarity Between Gocciolotti and Grottoli

The second comparison involved Biscuit 2 (Gocciolotti) and Biscuit 4 (Grottoli).
The average sensory profile for Gocciolotti was as follows:

Sweetness: 5.65
Chocolate flavor: 5.10
Crunchiness: 4.30
Butteriness: 4.65
Hardness: 4.15
Compactness: 4.20
Consistency: 4.30
Dryness: 3.00
Saltiness: 3.05

The Euclidean distance between Gocciolotti and Grottoli sensory vectors was calculated and resulted in a value of 1.9812, which was lower than the distances observed in the other comparisons.

This result indicates that Gocciolotti is the biscuit whose sensory characteristics most closely resemble those of Grottoli. In practical terms, this means that the two products share a highly similar sensory profile across the nine attributes considered in the study.

Similarity Between Frollini MD and Grottoli

The third comparison examined the relationship between Biscuit 3 (Frollini) and Biscuit 4 (Grottoli).
The mean sensory profile of Frollini was:

Sweetness: 6.15
Chocolate flavor: 6.70
Crunchiness: 4.65
Butteriness: 5.20
Hardness: 4.40
Compactness: 3.55
Consistency: 3.50
Dryness: 3.10
Saltiness: 4.15

The Euclidean distance between Frollini MD and Grottoli sensory vectors was calculated as 3.9825, which represents a substantially higher value compared to the other comparisons. This result suggests that Frollini is the biscuit that differs the most from Grottoli among the products considered.

Summary of Similarity Results

The comparison of Euclidean distances across the three product pairs revealed a clear ranking of similarity.

Among the biscuits analyzed, Gocciolotti demonstrated the highest degree of similarity to Grottoli, as indicated by the smallest Euclidean distance value. This finding implies that, from a sensory perspective, consumers who appreciate Gocciolotti might also find Grottoli to be a satisfactory alternative.

Comparison	*Euclidean Distance*
Gocciole – Grottoli	*2,7735*
Gocciolotti – Grottoli	*1.9812*
Frollini – Grottoli	*3.9825*

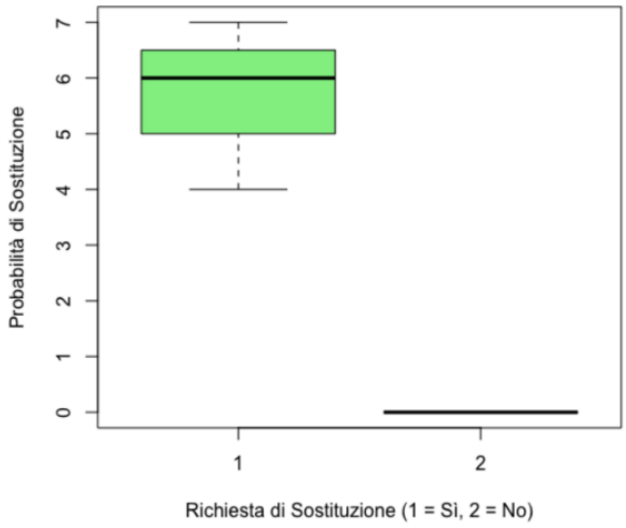
The results clearly show that the second biscuit represents the closest match to the fourth product.

Feasibility Analysis of the Recommendation System

After identifying Gocciolotti as the biscuit most similar to Grottoli, the final stage of the experiment aimed to test the practical feasibility of the recommendation system. Participants who had initially expressed a preference for Gocciolotti were selected for a follow-up test. These individuals were invited to taste both the Grottoli biscuit and the Gocciolotti biscuit and were subsequently asked whether they would consider replacing their preferred product with the recommended alternative. The responses were recorded in a dedicated dataset and analyzed using RStudio.

The analysis involved computing the absolute frequency of substitution responses, which indicated how many participants were willing to replace their preferred biscuit with the recommended product.

Fig.1. Frequency distribution of substitution responses



Source: Our own elaboration

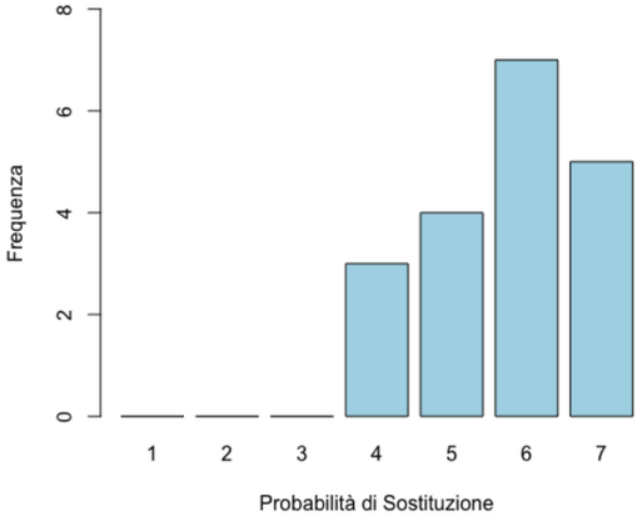
Distribution of Substitution Probability

In addition to the binary substitution responses, participants were also asked to rate the probability of substitution on a scale from 1 to 7, where higher values indicated a greater willingness to accept the recommended product.

The distribution of these responses was visualized through a bar chart generated in RStudio.

The results showed that the highest frequencies corresponded to the values 6 and 7, indicating a relatively strong willingness among participants to accept the substitution. This result provides empirical support for the hypothesis that similarity-based recommendation systems may influence consumer acceptance of alternative products.

Fig. 2 – Probability distribution of substitution ratings



Source: Our own elaboration

Research limitations. *This study should be interpreted as an exploratory proof-of-concept and therefore presents several limitations. First of all, the sample size is relatively small, particularly in the second phase of the experiment, which limits the generalizability of the findings and calls for caution in extending the results to broader consumer populations. Future studies should replicate the analysis on larger and more heterogeneous samples in order to strengthen external validity. The experimental setting- furthermore- was intentionally simplified to isolate the role of sensory similarity in substitution decisions. Participants evaluated products exclusively on the basis of sensory attributes, while other factors that typically influence consumer choice in real market environments—such as price, brand reputation, packaging, promotions, availability, and prior loyalty—were deliberately excluded. As a consequence, the findings do not capture the full complexity of actual purchasing behavior, but rather identify the potential behavioral relevance of attribute-based similarity under controlled conditions. In addition, the similarity analysis relies on aggregated mean ratings across attributes rather than on individual-level preference structures. While this choice is consistent with the exploratory*

purpose of the study and allows for a clear simulation of a simplified content-based recommendation logic, it may mask heterogeneity in consumer tastes and attribute salience. Future research could address this issue by employing individual-level weighting schemes, segmentation procedures, or more advanced predictive models able to account for preference variability. Last but not least, the study does not test a recommender system in a live digital environment, but simulates a recommendation mechanism through attribute-based product comparison in an experimental context. For this reason, the results should not be interpreted as a full validation of recommender systems in online retail platforms; rather, they provide preliminary evidence that perceived product similarity may support substitution acceptance. Further research should extend this framework to real or simulated digital choice environments in order to assess its ecological validity more fully.

Managerial implications. *The results of this study confirm the practical applicability of a simplified content-based recommender system based on product attribute similarity. The empirical analysis demonstrates that it is possible to identify a substitute product through the comparison of sensory characteristics and that this similarity is reflected in consumers' substitution intentions. The findings show that Grottoli is perceptually closest to Gocciolotti and that a majority of respondents declared their willingness to accept the suggested alternative if the original product were unavailable. This indicates coherence between the similarity calculation and consumer behavioral response. The recommendation logic applied in the study therefore appears consistent with actual consumer evaluations.*

The analysis also highlights that certain attributes, such as sweetness and chocolate intensity, contributed more significantly to perceived similarity, as reflected in the comparison of mean values across products. This suggests that similarity based on concrete and measurable product characteristics can effectively support substitution decisions.

From a practical perspective, the study indicates that companies may reduce the negative effects of product unavailability by recommending alternatives that share similar sensory attributes. The results therefore support the feasibility of applying structured attribute analysis in the development of recommendation mechanisms within the food sector.

Originality of the paper. *The study applies recommendation logic to the concept of product substitution in the food sector, an area that has received comparatively less attention in the recommender systems literature. By empirically linking similarity measurement to substitution intention, the research provides a concrete behavioral validation of content-based filtering mechanisms.*

The use of sensory attributes as measurable variables to simulate algorithmic recommendation also represents an innovative methodological contribution, bridging marketing research and algorithmic modeling in a controlled experimental framework.

The study contributes to the literature by linking algorithmic similarity analysis with consumer behavioral responses, providing experimental evidence on how content-based recommendation mechanisms may shape product substitution decisions.

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Antropomorfismo visivo, stile comunicativo e tipologia di prodotto come determinanti dell'intenzione d'acquisto: verso un principio di coerenza tri-dimensionale nella progettazione degli assistenti virtuali

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Abstract. *Il lavoro esamina come la coerenza tra antropomorfismo visivo dell'assistente virtuale, stile comunicativo e tipologia di prodotto influenzi l'intenzione di acquisto del consumatore. Attraverso una ricognizione della letteratura e l'analisi esplorativa di due casi aziendali – Amazon Rufus e Qatar Airways Sama – lo studio evidenzia che non esiste un assistente virtuale universalmente efficace, poiché la sua efficacia dipende dall'allineamento tra le caratteristiche dell'agente e la natura utilitaristica o edonistica dell'offerta. Il lavoro formula tre proposition e propone un principio di coerenza tri-dimensionale come criterio progettuale per gli assistenti virtuali nei contesti di vendita, da verificare nella successiva fase sperimentale della ricerca. Il paper si configura come contributo teorico preliminare all'interno di un progetto di ricerca più ampio attualmente in corso.*
Keywords: *assistenti virtuali; antropomorfismo visivo; stile comunicativo; intenzione di acquisto; prodotti edonistici; prodotti utilitaristici*

Framing of the research. L'utilizzo di assistenti virtuali basati sull'intelligenza artificiale nelle relazioni con i clienti si sta rapidamente diffondendo in numerosi settori, dalla cura della salute (Bavaresco et al., 2020; Laranjo et al., 2018; Montenegro et al., 2019) al retail (Dangol, Rind, 2024; Jan et al., 2023; Kim, Hur, 2023; Leung, Yan Chan, 2020). Ciò ha stimolato un crescente interesse degli studiosi volto a comprendere in che modo questi agenti possano influenzare il comportamento del consumatore. Dai semplici chatbot testuali fino ai digital human fortemente somiglianti agli esseri umani, gli assistenti virtuali operano lungo un ampio spettro di configurazioni visive e comunicative, ponendo una questione centrale su cosa renda efficace un assistente AI nel processo d'acquisto. Alcune ricerche hanno evidenziato come la progettazione di specifici aspetti di un agente conversazionale – tra cui il suo antropomorfismo visivo (cioè il grado in cui un agente non umano incorpora elementi visivi tipicamente umani, tali da evocare una percezione di umanità in chi interagisce), i suoi segnali comportamentali e i tratti identitari – possa influenzare percezioni e comportamenti dei consumatori (Pavone et al., 2023). In particolare, Go e Sundar (2019) hanno dimostrato che i segnali di umanizzazione, siano essi visivi, identitari o comunicativi, plasmano la percezione che i consumatori hanno dei chatbot e influenzano la loro disponibilità a interagire. La ricerca, basandosi sulla teoria della violazione delle aspettative di Burgoon ed Hale (1988), evidenzia altresì che l'incoerenza tra l'aspetto di un agente e il suo comportamento comunicativo genera effetti negativi sul consumatore, tra cui la riduzione della fiducia e il disagio percepito.

La review di Cihodaru-Ștefanache e Podina (2025) ha precisato che questo effetto di incoerenza emerge non soltanto dall'aspetto fisico dell'agente, ma anche dal disallineamento tra caratteristiche visive e comportamento comunicativo, ed è tanto più pronunciato quanto più alto è il grado di antropomorfismo visivo. Pertanto, se un agente appare fortemente umano genera aspettative elevate nel consumatore; ma qualora non comunichi in modo coerente con tale aspetto, gli utenti sperimentano incoerenza cognitiva, riduzione della fiducia e tendenza all'evitamento. Tale meccanismo si ricollega al fenomeno della uncanny valley (Mori et al., 2012; Wang et al., 2015), che descrive il disagio che gli utenti provano quando interagiscono con agenti che si avvicinano eccessivamente all'aspetto umano senza raggiungere un livello di realismo convincente.

Sul piano delle dimensioni valutative, Belanche et al. (2021) hanno dimostrato empiricamente, in un contesto di robot fisici, che la competenza percepita genera valore funzionale mentre il calore percepito genera valore emotivo. Questa distinzione suggerisce che il profilo comportamentale di un agente – ovvero se proietta prevalentemente competenza o calore – determina il tipo di valore che esso offre al consumatore. Zourrig et al. (2025), in un contesto di virtual influencer su Instagram, hanno ulteriormente precisato che le dimensioni di calore e competenza mediano il legame tra antropomorfismo visivo e social presence, e quindi l'intenzione d'acquisto: un agente con elevato antropomorfismo evoca attese di calore e competenza che, se confermate, attivano la presenza sociale e sostengono le intenzioni comportamentali. Altre ricerche hanno esteso questa logica alla dimensione comunicativa degli agenti AI. Cai et al. (2024) hanno identificato due distinti stili comunicativi nelle interazioni con i chatbot: uno stile task-oriented, caratterizzato da dialogo formale, orientato agli obiettivi ed efficiente, e uno stile social-oriented, caratterizzato da comunicazione personalizzata, empatica e relazionale. I loro risultati mostrano che lo stile social-oriented genera percezioni più elevate di calore e, di conseguenza, maggiore soddisfazione nell'interazione, fiducia e intenzione di acquisto nel contesto del recupero da service failure. Chen et al. (2025), attraverso una serie di studi sperimentali sui robot, hanno dimostrato che lo stile social-

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oriented genera una maggiore propensione all'uso rispetto allo stile task-oriented, con le emozioni positive come variabile mediatrice di questa relazione. Il tipo di servizio modera l'intensità di questo effetto: la mediazione delle emozioni positive è significativamente più forte in contesti edonistici che in contesti utilitaristici, sebbene lo stile social-oriented risulti superiore al task-oriented in entrambi i contesti.

Un'ulteriore dimensione rilevante è rappresentata dalla natura del prodotto. In letteratura, la distinzione tra prodotti utilitaristici ed edonistici è consolidata: i prodotti utilitaristici sono caratterizzati da attributi funzionali e strumentali, rispondono a bisogni pratici e attivano una modalità di elaborazione prevalentemente cognitiva e razionale; i prodotti edonistici sono invece associati ad attributi esperienziali, sensoriali ed emotivi, e attivano una modalità di elaborazione affettiva (Batra e Ahtola, 1991; Voss et al., 2003). Longoni e Cian (2022) hanno dimostrato che la preferenza dei consumatori per raccomandazioni generate dall'AI varia in funzione della natura utilitaristica o edonistica del prodotto. Per i prodotti utilitaristici i consumatori si fidano delle raccomandazioni da parte di un agente AI, percepito come razionale e logicamente valutante; per i prodotti edonistici preferiscono invece gli umani, ritenuti più adatti a valutare attributi esperienziali. Ciò non implica che l'AI sia strutturalmente inadatta ai contesti edonistici, ma evidenzia la sfida di ridurre la distanza percepita tra l'agente AI e l'umano attraverso scelte di aspetto e comportamento comunicativo coerenti con le aspettative affettive del consumatore.

In coerenza con questi risultati, Lan et al. (2024), attraverso una serie di studi sperimentali su assistenti vocali AI, hanno dimostrato che gli utenti esprimono una maggiore intenzione di continuare a utilizzare l'assistente quando lo stile linguistico è congruente con il contesto di servizio: il linguaggio astratto è preferito in contesti a dominanza edonistica, mentre il linguaggio concreto è più efficace in contesti a dominanza utilitaristica. Questo effetto è mediato dalla processing fluency, ovvero dalla facilità percepita nell'elaborare le risposte dell'agente. La corrispondenza tra stile linguistico e contesto di servizio genera quindi un effetto di congruità che migliora la valutazione dell'assistente e la propensione al suo uso continuativo. Murtaza et al. (2024), attraverso tre studi sperimentali condotti su campioni statunitensi, hanno esaminato il ruolo dello stile comunicativo del chatbot (task-oriented vs. social-oriented), della complessità del task e della brand personality sulla fiducia del consumatore e sull'intenzione d'uso. I risultati mostrano che lo stile task-oriented genera maggiore fiducia in condizioni di alta complessità del task, e che l'antropomorfismo percepito media il legame tra stile comunicativo e intenzione d'uso. Questo studio, pur offrendo evidenze rilevanti sul ruolo congiunto di stile comunicativo e antropomorfismo percepito, non considera la natura edonistica o utilitaristica del prodotto né la dimensione visiva dell'agente.

Purpose of the paper. Gli studi sopra menzionati, pur evidenziando aspetti rilevanti della progettazione degli assistenti virtuali, non propongono un'analisi che consideri la sinergia tra dimensione visiva, stile comunicativo e natura del prodotto. Go e Sundar (2019) dimostrano che la coerenza tra antropomorfismo visivo e comportamento comunicativo è una condizione necessaria per non violare le aspettative dell'utente, ma non specificano quale stile comunicativo sia più efficace in relazione alla natura del prodotto. Cai et al. (2024) si concentrano sugli stili comunicativi e ne dimostrano l'efficacia, ma non li collegano né alla natura del prodotto né alla dimensione visiva dell'agente. Murtaza et al. (2024) offrono evidenze sul ruolo congiunto di stile comunicativo e antropomorfismo, operazionalizzato però come costrutto percepito, non come dimensione visiva di design, e intenzione d'uso, senza considerare la natura edonistica o utilitaristica del prodotto. Longoni e Cian (2022) analizzano la preferenza per la fonte della raccomandazione (AI vs. umano), in relazione alla tipologia di prodotto (edonistica vs. utilitaristica), ma non lo stile comunicativo dell'agente. Nessuno di questi studi ha testato in modo integrato la triplice relazione tra antropomorfismo visivo, stile comunicativo e tipologia di prodotto come determinanti congiunte dell'intenzione d'acquisto.

Alla luce di questo gap, il presente studio – in fieri e parte di un più ampio progetto di ricerca – si propone di esplorare il grado di antropomorfismo visivo dell'agente, il suo stile comunicativo e la natura del prodotto venduto come determinanti interdipendenti dell'efficacia dell'assistente virtuale sul comportamento del consumatore. La domanda di ricerca è la seguente:

RQ: Quale effetto esercita la sinergia tra antropomorfismo visivo, stile comunicativo e tipologia di prodotto sull'intenzione di acquisto del consumatore?

Il lavoro mira a dimostrare che non esiste un assistente virtuale universalmente efficace e che l'efficacia dipende dalla coerenza tra i tre elementi considerati. Si ritiene che tale coerenza non sia semplicemente auspicabile, ma costituisca una condizione necessaria per massimizzare l'intenzione d'acquisto.

Methodology. Lo studio adotta metodologie differenti nelle due fasi principali del disegno di ricerca. Il presente manoscritto appartiene alla prima fase, di natura logico-deduttiva, in cui è stata condotta un'analisi esplorativa della letteratura e un'analisi di due casi aziendali significativi per le differenti caratteristiche dell'assistente virtuale impiegato: Amazon, con l'assistente Rufus, e Qatar Airways, con l'assistente Sama.

L'analisi dei casi è stata condotta, in questa fase iniziale, attraverso fonti secondarie: report e statistiche aziendali, articoli, comunicati stampa e dati forniti da UneeQ. Si tratta di risultati parziali e preliminari: nel prosieguo della ricerca, l'analisi sarà completata mediante fonti primarie, tra cui interviste a manager aziendali e a consumatori, al fine di comprendere la strategia di progettazione dell'assistente in relazione al posizionamento aziendale e la percezione dei consumatori sull'interazione con l'agente.

La scelta dei due casi, che si riferiscono a tipologie di prodotto differenti – prevalentemente utilitaristico (Amazon) e prevalentemente edonistico (Qatar Airways) – consente di osservare scelte aziendali contrastanti e di sviluppare la riflessione, giungendo alla formulazione di proposition da testare nella seconda fase.

La seconda fase prevede un disegno sperimentale 2×2×2 con variabili manipolate come segue:

- Antropomorfismo visivo: basso livello (assenza di indizi visivi antropomorfi) vs. alto livello (elevata somiglianza all'essere umano);
- Stile comunicativo: task-oriented vs. social-oriented;
- Tipologia di prodotto: utilitaristico vs. edonistico.

Da questa articolazione derivano otto condizioni sperimentali che consentono di confrontare configurazioni coerenti e incoerenti rispetto alla natura del prodotto. La variabile dipendente principale sarà l'intenzione d'acquisto; variabili dipendenti secondarie, quali la competenza percepita e il calore percepito, saranno inserite come mediatori per testare non solo se la coerenza funziona, ma anche perché funziona – colmando così una lacuna metodologica segnalata dalla letteratura (Belanche et al., 2021; Zourrig et al., 2025). Ai partecipanti sarà chiesto di esporsi a specifici scenari di interazione con l'assistente virtuale e di esprimere le proprie valutazioni successive. In tal modo, sarà possibile accertare empiricamente se l'efficacia dell'assistente virtuale derivi non da singoli attributi assunti isolatamente, bensì dalla coerenza complessiva tra dimensione visiva, stile comunicativo e tipologia di prodotto, e se tale coerenza rappresenti una condizione necessaria per favorire l'intenzione di acquisto.

Results. L'analisi della letteratura ha evidenziato l'importanza di due fattori che caratterizzano la progettazione degli assistenti virtuali: il grado di antropomorfismo visivo, che può variare dall'assenza totale di indizi visivi antropomorfi fino all'elevata somiglianza all'essere umano; e lo stile comunicativo, che può essere task-oriented, se l'assistente si concentra a fornire informazioni in modo formale ed efficiente, oppure social-oriented, se risulta empatico e orientato alla relazione. (Cihodaru-Ștefanache, Podina, 2025; Go, Sundar, 2019) Tali elementi devono essere considerati non solo in modo coerente tra loro, ma anche in coerenza con la natura edonistica o utilitaristica del prodotto.

Il caso Amazon – Rufus. Lanciato nel luglio 2024 e integrato direttamente nell'app e nel sito di e-commerce di Amazon, Rufus è un assistente chatbot con assenza di indizi visivi antropomorfi (nessun volto, nessun corpo, nessuna voce), presentando esclusivamente un'icona astratta e una finestra di dialogo testuale. Lo stile comunicativo è task-oriented: sintetico, diretto, formale, privo di small talk. Ogni risposta è orientata al completamento della transazione; la prima cosa che Rufus chiede all'utente è "Per cosa hai bisogno di aiuto oggi?", senza alcun saluto.

Questa configurazione risulta coerente con il marketplace utilitaristico di Amazon, dove il consumatore arriva con un bisogno preciso e vuole trovare il prodotto giusto al prezzo giusto nel minor tempo possibile. Questo attiva una modalità valutativa razionale in cui la competenza percepita dell'assistente vale più del calore "umano". La coerenza tra basso antropomorfismo visivo e stile task-oriented risponde efficacemente a questa aspettativa.

I risultati commerciali, seppure non attribuibili esclusivamente all'assistente virtuale e da interpretare con la cautela metodologica necessaria in assenza di un termine di confronto rigoroso, sono indicativi: secondo quanto riportato da PYMNTS (2026), il CEO Andy Jassy ha dichiarato che nel 2025 circa 300 milioni di clienti hanno utilizzato Rufus; i clienti che interagiscono con l'assistente durante il processo d'acquisto hanno il 60% di probabilità in più di completare una transazione rispetto a chi non lo utilizza. Nel corso del 2025, Rufus ha contribuito a generare vendite incrementali per circa 12 miliardi di dollari (Ebrun, 2026). Durante il Black Friday 2025 le sessioni con Rufus hanno rappresentato circa il 40% del totale ma hanno generato il 66% degli acquisti, con un tasso di conversione pari a 3,5 volte quello delle sessioni senza assistente (The Drum, 2026).

Il caso Qatar Airways – Sama. Sama è una digital human sviluppata dalla società americana UneeQ, accessibile attraverso Qverse, la piattaforma virtuale di Qatar Airways. Il suo grado di antropomorfismo visivo è elevato: presenta un volto umano realistico con micro-espressioni facciali in tempo reale, gestualità naturale, battito delle ciglia, lievi movimenti del capo anche in ascolto, voce espressiva con lip-sync e divisa ufficiale della compagnia. La tecnologia Synanim™ di UneeQ è progettata specificamente per eliminare la staticità tipica degli avatar digitali, che è una delle cause principali dell'effetto uncanny valley.

Lo stile comunicativo di Sama è social-oriented: empatico, narrativo, caldo. Sama non si limita a rispondere a domande ma guida l'utente attraverso gli spazi virtuali con un tono da ospite, incoraggia la conversazione, usa descrizioni sensoriali per evocare il piacere del viaggio e simula ospitalità. La sua presenza travalica il contesto transazionale: Sama possiede un profilo Instagram autonomo (@samaonthemove), lanciato a gennaio 2025 (Qatar Airways Press Release, 2025), dove pubblica contenuti in prima persona – resoconti di viaggio, riflessioni personali, immagini delle destinazioni – costruendo una narrativa identitaria persistente che la configura come virtual influencer, non soltanto come strumento di assistenza. In questo senso, Sama non esiste solo nel momento dell'interazione con il cliente, ma mantiene una presenza continuativa nello spazio digitale.

Questa combinazione di aspetto e atteggiamento è coerente con il posizionamento strategico di Qatar Airways nel segmento premium del trasporto aereo. Il sovrapprezzo che un cliente accetta di pagare rispetto alla tariffa di una compagnia low-cost non remunera la funzione di trasporto in sé, ma l'esperienza sensoriale, emotiva e di status ad essa

associata. In questo contesto, un assistente freddo e funzionale sarebbe inadatto poiché spezzerebbe l'atmosfera esperienziale che l'azienda intende costruire. L'alto antropomorfismo visivo di Sama attiva i meccanismi emotivi tipici delle interazioni umane, trasformando la navigazione sul sito in un'anticipazione dell'esperienza di volo.

Come nel caso Amazon, i dati di performance vanno letti con la necessaria cautela, non essendo possibile, con le sole fonti secondarie disponibili, isolare il contributo dell'assistente da quello di altri fattori strategici: il profilo @samaonthemove ha raggiunto 379.000 follower nel primo anno dal lancio; la campagna immersiva QVerse[4] ha generato un ritorno sulla spesa pubblicitaria superiore al 1000% e un ROI di prodotto superiore al 200% (The Drum, 2023). Per l'anno fiscale 2024/2025 Qatar Airways ha annunciato profitti netti di 7,85 miliardi di QAR (circa 2,15 miliardi di dollari) e una crescita degli utili del 28%, attribuendo questo risultato alla strategia "Qatar Airways 2.0" di cui Sama costituisce un elemento cardine (Qatar Airways, 2025).

La matrice di coerenza tri-dimensionale e le proposition. L'esame congiunto dei due casi, alla luce della letteratura analizzata, induce a ritenere che l'efficacia dell'assistente virtuale non dipenda da singoli attributi isolati, bensì dal grado di coerenza tra le sue caratteristiche, specificamente il grado di antropomorfismo visivo e lo stile comunicativo, e la natura edonistica o utilitaristica del prodotto proposto.

In particolare, riteniamo che lo stile task-oriented in presenza di un basso grado di antropomorfismo visivo dell'assistente, tenda a massimizzare l'intenzione d'acquisto quando si tratta di prodotti utilitaristici; mentre riteniamo che lo stile social-oriented risulti più efficace, in abbinamento a un alto grado di antropomorfismo visivo, in relazione all'acquisto di prodotti edonistici. Tale deduzione trova fondamento teorico nella letteratura sull'uncanny valley (Mori et al., 2012; Cihodaru-Ștefanache, Podina, 2025): un agente che si avvicina all'aspetto umano senza raggiungerlo genererebbe nel consumatore una sensazione di incongruenza percettiva più disturbante – e più dannosa per l'intenzione d'acquisto – rispetto sia all'assenza totale di indizi visivi antropomorfi che alla presenza di un elevato grado di antropomorfismo (si veda Tabella 1).

Tabella 1 – Matrice di coerenza tra antropomorfismo visivo e stile comunicativo

Tipo di prodotto	Stile comunicativo	Basso antropomorfismo visivo	Alto antropomorfismo visivo
Prodotto edonistico	***Social-oriented***	Bassa coerenza	***Alta coerenza (caso Sama)***
	Task-oriented	Bassa coerenza	Bassa coerenza
Prodotto utilitaristico	***Social-oriented***	Bassa coerenza	Bassa coerenza
	Task-oriented	***Alta coerenza (caso Rufus)***	Bassa coerenza

Fonte: Ns. elaborazione

La matrice riportata nella Tabella 1 offre un quadro di sintesi dell'analisi fin qui condotta, mostrando le possibili combinazioni tra livello di antropomorfismo, stile comunicativo e tipologia di prodotto, e concentrandosi, in particolare, sulle configurazioni ad alta coerenza rilevate nello studio dei casi osservati, le quali appaiono maggiormente idonee a favorire l'efficacia dell'assistente virtuale. Le rimanenti combinazioni delle tre variabili identificano sei soluzioni di bassa coerenza e dunque di limitata efficacia, presentando un disallineamento su almeno una delle tre dimensioni considerate.

Quanto sopra evidenziato costituisce la premessa teorica delle proposition formulate qui di seguito:

P1: Un assistente virtuale caratterizzato da un basso livello di antropomorfismo visivo e da uno stile comunicativo task-oriented determina un livello più elevato di intenzione di acquisto nel caso di prodotti utilitaristici.

P2: Un assistente virtuale caratterizzato da un elevato livello di antropomorfismo visivo e da uno stile comunicativo social-oriented determina un livello più elevato di intenzione di acquisto nel caso di prodotti edonistici.

P3: Quando il livello di antropomorfismo visivo e lo stile comunicativo dell'assistente virtuale risultano incoerenti con la tipologia di prodotto proposta, l'intenzione di acquisto del consumatore risulta inferiore rispetto ai casi in cui tali elementi appaiono coerenti.

Research limitations. Il presente lavoro si trova in una fase ancora iniziale e i risultati qui presentati sono preliminari e non definitivi. Questa è la principale limitazione da tenere presente nella valutazione del contributo.

L'analisi empirica è attualmente limitata: i due casi sono stati selezionati per convenienza teorica, in quanto rappresentano configurazioni polari rispetto alle variabili di interesse, il che favorisce l'illustrazione del framework ma non permette generalizzazione. L'analisi è stata condotta esclusivamente attraverso fonti secondarie, senza la possibilità di verificare direttamente le strategie di progettazione degli assistenti né la percezione dei consumatori; l'acquisizione di dati da fonti primarie è pertanto un passaggio necessario del prosieguo della ricerca.

[4] Tramite la piattaforma Qverse il cliente può esplorare cabine, lounge e spazi aeroportuali in ambiente tridimensionale prima della prenotazione, guidato da Sama in qualità di cabin crew virtuale.

La valutazione dei dati di performance di Rufus e Sama richiede cautela: non è possibile isolare il contributo dell'assistente da quello di altri fattori strategici e commerciali. I dati disponibili descrivono performance aziendali aggregate, non relazioni causali tra la configurazione dell'assistente e l'intenzione d'acquisto.

Il collegamento tra natura del prodotto e configurazione ottimale dell'assistente è qui dedotto logicamente dalla combinazione di precedenti studi (Belanche et al., 2021; Cai et al., 2024; Go e Sundar, 2019; Longoni e Cian, 2022; Murtaza et al., 2024), nessuno dei quali ha testato empiricamente la triplice relazione in modo integrato. La validazione sperimentale di questa proposta rimane un passo necessario.

Il modello proposto tratta l'antropomorfismo visivo e lo stile comunicativo come dimensioni binarie, mentre nella realtà entrambe si presentano con sfumature continue. Ricerche future potrebbero esplorare livelli intermedi e verificare se l'intensità dell'effetto uncanny valley varia in funzione del contesto di prodotto. Analogamente, il modello non considera le differenze individuali dei consumatori – propensione all'innovazione tecnologica, familiarità con gli assistenti AI, variabili demografiche e culturali – né la dimensione temporale dell'interazione: l'efficacia di una configurazione potrebbe variare nel corso di esposizioni ripetute, in cui la soglia di accettazione dell'antropomorfismo si aggiorna.

Managerial implications. Qualora le proposition trovassero conferma sperimentale, lo studio offrirebbe alcune implicazioni pratiche per i manager che progettano e gestiscono assistenti virtuali nelle relazioni con i clienti. Il principio di coerenza tri-dimensionale suggerirebbe che la decisione progettuale non debba riguardare singolarmente l'aspetto o lo stile dell'agente, ma la loro combinazione in relazione al posizionamento dell'offerta.

Per prodotti o servizi prevalentemente utilitaristici, la configurazione ottimale prevederebbe un assistente con basso o assente antropomorfismo visivo e stile comunicativo task-oriented. Questa scelta risponde alla modalità valutativa razionale che il consumatore attiva in tali contesti, minimizza i rischi di uncanny valley, e favorisce anche l'ottimizzazione dei costi di sviluppo e gestione dell'agente.

Per prodotti o servizi prevalentemente edonistici, la configurazione ottimale prevederebbe un assistente con elevato antropomorfismo visivo e stile comunicativo social-oriented. In questi contesti l'esperienza d'acquisto si lega all'emozione: l'assistente può colmare il deficit sensoriale dell'e-commerce aiutando il cliente a immaginare mentalmente l'esperienza attraverso narrazioni sensoriali e simulazione di empatia. L'alto antropomorfismo visivo attiva i meccanismi emotivi tipici delle interazioni umane, rafforzando le risposte emotive del consumatore.

Configurazioni intermedie – un agente con livello moderato di antropomorfismo o con stile comunicativo incoerente rispetto all'aspetto – sarebbero sconsigliati: i risultati della letteratura indicano che collocarsi a un livello medio di antropomorfismo produce effetti peggiori rispetto a collocarsi in uno dei due poli. Le imprese dovrebbero pertanto evitare soluzioni di compromesso e optare per configurazioni nette, coerenti con il posizionamento dell'offerta.

Originality of the paper. Dal punto di vista teorico, questo lavoro contribuisce al dibattito sull'uso degli assistenti virtuali nella gestione delle relazioni con i clienti presentando un principio di coerenza tri-dimensionale come criterio progettuale per gli assistenti virtuali nel retail. La novità del contributo risiede nell'integrazione di tre dimensioni – antropomorfismo visivo, stile comunicativo e tipologia di prodotto – che la letteratura ha finora esaminato separatamente o, al più, a coppie. Murtaza et al. (2024) esaminano la relazione tra stile comunicativo, antropomorfismo percepito e intenzione d'uso, ma senza considerare la natura del prodotto; Zourrig et al. (2025) e Belanche et al. (2021) collegano aspetto e dimensioni valutative; Lan et al. (2024) connettono stile linguistico e contesto di servizio. Nessun lavoro ha testato empiricamente la triplice relazione in modo integrato, e questo è il gap specifico che il disegno sperimentale 2×2×2 della seconda fase di questo progetto si propone di colmare.

Il principio di coerenza tri-dimensionale ha implicazioni teoriche che vanno oltre la progettazione degli assistenti virtuali: esso suggerisce che l'efficacia degli agenti AI nelle relazioni con i consumatori dipenda dalla congruità tra le caratteristiche dell'agente e le aspettative che il contesto di consumo attiva nel consumatore – aspettative razionali in contesti utilitaristici, aspettative affettive in contesti edonistici. Questo rappresenta un'estensione della teoria della violazione delle aspettative (Burgoon e Hale, 1988) all'architettura complessiva degli agenti AI nei contesti di vendita.

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Beyond positive brand identity: Conceptualizing the Negative Brand Identity System

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Abstract. *Brand identity theory has traditionally conceptualized identity as a system of meanings structured around desirable and aspirational values. Foundational frameworks implicitly assume a positive axiological orientation, leaving the valence of identity values under-theorized as a structural dimension. However, the growing visibility of brands organized around transgression, antagonism, disruption, or selective exclusion challenges this assumption. This paper introduces axiological valence as a missing structural dimension of brand identity and conceptualizes the Negative Brand Identity System (NBIS) as a coherent, purposive, and enduring identity configuration in which negatively oriented values are intentionally embedded across core and extended identity elements. We propose a multidimensional framework where a negative axiological essence (disvalue-based core) is systematically articulated through four extended dimensions: negative brand personality, cultural traits contrary to social and moral norms, controversial expressive signs, and controversial product offering attributes. Adopting an exploratory and interpretive research design, we provide a cross-sectoral mapping of illustrative brand cases across five industries characterized by high symbolic consumption and identity salience: fashion, audiovisual narratives, gaming, music, and combat sports. The findings reveal that in these contexts, negativity functions not as an episodic provocation but as a systemic organizing principle that generates identity distinctiveness and coherence. By reconceptualizing brand identity through an axiological lens, this study extends identity-based branding theory and offers strategic insights into the structural viability of negative value orientations in the contemporary marketplace.*

Keywords: *negative brand identity system; negative brand; systemic negative identity orientation; negative axiological brand essence*

Framing of the research. *Brand identity literature has traditionally conceptualized identity as a coherent and strategically designed system of meanings (Aaker, 1996; Kapferer, 2012). Within this perspective, identity is defined as "a unique set of brand associations that the brand strategist aspires to create or maintain" (Aaker, 1996, p. 68), organized into core and extended components and oriented toward building long-term brand value. Similarly, the Brand Identity Prism (Kapferer, 2012) conceptualizes identity as an integrated architecture that combines physical, cultural, relational, and symbolic dimensions into a coherent and recognizable whole.*

Despite differences in structure and theoretical emphasis, these foundational models share a common normative orientation: brand identity is implicitly grounded in positively valenced meanings. Identity systems are typically conceptualized as mechanisms that enhance symbolic meaning (Park, 1986), facilitate self-congruence between consumers and brands (Sirgy, 1982), and contribute to the creation of brand equity (Keller, 1993). Even within the cultural branding perspective (Holt et al., 2004), the power of brands derives from their ability to resolve cultural tensions by producing myths that offer empowerment, reassurance, or symbolic relief. Across these traditions, brand identity is therefore primarily theorized as an aspirational system that generates positive symbolic, relational, and cultural value.

However, the evolving sociocultural environment raises questions about the universality of this implicit positivity assumption. Contemporary societies are increasingly characterized by ideological polarization, moral fragmentation, and intensified symbolic contestation. Within such contexts, identity formation frequently operates not only through positive value alignment but also through negative differentiation and evaluative contrast. Social Identity Theory (Tajfel & Turner, 1986) emphasizes that identity construction is structurally linked to processes of intergroup comparison and differentiation, through which individuals define their in-group by distinguishing it from negatively evaluated out-groups. Complementarily, psychological research on negativity bias (Baumeister et al., 2001) demonstrates that negative stimuli often generate stronger cognitive processing, emotional intensity, and behavioral responses than positive stimuli.

Several streams of marketing research indirectly reflect these dynamics. Studies on brand activism (Vredenburg et al., 2020), polarizing brands (Paharia et al., 2014), and tribal brand communities (Muniz & O'Guinn, 2001) show that strong brand relationships may emerge not only from shared positive meanings but also from oppositional positioning, ideological alignment, or symbolic boundary construction. Nevertheless, in this literature, polarization is typically examined as an outcome of communication strategies or consumer responses rather than as a structural property of brand identity systems.

More recently, research has begun to explore the role of negatively valenced brand stimuli, particularly at the level of brand naming. For example, Guest et al. (2016) investigate how negative brand names influence memory and liking, demonstrating that the interaction between valence and arousal plays a critical role in shaping consumer responses. Their findings suggest that moderately negative or highly arousing brand names may enhance memorability without necessarily diminishing brand evaluations, whereas extremely negative stimuli can trigger adverse reactions — what the

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authors refer to as "brand suicide". In their concluding discussion, the authors implicitly distinguish between different forms of negativity, including ironic negativity, high-arousal negativity, and excessively negative brand cues.

Although this stream of research provides important insights into how consumers cognitively process negatively valenced brand stimuli, its analytical focus remains primarily situated at the perceptual and lexical levels of branding. Negativity is treated as a characteristic of discrete stimuli — such as words, names, or messages — rather than as an organizing principle embedded within broader identity architectures. Consequently, existing studies do not address how negatively oriented values might be coherently integrated into the core and extended components that structure brand identity systems.

This limitation points to a broader conceptual gap within brand identity theory. Despite the extensive development of identity frameworks, the literature has largely taken for granted the axiological orientation of brand values. Foundational models conceptualize identity as a coherent configuration of desirable associations, yet they rarely problematize the polarity of those values. As a result, the axiological dimension of identity — whether brand meanings are structured around positively or negatively oriented value constructs — remains under-theorized. At the same time, research on negativity in branding has predominantly focused on episodic manifestations such as controversial campaigns, negative brand names, or polarizing communications, without developing a systemic perspective on negativity as a structural dimension of brand identity. In this context, we introduce the concept of negative brands, defined as brands that deliberately incorporate negative, controversial, or transgressive meanings into their identity to enhance consumer appeal (Dagnino & Lo Presti, 2024; Vernuccio et al., 2025).

Building on these gaps, this study advances the argument that axiological valence represents a missing structural dimension within brand identity theory. Indeed, previous contributions conceptualize identity as a coherent system of meanings that guides brand positioning and long-term value creation (Aaker, 1996; Kapferer, 2012). Within this tradition, the axiological orientation of brand meanings is typically assumed to be positive and aspirational. This study challenges this implicit assumption by proposing that brand identity systems may also be systematically organized around negatively valenced value orientations, such as transgression, provocation, antagonism, cynicism, disruption, symbolic aggression, or the rejection of dominant social and cultural norms. Moreover, rather than viewing negativity as a merely communicative or perceptual attribute of isolated stimuli, we propose that it may also function as a coherent organizing orientation embedded within brand identity systems. Accordingly, we introduce the concept of the Negative Brand Identity System (NBIS), defined as a coherent, purposive, and enduring configuration in which negatively oriented values (e.g., transgression, provocation, antagonism, symbolic aggression) are structurally embedded within the core and extended architecture of brand identity.

By shifting the analytical focus from stimulus-level negativity to identity-level value orientation, this study conceptualizes negativity as a structural dimension of brand identity rather than as an episodic communicative device focusing on brands whose identity architecture is fundamentally structured around negatively valenced value propositions. and exploring how negative identity systems are configured across different industries.

Purpose of the paper. *This study addresses the following research question: How can negative value orientation be conceptualized as a structural dimension of brand identity systems?*

To address this question, the study pursues two interrelated objectives: (1) to introduce and conceptualize the construct of the Negative Brand Identity System (NBIS) by defining axiological valence as a structural dimension of brand identity and by identifying the key dimensions through which negative value orientation is embedded within identity systems; and (2) to develop a cross-sectoral interpretive framework for exploring how negative identity systems are configured across different industries.

Negative Brand Identity System (NBIS). *We define a Negative Brand Identity System (NBIS) as a coherent and enduring brand identity configuration in which negatively valenced values are intentionally embedded within the central meaning and extended dimensions of the identity system, shaping the symbolic meaning, expressive manifestations, and relational dynamics through which the brand engages with its audiences.*

Importantly, this conceptualization distinguishes systemic negative identity orientation from episodic uses of negative symbolism in brand communication. Many brands occasionally employ provocative or disturbing imagery to attract attention or generate discussion without integrating such meanings into their underlying identity system. For instance, Burger King's "Moldy Whopper" campaign, which deliberately showcased a decomposing burger to emphasize the absence of artificial preservatives, mobilized the aesthetics of decay and disgust as a provocative communicative device. Despite the strong negative symbolism deployed in the campaign, such imagery did not redefine the brand's underlying identity configuration.

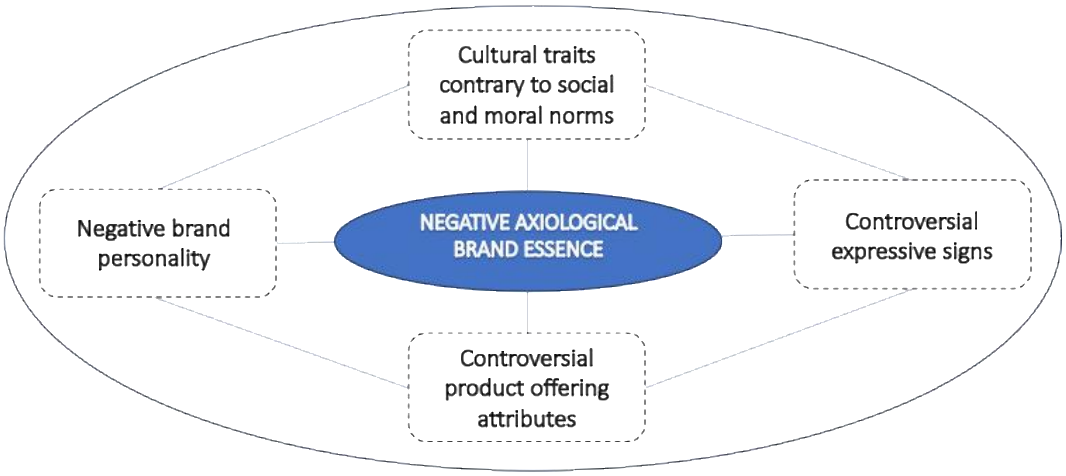
In contrast, within an NBIS negativity is strategic rather than tactical. Negative value orientation operates as a structuring principle of the identity system, influencing both the central meaning of the brand and the extended elements through which that meaning is articulated.

Building on the hierarchical identity system proposed by David Aaker (1996) and the multidimensional identity prism developed by Jean-Noël Kapferer (2012), this study conceptualizes brand identity systems as integrated configurations in which axiological orientation permeates both the core axiological brand essence and the surrounding extended identity dimensions. In the case of Negative Brand Identity Systems, negatively valenced meanings are embedded in the disvalue-based brand essence and are expressed across several extended dimensions, including negative brand personality,

cultural traits contrary to dominant social and moral norms, controversial expressive signs, and controversial product offering attributes.

As illustrated in Figure 1, the Negative Brand Identity System is organized around a core axiological essence, surrounded by a set of extended identity dimensions that translate and reinforce this orientation across the broader identity system.

Figure 1. The Negative Brand Identity System



Source: adapted from Vernuccio et al. (2025).

At the center of the system lies the negative axiological brand essence (disvalue-based core meaning), which represents the fundamental value orientation that defines the brand's identity. This core consists of negatively valenced concepts, such as disruption, transgression, antagonism, provocation, or rejection of dominant norms, that serve as the symbolic foundation of the brand. Rather than promoting harmonious or aspirational ideals, the identity is anchored in meanings that challenge, invert, or problematize mainstream cultural expectations. This core axiological essence provides the interpretive lens through which the brand's symbolic positioning, actions, and communications acquire coherence.

Surrounding this core negative meaning are several extended identity dimensions, which articulate the negative value orientation across different facets of the brand system and make it recognizable within the marketplace.

One dimension concerns brand personality, which reflects the set of human-like traits associated with the brand (Aaker, 1997). In NBIS configurations, personality traits may embody characteristics such as rebelliousness, irreverence, aggressiveness, cynicism, or disruptive confidence. These traits reinforce the identity's antagonistic or transgressive orientation and shape how audiences interpret the brand's stance within the cultural landscape. For instance, brands such as Liquid Death cultivate an intentionally aggressive and irreverent personality that transforms an otherwise conventional product category (water) into a symbolically provocative brand identity.

Another dimension concerns cultural traits, which refer to the cultural codes, symbolic attitudes, and value orientations through which the brand engages with broader social discourses (Holt et al., 2004; Kapferer, 2012). These traits shape how the brand interprets and frames its relationship with prevailing cultural norms and institutions, and they ultimately contribute to the brand's cultural positioning within the marketplace, which relates to the way the brand situates itself in relation to dominant social norms, institutions, or cultural conventions. Within NBIS configurations, such traits often express symbolic opposition to established norms, mobilizing narratives of disruption, resistance, or counter-cultural alignment that resonate with specific consumer communities. For example, brands such as Liquid Death mobilize dark humor, anti-corporate irony, and exaggerated themes of death and destruction as cultural traits that support a broader cultural positioning deliberately opposed to the sanitized and wellness-oriented discourse that typically characterizes the bottled water category.

A further dimension concerns controversial expressive signs of identity, through which negative values are translated into visible symbols, narratives, and aesthetic codes (Pastore & Vernuccio, 2008; Romaniuk, 2018). These manifestations may include provocative aesthetics, disturbing visual languages, controversial narratives, ironic messaging, unconventional naming strategies, or communication styles that intentionally depart from conventional brand discourse. For instance, the brand name Liquid Death itself exemplifies how provocative naming can operate as a powerful expressive device that immediately signals the brand's antagonistic symbolic stance.

Finally, a crucial dimension concerns the controversial product offering attributes (Vernuccio et al., 2025). In Negative Brand Identity Systems, the product may embody the brand's negative value orientation through deliberately controversial, transgressive, or norm-breaking attributes. These may involve unconventional product designs, unusual sensory characteristics, or product concepts that challenge established expectations within a category. For example,

brands such as Liquid Death incorporate dark, provocative symbolic references directly into their packaging and product design, embedding themes of death imagery, rebellious humor, and anti-corporate irony within the material design of the offering itself. In these instances, the negative value orientation extends from symbolic communication to the product offering, strengthening the coherence of the identity system.

In conclusion, the core axiological essence and the surrounding extended dimensions form an integrated identity configuration in which negatively valenced meanings permeate the system at multiple levels. In this perspective, negativity is not confined to isolated communicative initiatives but becomes an organizing principle that shapes the brand's symbolic orientation, expressive manifestations, relational positioning, and product offering over time.

Methodology. *Building on the conceptualization developed in the previous section (objective 1), the study adopts an exploratory and interpretive approach aimed at examining how negative value orientations may become embedded within brand identity systems across different cultural industries (objective 2). Rather than producing a quantitative assessment of the incidence of negative brands or an exhaustive identification of them across industries, this framework adopts an interpretive and exploratory perspective that combines theoretical development with an interpretive cross-sectoral mapping of illustrative brand cases (MacInnis, 2011). Its purpose is to identify recurring patterns and strategic configurations through which negative identity systems emerge and operate across sectors.*

In this perspective, the use of illustrative cases functions as an analytical device that helps examine how negative value orientations may become embedded within brand identity based upon the framework of NBIS.

The analysis relies on desk-based research and secondary sources (Yin, 2018), including brand websites, visual and narrative materials, media coverage, interviews with creators and designers, and documentation reported in specialized press and industry outlets (e.g., Owens, 2017).

The mapping was constructed through a two-step selection process. First, sectors were identified in which symbolic positioning and identity expression play a central role in shaping competitive differentiation. On this basis, the analysis focuses on five sectors in which identity signaling and symbolic consumption are particularly salient: fashion, audiovisual narratives, gaming, music, and combat sports.

Second, within each sector, illustrative cases were selected according to a purposive sampling logic (Eisenhardt, 1989). Selection was guided by three criteria: (1) the presence of a recognizable negative value orientation at the level of identity essence; (2) the articulation of this orientation across the elements of the identity system; and (3) the relative persistence of such configuration over time, beyond isolated episodes of controversy or provocation.

The final set of cases includes:

- *Rick Owens and Blackcraft Cult in fashion;*
- *A Clockwork Orange and Black Mirror in audiovisual narratives;*
- *Grand Theft Auto and Manhunt in gaming;*
- *Marilyn Manson and Slipknot in music;*
- *Ultimate Fighting Championship (UFC) and Pride Fighting Championships in combat sports.*

The desk analysis focused on publicly observable manifestations of brand identity, including personality traits, cultural meanings associated with each case, narrative, aesthetic and expressive codes, and product offering attributes. These elements were interpreted through the five identity components articulated in the conceptual framework (Figure 1): negative axiological brand essence, negative brand personality, cultural traits contrary to social and moral norms, controversial expressive signs, and controversial product offering attributes.

Consistent with the exploratory nature of the study, the mapping does not aim to produce a definitive classification of negative brands but rather to identify recurring configurational patterns through which Negative Brand Identity Systems may emerge across heterogeneous cultural industries.

Findings. *The outcome of the interpretive mapping is summarized in Appendix A (Table A1), which provides a cross-sectoral overview of the selected cases and illustrates how negative value orientation may originate at the level of identity essence and subsequently be articulated across the broader identity system.*

The cross-sectoral mapping provides initial support for the conceptual plausibility of the Negative Brand Identity System (NBIS). Across the selected cases, negative value orientation does not appear as an isolated communicative tactic or as an episodic form of brand provocation. Rather, it emerges as a structural organizing principle that permeates multiple dimensions of brand identity.

When the illustrative cases are examined through the five components of the NBIS framework, a recurrent configurational pattern becomes visible. In particular, negative value orientation originates at the level of the negative axiological essence and subsequently permeates the broader framework of brand identity through negative brand personality, cultural traits that challenge dominant social and moral norms, controversial expressive signs, and controversial product offering attributes.

Across the cases analyzed, the negative axiological essence operates as the generative core of the identity system. Instead of promoting aspirational or harmonious values, the identities examined are organized around meanings such as transgression, antagonism, aggression, or distrust toward dominant institutions and cultural norms. For example, within the fashion domain, Rick Owens develops a creative identity grounded in the aesthetic negation of conventional beauty standards, whereas Blackcraft Cult organizes its symbolic meaning around explicit anti-religious antagonism. Within audiovisual narratives, A Clockwork Orange structures its narrative identity around moral transgression and stylized

ultraviolence, while Black Mirror revolves around systemic skepticism toward technological progress. The gaming context offers comparable dynamics: Grand Theft Auto institutionalizes deviance and rule violation as defining elements of its fictional universe, while Manhunt centers its identity on the spectacle of extreme violence and voyeuristic brutality. A similar orientation characterizes the music industry, where the identities of Marilyn Manson and Slipknot are rooted in shock, aggression, and anti-mainstream provocation. Finally, combat sports organizations, such as UFC and Pride Fighting Championships, revolve around ritualized aggression and the spectacle of controlled violence. In all these cases, negative meanings function as the foundational value orientation structuring the identity system, instead of functioning as superficial stylistic elements.

The identity configuration also extends to the relational dimension of the brand through negative brand personality. Across the cases analyzed, the personality traits associated with the brands consistently reflect antagonistic or confrontational characteristics. Traits such as rebelliousness, aggression, dominance, hostility, or provocation frequently emerge as defining elements of the brand character. For instance, in the fashion cases, Rick Owens projects a detached and anti-conventional identity, while Blackcraft Cult conveys explicit antagonism toward institutional religion. Audiovisual narratives, such as A Clockwork Orange and Black Mirror, evoke disturbing and unsettling character profiles that reinforce the moral ambiguity of their worlds. Within gaming, Grand Theft Auto embodies irreverence and rebelliousness, while Manhunt communicates predatory and sadistic undertones. In the music field, the stage personas of Marilyn Manson and Slipknot amplify shock, aggression, and anti-mainstream provocation. Combat sports brands, including UFC and Pride Fighting Championships, cultivate combative and dominant identities centered on confrontation and physical supremacy. Through these personality configurations, the underlying axiological orientation becomes part of the symbolic relationship that audiences establish with the brand.

The identity configuration is stabilized through cultural traits that challenge dominant social and moral norms. Across the selected cases, audiences engage with the brand through forms of symbolic affiliation that reinterpret or embrace oppositional meanings embedded within the identity system. For example, the fashion brand Blackcraft Cult mobilizes a subcultural rejection of dominant religious values. In the audiovisual sphere, audiences of A Clockwork Orange and Black Mirror engage with narratives that problematize morality, authority, and technological progress. Gaming communities, particularly those surrounding Grand Theft Auto, normalize deviant behavior within broader cultural narratives of rebellion and institutional distrust. Music subcultures, such as those associated with Slipknot and Marilyn Manson, embrace themes of aggression, alienation, and anti-mainstream identity. In combat sports, organizations such as UFC and Pride Fighting Championships transform ritualized violence into widely recognized entertainment formats, legitimizing aggression within regulated cultural spaces.

This negative axiological orientation becomes publicly recognizable through a system of controversial expressive signs, which translate disvalues into distinctive symbolic forms. Across sectors, brands employ visual, narrative, or aesthetic codes that make their antagonistic orientation perceptible to audiences. For instance, fashion brands such as Rick Owens communicate aesthetic rupture through brutalist silhouettes and dark visual aesthetics, while Blackcraft Cult relies on occult and satanic imagery as visible markers of anti-religious defiance. Audiovisual productions, including A Clockwork Orange and Black Mirror, deploy disturbing iconography and dystopian visual languages that emphasize moral disorder and technological alienation. In gaming, graphic depictions of violence and criminal environments contribute to the symbolic universes of Grand Theft Auto and Manhunt. Within the music industry, the confrontational iconography associated with Marilyn Manson and the horror-inspired masks adopted by Slipknot transform antagonism into recognizable aesthetic signifiers. Combat sports events reinforce the spectacle of antagonistic rivalry through confrontational promotional narratives and theatrical staging.

The presence of controversial product offering attributes further reinforces this orientation. Here, negativity permeates the design of the product or experiential offering itself, going beyond symbolic communication. In fashion, anti-normative garment structures and symbolic references embedded in apparel design translate ideological opposition into material products. Audiovisual narratives revolve around deviant protagonists, dystopian futures, or morally ambiguous worlds. Gaming experiences, particularly Grand Theft Auto and Manhunt, incorporate criminal activity, rule transgression, and execution-based mechanics centered on extreme violence. Music performances and lyrics, especially in the cases of Marilyn Manson and Slipknot, deliberately cultivate shock, aggression, and confrontation. Combat sports events place physical confrontation and aggressive competition at the center of the entertainment format itself. Through these mechanisms, the negative axiological orientation is materially enacted through the offering.

The analysis across sectors reveals a recurring identity configuration in which negative value orientation originates at the level of axiological essence and subsequently permeates multiple reinforcing dimensions of brand identity. Negative brand personality, cultural traits contrary to social and moral norms, controversial expressive signs and controversial product offering attributes interact in a mutually reinforcing manner, generating systemic coherence across the identity system.

This multilayered coherence distinguishes Negative Brand Identity Systems from brands in which negativity appears only in isolated campaigns or episodic controversies. In NBIS configurations, negativity operates as a structural organizing principle shaping symbolic meaning, experiential offerings, and relational positioning over time, instead of serving as a temporary communication tactic.

Research limitations. *This study presents some limitations that open avenues for future research. First, the research adopts a conceptual and exploratory design supported by an interpretive desk-based mapping of illustrative cases. While appropriate for theory development, this approach does not provide empirical testing of the proposed framework. Future research could therefore operationalize the dimensions of the Negative Brand Identity System and examine their effects on consumer perceptions and brand outcomes. Second, the analysis focuses primarily on brand identity construction, without directly investigating how consumers interpret or respond to negative brand identities. Further studies could explore the conditions under which negative value orientations generate attraction, identification, or rejection among different audience segments.*

Managerial implications. *The proposed framework generates several strategic implications for brand managers, CMOs, and identity strategists.*

First, the findings suggest that brand identity does not necessarily need to be grounded in universally positive values. When coherently structured, negatively oriented value propositions — such as disruption, antagonism, or transgression — may serve as powerful mechanisms of symbolic differentiation, particularly in markets characterized by strong identity signaling and cultural contestation.

However, the effectiveness of such positioning depends on systemic coherence rather than isolated provocation. Brands that employ negative symbolism only in episodic campaigns risk generating reputational inconsistency or credibility loss. By contrast, the cases analyzed show that successful negative brands embed their value orientation across multiple dimensions of the identity system, including expressive signs, product offering attributes, personality traits, and cultural positioning.

Finally, the concept of axiological valence can be used as a strategic diagnostic tool. Managers may map competitors along the positive–negative value continuum in order to identify under-explored identity spaces within their category. In this sense, identity strategy may involve not only defining which values a brand expresses,but also determining the valence orientation through which those values are articulated.

Originality of the paper. *This study contributes to branding and brand identity literature in three main ways.*

First, it introduces axiological valence as a previously under-theorized structural dimension of brand identity systems. While existing identity frameworks conceptualize brands as coherent configurations of associations, they implicitly assume that such associations are positively oriented. By explicitly theorizing the polarity of identity values, this research extends the conceptual foundations of brand identity beyond its traditional positivity bias.

Second, the study develops the concept of the Negative Brand Identity System (NBIS), defined as a coherent and enduring identity configuration in which negatively valenced meanings are systematically embedded across both core and extended identity dimensions. This shifts the analytical focus from stimulus-level negativity — such as negative brand names or controversial communications — to identity-level value orientation as a structural property of brand identity systems. The research introduces a conceptual distinction between episodic negativity and systemic negative identity configurations, highlighting how negative meanings may function not merely as temporary communication tactics but as stable organizing principles shaping brand meaning, positioning, and relational dynamics over time.

Third, by providing an interpretive cross-sectoral mapping of illustrative brand cases, the study offers an initial exploratory framework for identifying recurring patterns through which negative identity systems emerge across industries.

In conclusion, these contributions extend brand identity theory by integrating axiological valence into the conceptual architecture of identity systems and by offering a new analytical lens for understanding the emergence and strategic role of negative brands in contemporary markets.

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Appendix A - Table A1. Cross-Dimensional Mapping of Negative Brand Identity Systems

Sector	Brand	Negative Axiological Essence	Negative Brand Personality	Cultural Traits Contrary to Social and Moral Norms	Controversial Expressive Signs	Controversial Product Offering Attributes
Fashion	Rick Owens	Aesthetic negation of conventional beauty	Detached; anti-conventional	Radical aesthetic rupture within fashion norms	Brutalist silhouettes and dark aesthetics	Anti-normative garment structures
	Blackcraft Cult	Anti-religious antagonism	Rebellious; antagonistic	Rejection of dominant religious values	Occult and satanic visual symbolism	Apparel embedding explicit anti-clerical references
Audiovisual	A Clockwork Orange	Moral transgression and ultraviolence	Sadistic; provocative	Subversion of social and institutional order	Disturbing iconography and stylized violence	Narrative centered on a deviant anti-hero
	Black Mirror	Technological distrust	Cynical; skeptical	Suspicion toward technological progress	Dystopian visual language	Narratives depicting the dark consequences of digital innovation
Gaming	Grand Theft Auto	Legitimized deviance	Rebellious; irreverent	Normalization of rule violation	Satirical urban aesthetics	Gameplay mechanics rewarding criminal behavior
	Manhunt	Violence as spectacle	Sadistic; predatory	Voyeuristic fascination with violence	Snuff-inspired visual language	Execution-centered gameplay mechanics
Music	Marilyn Manson	Shock and anti-moral provocation	Antagonistic	Cultural defiance toward mainstream moral norms	Confrontational iconography	Provocative performances and transgressive texts
	Slipknot	Aggression and chaotic hostility	Hostile; aggressive	Alignment with anti-mainstream metal subculture	Horror-inspired masks and disturbing stage aesthetics	Extreme metal sound and intense performances
Combat Sports	UFC	Ritualized aggression	Dominant; combative	Legitimation of controlled violence	Confrontational promotional narratives	Institutionalized physical confrontation format
	Pride Fighting Championships	Spectacularized violence	Dominant; aggressive	Celebration of extreme combat spectacle	Theatrical fighter entrances and hyper-dramatic arenas	Permissive combat rules and extreme match-ups

Breaking the Binary: How Gender-Neutral Branding Shapes Brand Love

FRANCESCA CELIO, ALESSANDRA DOMINIJANNI, ANGELO BACCELLONI, FRANCESCO RICOTTA

Abstract. *As societal expectations for inclusivity reshape marketplace dynamics, gender-neutral marketing has emerged as a strategy that challenges traditional gender segmentation. However, little is known about how gender-neutral product presentation influences consumer–brand relationships. This study examines how gender-neutral branding shapes consumers' emotional attachment to brands. Drawing on branding and consumer identity literature, we propose that gender-neutral product positioning influences brand love through perceived brand uniqueness and perceived brand quality, which in turn foster brand self-connection. A between-subjects experiment with 151 Generation Z consumers tested the proposed model. Results show that gender-neutral product presentation significantly enhances perceived brand uniqueness, which in turn strengthens brand self-connection and ultimately increases brand love. The findings contribute to the emerging literature on gender-neutral marketing by demonstrating how inclusive product positioning can strengthen consumer–brand relationships through both symbolic and evaluative brand perceptions.*
Keywords: *Gender Neutral Marketing; Brand Love; Uniqueness; Inclusivity; Perceived Brand Quality*

Framing of the research. *In contemporary markets, brands are increasingly expected to reflect and engage with broader societal values in their communication strategies. In this context, inclusive branding refers to the deliberate representation of diverse identities and social groups in brand communication and positioning (Srivastava et al., 2025; Hollenbeck and Patrick, 2025). This shift has gained momentum as consumers—particularly younger generations—demand greater alignment between brand actions and evolving cultural norms related to diversity, identity and representation (McKinsey, 2026).*

Building on this shift, inclusive marketing communication has been identified as a key mechanism through which brands translate inclusive positioning into concrete consumer-facing messages. Prior research shows that such communication can influence consumers' purchase decisions and strengthen loyalty toward brands (Brodzik et al., 2021; Madeline and Sihombing, 2019). By thoughtfully representing diversity and including underrepresented groups, brands can create messages that resonate emotionally with consumers and reinforce consumer–brand relationships (Dimitrieska et al., 2019; Xavier, 2020). In turn, these strategies have been shown to foster attachment, happiness and passionate feelings toward brands, contributing to the development of brand love and more favorable brand attitudes (Salsabila and Apriliyanty, 2022; Suh and Lee, 2016).

These dynamics can also be linked to the human need for belonging. As Maslow (1943) suggests, individuals seek membership in social groups, and consumption may serve as a means of expressing identity and shared values (Rokeach, 1979; Karababa and Kjeldgaard, 2014). Consistent with this perspective, consumers respond more positively to brands that signal fairness and respect toward diverse customers (Bourke and Dillon, 2018). This is particularly evident among younger consumers, many of whom report preferring brands whose marketing strategies demonstrate inclusiveness (Accenture, 2018).

Generational differences further highlight the relevance of inclusive and gender-neutral marketing practices. Gen Z consumers, born between 1996 and 2010, are often described as "inclusive consumers" who expect brands to demonstrate purpose, social responsibility, and accountability while promoting equity and opportunities for diverse and underrepresented groups (McKinsey, 2026). At the same time, prior research shows that gender stereotypes have traditionally been used in advertising to strengthen brand–consumer relationships (Lieven et al., 2014; Ellemers, 2018), although recent societal changes have transformed how gender is represented in marketing communication (Aramendia-Muneta, 2020). Despite these developments, research on generational perceptions of gender representations—particularly among Generation Z and Generation Y—remains limited, and empirical studies on gender-neutral advertising and marketing practices are still relatively scarce (Hickman et al., 2019; Stavrianea et al., 2020).

Within this broader discussion on inclusivity, gender represents a particularly relevant dimension. For decades, companies have segmented markets based on gender, categorizing consumers into groups of men and women or boys and girls (Kotler, Keller, and Chernev, 2022). However, this fundamental marketing practice has increasingly been challenged as the meaning of gender evolves beyond the traditional male–female binary (Geiger and Graf, 2019; Minkin and Brown, 2021; Parker, Horowitz, and Brown, 2022). As a result, consumers increasingly demand a marketplace that reflects greater diversity and inclusivity.

In response to these changes, some companies have started adopting gender-neutral marketing strategies that explicitly reject binary gender categorization and stereotypes in product development and communication (Yin et al., 2025). Gender-neutral marketing therefore refers to strategic efforts that avoid gender-specific cues while explicitly signaling inclusivity toward diverse gender identities. Even brands that historically relied on binary gender representations have begun integrating more gender-inclusive messaging into their marketing communications (Lacombe, 2020; Prokopets, 2022).

Despite growing societal interest in gender inclusivity, the adoption of gender-neutral marketing practices remains relatively limited. While consumers appear increasingly supportive of gender-neutral marketplace offerings, marketers may still hesitate to move away from traditional gender segmentation because of the longstanding effectiveness of gendered marketing strategies (Eisend, 2010). At the same time, empirical research specifically examining consumer responses to gender-neutral marketing offers remains relatively scarce. Consequently, insights into whether gender neutrality in marketing is beneficial or potentially harmful from a brand perspective are still limited.

Existing research on gender and marketing has primarily focused on advertising and communication strategies (Stavrianea et al., 2020). However, this perspective often overlooks the important role that product and package design plays in shaping consumer responses and brand evaluations (Bloch, 1995).
This limitation is particularly relevant because many product categories—such as cosmetics, wellness products, fashion, kitchen appliances, and children's products—have historically relied heavily on gendered product design and packaging (Petersson McIntyre, 2018).
Gender-neutral branding can be conveyed through multiple brand touchpoints, including advertising, marketing communication, and product design elements such as packaging and labeling. Prior research shows that marketing cues can shape consumers' reliance on gender stereotypes in product evaluation (Yin et al., 2025), while packaging design itself communicates symbolic meanings about gender and brand identity (Petersson McIntyre, 2018). As a key brand touchpoint, product packaging plays an important role in shaping consumer perceptions and brand evaluations (Silayoi and Speece, 2007).

Moreover, gendered marketing practices may reinforce stereotypes and generate negative consumer responses. Although gender segmentation remains widespread, many consumers do not necessarily agree with traditional gender stereotypes in marketing (Huhmann and Limbu, 2016). Contemporary masculinity is undergoing a structural redefinition of consumption, characterized by a significant migration into market segments historically gendered as feminine. This shift is empirically evidenced by the global male skincare market—valued at approximately $17.6 billion in 2025—and a 15% year-on-year increase in male engagement with non-invasive aesthetic procedures. Driven by the 'wellness' paradigm and a generational erosion of traditional gender binaries, men are increasingly normalizing the use of specialized cosmetics and holistic health practices as essential tools for both identity signalling and professional self-management (Euromonitor, 2025; Statista, 2026).

Consequently, stereotypical gender-based marketing tactics may trigger negative reactions among consumers, particularly among women (Åkestam et al., 2021). In addition, applying gender-specific designs to similar products may limit brands' ability to engage consumers who identify with fluid gender identities or belong to generations that increasingly perceive gender as non-binary (Stavrianea et al., 2020).

Recent research has begun to examine consumer responses to gender-neutral marketing practices. For instance, Nickel and Blijlevens (2025) show that gender-neutral packaging represents a meaningful departure from traditional gendered cues and can influence how consumers evaluate products and brands. Similarly, emerging research suggests that gender-neutral marketing may shape how consumers process product information by reducing reliance on gender stereotypes in product evaluation (Yin et al., 2025).

To further explain why gender-neutral product presentation may influence consumers' perceptions of brand uniqueness, this research draws on uniqueness theory. According to Snyder and Fromkin (1977), individuals are motivated not only by pressures toward conformity but also by a fundamental desire to perceive themselves as different from others. When individuals perceive excessive similarity with others, they may engage in behaviors aimed at restoring their sense of distinctiveness (Fromkin and Snyder, 1980). In consumption contexts, this motivation is often expressed through marketplace choices, as consumers use products and brands as symbolic resources to differentiate themselves and reinforce their personal and social identity (Tian et al., 2001). Brands can therefore serve as tools through which individuals construct and confirm their self-concept and express a unique identity (Fournier, 1998). Prior research further shows that consumers' need for uniqueness can influence how they evaluate brands and engage with them (Abosag et al., 2020). In this respect, brands that deviate from established marketplace conventions—such as traditional gender segmentation—may be perceived as more distinctive and therefore enhance perceptions of brand uniqueness.

Despite these emerging insights, empirical research examining the relational consequences of gender-neutral branding remains limited. Existing studies primarily focus on consumers' perceptions of gender-neutral communication or design cues (Stavrianea et al., 2020; Nickel and Blijlevens, 2025), providing limited understanding of how gender-neutral brand positioning shapes the development of deeper consumer–brand relationships. In particular, little is known about the psychological mechanisms through which gender-neutral product presentation influences consumers' emotional attachment to brands.

Addressing this gap, the present study examines how gender-neutral product presentation influences consumer–brand relationships. Specifically, we argue that gender-neutral brand positioning shapes consumers' perceptions of the brand along two complementary dimensions—perceived brand uniqueness and perceived brand quality. These perceptions, in turn, enhance consumers' psychological connection with the brand (brand self-connection), ultimately fostering stronger emotional attachment in the form of brand love.

Purpose of the paper. *Brands increasingly adopt positioning strategies that challenge traditional product category conventions. One such strategy involves presenting products in a gender-neutral manner, thereby avoiding the conventional gender segmentation that characterizes many consumer goods markets. Gender-neutral branding may*

signal inclusivity, modernity, and social awareness, potentially shaping the way consumers perceive and evaluate the brand.

First, gender-neutral positioning may influence perceptions of brand uniqueness. By deviating from traditional gendered marketing cues and category norms, a brand may appear more original, distinctive, and differentiated from competitors. Accordingly, gender-neutral product presentation may enhance consumers' perceptions of brand uniqueness.

H1: Gender-neutral product presentation positively influences perceived brand uniqueness.

Beyond symbolic perceptions, gender-neutral positioning may also shape evaluative judgments such as perceived brand quality. Inclusive or progressive positioning may lead consumers to infer that the brand is modern, thoughtful, and attentive to contemporary social values, thereby improving perceived quality.

H2: Gender-neutral product presentation positively influences perceived brand quality.

Consumers often form relationships with brands that reflect aspects of their identity and self-concept. Brand self-connection refers to the extent to which consumers incorporate a brand into their self-definition and perceive the brand as representing who they are.

Perceived brand uniqueness can play a key role in fostering such connections. Brands that are perceived as distinctive may serve as effective vehicles for self-expression because they allow consumers to signal individuality and differentiate themselves from others. When a brand is perceived as unique, consumers may therefore be more likely to integrate the brand into their self-concept.

H3: Perceived brand uniqueness positively influences brand self-connection.

Perceived brand quality may also contribute to the development of self-connection. When consumers evaluate a brand as high in quality, they may feel more comfortable associating themselves with that brand, as doing so reflects positively on their identity. Positive evaluations of brand quality can therefore strengthen the psychological bond between consumers and brands.

H4: Perceived brand quality positively influences brand self-connection.

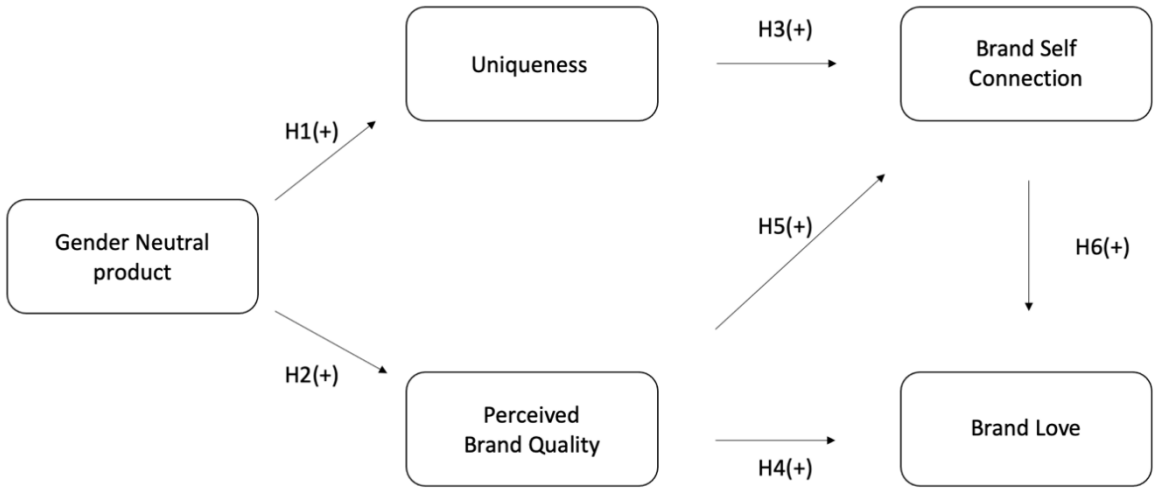
Brand relationships can evolve into deeper emotional bonds over time. Brand love reflects a strong emotional attachment characterized by affection, passion, and closeness toward the brand. Evaluative perceptions such as perceived brand quality may also directly contribute to brand love. Consumers are more likely to develop emotional attachment to brands they perceive as reliable, well-performing, and high in quality.

H5: Perceived brand quality positively influences brand love.

Brand self-connection is widely recognized as a central driver of brand love. When consumers perceive a brand as part of their self-definition, their relationship with the brand becomes more personally meaningful, which increases the likelihood of developing strong emotional attachment.

H6: Brand self-connection positively influences brand love.

Figure 1. Conceptual Model



Source: our elaboration

Conceptual model proposing (Figure 1) that gender-neutral product positioning shapes consumer–brand relationships through two complementary perceptual routes: a symbolic route through perceived brand uniqueness and brand self-connection, and an evaluative route through perceived brand quality, ultimately leading to brand love.

Methodology. *To examine how gender-neutral product positioning influences consumer–brand relationships, we conducted a between-subjects experiment in which participants were randomly assigned to either a gender-neutral or a gender-typed product condition.*

Visual gender neutrality in product and package design refers to the use of marketing visuals that avoid gender stereotypes and gendered design cues (Cakiroglu, 2017). Accordingly, gender-neutral designs rely on neutral visual elements and avoid colours, shapes, or stylistic features typically associated with masculinity or femininity (Stilma, 2010). In contrast, gender-typed designs communicate gender through visual elements commonly linked to masculine or feminine aesthetics.

Participants were first exposed to a product stimulus presenting a perfume from a fictious brand according to the assigned condition. In the gender-neutral condition, participants were presented with two identical perfume bottles displayed side by side. The packaging used neutral colours and minimalist visual elements that avoided gendered cues or associations, and the label described the product as "gender-neutral perfume." In the gender-typed condition, participants viewed two perfume bottles displayed side by side, labelled "for him" and "for her." The bottles incorporated visual elements traditionally associated with specific genders, including gender-coded colours and stylistic features.

After viewing the stimulus, participants completed a questionnaire measuring their perceptions of the brand, including perceived brand uniqueness, perceived brand quality, brand self-connection, and brand love. The order of the measures was randomized to reduce potential order effects. Finally, participants provided demographic information.

A total of 151 Generation Z participants, recruited through Prolific, completed the online study. Responses were screened for completeness prior to analysis, and only fully completed questionnaires were retained.

All constructs were measured using established multi-item scales adapted from prior literature. Responses were recorded on Likert-type scales. Perceived brand uniqueness was measured with items adapted from Anselmsson et al. (2014), perceived brand quality with items adapted from Nath Sanyal and Datta (2011), brand self-connection with items adapted from Jin and Bolebruch (2009), and brand love with items adapted from Carroll and Ahuvia (2006).

To test the hypothesized relationships among the constructs, we estimated a structural equation model (SEM) using maximum likelihood estimation. The model examined the effect of the experimental manipulation (gender-neutral vs. gender-typed condition) on perceived brand uniqueness and perceived brand quality, and the subsequent effects of these perceptions on brand self-connection and brand love.

Results. *A manipulation check confirmed that participants perceived the product presentation as intended. Participants in the gender-neutral condition reported higher manipulation check scores ($M = 5.23$, $SD = 1.54$) than those in the gender-typed condition ($M = 2.55$, $SD = 1.77$), $t(145.12) = 9.89$, $p < .001$, confirming that the manipulation was successful.*

Measurement Model and Construct Validity

Before testing the structural relationships, we assessed the reliability and validity of the measurement model. All constructs demonstrated excellent internal consistency. Cronbach's alpha values exceeded the recommended threshold of .70 (Nunnally and Bernstein, 1994), indicating high reliability for all scales. Specifically, reliability coefficients were $\alpha = .964$ for brand uniqueness, $\alpha = .947$ for perceived brand quality, $\alpha = .948$ for brand self-connection, and $\alpha = .940$ for brand love. Descriptive statistics, reliability coefficients, and correlations among the constructs are reported in Table 1.

Table 1: Descriptive Statistics and Correlations

Construct	*Mean*	*SD*	*Cronbach's alpha*	*1*	*2*	*3*	*4*
1. Brand Uniqueness	*3.42*	*1.59*	*.964*	—			
2. Perceived Brand Quality	*4.70*	*1.12*	*.947*	*.59*	—		
3. Brand Self-Connection	*2.97*	*1.34*	*.948*	*.48*	*.47*	—	
4. Brand Love	*3.98*	*1.23*	*.940*	*.52*	*.70*	*.79*	—

Note: N = 151. All correlations are significant at $p < .001$.

Source: our elaboration

We next assessed convergent validity using the average variance extracted (AVE). All constructs exceeded the recommended threshold of .50 (Fornell and Larcker, 1981), indicating satisfactory convergent validity. AVE values were .868 for brand uniqueness, .859 for perceived brand quality, .759 for brand self-connection, and .694 for brand love.

Discriminant validity was assessed using the Fornell–Larcker criterion. As shown in Table 2, the square root of the AVE for each construct exceeded its correlations with the other constructs, supporting discriminant validity. Although the correlation between brand self-connection and brand love was relatively high ($r = .79$), it remained below the square root of the AVE for both constructs, indicating that the constructs are empirically distinct.

Table 2: Measurement Model Assessment

Construct	*AVE*	*1*	*2*	*3*	*4*
1. Brand Uniqueness	*.868*	***.932***			
2. Perceived Brand Quality	*.859*	*.604*	***.927***		
3. Brand Self-Connection	*.759*	*.504*	*.482*	***.871***	
4. Brand Love	*.694*	*.549*	*.733*	*.831*	***.833***

Note: Diagonal elements (bold) represent the square root of AVE. Off-diagonal elements are latent-factor correlations obtained from the confirmatory factor analysis.

Source: our elaboration

Additional support for discriminant validity emerged from the HTMT criterion (Henseler et al., 2015): the HTMT value between brand self-connection and brand love was .53, well below the recommended .85 threshold. This result provides additional evidence that the two constructs are empirically distinct despite their relatively strong correlation.

Hypothesis Testing and Structural Model Results

To test the proposed relationships among condition, perceived uniqueness, perceived brand quality (PBQ), brand self-connection (BSC), and brand love, we estimated a structural equation model using maximum likelihood estimation with 5,000 bootstrap resamples.

The structural model demonstrated an acceptable fit to the data. Although the chi-square statistic was significant ($\chi^2(3) = 10.25$, $p = .017$), the remaining fit indices indicated acceptable model fit (CFI = .979; TLI = .931), and the standardized root mean square residual suggested low residual error (SRMR = .063). The RMSEA value was .126 (90% CI [.047, .215]). Given the very small number of degrees of freedom in the model, RMSEA should be interpreted cautiously (Kenny et al., 2015). Overall, the pattern of fit indices suggests that the proposed structural model adequately represents the observed data.

We first examined the effect of the experimental manipulation on the two proposed perceptual antecedents. Consistent with H1, gender-neutral brand products significantly increased perceived uniqueness ($\beta = .334$, $p < .001$). Thus, H1 was supported. The effect of condition on perceived brand quality was positive but only marginally significant ($\beta = .154$, $p = .059$). Accordingly, H2 received marginal support.

We then tested the effects of these perceptual variables on brand self-connection. As predicted in H3, higher perceived uniqueness significantly increased consumers' psychological connection with the brand ($\beta = .318$, $p = .001$). Thus, H3 was supported. Similarly, perceived brand quality positively predicted brand self-connection ($\beta = .282$, $p < .001$), providing support for H4.

Next, we examined the antecedents of brand love. Consistent with H5, perceived brand quality positively predicted brand love ($\beta = .430$, $p < .001$). Thus, H5 was supported. In addition, brand self-connection strongly predicted brand love ($\beta = .584$, $p < .001$), supporting H6.

Taken together, these findings (reported in Table 3) indicate that emotional attachment to the brand is shaped by both symbolic and evaluative brand perceptions, although their influence differs in strength and structure. Symbolic perceptions, captured by perceived brand uniqueness, contribute to brand love only indirectly by strengthening consumers' brand self-connection ($\beta = .318$). In contrast, evaluative perceptions reflected in perceived brand quality exert a stronger influence, both indirectly through brand self-connection ($\beta = .282$) and directly on brand love ($\beta = .430$). Consistent with this pattern, brand self-connection emerges as the most powerful proximal predictor of brand love in the model ($\beta = .584$).

The model explained a substantial proportion of variance in the focal constructs (R^2_BSC = .286; R^2_BrandLove = .762).

Table 3: Structural Model Results

Path	*b*	*SE*	*z*	*p*	*β*
Condition → Uniqueness	*1.004*	*.232*	*4.321*	*< .001*	*.334*
Condition → PBQ	*.384*	*.203*	*1.889*	*.059*	*.154*
Uniqueness → BSC	*.278*	*.087*	*3.196*	*.001*	*.318*
PBQ → BSC	*.298*	*.084*	*3.555*	*< .001*	*.282*
PBQ → Brand Love	*.413*	*.046*	*8.935*	*< .001*	*.430*
BSC → Brand Love	*.532*	*.046*	*11.674*	*< .001*	*.584*

Source: our elaboration

Bootstrapped indirect effects (shown in Table 4) further supported the proposed psychological mechanism. Specifically, condition exerted a significant indirect effect on brand self-connection through perceived uniqueness (β_indirect = .106, $p = .005$). Moreover, the sequential pathway condition → perceived uniqueness → brand self-

connection → brand love was significant (β_indirect = .062, p = .010). The total indirect effect of condition on brand love was also significant (β_indirect = .153, p = .008). By contrast, indirect paths involving perceived brand quality were positive but did not reach conventional levels of statistical significance.

Overall, the pattern of results supports the proposed theoretical framework. More specifically, gender-neutral brand framing appears to shape consumer–brand relationships through two complementary perceptual routes. First, the manipulation increases perceived uniqueness, which strengthens consumers' psychological self-connection with the brand and ultimately enhances brand love. Second, the manipulation also shows a weaker but positive association with perceived brand quality, which contributes directly to both brand self-connection and brand love. These findings highlight the joint role of symbolic brand perceptions and evaluative brand perceptions in explaining how consumers develop emotional bonds with brands.

Table 4: Indirect Effects

Indirect Path	*Effect*	*SE*	*p*
Condition → Uniqueness → BSC	*.279*	*.100*	*.005*
Condition → PBQ → BSC	*.114*	*.070*	*.102*
Condition → PBQ → Brand Love	*.159*	*.085*	*.061*
Condition → Uniqueness → BSC → Brand Love	*.148*	*.058*	*.010*
Condition → PBQ → BSC → Brand Love	*.061*	*.037*	*.097*
Total indirect effect on Brand Love	*.368*	*.138*	*.008*

Source: our elaboration

To assess the robustness of the findings, we conducted additional analyses.

First, the structural model was re-estimated using robust maximum likelihood estimation (MLR), which adjusts standard errors and fit statistics for potential non-normality. The results were substantively identical to those obtained with the original estimation approach. In particular, the standardized path coefficients remained virtually unchanged (condition → uniqueness β = .334; uniqueness → BSC β = .318; BSC → brand love β = .584; PBQ → brand love β = .430), and the statistical significance of the focal relationships was unaffected.

Second, additional bootstrapped mediation analyses confirmed the sequential indirect effect of condition on brand love through perceived uniqueness and brand self-connection (β_indirect = .127, p < .001), as well as the mediation effect of perceived uniqueness on the relationship between condition and brand self-connection (β_indirect = .162, p < .001). Overall, these additional analyses replicate the psychological mechanism identified in the structural model and confirm the robustness of the findings.

Research limitations. *Despite its contributions, this research has several limitations that open avenues for future investigation. First, the study relies on a relatively modest sample size. Although sufficient for the structural analyses conducted, future research could employ larger samples to enhance statistical power and generalizability.*

Second, the experimental design employed a single product category and a specific product stimulus (perfume bottles). While this choice allowed for a controlled manipulation of gendered versus gender-neutral product presentation, it may restrict the generalizability of the results across different product categories. Future studies could extend this research by examining gender-neutral product presentation across a wider range of product types, including both hedonic and utilitarian categories.

Third, the study relies on self-reported measures of consumer perceptions and emotional responses. Although such measures are widely used in consumer research, they may be subject to social desirability bias or response tendencies. Future research could complement self-report measures with behavioral or implicit indicators to capture consumer responses more comprehensively.

Fourth, the sample primarily consisted of young consumers belonging to Generation Z. While this focus is theoretically justified given Gen Z's heightened sensitivity to issues of inclusivity and diversity, it may limit the applicability of the findings to other age groups. Future research could investigate whether similar effects emerge among older consumer cohorts with different attitudes toward gender representation in marketing.

Fifth, although the findings provide support for the proposed mechanisms linking gender-neutral product presentation to consumer–brand relationships, the empirical results suggest that the symbolic route through perceived brand uniqueness plays a stronger role than the evaluative route through perceived brand quality. While the effect of gender-neutral presentation on perceived brand quality was only marginally significant, the uniqueness-based pathway emerged as the more robust mechanism driving brand self-connection and brand love. Future research could further explore the conditions under which gender-neutral branding influences quality perceptions and examine additional mediating mechanisms that may explain consumers' relational responses to gender-neutral brand positioning.

Finally, future research could explore potential boundary conditions or individual differences—such as consumers' attitudes toward gender norms or their need for uniqueness—that may shape responses to gender-neutral brand positioning.

Managerial implications. *The findings offer several implications for brand managers. First, the results suggest that gender-neutral product positioning can strengthen consumer–brand relationships by enhancing perceptions of brand uniqueness and fostering consumers' psychological connection with the brand. Managers seeking to build stronger emotional bonds with consumers may therefore benefit from adopting more inclusive and gender-neutral brand strategies. Second, the results highlight that both symbolic perceptions (e.g., uniqueness) and evaluative perceptions (e.g., perceived quality) play a role in fostering brand love, although their influence differs in strength. While perceived quality exerts a stronger and more direct impact on brand love, brand uniqueness contributes indirectly by strengthening consumers' brand self-connection. Accordingly, managers implementing gender-neutral positioning should ensure that such strategies not only signal inclusivity but also reinforce perceptions of product quality and brand distinctiveness. By combining credible quality cues with distinctive positioning, brands can strengthen consumers' identification with the brand and ultimately foster stronger emotional attachment.*

Originality of the paper. *This research contributes to the emerging literature on gender-neutral branding by examining how gender-neutral brand positioning shapes consumer–brand relationships through both symbolic and evaluative perceptions. Specifically, the study integrates perspectives from branding and consumer identity research to explain how gender-neutral positioning influences consumers' emotional relationships with brands through two complementary perceptual pathways: perceived brand uniqueness and perceived brand quality.*

The findings show that gender-neutral products can enhance perceived brand uniqueness, which strengthens consumers' brand self-connection and ultimately fosters brand love. At the same time, the study highlights the role of perceived brand quality as an additional evaluative pathway through which gender-neutral positioning may influence consumer–brand relationships.

By uncovering these mechanisms, the research advances understanding of how gender-neutral branding strategies can shape consumers' perceptions of brands and contribute to the development of deeper emotional relationships between consumers and brands.

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Can Brand-Related User-Generated Selfies be Recognized as Brand Hijacking? Preliminary Insights from an investigation of the Louis Vuitton brand

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Abstract. *Digital environments increasingly expose brands to unauthorized third-party use, particularly through visual user-generated content. Selfies are the most prevalent type of image on social media Although their use has been studied in marketing and branding literature, they remain underexplored in brand hijacking research, especially within the luxury sector. The present exploratory study addresses this gap by investigating whether luxury brand-related selfies can be considered brand hijacking practices and whether they represent constructive or destructive forms of the phenomenon. Indeed, luxury brands are particularly vulnerable to this phenomenon, as they rely on exclusivity, symbolic value, and tightly controlled communication. This study adopted a qualitative approach focusing on the Louis Vuitton (LV) brand. Specifically, a visual content analysis was conducted to compare LV's brand communication with LV-related user-generated selfies posted on Instagram. The findings suggest that most of the selected selfies may constitute destructive brand hijacking, as they include elements inconsistent with LV's brand identity. This research advances luxury branding research by incorporating the brand hijacking practices and contributes to brand hijacking literature by introducing the Destructive Brand Hijacking (DBH) score. It also provides managers with preliminary insights for developing appropriate strategies to monitor and influence brand-related user-generated selfies.*
Keywords: *Brand Hijacking; Brand-Related User-Generated Selfie; Luxury Brand; Louis Vuitton; Visual Content Analysis.*

Framing of the research. Digital has transformed how brands are built. In the digital environment, brand meanings emerge from evolving and often ambiguous interpretations generated by multiple actors involved in the brand-building process (Berthon et al., 2009; Wider et al., 2018). Accordingly, recent branding research has increasingly emphasized a participatory and multi-stakeholder perspective of brand management, conceptualizing the brand as a social, dynamic, and polysemic construct (da Silveira et al., 2013; Michel, 2017; Kristal et al., 2020).

While digital transformation affects brands across sectors, it is especially disruptive for luxury brands (Ye, 2026). Luxury brands, more than others, have traditionally relied on strong symbolic control, coherent storytelling, and exclusivity to preserve consistency across touchpoints and maintain the brand's aura, desirability, and status-signaling function (Kapferer, 2014). The digital environment challenges luxury brands' ability to control brand identity and meanings, posing a risk to the perception of exclusivity and uniqueness. This creates a need to reshape how brands are built and communicated (Christodoulides & Wiedmann, 2022; Gupta et al., 2024). As a result, some brands have reconsidered their strategies, opening to co-creation to avoid a loss of relevance, while others seek to maintain a control-oriented approach to protect their status and unique value (Essamri et al., 2019; Riedmeier & Kreuzer, 2022; Kłeczek & Hajdas, 2025). This creates a growing tension between openness and control in luxury branding (Basile et al., 2024), further intensified by brand hijacking.

Brand hijacking refers to the symbolic appropriation of the brand by stakeholders who reinterpret or manipulate its core elements beyond the company's control (Wipperfürth, 2005; Fournier & Avery, 2011). Indeed, these dynamics have recently been defined as non-collaborative brand co-creation, as consumers contribute to shaping and reinterpreting brand meanings through content creation in digital environments without brand interaction (D'Antonio & Siano, 2023). The phenomenon is treated in the literature from a destructive/constructive perspective (Siano et al., 2022). On the one hand, it can take negative forms aimed at damaging reputation and equity through practices such as parody, satire, or trademark abuse (Fournier & Alvarez, 2013; Kucuk, 2019). On the other hand, it may also produce positive outcomes by generating new meanings or facilitating brand repositioning (Kristal et al., 2018).

In both cases, hijacking practices mainly emerge through the manipulation of visual brand elements such as logos, packaging, slogans, or advertising campaigns (Hewer & Brownlie, 2010; Benton & Peterka-Benton, 2020). The preference for visual elements aligns with the pursuit of virality that characterizes hijacking practices, as visual content tends to be more memorable and more likely to spread on social media (Bainbridge, 2025).

Among the various forms of user-generated visual content spread in social media, selfies have a significant position. Selfies can be defined as self-produced digital self-portraits in which the subject of the image coincides with the author of the photograph. They may be created, for instance, by holding the camera in hand, using a mirror, or setting the device

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to capture the image automatically (Papacharissi & Mendelson, 2011). Moreover, the phenomenon includes a variety of visual practices, such as belfies and foot selfies, which portray isolated body parts, as well as images involving multiple individuals (i.e., usies, wefies, and groupfies) (Miller et al., 2016; Rettberg, 2014).

Recent studies further highlight that selfies function as tools of self-presentation and identity performance, enabling individuals to construct and negotiate their identities on social media (Tiidenberg & Cruz, 2015). Consequently, when brands are incorporated into selfies, they become part of users' identity narratives (Presi et al., 2016). Therefore, users appropriate the symbolic meanings of the brand but, by sharing content with their network of friends and followers, they attribute their own social meanings to it (Kozinets et al., 2017; Uzunboylu et al., 2020).

This dynamic may be even more critical for luxury brands. Luxury consumers actively share pictures, posts, product reviews, and feedback on social media platforms such as Instagram and Facebook to signal their status and prestige (Koivisto & Mattila, 2020; Pangarkar et al., 2023). However, luxury brand-related self-representation practices can also produce interpretations that diverge from the intended positioning of these brands.

Therefore, selfies may become a privileged space for brand hijacking in the luxury context. It becomes essential to understand how and to what extent selfies contribute to processes of redefinition of luxury brand meanings on social media.

Purpose of the paper. The effects of brand-related user-generated selfies in terms of brand stabilization and destabilization were addressed by Rokka and Canniford (2016). However, these practices remain largely unexplored in brand hijacking literature, which has mainly focused on advertising parodies or hijacked videos and images shared on social media (Thota & Villarreal, 2020). Addressing this gap, our study investigates whether selfies can be classified as a form of brand hijacking and if so, whether they represent constructive or destructive forms of the phenomenon. Indeed, it considers users' practices of brand reinterpretation not only as potential reputational threats but also as possible strategic resources (Siano et al., 2022).

Accordingly, this study addresses the following Research Questions (RQs).

RQ1: *Could brand-related user-generated selfies represent a form of brand hijacking?*

RQ2: *Could brand-related user-generated selfies be categorized as constructive or destructive forms of brand hijacking?*

To answer the RQs, the present study explores the case of Louis Vuitton (LV), a French fashion house founded in Paris in 1854 by Louis Vuitton and currently part of LVMH, a global leader in the luxury goods sector. Initially specialized in travel trunks, the brand later expanded into leather goods, ready-to-wear, accessories, and jewelry, becoming one of the most iconic and influential luxury brands worldwide (Temirov, 2025). Its economic and symbolic relevance is reflected in its presence in the Interbrand Best Global Brands 2025 ranking, where LV holds the 12th position worldwide with an estimated brand value of USD 48.4 billion (Interbrand, 2025). It is also ranked fourth in the Top 10 luxury brands in the world by the Glion Institute of Higher Education (2025).

Moreover, the brand has a highly codified symbolic system. Although it has recently opened its creative universe to collaborations with artists and designers, including Yayoi Kusama (Kłeczek & Hajdas, 2025), it continues to maintain careful and strategic control over its symbolic capital.

In addition, LV has a strong presence on social media, particularly on Instagram. The brand has published over 9,000 posts and has approximately 56 million followers, generating high levels of engagement, exceeding those of other leading luxury brands (Torregrosa et al., 2023).

Overall, these elements make Louis Vuitton a suitable case for addressing the RQs, as it provides a rich and relevant empirical context.

Methodology. To ensure consistency with the purpose of the paper, this study adopted a qualitative approach. We began by defining the intended identity of LV following Kapferer (1992; 2004), based on an analysis of content disseminated through the brand's owned media, including its official website and social media accounts. We then conducted a visual content analysis to compare official brand images with brand-related user-generated selfies (Rokka & Canniford, 2016). Visual content analysis is a systematic method of examining visual materials through explicit and replicable coding categories (Rose, 2012). The method analyzes visual content into analytical units and assigns meanings based on predefined categories, ensuring consistency, transparency, and comparability of results (Gleeson, 2011). In the present study, this method helps to identify the predominance of brand-related meanings in both official brand images and brand-related user-generated selfies and detects potential processes of re-signification associated with brand hijacking (RQ_1 and RQ_2).

Data collection involved two groups of images. Group A consists of official images published on the Instagram account @louisvuitton. Posts published between 2016 and 2026 were considered and gathered by hand. Only visual content depicting people was included. Videos were excluded. Due to platform limitations, posts prior to 2021 could not be fully retrieved. Therefore, the initial corpus included n = 1335 LV's posts. Given the exploratory nature of this preliminary study, only a random sample of 50 images was extracted to enable an in-depth qualitative analysis. Group B consists of brand-related user-generated selfies published on Instagram during the same period (2016–2026). Images were identified through hashtags containing #lv or #louisvuitton combined with #selfie or #selfies and were collected manually. Videos were excluded. The initial corpus included n = 104 LV-related user-generated selfies, from which a random sample

of 50 images was retained. Therefore, the two groups were obtained through simple random sampling. They contain an equivalent number of images, ensuring comparability.

For the purposes of the coding process, interpretive categories were defined to assess both the predominance of meanings associated with the brand and their consistency across the two groups of images. The coding scheme was developed using a hybrid approach combining data-driven and theory-driven strategies. In the first phase, an inductive ("bottom-up") analysis was conducted through visualization and open coding of the entire sample to identify patterns, similarities, and differences within and across the two groups. In the second phase, a deductive ("top-down") approach was adopted, whereby the emerging categories were systematically compared with existing literature, allowing their refinement and integration and improving the clarity and objectivity of the coding process (Tuckett, 2005).

Specifically, we identified the macro-category "expression of luxury", articulated into several sub-categories, namely heritage (e.g., iconic products, historical monograms or emblems), magic (e.g., surreal settings, fairy-tale dresses), elegance (e.g., formal clothing, composed posture), craftsmanship (e.g., close-up details, scenes of the atelier or workshop), exclusivity (e.g., private events, prestigious or elite locations, celebrity endorsement), creativity (e.g., artistic collaborations, experimental use of colors, shapes, and lighting), and excellence (e.g., product packaging design, refined and high-quality materials). These sub-categories were grounded in prior research on luxury branding (Ko et al., 2019; Christodoulides et al., 2009; Rokka & Canniford, 2016; Jacob et al., 2020).

In addition, we included the macro-category "expression of narcissism". This macro-category was operationalized through visual cues associated with vanity (e.g., self-focused poses, body emphasis, mirror use) and ostentatious display (e.g., gestures and postures that demonstrate ownership of the product). Indeed, while vanity reflects the psychological dimension of narcissism, ostentation captures its manifestation in consumption practices and its orientation toward signaling status (Neave et al., 2020).

To capture the tone of the images analyzed, a further macro-category, "expression of humor", was considered, following Vanden Bergh et al. (2011). This category comprises three sub-dimensions: cool (e.g., fashionable and trendy outfits), funny (e.g., playful or entertaining situations, expressions of joy), and witty (e.g., ironic and playful gestures, such as winking or sticking out the tongue).

Each image from groups A and B was examined, classified, and labeled through an iterative process of reading and re-reading, using the same categories. Images from Group B were also analyzed using two macro-categories (disparaging humor and offensiveness) to assess destructive brand hijacking, in line with the approach taken by Vanden Bergh et al. (2011) and previous studies by Thota & Villarreal (2020).

Regarding the disparaging humor macro-dimension, we considered the following sub-categories:

- *mocking (i.e., gesture intended to ridicule the brand or its products);*
- *teasing (i.e., ironic expressions associated with playful, harmless misuses of the brand or its products);*
- *joke (i.e., comical poses or situations associated with the brand or its products);*
- *making fun of (i.e., expressions of disapproval toward the brand or its products);*
- *critical (i.e., gestures of criticism or expressions of explicit contempt that draw attention to a visible defect in the brand's product).*

We considered offensiveness macro-categories in terms of the following sub-categories:

- *gross (i.e., unclean or unhygienic places or vulgar poses associated with the brand and its products);*
- *disgusting (i.e., repulsive or grotesque elements in connection with the brand and its products);*
- *disturbing (i.e., dangerous objects or weapons shown with the brand);*
- *mean (i.e., aggressive or crude gestures in association with the brand or its products);*
- *distorted (i.e., visual elements that clearly deviate from the brand's image).*

Each subcategory was coded as present (1) or absent (0). For each selfie, the scores were summed to obtain a Destructive Brand Hijacking (DBH) score ranging from 0 to 10. Scores were then classified into five levels: low (1–2), medium–low (3–4), medium (5–6), medium–high (7–8), and high (9–10).

To reduce subjective interpretations, a parallel coding of the two image groups was conducted by two independent coders. Inter-coder reliability reached 93% for images in group A and 96% for those in group B, exceeding the 80% recommended by Krippendorff (2012).

Finally, in line with the study objectives, coding frequencies were calculated for the analyzed images, and the consistency between group A and group B was assessed based on differences in the frequency of the categories considered.

Results.

LV intended identity

The LV brand is defined by a strategic combination of heritage, artisanal savoir-faire, and creative innovation (LVMH, 2026), elements recognized as central pillars of contemporary luxury branding (Ko et al., 2019). This identity configuration can be comprehensively analyzed through the Brand Identity Prism, a theoretical model developed by Kapferer (1992; 2004), which conceives a brand as an articulated system of six interconnected dimensions.

- *Physique: this includes tangible elements that ensure instant recognition, such as the patronymic brand name, the "LV" monogram, and iconic products like travel trunks and handbags. The color palette further cements this*

visual identity: the brown of the Monogram Canvas evokes tradition, gold signals exclusivity, and black communicates refined elegance.

- *Relationship: LV builds a privileged connection with consumers via diverse touchpoints, including its official website, physical boutiques, social media accounts, and exclusive events like runway shows. These interactions foster prestige and trust, strengthening the emotional bond with the consumer.*
- *Reflection: this refers to the "ideal" consumer profile. LV's reflection is an individual who is elegant and successful, a perception reinforced by the brand's frequent association with global celebrities and influential figures.*
- *Personality: the brand expresses elegance and creativity with a strong innovative drive. It primarily embodies the Creator archetype, focused on design and innovation, balanced with the Ruler archetype, representing prestigious and leadership.*
- *Culture: deeply rooted in French artisanal tradition and the value of savoir-faire, the brand focuses on excellence in leatherwork. It blends its European luxury heritage with constant creative collaborations.*
- *Self-Image: this is the internal mirror of the consumer. When using LV, customers perceive themselves as sophisticated and part of an exclusive social circle. The brand acts as a symbolic tool for expressing personal distinction.*

Overall, the framework highlights how LV utilizes integrated dimensions to reinforce consistency and distinctiveness in the global luxury landscape, creating significant symbolic value for its audience.

Preliminary content analysis results: group A and B coding frequencies. The visual content analysis of images published on LV's Instagram account (group A) reveals a communication strategy strongly aligned with the symbolic codes of luxury. The most frequently occurring dimensions are exclusivity (90%), excellence (74%), and elegance (66%). Exclusivity is often conveyed through the presence of celebrities (about 32%) or house ambassadors (about 18%) and through prestigious settings such as private events or iconic locations (about 26%). Excellence is mainly expressed through the visual emphasis on product quality, while elegance emerges from the posture of the subjects and their tailored clothing (e.g., tuxedos, suits, jackets, and long dresses). The dimension of creativity (42%) also appears frequently. Creativity emerges through artistic settings or references to the brand's collaborations with artists. The dimensions of heritage/tradition (24%), craftsmanship (22%), and magic (14%) are less frequent. Heritage appears through references to iconic products, historical monograms, or reinterpretations of past designs. Craftsmanship is conveyed through images that emphasize artisanal processes and product details, whereas magic appears in images featuring evocative scenery, fairy-tale atmospheres, and dresses. The cool/trendy sub-dimension dominates among humor categories (76%) (Vanden Bergh et al., 2011), reflecting in the presence of urban contexts, stylish outfits, etc. The funny (16%) and witty (14%) sub-categories appear only marginally, respectively in entertainment situations or in playful poses adopted by the models. Elements associated with narcissism are almost absent; only the vanity dimension appears with a frequency of 36%. Inter-coder reliability reached 93% in group A.

Brand-related selfies (group B) were analyzed using the same categories. Luxury elements appear much less frequently: elegance (30%), exclusivity (20%), and excellence (16%). These dimensions mainly emerge from selfies taken in LV contexts, such as LV stores and restaurants (about 22%). Indeed, most selfies are taken in indoor environments, particularly in domestic (e.g., bedrooms and bathrooms) (about 38%) and non-domestic settings (i.e., restaurants, stores, gyms, elevators, hotels) (26%). The categories of creativity (10%) and magic (2%) appear only marginally, whereas the dimensions of heritage/tradition (0%) and craftsmanship (0%) are absent. In contrast, elements related to individual expression are far more prominent in line with Mishra & Mohapatra's studies (2025). The ostentatious and vanity dimensions appear at very high frequencies (96% and 90%, respectively). In particular, ostentation emerges as subjects display an LV product in the foreground. The most frequently represented LV items are accessories (62%) (e.g., bags, belts, hats, and scarves), followed by clothing (6%), jewelry and watches (4%), and other items (10%) (i.e., face masks, phone cases, etc.). Among the humor sub-categories, the cool/trendy (56%) and witty (50%) dimensions are the most frequent, followed by funny (30%). In several cases, the brand appears in entertainment contexts or in situations where subjects adopt ironic poses or expressions. In group B, the inter-coder reliability reached 96%.

Table 1. Preliminary coding frequencies of group A and group B.

Categories	Coding frequencies	
	LV brand account images	*LV-related user-generated selfie*
Expression of luxury		
exclusivity	90%	20%
excellence	74%	16%
elegance	66%	30%

creativity	42%	10%
heritage/tradition	24%	0%
craftsmanship	22%	0%
magic	14%	2%
Expression of narcissism		
vanity	36%	90%
ostentatious	0%	96%
Expression of humor		
cool/trendy	76%	56%
funny	16%	30%
witty	14%	50%

Source: our elaboration

As shown in table 1, the preliminary results reveal differences in coding frequencies, reflecting diverging meanings associated with LV by the company and their users. Group A (LV's official posts) emphasizes traditional luxury codes such as elegance, reflecting a prestigious brand positioning. In contrast, group B (LV-related user-generated selfies) does not adhere to these symbolic codes and communicative registers. Indeed, LV-related user-generated selfies exhibit a broader range of playful and ironic expressions, which shift the brand away from its established aura of exclusivity and magic. The users of the analyzed selfies use the brand in everyday contexts, thereby distancing it from the elitist settings depicted in official posts. Moreover, these users do not aim to highlight product excellence in terms of heritage, craftsmanship, or creativity. In the analyzed selfies, users display the brand and its products mainly to perform their personal identity, as confirmed by the high coding frequencies observed for the narcissism dimensions.

Therefore, these inconsistencies across images in groups A and B allow the analyzed selfies to be interpreted as instances of brand hijacking.

Preliminary DBH score results based on visual content analysis. Most of the selfies analyzed depict LV in a way that deviates from the brand's luxury identity, potentially harming and diluting its positioning and value. Overall, considering the definition provided by Siano et al. (2022), these preliminary findings suggest that the analyzed selfies can be interpreted as potentially destructive forms of brand hijacking, as they reinterpret the brand's meaning through associations with contexts perceived as inappropriate or inconsistent with the LV intended identity built over the years. For example, they associate the brand with unclean or nasty contexts (e.g., bathrooms) and, in some cases, with vulgarity (e.g., nudity or inappropriate poses), potentially distorting LV's image, undermining its luxury status, and compromising the prestige historically associated with the brand.

Specifically, 16 out of 50 selfies (32%) cannot be classified as destructive brand hijacking. These selfies reinforce the brand's positioning, but they are not categorizable as constructive forms of brand hijacking, as they reproduce the brand's established symbolic codes without introducing reinterpretations or alternative meanings. Conversely, 34 out of 50 selfies (68%) can be classified as potential cases of destructive brand hijacking, as they fall into at least one of the ten subcategories used in the analysis (mocking, teasing, joke, make a fan of, critical, gross, disgusting, disturbing, means, distorted).

The sample shows heterogeneity in the number of subcategories represented. Most selfies exhibit a low level of DBH: 42% of the total selfies (21 out of 50), accounting for 62% of the selfies that are classified as destructive brand hijacking (21 out of 34). Instead, 24% of all selfies (12 out of 50) have a medium-low DBH score, representing 35% of those classified as brand hijacking (12 out of 34). Only 2% of the analyzed selfies (1 out of 50) received a high DBH score, making up 3% of the selfies categorized as brand hijacking (1 out of 34). Accordingly, the average value of DBH obtained for the 34 selfies classified as destructive brand hijacking is 2.26 (in the range from 0 to 10), which is relatively low, representing a limited average presence of heterogeneous dimensions associated with brand hijacking among those considered in the methodology section.

Therefore, these preliminary findings provide affirmative answers to both RQ_1 and RQ_2, which guided this study, offering initial insights into how luxury brand-related selfies may be considered as destructive forms of brand hijacking.

Managerial implications. The preliminary findings suggest several managerial implications for luxury brand managers facing the growing diffusion of visual user-generated content on social media. In the case of LV, the findings reveal a significant inconsistency between the controlled communication disseminated through the brand's official Instagram account and the representations emerging from brand-related user-generated selfies. This may indicate that, in digital environments, luxury brands face increasing difficulties in maintaining full control over their symbolic representation. Consequently, brand managers may adopt more proactive strategies for monitoring and influencing visual user-generated content. As noted by Uzunboylu et al. (2020), users do not only consume brand meanings in digital environments but also contribute to their production. From this perspective, selfies can be interpreted as a branding tool that may incentivize the co-creation process. However, in the luxury sector, these dynamics require careful management, as excessively broad participation could undermine the perception of exclusivity that characterizes luxury brands (Riedmeier & Kreuzer, 2022; Basile et al., 2024). Therefore, brand managers may promote forms of controlled co-creation, encouraging consumers to express themselves creatively within a narrative framework that remains consistent with the brand's values and meaning (Koivisto & Mattila, 2020), avoiding the dilution of brand image (Park et al., 2020). For instance, brand managers can run online contests, providing clear guidelines and defining key values and narrative directions to guide user-generated content creation.

Monitoring selfies not only offers insight into consumers' perceptions, brand meanings (brand associations), and consumption experiences - but also assists brand managers in understanding how they are reinterpreted in a digital environment. By strengthening social media listening, brand managers can identify potentially harmful brand representations early on. Such representations may damage the symbolic capital and prestige on which luxury brand positioning is based, and compromise brand equity. In this context brands may adopt differentiated response strategies, such as engaging in dialogue with users, publicly dissociating from the content, or implementing containment strategies, depending on the nature and severity of the hijacked user-generated content (Siano et al., 2022).

In this context, the involvement of Online Brand Communities (OBCs) may be critical for safeguarding the brand. Actively engaging with these communities, particularly with members who show strong emotional involvement with the brand, may foster brand defense behaviors (Hassan & Casaló Ariño, 2016) and encourage the emergence of brand evangelists who support and defend the brand in digital environments (Cavadas & Moreira, 2025). Hence, brand managers should critically evaluate current initiatives aimed at strengthening relationships with the brand community, as well as those that can be implemented to increase brand loyalty and emotional attachment.

Research limitations and future research. This study presents several limitations that suggest future research directions. First, the use of a single case restricts the generalizability of the findings (Yin, 2009). Therefore, future research could extend the analysis to multiple cases belonging to different luxury industries (e.g., Ready-to-Wear, Perfumes and Cosmetics, Leather Goods, Wines and Spirits, Jewelry and Watches).

Moreover, the study is subject to typical limitations of content analysis techniques (Krippendorff, 2012). The categorization of content into analytical groups may not fully capture the complexity of the visual material, while the relatively small sample of images may limit the generalizability of the findings (Veum & Undrum, 2018). Measurement procedures should be refined in future research and tested on a larger scale in different contexts and time periods.

Finally, the present study considers brand-related selfies as a potential form of brand hijacking, reflecting the researcher's perspective. Future research could incorporate the viewpoints of brand managers and members of luxury OBCs - including influencers, brand lovers, creatives, and artists. On the one hand, considering the perspective of brand managers, as custodians of the brand (Capon et al., 2001), may help accurately capture whether the selected brand-related selfies are constructive or destructive forms of brand hijacking. On the other hand, OBCs represent key contexts for the production and negotiation of brand meaning, characterized by deep, enduring, and emotional relationships between consumers and brands that go beyond mere loyalty (Muniz & O'Guinn, 2001; Cavadas & Moreira, 2025). Therefore, members of these communities constitute relevant stakeholders, whose perspectives could clarify whether brand-related user-generated selfies are socially legitimized as coherent brand expressions or interpreted as practices of re-signification that may reflect brand hijacking dynamics.

Originality of the paper. This study contributes to luxury branding research (Ko et al., 2019) by incorporating the concept of brand hijacking. To the best of our knowledge, it is the first study to explore this perspective.

Furthermore, our preliminary findings may help to extend the conceptual boundaries of brand hijacking. Unlike previous studies, we propose that destructive brand hijacking does not necessarily occur through explicit or disruptive forms of brand sabotage (Fournier & Alvarez, 2013). In the context of luxury brands, even deviations from the established luxury brand identity can distort brand meanings, constituting a form of destructive brand hijacking.

In addition, we introduce a first DBH score to empirically measure brand hijacking, which could facilitate its systematic assessment across visual context. In this regard, the study contributes to ongoing efforts in branding research to develop more robust and measurable constructs (Sarasvuo et al., 2022).

Finally, by focusing on visual user-generated content, this research advances brand hijacking understanding by considering an everyday visual practice, i.e., selfies, as a potential driver of the phenomenon. Accordingly, it opens a new avenue for research at the union of brand-related user-generated selfies and brand hijacking.

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Congruency Matters.
Physiological Responses to Nutritional Claim–Product Fit

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Abstract. *Among packaging elements, nutritional claims play a crucial role by providing concise information about product attributes and health-related benefits. However, their effectiveness is not straightforward, as consumers' evaluations are influenced by cognitive biases and contextual factors, including the perceived relationship between healthiness and tastiness. Building on Schema Congruity Theory, this study investigates how the effectiveness of packaging claims depends on the degree of congruence between the claim and the product category. In particular, the research examines whether alignment or misalignment between the communicated benefit (gustatory gratification oriented vs. health oriented claim) and the product's nutritional identity influences consumers' physiological and evaluative responses.*

A between-subjects experimental design was conducted with 40 participants who were exposed to packaging images of two breakfast snacks differing in perceived healthiness (indulgent vs. healthier product). Each product was presented with either an indulgent claim emphasizing taste or a health-related claim highlighting nutritional benefits. Psychophysiological measures, including electrocardiography (ECG) and electromyography (EMG), were used to capture automatic physiological responses related to arousal and emotional valence, while self-reported preferences were collected to assess consumption intentions.

Results showed that emotional valence and product evaluation are strongly influenced by claim–product congruence. Congruent combinations elicit more positive affective responses, while incongruent pairings lead to less favourable emotional evaluations despite higher arousal levels. Behavioural choices further confirm this pattern. These findings highlight that the persuasive effectiveness of nutritional claims depends not only on their informational content but also on their symbolic coherence with the product category schema. Theoretical contributions to research on effectiveness of claims and practical implications for the strategic design of packaging communication are provided, emphasizing the importance of aligning nutritional claims with the product's perceived identity to enhance consumer evaluation and purchase intention.

Keywords: *nutritional claims; congruency; packaging; physiological responses; neuromarketing*

Framing of the research. *Packaging plays a strategic role in the purchasing decision-making process thanks to its ability to create identity and differentiation, as well as to establish a direct channel of communication with consumers (Brennan et al., 2021; Kukreja and Patil, 2025; Rundh, 2016; Underwood, 2003). Among its communicative elements, claims represent a particularly powerful lever that combines strong symbolic value with high informative capacity (Ballco e Gracia, 2022; Prada et al., 2021; van Trijp e van der Lans, 2007). In the food sector, claims are commonly used to convey information about specific product or about the relationship between products and health. These include nutrition claims, which refer to the nutritional properties of a product and its positive effects on bodily functions (Neale and Tapsell, 2022). By providing concise and easily accessible information, nutrition claims perform a useful communication function for consumers supporting them in the comparative evaluation of products and guiding them toward healthier food choices (Ballco and Gracia, 2022; Choi and Reid, 2015; Kristal et al., 1998; Talati et al., 2017).*

In this perspective, nutritional information on packaging does not merely describe product attributes. Rather, it actively shapes consumers' perceptions and influences their behavioural responses, ultimately affecting how products are evaluated and chosen (Abbas et al., 2024; Prada et al., 2021; Stoltze et al., 2021).

Literature has consistently shown that the impact of nutritional claims on consumers' expectations and product evaluations is far from straightforward, as it is shaped by a complex interplay of cognitive, perceptual, and contextual factors. First, some authors have demonstrated that their effectiveness depends on the consumer's correct interpretation and understanding of the information conveyed (e.g., Anastasiou et al., 2019; Campos, 2011). For example, a claim such as "low cholesterol" may be misinterpreted as "low fat", leading to inaccurate inferences about the product's overall nutritional profile (Reid and Hendricks, 1994). In such cases, claims do not merely inform but may activate simplified heuristics that shape expectations in unintended ways. Beyond issues of comprehension, nutritional claims can also trigger deeper evaluative biases linked to lay beliefs about the relationship between health and taste. In particular, research has documented the so-called "unhealthy = tasty intuition", according to which consumers implicitly associate healthiness with inferior taste (Haasova and Florack, 2019). When a claim highlights beneficial ingredients or specific nutritional properties, it may enhance perceptions of healthiness while simultaneously diminishing expected tastiness,

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thereby reducing desire and purchase intention (Garaus and Lalicic, 2021; Paakki et al., 2022; Raghunathan et al., 2006). Importantly, this bias operates not only during actual product consumption but also in the pre-consumption phase: it influences the construction of expectations, guiding product evaluations and behavioural intentions even in the absence of direct sensory experience.

However, more recent research suggested that the association between healthiness and reduced tastiness is not universal, but rather context-dependent. In certain communicative or cultural contexts, and for categories perceived as naturally healthy, healthiness can strengthen taste expectations, especially when integrated with complementary hedonic communication (Dubé et al., 2016; Garaus and Lalicic, 2021). Overall, these findings suggest that the effectiveness of health claims cannot be understood solely in terms of their informational content. Instead, their impact depends on the symbolic meanings they activate and the perceptual context in which they are embedded. When a health claim is consistent with prior expectations (for example, in categories perceived as "naturally healthy") or accompanied by hedonic cues that trigger positive inferences about taste, the traditional opposition between health and palatability weakens or even reverses. Conversely, when healthiness appears incongruent with the taste imagery of a product category, the health claim risks activating the "unhealthy = tasty" heuristic, ultimately reducing the product's perceived attractiveness and desirability.

Purpose of the paper. *The present paper aims to contribute to the literature on the communicative power of nutrition claims by examining how their effectiveness depends on the degree of alignment between the claim and the product to which it is associated. In particular, the research focuses on the level of claim–product fit, analysing how perceived congruence or incongruence between the information conveyed through the claim and the product's nutritional identity influences consumers' evaluation processes.*

The notion of congruence refers to the degree of correspondence or discordance between the object of evaluation and the associated attributes (Clemente et al., 2014). According to Schema Congruity Theory (Meyers-Levy & Tybout, 1989), individuals interpret new information through pre-existing cognitive schemas that guide expectations and facilitate information processing (Gao et al., 2022; Meyers-Levy & Tybout, 1989). When incoming information is consistent with these schemas, it tends to be processed more fluently, which generally results in more favourable evaluations and higher perceived credibility. Conversely, incongruent information may require more elaborate cognitive processing and can generate uncertainty, ambivalence, or cognitive dissonance when the message conflicts with established expectations (Peracchio and Tybout, 1996).

In the context of food claims, marketing research has shown that their persuasive effectiveness depends not only on the informational content conveyed, but also on the degree of perceived congruence between the claim, the product, and the consumer's system of expectations (Choi and Reid, 2015; Luo et al., 2025; Magnier and Schoormans, 2015). For instance, health-related claims tend to be more persuasive when associated with products that are already perceived as healthy, as they reinforce existing category schemas. Conversely, when applied to indulgent or hedonic products, such claims may create a mismatch between the communicated benefit and the product's symbolic meaning, potentially reducing credibility or generating cognitive tension (Choi and Reid, 2015).

Building on these theoretical premises, this experimental study used psychophysiological research methodologies to thoroughly investigate the role of congruence/incongruence between packaging claims and category schemas. Specifically, the objective was to verify how different types of claims influence product perception and interest depending on the degree of consistency between the communicated benefit and the product category. To address this objective, the study compared two types of claims: hedonic claims, which emphasise taste and hedonic benefits (indulgent claims), and health-related claims, which highlight nutritional properties (healthy claims). The underlying assumption is that greater alignment between the claim and the product identity will result in more positive implicit attitudes as well as stronger purchase intentions. In contrast, incongruent contexts are expected to elicit more negative automatic cognitive and physiological mechanisms. Therefore, when the emphasised benefit is consistent with the category schema (claim-product congruence condition), the claim may reinforce inferences about the product's characteristics and desirability. Conversely, when a discrepancy exists between the claim and the product (claim–product incongruence condition), the resulting cognitive tension may lead to more critical evaluations and less favourable perceptions of the product. Based on this reasoning, the following research hypotheses are proposed:

H1: Claim-product congruence will lead to a greater physiological activation (arousal) toward the product compared to claim-product incongruence.

H2: Claim-product congruence will lead to a greater affective evaluation (valence) toward the product compared to claim-product incongruence.

H3: Claim-product congruence will lead to a greater consumption intention toward the product compared to claim-product incongruence.

The empirical context of the study is the breakfast snack category, which is characterized by a structural tension between hedonic and health-related consumption motivations. Within this category, products differ significantly in their perceived healthiness and nutritional composition, making it a particularly relevant context in which to investigate claim–product congruence. For less healthy products, a health-related claim may be perceived as less consistent with the product's category schema, potentially generating ambiguous or sceptical evaluations and reducing persuasive effectiveness compared to indulgent claims. Conversely, for healthier products, health claims may appear more coherent

with the product's identity, reinforcing positive inferences without necessarily undermining taste expectations and thereby mitigating the traditional trade-off between healthiness and pleasantness.

Methodology. *A between-subjects experimental design was developed involving a sample of 40 participants (24 Females and 16 Males, Average Age = 23.6). The subjects were shown packaging images of two breakfast snacks: a) one more indulgent in terms of nutritional composition (IN product); and b) the other with a nutritional profile more oriented towards well-being and healthiness (HE product). The four experimental conditions were obtained by combining the two independent variables (higher/lower level of healthiness of the product and indulgent/healthy claim). Therefore, two version of each product image were developed. The two images were absolutely identical, with the only difference being the type of claim (healthy or indulgent) featured on the packaging. The sample was divided into two subgroups. Each group observed both products in only one of the two claim versions (indulgent claims N = 20; healthy claims N = 20).*

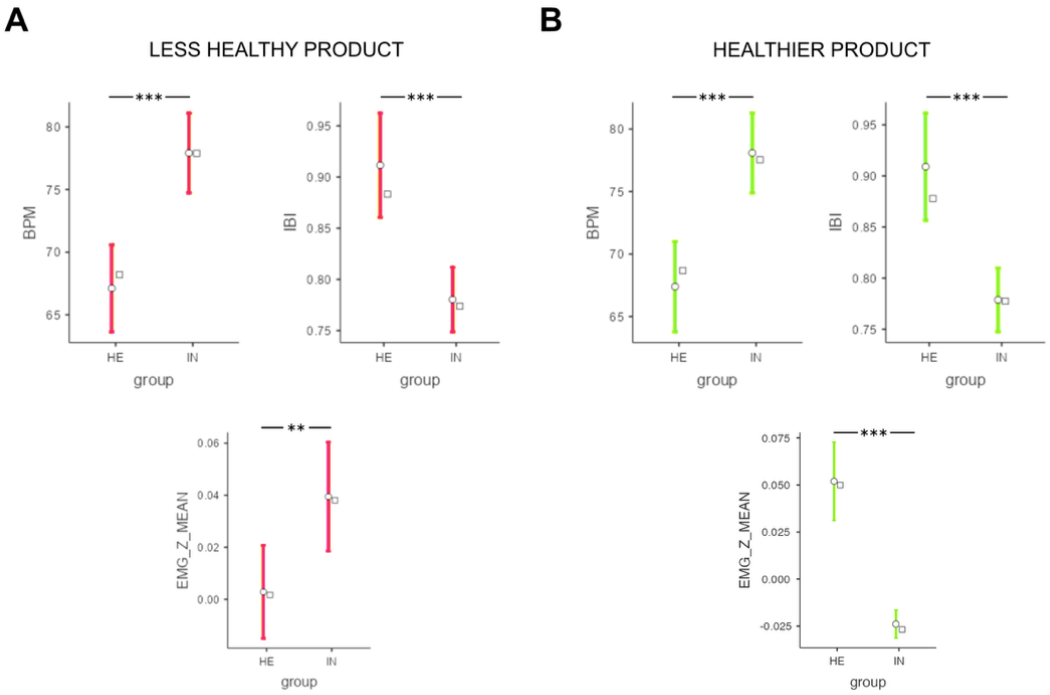
To assess the physiological responses to congruence and incongruence between claims and products, instruments capable of measuring cardiac (electrocardiogram) and facial muscle (electromyogram) responses were used. These instruments enable highly precise detection of the automatic responses triggered by changes in physiological state, which are often mediated by the autonomic nervous system through its orthosympathetic and parasympathetic branches. After viewing the stimuli and measuring physiological parameters, participants were asked to express a final choice preference between the two products (healthy product vs. indulgent product with the same type of claim). Moreover, to investigate whether participants perceived the claim-product pairing as congruent or incongruent, judgements on perceived congruence were also collected (on a scale from 1 = very incongruent to 10 = very congruent).

Results. *The manipulation check confirmed that participants attributed different levels of congruence to the claims, depending on the product in question. For the IN product, the indulgent claim was considered more coherent than the healthy claim ($U = 47.5$, $p < .001$, $r_{rb} = .76$) while for the HE product, the healthy claim was considered more consistent ($U = 127.0$, $p < .046$, $r_{rb} = -.37$).*

The data derived from the electrocardiographic responses showed that arousal is independent of the degree of consistency of the claim with the product. For both products, in fact, the indulgent claim increases physiological activation towards the stimulus, eliciting a higher arousal than the health claim (Heart Rate – HR; Interbeat Interval – IBI) (Figure 1). Therefore, regardless of the degree of congruence with the product, the more indulgent claim activates the organism more (IN product: BPM, $t(38) = -4.50$, $p < .001$, $d = -1.42$; IBI, $t(38) = 4.30$, $p < .001$, $d = 1.36$; HE product: BPM, $t(38) = -4.36$, $p < .001$, $d = -1.38$; IBI, $t(38) = 4.20$, $p < .001$, $d = 1.33$), automatically recalling highly activating and salient characteristics. Hypothesis H1 is therefore not supported. The results from electromyographic measurements, however, highlighted how the emotional valence of the product was strictly dependent on the degree of consistency with the claim, supporting hypothesis H2. Although the indulgent claim generally triggers greater arousal, this does not automatically translate into a positive emotional response for all products. Analysis of the EMG data showed that it is in congruent combinations (IN product with indulgent claim and HE product with healthy claim) that an attribution of positive valence is detected. Conversely, the perception of pleasantness decreases in the case of incongruent stimuli, i.e., indulgent product with healthy claim ($t(38) = -2.61$, $p = .013$, $d = -0.82$) and healthy product with indulgent claim ($t(38) = 6.74$, $p < .001$, $d = 2.13$). This highlights how, despite the high level of physiological arousal, the perceived incongruence between the claim and the product penalizes the latter, implicitly making it more negative in terms of automatic emotional response. Participants' behaviours confirm this result. When faced with a choice between more or less indulgent products, participants exposed to a health claim expressed a preference for the HE product, while participants exposed to an indulgent claim opted primarily for the IN product. Therefore, hypothesis H3 appears to be supported.

Research limitations. *Despite the contributions of this research, some limitations should be acknowledged. First, the study relied on a relatively small sample of participants (N = 40) which, although sufficient to have a certain statistical power in physiological studies, may limit the generalizability of the findings. Future research could replicate the experiment with larger samples to verify the robustness of the observed effects also across different demographic segments. Second, the experiment was conducted in a controlled laboratory setting. Although this approach allowed to control for several confounding variables that could have altered the data and reduced sources of noise that could have compromised the integrity of the physiological recorded signal, it may not fully reproduce the complexity of real purchase environments, where consumers are exposed to multiple stimuli simultaneously and make decisions under time pressure. Further studies could therefore investigate this congruence effect in more ecologically valid contexts. Finally, the research focused on the breakfast snack category and on two specific types of claims (hedonic versus health-related). While this was the category of focus for this current research and allowed for a clear experimental manipulation, the results may not necessarily extend to other food categories or to different types of claims. Future research could explore whether similar congruence effects emerge across a broader range of products and communicative strategies.*

FIGURE 1. ECG and EMG results



Managerial implications. *The study offer several managerial insights for companies involved in the design of food packaging and the strategic use of nutritional claims. First, the results highlight that the effectiveness of packaging claims cannot be evaluated solely in terms of their informational content or their orientation toward health or indulgence. Rather, their persuasive power depends critically on the degree of perceived congruence between the claim and the symbolic and nutritional identity of the product category. When a claim is aligned with consumers' pre-existing expectations about the product, it reinforces the cognitive schema associated with that category and facilitates the formation of positive product evaluations. In the case of the indulgent breakfast snack, the healthy claim appears to conflict with the product's hedonic image, triggering less favourable physiological and evaluative reactions, thereby undermining the credibility of the communication. For companies, this implies that the indiscriminate use of health claims across product portfolios may be ineffective or even counterproductive when such claims are not coherent with the underlying product positioning. Conversely, when nutritional claims are applied to snacks whose identity is already associated with healthier consumption, they tend to strengthen positive inferences and reinforce the product's positioning. In these cases, the claim is easily integrated into the consumer's existing schema and does not generate cognitive dissonance or doubts about taste expectations. This alignment enables to consolidate the product's health-oriented positioning and enhance perceived value without negatively impacting the overall evaluation or consumption intention.*

The physiological measurements employed in this research also provide an important managerial insight: higher attention or arousal does not necessarily translate into more favourable product evaluations. While incongruent claims may attract attention due to their novelty or unexpectedness, this increased salience can simultaneously activate cognitive tension and less positive emotional responses. This result can be explained by the cognitive processing mechanisms described by Schema Congruity Theory: the discrepancy between the product image and the message conveyed by the claim requires greater interpretative effort, which can activate dissonance resolution mechanisms resulting in a less positive overall evaluation of the product. For practitioners, this suggests that capturing consumer attention through surprising or unconventional claims is not sufficient to ensure persuasive effectiveness. Instead, communication strategies must carefully balance distinctiveness with coherence to avoid triggering scepticism or negative implicit reactions.

From a strategic perspective, these results underline the importance of designing claims as part of a coherent communication system that integrates product attributes, category symbolism, and consumer expectations. Using health claims on products that are perceived as indulgent can be ineffective, or even counterproductive, as it risks undermining the credibility of the message and prompting negative associations. Conversely, for products with a well-established health-oriented identity, health claims can reinforce positive inferences, consolidate the health positioning and differentiate the product without lowering expectations. In synthesis, managing the congruence between claims and product identity emerges as a key lever for maximizing the persuasive effectiveness of packaging communication and for guiding consumers' product evaluations and purchase decisions.

Originality of the paper. *By employing physiological responses measurement tools, this study seeks to understand the cognitive and affective mechanisms underlying the processing of nutritional claims, examining whether product evaluations and consumer engagement can be modulated by the broader communication context and by the degree of symbolic congruence between the product and the message conveyed. In doing so, the research moves beyond purely declarative assessments to capture more implicit, real-time reactions that accompany the formation of judgments.*

More specifically, the study contributes to the literature by disentangling the distinct roles of physiological activation (arousal) and affective evaluation (valence), showing that claim–product congruence exerts a stronger and more consistent effect on evaluative responses than on mere activation. Moreover, the integration of physiological indicators with self-reported data enables a more comprehensive understanding of how product–claim congruence shapes perception and influences food-related decision-making. Overall, the research contributes to a deeper understanding of the role of communicative congruence as a key factor in shaping expectations and the choice processes relating to breakfast products, offering theoretical and managerial implications for the strategic design of nutritional claims.

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Delegating distress: Evaluating LLMs as protective tools for coding sensitive advertising content

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Abstract. *This preliminary research examines the adoption of Large Language Models (LLMs) as collaborative tools for qualitative analysis of sensitive video advertisements, with the objective of mitigating the researchers' exposure to vicarious trauma. Although LLMs frequently encounter difficulties in comprehending implicit cultural nuances, their "emotional detachment" is a potential safeguard when analyzing distressing qualitative content. The study analyzed 40 Ukrainian broadcast advertisements from the 2012–2024 period. Initially, two human coders from different cultural backgrounds (Italian and Ukrainian) manually coded the data using a 13-variable codebook. Subsequently, the same advertisements sample was given for analysis to three different LLMs (Gemini Pro 2.5, GPT-4o, and Perplexity Sonar Pro). Preliminary results suggest that LLMs have unique advantages but cannot currently function as independent coders, since they struggled with implicit, subjective variables like archetypes and tone due to their reliance on literal interpretation of advertisements. However, specific models proved to be effective at identifying explicit elements: GPT performed best for explicit symbolism, while Gemini was more effective for identifying character roles and gender stereotypes. Based on the preliminary results, this work proposes a trauma-informed idea for qualitative research where LLMs function as auxiliary coders for explicit, potentially distressing elements of advertisements. Future research will evaluate the framework by examining the actual buffering of researchers' stress, aiming to define a workflow that protects researchers' well-being, particularly in critical situations.*

Keywords: *large language models; qualitative coding; vicarious trauma; advertising research; trauma-informed research*

Framing of the research. *Within marketing and advertising research, researchers are increasingly adopting Large Language Models (LLMs) and AI-based systems to process vast amounts of unstructured consumer data, such as focus group transcripts and social media engagement (Verma et al., 2021). These models possess strong capabilities: they can operate at immense scale, maintain consistency, allow for rapid iteration, and follow rules for explicit, deductive coding (Törnberg, 2024; Xiao et al., 2023), being also able to extract and analyze essential elements from video footage (Liu et al., 2024). By rapidly summarizing narratives and extracting themes using "chain-of-thought" reasoning, LLMs are fundamentally transforming how researchers integrate interpretive tasks (Dunivin, 2025; Mehta et al., 2025). However, deploying these models comes with significant elements to be taken into account.*

While highly effective at surface-level sentiments or information, LLMs frequently struggle with tacit meaning, irony, and the nuanced, culturally grounded motivations driving human behaviors (Mehta et al., 2025; Xiao et al., 2023). In particular, because AI tools are shaped by their training data distributions, their performance differs drastically across cultural contexts, often defaulting to Western norms, hallucinating or misattributing quotes, and carrying inherent biases that can influence different data interpretations (Liu, 2024; Mehta et al., 2025; Törnberg, 2024). However, despite these cultural biases and limitations, LLMs offer a profound methodological advantage: they are entirely immune to the emotional risks determined by the eccessive empathy. This element is particularly useful when considering the analysis of data that contains elements related to war, violence, or more generally, difficult contexts. Research showed that long-term exposure to traumatic material or content, can cause the so defined secondary or vicarious trauma in qualitative researchers, significantly impacting transcription, analysis, and supervision (Kiyimba & O'Reilly, 2015; Smith et al., 2023; Williamson et al., 2020).

This is particularly applicable in the context of interviews, as well as when researchers are exposed to video or picture content containing traumatic elements. Literature emphasises how researchers could behave to protect vulnerable participants in such research conditions, for example by maintaining neutrality when feasible (West & Blom, 2016). Nevertheless, certain studies are concentrating on safeguarding the researchers themselves, which is particularly crucial during data analysis—a stage that necessitates intense intellectual and emotional effort. Throughout the manual coding and content analysis process of such material, researchers encounter recurrent exposure to distressing content, which can produce a considerable cumulative burden over time, potentially leading to intrusive imagery, emotional dysregulation and burnout (Coles et al., 2014; Smith et al., 2023).

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Researchers' well-being is often treated solely as an individual responsibility; however, trauma exposure is not limited to fieldwork and it's present also during the processes of replay, transcription, and data analysis. For this reason, structural and project-level assistance is necessary (Karcher et al., 2024). It is not advisable (and possible) to depend exclusively on human resilience to cope with trauma exposure; instead, targeted measures, such as structured rehabilitation, regular assessments, explicit cessation guidelines, and measured evaluation should be implemented (Karmakar & Duggal, 2023; Silverio & Sandall, 2022). In light of these elements, the ability of tools like LLMs to analyse data with "emotional detachment" while simultaneously being capable of extracting relevant information renders them appropriate for integration as a method to safeguard researchers' well-being. By incorporating LLMs into the research design to manage the preliminary analysis of potentially distressing qualitative content, researchers can implement trauma-informed principles as a safety measure that proactively reduces harm (Coles et al., 2014; Diab & Al-Azzeh, 2024). Thus, LLMs may be seen as collaborative, auxiliary helpers. This methodology necessitates that researchers conduct systematic audits of LLM outputs and prioritise human experts to guarantee thorough and culturally precise results (Barari & Eisend, 2024; Mehta et al., 2025; Törnberg, 2024; Xiao et al., 2023), while concurrently protecting these experts from the significant psychological burden of qualitative analysis, or at least by distributing the workload between human and LLM coders.

Purpose of the paper. *The principal objective of this work is to investigate how LLMs can be integrated as collaborative tools for human researchers during the content analysis and coding of sensitive video advertising. While the underlying conceptual motivation is to explore their potential to mitigate researchers' exposure to traumatic content and reduce the risk of vicarious trauma, the empirical focus of this study is practice-oriented. This preliminary paper serves as a technical feasibility study; while it doesn't yet quantify stress alleviation, it evaluates if LLMs can achieve sufficient interpretive alignment with humans to justify their future use as protective buffers. Because this phase of the research does not directly measure the alleviation of researchers' stress, it concentrates instead on evaluating the comparative capabilities of different LLMs to interpret specific elements of advertisements in a way that can be compared to human coders. Ultimately, the purpose is to establish a methodological framework that guides the optimal selection of specific AI tools for distinct coding tasks and helps redefine the role of the human coder, laying the technical groundwork for future trauma-informed research practices.*

Methodology. *The research employed content-based coding of 40 advertising from the Ukrainian broadcast schedule between 2012 and 2024. The sample was extracted by a broader set (N = 260) of advertisements and served as a "gold set" to train LLMs to further code other advertisements. The first phase of manual content and coding analysis were conducted by two human coders from distinct cultural backgrounds: one Italian and one Ukrainian. This choice was primarily driven by the ethical need to protect the Ukrainian researcher: although it was impossible to eliminate the exposure to potential traumatic advertising content, working in parallel with an external researcher allowed for the distribution of the emotional burden (when needed) and provided a neutral psychological "anchor" during data discussion and interpretation. Furthermore, utilizing a cross-cultural team supported a more balanced interpretation of data, mitigating the Ukrainian coder's inevitable emotional involvement through the Italian coder's objective detachment, consequently reducing the incidence of cultural bias. The content and coding analyses were performed using a codebook that outlined aspects to be retrieved from the advertisements, composed by a total of 13 variables, including 7 binomial (yes/no) and 6 multi-categorical variables. The examined variables encompassed the presence or absence of elements associated with war or crisis elements, the archetypes of different advertisements, the representation of female and male stereotypes, the tone of the advertisement, and the overall characteristics of the depicted characters. The codebook was used in the first phase of manual coding conducted by human coders, who later evaluated their agreement rate on the responses. The codebook and the rules were subsequently modified to address any discrepancies or ambiguities among human coders, defining more precise guidelines for the analysis. The set of advertisements was subsequently re-evaluated using the revised regulations. The data was structured in a tabular format, with each variable corresponding to a designated category, then analysed with RStudio software (v. 2025.9.2.418; Posit team, 2025).*

After the initial step of manual coding and consensus validation among human coders, the codebook containing the coding parameters was attached to three separate LLMs: Gemini Pro 2.5, GPT-4o, Perplexity Sonar pro. The selection of the three models followed an exploratory logic. While the first two models possess native multimodal capabilities for direct video processing, the inclusion of Perplexity (a more search-oriented model) was intended to test the versatility of different LLMs in a qualitative coding context. Then, the 40 video files of the advertisements were attached individually, one by one, paired with the English translated transcription of each advertisement (when applicable). For each video, the LLMs were queried with the following specific prompt: "Analyze the advertisement, verify the presence of the variables contained in the codebook, and assign the categories based on the instructions provided within the codebook. Give the results in a tabular format. If it's not possible to extract a variable, indicate it with NA". The advertising sample size was chosen to have an adequately large sample for result comparison, while concurrently averting model overload, which could increase the risk of hallucinations. After the coding was completed by the LLMs, evaluation of agreement levels was performed between two human coders and one LLM coder at a time. This was conducted to ascertain the most reliable model for element recognition. The level of agreement was assessed using Cohen's kappa for pairwise coder comparisons (Cohen, 1960), whereas Krippendorff's alpha (Krippendorff, 2019) was employed for collective agreement including multiple coders. Moreover, considering the peculiar nature of some of the chosen variables to code (especially

binary ones), also percentage agreement was considered, to further have support in evaluating the actual agreement between coders.

Results. *The results obtained are preliminary, and they come from an initial investigation of the potential role of AI tools in helping code particular elements of advertisements, which have a critical nature. As for the agreement between human coders, the agreement rate that was reached was moderate, since kappa reported values higher than the cut-off of 0.60 (McHugh, 2012) in almost every coded variable, and this was further supported by a general medium-high percentage agreement between coders (Table 1). Specifically, the highest inter-coder agreement was reached for the Character_gender variable (κ = 0.83), and agreement level was also moderate for the Character_role variable (κ = 0.75); these results can be attributed to the fact that basic character traits are more readily identifiable across different advertising scenarios. Moreover, the variables related to male and female stereotypes reported a moderate agreement (κ = 0.77 and κ = 0.65, respectively), indicating that the coders consistently identified the same underlying stereotypes for both male and female characters across the advertising sample. These values are particularly significant given the multi-categorical nature of these specific variables (i.e., which stereotype is represented?) and their more complex interpretation. In contrast, the symbolism variables exhibited a more complex pattern. While they displayed generally homogeneous (and high) levels of percentage agreement, their statistical indices varied significantly. For example, solidarity symbolism yielded a high Cohen's kappa (0.84) but a lower percentage agreement compared to militaristic symbolism, which, conversely, showed a very low kappa (0.41) despite a near-perfect percentage agreement. This phenomenon is probably attributable to the binomial nature of these variables (i.e., present/absent) combined with the relatively small sample size. In fact, certain symbolic characteristics were either consistently present or consistently absent across almost all advertisements. Under such conditions of high trait prevalence (or absence), a single disagreement between coders carries a disproportionate mathematical weight in the calculation of the statistical index, thus lowering the kappa or alpha values despite high agreement in absolute terms (Feinstein & Cicchetti, 1990).*

The Archetype and Tone variables reported generally low levels of inter-coder agreement, reflected in both percentage terms and statistical indices (κ = 0.54 and κ = 0.48, respectively). These levels can likely be attributed to the inherently "cultural" and subjective nature of these constructs. Although the archetypes were clearly defined using an adaptation of Mark and Pearson's (2001) framework, their interpretation—particularly within the constrained timeframe of short advertisements (e.g., under 20 seconds)—remained ambiguous. Specifically, the coders frequently emphasised different advertisements' characteristics as the primary identifying features of a specific archetype, leading to divergent categorisations. The coders explicitly acknowledged this subjective "weighting" during their discussion of agreement results. During this same discussion, the impact of cultural background became especially apparent regarding the Tone variable. For example, the Italian coder overlooked particular sarcasm aimed at the Ukrainian audience, categorising the advertisement's tone as simply "light".

Table 1. Agreement between the two human coders

Variable	*Cohen's kappa*	*Pct_Agreement*
Char_Gender	*0.830*	*87.5*
Char_role	*0.754*	*82.5*
Archetype	*0.542*	*60.0*
Stereotype_man	*0.769*	*82.5*
Stereotype_woman	*0.654*	*72.5*
National_symbolism	*0.630*	*92.5*
Solidarity_symbolism	*0.844*	*95.0*
Militaristic_symbolism	*0.413*	*97.5*
Hedonic_symbolism	*0.383*	*70.0*
Healthcrisis_symbolism	*0.634*	*100.0*
Domesticity_symbolism	*0.377*	*85.0*
Professional_technical_symbolism	*0.584*	*80.0*
Tone	*0.481*	*67.5*

After evaluating inter-rater agreement between the two human coders to study which LLM performed better, the agreement rate between groups of 3 coders (two humans and one AI) was calculated. Results are synthesised in Table 2. Looking at the results, it can be observed that, in terms of the "best" model, GPT reports most of the higher levels in terms of agreement (8 out of 13 variables), followed by Gemini (6 out of 13 variables). Perplexity reported the higher score for only one variable (Healthcrisis_symbolism). Specifically, GPT reports higher scores for the symbolism variables (Solidarity, Militaristic, Hedonic, Domesticity, Professional technical), while Gemini works best for variables as Character role, Stereotype man and woman; GPT also scored the highest for the Archetype variable, even if the value is

generally low in this last case (0.54). Considering the agreement scores in general terms, the variables for which the higher agreement score was reached are represented by Militaristic symbolism (0.900), National symbolism (0.758) and Character gender (0.773). The binomial (or, in the case of Character gender, a three-level) nature of these variables can explain why they scored higher for the agreement with LLMs coders.

Variables of increased complexity, such as character role and gender stereotypes, proved more challenging for the LLMs to code. As a result, for these categories agreement levels with human coders were acceptable yet relatively low (0.714, 0.674, and 0.710, respectively). The greatest issues emerged with the Archetype (maximum value of 0.540) and Tone (maximum value of 0.343) variables. As previously mentioned, these represent the most complex variables, heavily dependent on a "watching" experience and the subjective interpretation of character behaviours and interactions in both explicit and implicit contexts. It is also noteworthy that for specific variables, high percentage agreement frequently coincided with low Krippendorff's alpha values (e.g. solidarity, hedonic and professional/technical symbolism). This discrepancy, aligned with the trends noted among human coders, suggests that these specific features are highly prevalent (or totally absent) within the dataset. Due to coders' consensus regarding a variable's almost constant presence or absence, any rare instance of disagreement carries a disproportionately heavy "penalty" in the calculation of the reliability index.

Overall, the preliminary results suggest that LLM coders currently provide insufficient standalone support for the human coding process, as these models require a precisely defined reality and inherently find it challenging to grasp nuanced subtleties or implicit meanings. This limitation potentially arises from underlying technical constraints: instead of watching and processing the advertisements holistically, the models must infer events by analyzing the video footage frame-by-frame, which forces a strictly literal interpretation of the narrative. Consequently, if narrative elements are not explicitly represented, the model is unable to "see" them, unlike a human coder who can perceive subtext. These findings are consistent with the literature highlighting that while LLMs are proficient at extracting surface-level information, they fail when the analysis context is more complex (Mehta et al., 2025). Even with the guidance of a comprehensive codebook, the models' fundamental lack of "tacit knowledge" significantly limits their ability to interpret the multidimensional complexities of advertising content. Paradoxically, this inability to "read" emotional context serves a protective function: it makes LLMs suitable for coding specific explicit variables that can carry a strong emotional weight (e.g. the presence of war images), thereby helping to safeguard human coders and reduce their overall stress.

Table 2. Differences in agreement between human coders and single AI model

Variable	***Kripp_alpha***			***Pct_agreement***		
	GEMINI	*PERPL.*	*GPT*	*GEMINI*	*PERPL.*	*GPT*
Char_Gender	*0.700*	*0.772*	***0.773***	*67.5*	***75***	***75***
Char_role	***0.714***	*0.553*	*0.529*	***70***	*52.5*	*50*
Archetype	*0.511*	*0.537*	***0.540***	*45*	*50*	***52.5***
Stereotype_man	***0.674***	*0.425*	*0.609*	***70***	*42.5*	*60*
Stereotype_woman	***0.710***	*0.482*	*0.506*	***67.5***	*42.5*	*47.5*
National_symbolism	***0.758***	*0.258*	*0.713*	***92.5***	*60*	*90*
Solidarity_symbolism	*0.413*	*0.236*	***0.641***	*70*	*55*	***85***
Militaristic_symbolism	*0.816*	*0.816*	***0.900***	*95*	*95*	***97.5***
Hedonic_symbolism	*0.500*	*0.533*	***0.598***	*62.5*	*65*	***70***
Healthcrisis_symbolism	***1***	***1***	***1***	***100***	***100***	***100***
Domesticity_symbolism	*0.689*	*0.584*	***0.709***	*80*	*72.5*	***82.5***
Professional_technical_symbolism	*0.511*	*0.289*	***0.518***	*75*	*55*	***77.5***
Tone	***0.343***	*0.225*	*0.189*	***60***	*55*	*42.5*

Note: In bold are reported the highest levels of agreement for each variable

Research limitations. The present research, especially due to its preliminary and exploratory nature, presents a set of limitations. First, *despite employing three distinct LLMs for coding, only two human coders were involved, and just one cross-cultural comparison (Italy vs. Ukraine) was conducted. Future studies could incorporate human coders from different cultural backgrounds. Moreover, the current (advertising) sample size is relatively constrained, especially for the annual distribution of commercials, and the results will be more robust once the supplementary corpus of advertisements will be incorporated in the data analysis. Moreover, although the choice to utilise Ukrainian advertisements as the sample was justified by the nation's current state of emergency, this does not permit the results to be entirely generalised to other contexts with analogous conditions.*

From a "technical" point of view, an important limitation is represented in the "black-box" nature of the models' mechanisms regarding video analysis. Specifically, parameters such as frame sampling rates, resolution, and the

potential reliance on keyframes rather than holistic video processing were not veryfied. As this is a preliminary feasibility study focused on output alignment rather than optimisation, these variables were not controlled, limiting the reproducibility of the study. Also, our understanding of the potential impact of other LLMs is constrained by the use of a single, very simple prompt and the consideration of only three models. Particularly, the lack of application of the Chain-of-thought reasoning (Dunivin, 2025) constitutes a methodological limitation This likely hindered the models' performance on "difficult" variables such as Archetype and Tone, which in the current study was based on a simple classification prompt. Finally, the inability to perform interviews (at the moment) and evaluate stress or vicarious trauma levels prior to and subsequent to the data processing process constitutes another notable limitation. This will be executed in the succeeding phases of the investigation. Our forthcoming research intends to investigate these elements more comprehensively.

Managerial implications. *Based on the preliminary findings of this study, the immediate managerial implications for research practitioners center on the methodological integration and strategic selection of LLMs in qualitative analysis (content analysis and coding) workflows. Results suggest that specific AI models must carefully be selected based on the distinct nature of the variables being analyzed, as performance varies significantly between tools. For instance, when analyzing cultural influenced elements such as archetypes and gender stereotypes, models like Gemini demonstrate higher (even if not strong) agreement rates with human coders. Conversely, for identifying variables related to explicit symbolism—such as solidarity, militaristic, or domestic symbols—GPT appears to be a more effective tool. These preliminary results suggest a potential functional specialization of LLMS (e.g. GPT for explicit symbolism and Gemini for cultural influenced indicators), though these should be treated as a baseline for human auditing and as a support Furthermore, practitioners should avoid combining multiple AI coders indiscriminately; the data indicates that combining all human and AI coders together drastically reduces agreement rates, making consensus a matter of chance rather than accuracy. The current technical constraints of LLMs also necessitate a redefinition of the human researcher's role within the analytical process. Because LLMs analyze videos frame-by-frame and struggle with tacit meaning, they are best deployed as auxiliary helpers for identifying the objective presence or absence of explicit elements. Consequently, human coders must transition into dual roles as cultural interpreters and systematic auditors. Humans remain essential for grasping the nuanced, culturally grounded motivations and implicit tone within advertisements. Finally, while the core conceptual motivation of this methodology is to safeguard researchers from the distress of sensitive material, the actual implementation of LLMs as a structural mental health safeguard remains a potential implication requiring further study. The current phase of this research primarily evaluated the technical capabilities of LLMs to interpret advertising elements. Because stress and vicarious trauma levels were not quantified prior to and following the data analysis procedure, the definitive impact of this workflow on reducing cumulative researcher burden must be addressed in subsequent stages of the research. However, the preliminary success of LLMs in coding explicit variables suggests a promising framework where the preliminary analysis of distressing content can be delegated to AI, reducing harm and supporting trauma-informed research principles.*

Originality of the paper. *The originality of this paper lies not merely in applying LLMs to qualitative content analysis in marketing, but in proposing a novel methodological framework strategically designed to safeguard human coders from potential stress and trauma. By delegating the initial coding of distressing stimuli—such as content related to war and conflict—to LLMs, this work highlights how these technologies can support, rather than supplant, human researchers. Another key element of novelty is the comparative evaluation of different LLMs for video content analysis, alongside the explicit definition of distinct analytical roles for AI and human coders. Specifically, the study highlights that different LLMs possess distinct strengths in identifying the objective presence or absence of specific elements, whereas human coders remain essential for interpreting the deeper cultural and "human" elements within video advertisements. Furthermore, this study considered a multicultural perspective by employing human coders from diverse cultural backgrounds, ensuring cultural sensitivity when analyzing war-related advertisements. Ultimately, this provides the base for an adaptable, trauma-informed framework for similar research contexts involving potentially sensitive content.*

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Designing Sustainable Delivery Choices at Checkout: Evidence from Digital Nudging Experiments

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Abstract. *As e-commerce continues to expand, last-mile delivery has become a major source of environmental impact. Although research on sustainable logistics has traditionally focused on upstream operational solutions, delivery choices are increasingly made by consumers during the checkout phase. This research examines how digital choice architecture at checkout influences sustainable delivery decisions, focusing on informational complexity and default preselection. Drawing on Cognitive Load Theory, we argue that sustainability information embedded in checkout interfaces imposes varying cognitive processing demands that can shape delivery choices. Across one preliminary study and two experiments conducted with Italian consumers, we test how informational nudges and default preselection affect the adoption of Click & Collect as a more sustainable delivery option. Results show that informational nudges exhibit a non-linear effect: moderate informational complexity increases Click & Collect adoption, while highly detailed information reduces it. Process evidence indicates that this effect is mediated by perceived cognitive effort. Default preselection consistently increases Click & Collect adoption but does not reduce perceived cognitive effort. By conceptualizing checkout as a cognitively constrained decision environment, this research contributes to digital nudging literature and sustainable last-mile delivery research. The findings highlight the importance of balancing informational and structural nudges in digital interfaces designed to promote sustainable consumer behaviour.*
Keywords: *first; second; third; fourth; fifth; sixth*

Framing of the research. The rapid expansion of e-commerce has significantly increased the environmental impact of last-mile delivery. The growing number of shipments, fragmented delivery routes and consumer expectations for rapid delivery contribute to emissions, congestion and logistical inefficiencies (Nogueira et al., 2021; Biancolin & Rotaris, 2024). Although technological innovations such as electrification or route optimisation aim to mitigate these impacts, the role of consumer decisions in shaping delivery outcomes has received comparatively less attention.

In online retail environments, the selection of delivery options typically occurs during the checkout stage. This moment represents a critical decision point where consumers choose between alternatives such as home delivery or pickup options including Click & Collect or parcel lockers. Research shows that consumers frequently prioritise speed and convenience over environmental considerations (Ignat & Chankov, 2020; Caspersen & Navrud, 2021). However, behavioural research suggests that consumer decisions are not fixed and can be influenced by the design of digital choice environments (Johnson et al., 2012; Thaler & Sunstein, 2008).

In digital contexts, choice architecture interventions such as informational cues or default settings can significantly influence consumer decisions. Informational nudges, including environmental labels or sustainability indicators, can increase the salience of ecological consequences and guide consumers toward more sustainable choices (Rai et al., 2021; Thomas et al., 2022). Structural interventions such as default preselection can be even more powerful, as consumers often interpret defaults as recommendations or rely on them due to inertia (Pichert & Katsikopoulos, 2008; Jachimowicz et al., 2018).

Despite this growing literature, relatively little attention has been devoted to the cognitive constraints under which checkout decisions occur. Online checkout environments present consumers with multiple simultaneous decisions, including payment options, delivery choices and administrative information. Research on decision making suggests that complex decision environments increase the likelihood of heuristic processing and simplified decision strategies (Chernev et al., 2015).

To address this issue, the present study adopts Cognitive Load Theory as a theoretical framework. Cognitive Load Theory proposes that individuals possess limited working memory resources and that the structure and complexity of information influence decision processes (Sweller, 1988; Paas et al., 2003). When information exceeds individuals' processing capacity, decision quality may decline or individuals may avoid cognitively demanding alternatives.

Applying this perspective to digital checkout environments allows sustainability information to be interpreted not only as communication but also as a cognitive processing task. Sustainability indicators often involve numerical or abstract information, such as carbon emissions or environmental impact metrics. While such information may enhance awareness, excessive complexity may increase cognitive effort and reduce engagement with sustainable options.

Building on these insights, the present research investigates how informational complexity and default preselection influence sustainable delivery choices in online checkout environments.

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Purpose of the paper. The purpose of this research is to examine how digital choice architecture embedded in e-commerce checkout interfaces can influence consumers' selection of sustainable delivery options. Specifically, the study focuses on two widely used digital nudging strategies—informational cues and default preselection—and investigates how these interventions shape the adoption of Click & Collect as a more sustainable last-mile delivery option.

In online retail environments, the checkout stage represents a critical decision moment in which consumers select delivery options under conditions of limited attention and time pressure. While sustainability information can make environmental consequences more salient, its effectiveness depends on how such information is presented. Previous research has shown that sustainability-related information can encourage environmentally responsible behaviour when it is clearly interpretable and easily comparable across alternatives (Rai et al., 2021; Thomas et al., 2022). However, studies on consumer decision-making also highlight that excessive informational complexity may increase cognitive effort and reduce decision quality (Chernev et al., 2015).

Drawing on Cognitive Load Theory (Sweller, 1988; Paas et al., 2003), this research proposes that the relationship between sustainability-related information and delivery choice may be non-linear. Moderate informational cues may improve evaluability and facilitate decision-making, whereas highly detailed information may increase perceived cognitive effort and discourage the adoption of sustainable delivery options.

Accordingly, the first objective of this research is to examine whether the presence of sustainability-related informational cues at checkout influences the likelihood that consumers select the Click & Collect delivery option. Based on prior literature on sustainability communication and environmental labelling, we expect informational nudges to increase the adoption of the sustainable delivery alternative relative to a condition without such cues.

H1: The presence of sustainability-related informational cues at checkout increases the likelihood that consumers select the Click & Collect delivery option.

Second, the study investigates whether informational complexity influences sustainable delivery choice in a non-linear manner. While simple informational cues may not sufficiently communicate the environmental benefits of alternative delivery modes, highly detailed information may impose excessive cognitive processing demands.

Therefore, building on Cognitive Load Theory and research on information overload (Chernev et al., 2015), the study proposes that moderate informational complexity will be more effective than either minimal or highly detailed messages.

H2: Informational complexity has an inverted U-shaped relationship with the likelihood of selecting Click & Collect, such that moderate informational complexity produces the highest adoption rates.

Third, the research examines the psychological mechanism underlying these effects. Cognitive Load Theory suggests that individuals possess limited working memory resources and that increasing informational complexity can increase perceived cognitive effort (Sweller, 1988; Paas et al., 2003). Higher perceived effort may reduce consumers' willingness to engage with more effortful decision alternatives, leading them to rely on simpler or more convenient options.

Accordingly, we expect perceived cognitive effort to mediate the relationship between informational complexity and sustainable delivery choice.

H3: Perceived cognitive effort mediates the relationship between informational complexity and the likelihood of selecting the Click & Collect delivery option.

Finally, the study examines the effect of default preselection as a structural choice-architecture intervention. Defaults are widely recognised as one of the most powerful tools of choice architecture because they influence behaviour while preserving freedom of choice (Thaler & Sunstein, 2008; Johnson et al., 2012). Empirical evidence shows that preselecting sustainable options can significantly increase their adoption across multiple domains (Pichert & Katsikopoulos, 2008; Jachimowicz et al., 2018).

Therefore, we expect that preselecting Click & Collect as the default delivery option will increase its adoption regardless of the informational complexity presented in the checkout interface.

H4: Default preselection of Click & Collect increases the likelihood that consumers select this delivery option compared with a non-preselected condition.

Overall, the study aims to contribute to the literature on digital nudging and sustainable consumption by examining how informational design and structural choice architecture interact in shaping sustainable delivery decisions in online retail environments.

Methodology. To test the proposed hypotheses, the research employs an experimental approach consisting of one preliminary study and two main experimental studies. Experimental methods are particularly suitable for examining digital nudging interventions because they allow the causal effects of interface design elements to be isolated and systematically manipulated.

The preliminary study served to validate the manipulation of informational complexity and to assess whether different sustainability cues were perceived as varying in informational intensity. Participants were presented with different informational messages associated with the Click & Collect option during a simulated checkout scenario. The messages ranged from simple visual cues, such as a sustainability icon, to more detailed environmental information including CO_2 emission calculations. The primary objective of this pre-study was to confirm that participants perceived these messages as differing in complexity and that increasing informational detail was associated with higher perceived cognitive effort.

The main empirical tests were conducted in two experimental studies involving Italian consumers recruited through online panels. Across both studies, participants were asked to imagine completing an online purchase and were exposed to a simulated e-commerce checkout interface presenting two delivery options: home delivery and Click & Collect.

Study 1 employed a between-subjects design manipulating informational complexity and default preselection. Participants were randomly assigned to experimental conditions representing different levels of informational complexity. In addition, some participants were exposed to a default condition in which Click & Collect was preselected, while others were required to actively choose between the two delivery options.

Following exposure to the checkout interface, participants completed a short questionnaire measuring perceived cognitive effort using Likert-scale items. In addition to the binary delivery choice task, participants also reported their level of consideration for selecting the Click & Collect option. Standard demographic and behavioural variables such as age, gender, education level, environmental attitudes and online shopping frequency were included as control variables.

Study 2 served as the main behavioural experiment and employed a simulated e-commerce interface that replicated a full purchasing journey. Participants were asked to select a product and proceed through a checkout process in which they encountered different informational cues and default settings associated with the Click & Collect option. The experiment included several informational conditions corresponding to increasing levels of informational complexity, ranging from minimal visual indicators to detailed environmental information.

In total, more than 400 participants completed the final experimental study. Data were collected through an online platform and participants were randomly assigned to experimental conditions. Statistical analyses included regression models and mediation analyses to examine the effects of informational complexity, perceived cognitive effort and default preselection on delivery choice outcomes.

Results. The results provide empirical support for several of the proposed hypotheses regarding the influence of digital choice architecture on sustainable delivery decisions.

First, the analyses show that the presence of sustainability-related informational cues at checkout influences consumers' delivery choices. Informational conditions characterised by moderate levels of informational complexity significantly increased the probability that participants selected the Click & Collect option compared with the control condition. These results provide partial support for H1, indicating that sustainability information can encourage the adoption of more environmentally friendly delivery alternatives.

Second, the findings reveal a non-linear relationship between informational complexity and delivery choice. Informational cues with moderate complexity generated the highest rates of Click & Collect adoption, whereas both very simple cues and highly detailed environmental messages were associated with lower adoption rates. Statistical analyses confirmed the presence of an inverted U-shaped relationship between informational complexity and sustainable delivery choice, supporting H2.

For example, intermediate informational conditions increased Click & Collect adoption rates by approximately 15–25 percentage points relative to the control condition, whereas the most complex informational message produced adoption rates similar to those observed in the absence of informational cues. These findings suggest that excessive informational detail may impose cognitive processing costs that discourage engagement with sustainability information.

Third, mediation analyses provide evidence for the role of perceived cognitive effort as an explanatory mechanism. Higher levels of informational complexity were associated with significantly higher levels of perceived cognitive effort. In turn, perceived cognitive effort was negatively related to the likelihood of selecting the Click & Collect option. Once cognitive effort was included in the model, the direct effect of informational complexity on delivery choice decreased substantially. These results provide support for H3, indicating that cognitive effort mediates the relationship between informational complexity and sustainable delivery choice.

Finally, the results demonstrate a strong effect of default preselection. Across experimental conditions, participants exposed to a default setting in which Click & Collect was preselected were significantly more likely to retain that option compared with participants who were required to actively choose between delivery alternatives. On average, default preselection increased Click & Collect adoption by approximately 20–25 percentage points across conditions. This finding supports H4 and confirms the powerful behavioural influence of default settings previously documented in the literature (Pichert & Katsikopoulos, 2008; Jachimowicz et al., 2018).

Overall, the results highlight that informational cues and default settings influence sustainable delivery choices through distinct mechanisms. Informational nudges operate primarily through cognitive processing dynamics, whereas default preselection directly shapes behaviour by structuring the decision environment.

Research limitations. This research presents several limitations that should be acknowledged and that provide opportunities for future research.

First, the empirical studies rely on a single-country sample consisting of Italian consumers. Although this context is relevant due to the rapid growth of e-commerce and increasing attention to sustainable delivery solutions, consumer responses to digital nudging interventions may vary across countries due to differences in logistics infrastructure, digital maturity and sustainability norms (Caspersen & Navrud, 2021; Rai et al., 2021). Future studies could therefore test the proposed framework in cross-country settings to examine the generalizability of the findings.

Second, the research adopts an experimental design based on simulated checkout environments. Experimental methods allow strong internal validity and causal inference, which are essential when studying digital nudging interventions. However, simulated decision contexts cannot fully replicate the complexity of real online purchasing situations, where additional factors such as time pressure, delivery urgency, promotions or habitual preferences may

influence consumer decisions (Chernev et al., 2015). Future research could complement experimental evidence with field experiments conducted in real e-commerce platforms.

Third, the study focuses on short-term behavioural responses to nudges embedded in the checkout interface. Although previous research shows that choice architecture interventions can influence immediate decisions, their long-term effects on behaviour remain less clear (Jachimowicz et al., 2018). Future studies could therefore examine whether repeated exposure to sustainability-related nudges leads to persistent behavioural change or whether their effects diminish over time.

Finally, the present research examines informational complexity and default preselection as two specific nudging strategies. While these interventions are among the most widely studied tools of choice architecture (Johnson et al., 2012; Thaler & Sunstein, 2008), future research could investigate how other forms of digital nudges—such as social norms, framing strategies or recommendation systems—interact with informational design in shaping sustainable delivery choices.

Managerial implications. The findings provide several implications for e-commerce managers, digital channel designers and logistics providers seeking to promote more sustainable delivery choices.

First, the results suggest that the design of sustainability information in checkout interfaces should carefully balance informativeness and cognitive simplicity. While providing environmental information can increase the adoption of sustainable delivery options, overly complex messages may impose cognitive burdens that reduce engagement. Managers should therefore prioritise concise and easily interpretable sustainability cues, such as simplified environmental labels or icons, rather than highly detailed technical information.

Second, default preselection emerges as a particularly effective intervention to encourage sustainable delivery choices. Consistent with prior research on choice architecture, preselecting the sustainable option significantly increases the probability that consumers adopt it (Pichert & Katsikopoulos, 2008; Jachimowicz et al., 2018). For online retailers, implementing a "green default" in which Click & Collect is preselected at checkout represents a relatively low-cost and scalable strategy for promoting sustainable logistics.

Third, the findings highlight the strategic importance of the checkout stage as a behavioural intervention point. While sustainability initiatives in logistics are often implemented upstream through technological innovations or infrastructure investments, the checkout interface represents a powerful yet underutilized opportunity to influence consumer behaviour. Designing checkout environments that facilitate sustainable choices can therefore complement operational sustainability strategies.

Finally, the results are also relevant for logistics providers and policymakers interested in reducing the environmental impact of last-mile delivery. Encouraging the adoption of pickup-based delivery solutions such as Click & Collect can significantly reduce emissions and delivery inefficiencies (Nogueira et al., 2021; Biancolin & Rotaris, 2024). Digital nudging interventions embedded in online retail interfaces may therefore represent a flexible and scalable complement to regulatory or infrastructural policies aimed at promoting sustainable urban logistics.

Originality of the paper. This research contributes to the literature on digital nudging, sustainable consumption and last-mile logistics in several related ways.

First, the paper contributes to research on sustainable delivery decisions by conceptualizing checkout as a cognitively constrained decision environment rather than as a purely transactional stage of the online purchase journey. While prior studies have shown that sustainability information can influence consumers' delivery preferences, less attention has been devoted to the role of information processing constraints in shaping these effects. By applying Cognitive Load Theory (Sweller, 1988; Paas et al., 2003), this study shows that the effectiveness of sustainability-related informational cues depends not only on their presence, but also on their level of complexity and on the cognitive effort they require.

Second, the paper contributes to the digital nudging literature by distinguishing more clearly between informational nudges and structural nudges within the same empirical setting. Existing studies often examine individual nudging tools in isolation, whereas real digital environments expose consumers to multiple cues simultaneously (Johnson et al., 2012; Thaler & Sunstein, 2008). By analysing informational complexity and default preselection together, the study provides a more realistic account of how different forms of digital choice architecture shape behaviour at checkout.

Third, the study offers a more process-based interpretation of sustainable delivery choice. Rather than treating the selection of Click & Collect simply as a preference outcome, the paper highlights the cognitive mechanism through which checkout design may facilitate or hinder sustainable choice. In particular, the findings indicate that perceived cognitive effort helps explain why moderate informational nudges are more effective than highly detailed ones. This adds nuance to previous evidence on sustainability-related information and supports the idea that more information is not necessarily better in digital decision environments (Chernev et al., 2015).

Fourth, the research contributes to the emerging intersection between marketing and last-mile logistics by treating delivery mode selection as a consumer behaviour problem as well as an operational one. In much of the logistics literature, sustainable last-mile delivery is approached mainly through infrastructure, technology or efficiency lenses (Nogueira et al., 2021; Biancolin & Rotaris, 2024). This paper instead emphasises that the consumer-facing interface is itself part of the sustainability challenge, because the final delivery outcome is also shaped by how options are presented at the moment of choice.

Finally, the originality of the study also lies in its managerial relevance. By focusing on checkout design, the paper identifies a practical and scalable intervention point through which firms can promote more sustainable delivery behaviour without removing consumer freedom of choice. In this sense, the research advances current understanding of how digital retail design can support sustainability objectives through relatively light-touch behavioural interventions.

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Directive vs. Non-Directive Front-of-Pack Nutritional Labels: Evidence on Healthiness Perceptions and Purchase Intentions from Private Label and National Brands in Poland

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Abstract. *This exploratory study examines how directive (Nutri-Score) vs non-directive (NutrInform Battery) front-of-pack nutrition labels (FOPL) influence Polish consumers' perceptions of product healthiness and purchase intentions in the breakfast cereal category, while controlling for brand type (national brand vs private label). Using a 2 × 2 between-subjects experimental design with 202 Polish primary grocery shoppers, we compare Nutri-Score and NutrInform applied to fictitious cereal brands. Results from a MANOVA followed by univariate tests show that FOPL significantly affect perceived healthiness and, to a lesser extent, purchase intentions (with small effect sizes), while no significant differences emerge for brand attitude, trust, word-of-mouth or loyalty-related outcomes. Brand type does not significantly moderate these effects, suggesting that FOPL act primarily as category-level informational cues rather than as brand-differentiating levers. The findings reinforce the informational role of FOPL in supporting more informed choices and highlight their limited immediate impact on broader brand-relationship metrics, offering insights for both retailers and policy makers in non-harmonized FOPL environments.*
Keywords*: Front-of-Pack Nutritional Label (FOPL), Nutri-Score, NutrInform Battery, Perceived Healthiness, Private Labels, Attitude Toward the Brand, Purchase Intention, Poland.*

1. Introduction. The increase in the consumption of specific nutrients, together with the growing prevalence of sedentary lifestyles, has contributed to the rise of overweight and obesity globally (World Health Organization, 2021). In response, institutions and companies have promoted several initiatives aimed at guiding consumers towards healthier food choices, including Front-of-Pack Nutrition Labelling (FOPL) systems that make nutritional information more salient during purchase decisions (Hamlin et al., 2015; Deren et al., 2021). At the same time, the spread of heterogeneous FOPL systems across European countries has fueled the debate on the identification of a harmonized model at the EU level (Mazzù et al., 2023). From a conceptual point of view, FOPL systems can be divided into two macro-categories. Directive labels, such as the Nutri-Score, provide a synthetic assessment of the overall nutritional quality of the product through simplified and algorithmic indicators. In contrast, non-directive labels, such as the NutrInform Battery, present detailed numerical information related to the main nutrients, requiring greater cognitive effort on the part of the consumer (De la Cruz-Góngora et al., 2017). This distinction implies that different labelling formats can activate different decision-making mechanisms. Directive labels may serve as simple evaluative heuristics focused on the individual product, whereas non-directive labels may foster more analytical processing and spill over to brand-level evaluations such as transparency and competence.

Considering these differences, the present study examines the interaction between label format (FOPL format) and brand type, postulating that the effects of FOPL vary according to the type of information provided and the competitive context. A heterogeneous impact on consumer responses is assumed: directive labels would exert a more immediate influence on product evaluations (e.g., healthiness or nutritional quality), while non-directive labels would foster perceptions of transparency, reliability and competence at the brand level. To investigate these dynamics, the Polish market represents a relevant empirical setting, allowing to evaluate the complementary role of FOPL not only as a public health tool, but also as a strategic signaling mechanism in consumer decision-making. In fact, Poland has one of the highest rates of overweight in Europe with about 76% of the adult population classified as overweight and 32% as obese (EUFIC, 2025), despite not having adopted an official national FOPL system or a uniform dissemination of specific schemes (World Obesity Federation, 2025). This context, characterized by high obesity prevalence and limited prior exposure to harmonized FOPL schemes, offers a relevant testbed to assess the informational role of FOPL in a market where their adoption is still largely voluntary (Storcksdieck Genannt Bonsmannet al., 2020).

Although prior research has extensively investigated the impact of FOPLs on product evaluations and purchase intentions, less attention has been devoted to the interaction between label format and brand context. In particular, limited research has explored whether directive and non-directive labeling systems generate different responses when associated with private labels versus national brands. This study contributes to the literature in three ways. First, it compares directive and non-directive FOPL formats within a unified experimental framework. Second, it examines

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whether label format interacts with brand type (private label vs national brand). Third, it extends prior research by considering both product- level evaluations (e.g., healthiness) and brand-level responses.
Accordingly, this study investigates whether directive and non-directive FOPLs activate different cognitive processing mechanisms and how these mechanisms influence both product-level evaluations and brand-related responses.

2. Literature Review.

2.1. FOPL and consumer decision making

Previous research has demonstrated that consumer behavior towards food products is shaped by a variety of factors, including the presence of nutritional labels, price, and the product's ability to satisfy hedonic needs (Cornil & Chandon, 2016; Hagen et al., 2017; Liu et al., 2019). Concurrently, several studies have highlighted the effectiveness of front-of-pack nutrition labelling systems in enhancing consumers' perceptions of product healthiness and in strengthening positive attitudes towards the brand (Baccelloni et al., 2021; Egnell et al., 2022; Post et al., 2010). Within this framework, improvements in perceived product healthiness are associated with more favorable brand attitudes, which in turn exert a positive influence on purchase intentions. This relationship is consistent with existing literature suggesting that positive health-related perceptions foster more favorable attitudinal evaluations and stronger behavioral intentions among consumers (Küster-Boluda & Vila, 2020). Furthermore, the literature underscores the role of nutritional labels in influencing consumer behavior through cognitive and evaluative mechanisms that enhance perceptions of healthiness and generate positive brand attitudes during the purchase decision-making process. In this phase, consumer perceptions and attitudes interact dynamically, whereby perceptions of a product shape attitudes towards it, which subsequently influence purchasing decisions and behaviors (Wang, 2024).

2.2. Directive vs non-directive labels

FOPLs differ not only in the information they provide but also in how they structure consumers' interpretation of nutritional information. Directive labels such as Nutri-Score provide an immediate evaluative signal that simplifies nutritional information, facilitating heuristic processing. Conversely, non-directive systems such as NutrInform Battery require consumers to process numerical information and perform a more analytical interpretation of nutritional values.

2.3. Brand context

In addition, prior research emphasizes the pivotal role of the brand as an interpretative framework within the consumer decision-making process, capable of guiding evaluations and behaviors. Consumers who predominantly purchase manufacturer brands tend to place greater emphasis on brand-related cues and prefer branded products, to which they attribute higher value (Goldsmith et al., 2010). In response, many brands have implemented initiatives aimed at introducing or enhancing nutritional labelling systems to improve the accessibility and usability of nutritional information. These initiatives are designed to support consumers during the purchase process by offering more immediate and intuitive information, thereby complementing the traditional back-of-pack nutritional label (Ikonen et al., 2019; Medina-Molina et al., 2021). Beyond the effects of labelling alone, brand familiarity further contributes to consumers' perceptions of food healthiness, often leading to more favorable evaluations compared to less familiar alternatives (Ponnam et al., 2015; Godden et al., 2023). This effect can be attributed to the strong brand equity developed by firms, as well as to a reduction in cognitive effort through established mental and social associations linked to branded products (Cobb-Walgren et al., 2016; Franca et al., 2025). Building on this evidence, it can be hypothesized that regular private label consumers may respond more strongly to the presence of front-of-pack nutrition labelling systems. In such cases, the informative role of labels may not only affect product evaluations but also influence overall brand perceptions, with indirect effects on consumers' purchase intentions (De Temmerman et al., 2021).

2.4. Hypothesis

Overall, prior studies suggest that FOPL primarily affect cognitive evaluations, such as perceived healthiness, with potential downstream effects on purchase-related outcomes, while their impact on broader brand-relationship metrics (e.g., trust, loyalty, loyalty program enrolment) remains more ambiguous. This study therefore examines a broad set of product, brand and retailer-related responses to investigate where directive vs non-directive labels exert the strongest influence. In addition to product-level outcomes, exploratory analyses examine whether FOPL formats influence broader brand-related responses such as brand attitude, trust, and word-of-mouth.
Formally:

- H1: Exposure to a directive FOPL will result in higher perceived healthiness compared to a non-directive FOPL
- H2: FOPL format will positively affect purchase intention, with stronger effects for the directive label.
- H3: Brand type (national brand vs. private label) will moderate the relationship between FOPL format and consumer evaluation.

Methodology. A breakfast cereal package was used as the experimental stimulus, with all brand-identifying elements removed to avoid brand-related biases. Front-of-pack nutrition labels (FOPL) were subsequently digitally applied in a prominent and clearly visible position on the packaging, in line with the procedure adopted by (Mazzù et al., 2024). Specifically, the Nutri-Score was used as the directive labelling system, whereas the NutrInform Battery was adopted as the non-directive labelling system.
A pre-test on 86 Prolific participants identified fictitious brand names for the national brand and private label conditions. Zenya (M = 4.48; SD = 1.24) was selected as the private label name and Olympia (M = 5.16; SD = 1.23) as the national brand name (Figure 1). This procedure minimized potential perceptual biases among respondents, confirming that

respondents associated Olympia with a national brand and Zenya with a private label: $\chi^2(1, N = 84) = 8.60$, $p = .003$.

Figure 1. Experimental stimuli



The main study was conducted on a sample of 202 Polish primary grocery shoppers recruited through Prolific. Most respondents were aged between 18 and 44 years and held at least a secondary education degree; women represented 34.7% of the sample. Participants were randomly assigned to one of four experimental conditions in a 2 × 2 between-subjects design (Brand: national brand vs private label; Label: Nutri-Score vs NutrInform Battery). Data were analysed using a multivariate analysis of variance (MANOVA) conducted using SPSS. The analysis examined the effects of Brand and Label on multiple dependent variables simultaneously, including perceived healthiness, attitude toward the brand, purchase intention, tastiness, word-of-mouth, trust, familiarity, and private label usage. In order to capture potential spillover effects from product evaluation to broader retailer-related outcomes, the study also includes variables related to retailer loyalty and loyalty program enrolment. All scales were measured using multi-item 7-point Likert scales adapted from validated sources (see Appendix) and showed satisfactory reliability.

Results. A two-way MANOVA was conducted with Brand and Label as independent variables and the ten dependent variables. Using Pillai's Trace, the multivariate effect of Label was significant,
$V = .132$, $F(10, 189) = 2.87$, $p = .002$, partial $\eta^2 =$
.132. In contrast, neither the multivariate effect of Brand, $V = .046$, $F(10, 189) = 0.91$, $p = .525$, nor the Brand × Label interaction, $V = .041$, $F(10, 189) = 0.81$, $p = .618$, reached statistical significance. Levene tests indicate that the homogeneity assumption of variances is satisfied for most dependent variables. Although some violations were observed for RBL and TR, the use of Pillai's Trace and the absence of significant univariate effects for these variables suggest that the results can be considered robust.
Follow-up univariate ANOVAs showed a significant effect of Label on perceived healthiness, $F(1, 198) = 17.75$, $p < .001$, partial $\eta^2 = .082$, indicating a moderate effect size, and a smaller but significant effect on purchase intention, $F(1, 198) = 4.14$, $p = .043$, partial $\eta^2 = .020$. No significant effects of Label emerged for the remaining dependent variables. Descriptive statistics show that Nutri-Score is associated with higher perceived healthiness than NutrInform Battery ($M = 4.18$ vs. $M = 3.28$). Differences between the labels for the remaining variables are limited, in line with the non-significant univariate results. This result is consistent with the heuristic nature of directive labels, which provide a simplified evaluative cue that consumers can process quickly during product evaluation.

Discussions. This study investigated the effects of different types of front-of-pack nutrition labelling on consumers' responses to a food product and its brand, focusing on the interaction between label format and brand type. The findings confirm that FOPLs primarily act as informational cues that increase perceived product healthiness, with Nutri-Score outperforming NutrInform Battery. Behavioural outcomes such as purchase intention are only modestly affected, and no significant differences emerge for broader brand-relationship indicators (attitude, trust, loyalty, word-of-mouth).
This result suggests that the impact of FOPL manifests itself mainly at the perceptual and cognitive level, influencing perceptions in the short term, while broader and relational evaluations related to the brand or retailer tend to remain relatively stable. Therefore, the inclusion of heterogeneous variables allows us to grasp how different labeling formats can influence distinct levels of consumer response: from product evaluations to brand inferences, up to possible repercussions on brand-related outcomes.
A further result concerns the absence of significant Brand and Brand × Label effects, which indicates that, in this setting, FOPLs operate largely at the product-category level rather than as brand-differentiating tools. In a market where FOPLs are not yet institutionalized, consumers seem to use them as generic nutritional shortcuts instead of brand-specific signals. The distinction between directive and non-directive labels helps to interpret this evidence. Directive systems, such as Nutri-Score, reduce cognitive effort by offering concise and immediate evaluation, thus being more effective in rapid product evaluations. On the contrary, non-directive labels, such as the NutrInform Battery, require more analytical processing and may be less incisive in immediate evaluations, but potentially more relevant from a retailer and strategic positioning perspective, as they can help communicate greater information transparency, nutritional expertise and support consumers in choosing between comparable alternatives. Overall, the results suggest that FOPL can contribute to strengthening the perception of healthiness and supporting consumer decision-making, without generating strongly differentiated effects on the other dimensions considered.

Conclusions. This exploratory study examines the role of front-of-pack (FOPL) nutrition labels in the process of consumer evaluation of food products. The results show that the presence of FOPL represents a relevant information element in the product evaluation process, contributing in particular to influencing the perception of food healthiness. At the same time, the differences between the different labelling formats are generally small, suggesting that these tools operate mainly as information aids that facilitate the interpretation of nutritional information by consumers.
However, it is important to underline that the experimental design made use of controlled stimuli represented by fictitious marks, a choice that allowed to guarantee a high internal validity of the analysis. Future studies could extend the investigation to real market contexts, comparing the effectiveness of FOPL between private labels and industrial brands present on the market, to verify whether brands characterized by different levels of notoriety and brand equity can moderate the impact of different nutrition labels on consumer evaluations.
Overall, empirical evidence supports the role of FOPL as cognitive and evaluative levers, capable of influencing short-term variables, such as the perception of product healthiness, brand attitudes, and purchase intention. At the same time, it is important to investigate how these labels can also affect long-term relational dimensions for retailers, for example in terms of loyalty to the brand or adherence to loyalty programs. Further research could also analyze more deeply the cognitive and attitudinal mechanisms through which the perception of healthiness translates into a greater purchase intention.
This research contributes to the literature by outlining differentiated effects between directive systems (such as the Nutri-Score) and non-directive systems (such as NutrInform Battery) and opens more advanced perspectives on the strategic role of retailers in contexts characterized by the absence of mandatory regulation of FOPL. In these contexts, the voluntary choice of specific labelling formats can be a significant distribution lever: retailers can adopt FOPL not only to provide nutritional information, but also to signal a commitment to health and transparency, differentiating their offer from competitors and strengthening perceptions of responsibility towards consumers. In this perspective, FOPL can take on managerial value, potentially contributing to influencing purchase intent and loyalty, particularly in the case of private labels. Future research could therefore quantify these effects in real competitive contexts, characterized by shelf competition dynamics between different brands and labeling formats.
Finally, the results of the study can also offer useful indications to policy makers, helping to deepen the role of FOPL in promoting healthier and more informed food choices, enhancing the complementarity of information between the different labeling systems. Extending the analysis to different geographical contexts, including countries where FOPL are not yet widespread or institutionalized, would allow for a comparative perspective that would provide relevant insights for both public decision-makers and distribution operators.
In summary, this study strengthens the evidence on the effectiveness of FOPL as tools to support more informed consumption choices, while paving the way for future research aimed at consolidating not only their information potential, but also their strategic and competitive value for companies and institutions.

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Appendix – Reliability of tested scale

Construct	**Items**	**Cronbach's alpha**	**Reference**
Perceived Healthiness (HEA)		.924	Mazzù et al., 2021
	I expect this product to be healthy		
	I would consider this product to be good for me		
	This product looks healthy		
Perceived Tastiness (TST)		.893	Mazzù et al., 2021
	How much do you think you will like this product?		
	How savoury and flavourful do you think this product will taste?		
	How much do you want to taste this product?		
Attitude toward the brand (ATT)		.950	Mitchell et al., 1981; Spears & Singh, 2004
	I have a favorable opinion of this food brand		
	I like this food brand		
	This food brand is appealing to me		
	This food brand gives me a positive impression		
	Overall, my attitude toward this food brand is positive		
Brand Trust (TR)		.808	Delgado-Ballester, 2004
	This brand inspires trust in me		
	This brand's products are reliable		
Purchase Intention (PI)		.929	Mazzù et al., 2021
	I would like to try this product		
	I would seriously consider buying this product		
Word-of-Mouth (WOM)		.962	Mazzù et al., 2022
	I am likely to spread positive word of mouth about this brand		
	I would recommend the brand's product to my friends		
Retailer Brand Loyalty (RBL)		.839	Chaudhuri & Holbrook, 2001
	I intend to continue shopping at this supermarket in the future		
	This supermarket would be my first choice for grocery shopping		
	I am likely to keep buying groceries from this supermarket		
	I would not easily switch to another supermarket		
Loyalty Program Enrolment (LPE)		.974	Yi & Jeon, 2003
	I would be willing to join this supermarket's loyalty program		
	I intend to sign up for the loyalty program offered by this supermarket		
	If available, I would probably enroll in this supermarket's loyalty program		
	I would consider becoming a member of this supermarket's loyalty program		
Familiarity with the product category (FAM)		.776	Park et al., 1994
	How informed are you with different types/ brands of cereal?		
	How would you rate your knowledge of branded product relative to other people?		
Private label usage (PLUse)		.886	Ailawadi et al., 2001
	I regularly buy supermarket-brand products		
	I look for supermarket-brand products when I go grocery shopping		
	Buying supermarket-brand products encourages me to shop there more often		

Framing the Complex Interplay of Ultra-Processed Foods, Nutrition Labeling, and Consumer Response: A Systematic Review

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Abstract. *In recent decades, rising rates of obesity and diet-related chronic diseases have turned consumer food choices into a central public health issue. Increasing evidence identifies ultra-processed foods (UPFs) as a major driver of this trend, raising concerns about how consumers perceive, select, and integrate these products into their daily diets. In response, governments and international institutions have introduced a range of policy tools aiming to influence consumer decision-making-such as Front-of-Pack Nutritional Labels (FOPLs), food processing classification systems (such as NOVA), marketing restrictions, and product reformulations intended to steer choices toward healthier options. Despite recent expansion, research on consumer behavior within the UPF field remains fragmented. While many studies examine health effects or nutrient composition, fewer explore how consumers interpret food processing information, react to labelling systems, or internalize policy interventions that frame UPFs as problematic. This study conducts a systematic literature review spanning 2000–2026, leveraging PRISMA methodology. A total of 297 scientific articles were identified through Web-of-Science and Scopus and analyzed to map consumer-oriented research trends. Results reveal a substantial and accelerating increase in publications and identify major sequential research streams: (i) consumer perceptions of food processing and health risk; (ii) behavioral responses to FOPLs; (iii) public debates on NOVA and nutrient profiling systems; and (iv) policy interventions shaping everyday food environments. Finally, it outlines future research directions to strengthen the conceptual coherence and policy relevance of the UPF field.*

1. Framing of the research

In recent decades, obesity and diet-related chronic diseases have become major global public health concerns. Numerous studies link the consumption of ultra-processed foods to adverse health outcomes such as obesity, type 2 diabetes, cardiovascular disease and premature mortality (Monteiro et al., 2013; Elizabeth et al., 2020; Pagliai et al., 2021). This epidemiological shift reflects a broader nutritional transition driven by the global expansion of industrialized food systems, the restructuring of retail distribution, and the growing availability of packaged and UPFs. Within this context, the UPFs—formalized through the NOVA classification—have gained prominence by reframing dietary quality not solely in terms of nutrient intake, but as a function of the degree and purpose of industrial processing. UPF attributes confer convenience, affordability, and long shelf life, but at the cost of diminished nutritional integrity and potential impacts on appetite regulation, satiety, and metabolic health. As a consequence, increasing attention has been devoted to policy tools aimed at improving the food environment and guiding healthier and more informed consumer choices, particularly FOPL systems (Julia & Hercberg, 2017; Taillie et al., 2020, Mazzù et al., 2023). Food policies such as marketing restrictions and mandatory reformulation have emerged as complementary strategies to reduce the consumption of UPFs and facilitate informed decision-making. However, UPFs counter-measures rely on different conceptual foundations. For instance, the NOVA framework situates health outcomes within the industrial and sociotechnical processes that underpin modern food production, whereas nutrient-profiling models used in most FOPLs assess products based on their nutrient composition (e.g., salt, sugar, and fat content). This theoretical divergence raises practical and communicative challenges, as nutrient scores provide immediate, easily interpretable information, whereas they may not capture the broader implications of extensive food processing. Accordingly, the literature remains fragmented, with studies on UPFs, labeling systems, and consumer behavior often developing in parallel rather than in a unified framework centered on consumers' understanding and decision-making processes. From a consumer perspective, the coexistence of processing-based classifications (such as NOVA) and nutrient-profiling labels (such as Nutri-Score, NutrInform Battery or Warning Labels) introduces a potential interpretative tension. While nutrient-profiling labels summarize the nutritional composition of products, the UPF paradigm emphasizes industrial transformation and formulation practices. Understanding how these frameworks coexist is therefore essential to clarify how consumers interpret food quality signals. The present study therefore reconstructs the evolution of the scientific literature through a consumer-centered perspective, positioning ultra-processed foods as a conceptual lens through which behavioral, nutritional, and policy debates can be integrated. By distinguishing between core UPF research, policy instruments such as FOPLs, and adjacent streams addressing consumer perception and choice, the review aims to clarify how these debates have evolved over time and across geographical contexts, and to identify where consumers' role remains theoretically and empirically underrepresented. In doing so, this paper

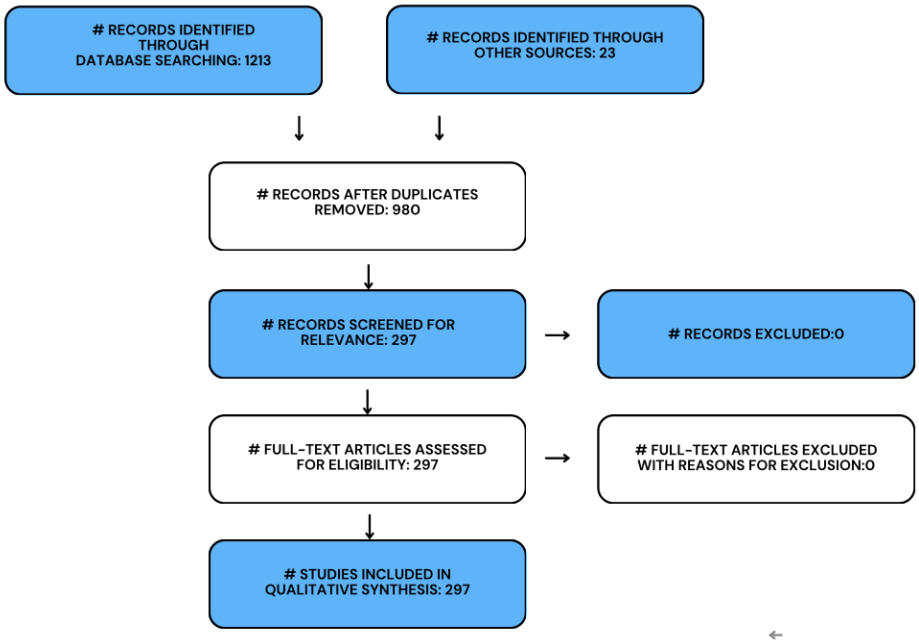
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contributes to the literature in several ways. First, it offers a structured review of 297 scientific articles published between 2000 and 2026, systematically selected and analyzed following PRISMA guidelines. Second, it delineates four evolutionary phases in the development of research on UPFs and consumer-oriented food policy, tracing how conceptual and methodological orientations have shifted over time. Third, it synthesizes the main areas of debate and current research gaps, highlighting disconnections between processing-based classifications, labeling frameworks, and consumer behavior literature. Finally, it proposes a set of future research directions articulated from the findings, outlining how an integrated consumer perspective can strengthen the conceptual coherence and policy relevance of the UPF field. This review also provides relevant theoretical and managerial implications. Theoretically, it advances the literature by connecting health-oriented, policy-oriented, and consumer-centered approaches within a unified interpretative framework, thus highlighting the multidimensional evolution of the UPF debate.

2. Purpose of the paper. In recent years, several reviews have examined the relationship between ultra-processed food (UPF) consumption and health outcomes observed in consumers. For instance, Elizabeth et al. (2020), Pagliai et al. (2021), and Lane et al. (2021) consistently link UPF intake to adverse health outcomes—such as obesity, cardiovascular disease, diabetes, and higher mortality—consolidating the scientific basis of the UPF–health debate.
Beyond epidemiological associations, scholars have also examined how the industrial organization of food supply and retail affects consumption patterns and health disparities (Moodie et al., 2013; Baker et al., 2020). Studies on labeling policy—particularly those on FOPLs—have explored consumers' nutritional understanding and purchase behavior (Hawley et al., 2013; Cecchini & Warin, 2016; Egnell et al., 2020; Mazzù et al., 2024), but few have explicitly connected these behavioral insights to the structural diffusion of UPFs and the regulation of the food environment. As a result, three research domains—UPFs and processing, food policy instruments, and consumer behavior—have largely evolved in parallel. This review positions itself at the intersection of these three research domains. It analyzes and organizes existing work by adopting a consumer-centered perspective to bridge research on industrial food processing, nutrition policy, and behavioral responses. By systematically mapping these domains and reconstructing their temporal evolution, it clarifies how the UPF paradigm has interacted with labeling policies and consumer-oriented research. Through this lens, UPFs are examined as elements of consumers' food environments shaped by labeling, marketing and policy interventions.

3. Methodology. The study adopted a multi-step systematic review protocol to identify, select, and analyze scientific literature on UPF, food labeling systems, policies and consumer perceptions and behaviors. The selection process of the items followed the traditional phases provided for by the PRISMA protocol (Figure 1).

Figure 1. PRISMA Flow Diagram of the Literature Selection Process



First, all potentially relevant records were identified, considering the literature's interdisciplinary scope. The research was conducted in the Web-of-Science and Scopus databases. The search strategy was designed to identify literature situated at the intersection of three core dimensions: ultra-processed foods (industrial processing), nutrition labeling (regulatory tools), and consumer behavior (perceptions and choices). To this end, a search string was defined by combining terms related to UPF, food labeling, and consumer behavior. The string used was as follows: TS=((“ultra-processed food” OR “ultra processed food” OR UPF OR NOVA OR “processed food*” OR “industrial food*”) AND (label* OR labeling OR labelling OR “front-of-pack" OR “warning label*” OR “nutrition label*” OR “food label*” OR

NutriScore OR "traffic light") AND (consumer* OR perception* OR behavior* OR "food choice*" OR "purchase intention")). Duplicate records were then removed prior to screening. The remaining articles were subjected to an initial screening phase through the reading of titles and abstracts, with the aim of excluding contributions that were not relevant to the objectives of the review. In the next phase, the full reading of the articles considered potentially relevant was carried out. At this stage, studies were excluded when, despite containing relevant keywords, they lacked a substantive focus on ultra-processed foods or on the research areas under review. At the end of the selection process, 297 scientific papers were included, published between 2000 and 2026. Inclusion decisions were not based solely on keyword matching but were guided by an interpretative framework centered on ultra-processed foods. During screening, articles were assessed for relevance to UPFs and grouped into research on the NOVA classification, policy instruments (e.g., FOPLs), and broader food system components (e.g., packaging, claims, marketing). Studies were excluded if unrelated to UPFs or processing, non–peer-reviewed, non-English, or lacking conceptual relevance.

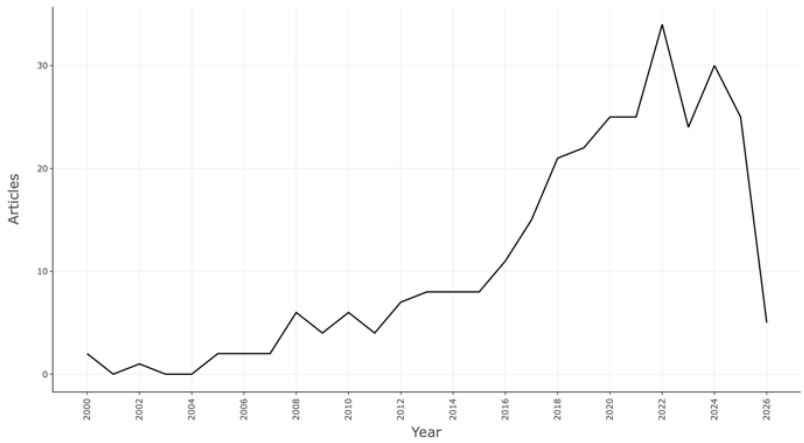
Data analysis. The selected articles were examined through a mixed analytical strategy that combined (i) descriptive quantitative analysis in R with (ii) in-depth qualitative examination of content. This dual approach made it possible to organize the literature into distinct evolutionary phases and to identify areas of convergence as well as persistent research gaps. From a quantitative perspective, the dataset was analyzed with Biblioshiny in R to map publication trends, geographical distribution, and main outlets, allowing the identification of four main historical phases in the development of the UPF literature between 2000 and 2026. These phases reflect shifts in the prominence of different themes and policy debates and provide the temporal scaffold for interpreting changes in how UPF, nutrition policy, and consumer behavior have been studied. In parallel, a qualitative thematic analysis was conducted to identify the primary research streams and reconstruct the evolution of the scientific debate. Articles were coded using an iterative thematic coding procedure. Each study was classified according to predefined analytical dimensions, including year of publication, geographical focus, main topic, conceptual orientation, policy relevance, and the presence or absence of explicit references to UPF or the NOVA classification. On this basis, contributions were iteratively grouped into thematic categories, which were refined throughout the analysis until a stable set of research streams and crosscutting themes emerged.

4. Results. This combined process highlighted four dominant strands: (i) the relationship between UPF consumption and health outcomes; (ii) the role of industrial food processing in shaping diet quality and food systems; (iii) the conceptual interplay between the NOVA classification and nutrient profiling models; and (iv) the impact of policy tools—particularly FOPLs—on consumer understanding and food choice. By examining how these strands evolve across the four phases, the review identifies points of convergence between health, policy, and consumer research, as well as domains where conceptual or methodological integration remains limited. A temporal perspective was therefore central to the analysis, enabling the reconstruction of key milestones in the UPF debate and clarifying how attention progressively shifted from nutrient based framings to broader discussions encompassing processing, food environments, and consumer facing nutrition policies. Additionally, the geographical distribution of scientific production was analyzed to highlight the territorial and political contexts in which different research strands are most concentrated, and to explore how regulatory and institutional dynamics—such as the adoption of Warning Labels in Latin America or FOPL debates in Europe—have influenced the configuration of the literature.

4.1 Main research streams on ultra-processed foods, from a descriptive quantitative perspective

The analysis of 297 scientific articles identifies several interconnected research streams on ultra-processed foods (UPF), showing how the literature has developed over the last two decades (Figure 2). In the early 2000s, output was very low, with only a few articles per year. From 2012 onwards, publications increased more sharply, accelerating after 2016 and peaking around 2022.

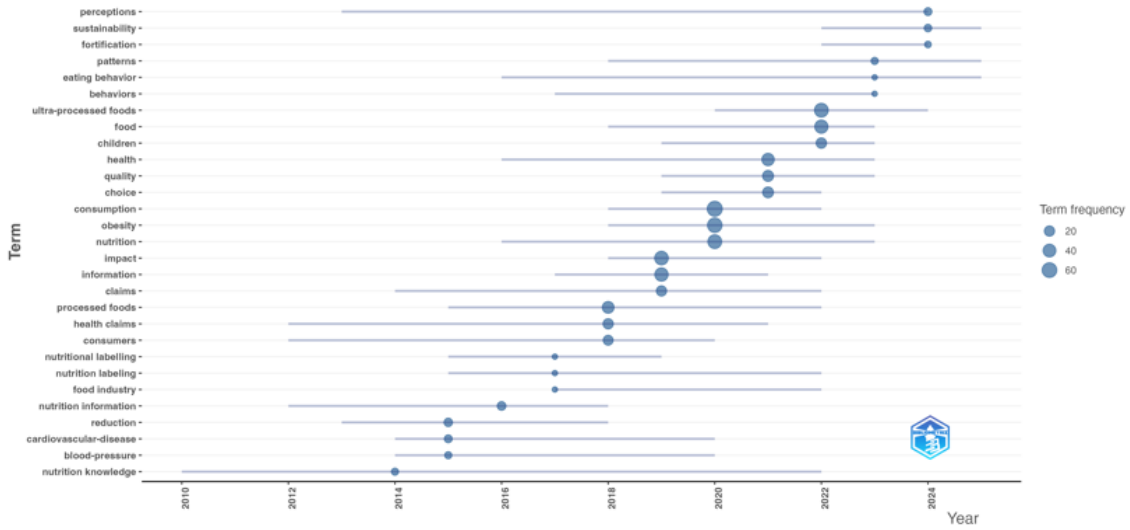
Figure 2. Annual scientific production related to ultra-processed foods, food labeling, and consumer behaviour (2000-2026).



4.1.2. Temporal evolution of literature, from a qualitative perspective

Additionally, the analysis of the corpus shows a significant growth in the number of publications over time and allows us to identify different evolutionary phases of scientific debate. The temporal analysis further reveals that the evolution of the literature does not follow a linear trajectory, but is divided into four distinct phases, each characterized by a different combination of nutrient-based approach, increasing attention to industrial processing, development of front-of-pack labeling systems and progressive integration with the policy debate (Figure 3). In the corpus analyzed, publications increased from 19 articles in 2000–2008 to 164 in 2020–2026, showing a strong acceleration in the most recent phases. This dynamic suggests that the issue of UPF and related policies is consolidated, especially after the formalization of the NOVA paradigm and, subsequently, with the international spread of regulatory tools such as FOPLs as NutrInform Battery, Warning Labels, Traffic-Light and the Nutri-Score. This acceleration reflects the growing institutionalization of the UPF paradigm within both public health research and food policy debates.

Figure 3. Evolution of Research Streams in Ultra-Processed Food Literature.



4.2.1 First phase: centrality of the nutrient-based approach and information transparency (2000–2008). In the first phase, the literature was primarily shaped by a nutrient-based perspective, with strong attention to transparency, consumer information, and the growing use of labels on packaged foods. Early studies focused on monitoring the spread of nutrition labeling and claims in the food market, showing that these instruments were becoming increasingly relevant in consumers' interactions with packaged products (Legault et al., 2004). At the same time, scholars began to examine whether consumers were actually able to understand and use this information effectively. Evidence suggested that many consumers found detailed nutritional information difficult to interpret, especially when labels were complex or overloaded with technical data (Cowburn & Stockley, 2005). Research then explored the value of nutritional information in food choice, showing that labels were effective only when simple, familiar, and easy to interpret (Loureiro et al., 2006; Grunert & Wills, 2007). This explains the growing attention to simplified FOPL systems, while food processing had not yet become central to the debate (Feunekes et al., 2008). Overall, this phase remained firmly centered on nutrients, readability, and information clarity.

4.2.2 Second phase: emergence of the UPF/NOVA paradigm and conceptual transition phase (2009–2014). Between 2009 and 2014, the literature entered a phase of conceptual transition, in which the traditional nutrient-based framework began to be challenged by a new way of understanding diet quality. A major turning point was Monteiro's argument that the key issue was not only food composition in terms of nutrients, but also the degree and purpose of industrial processing (Monteiro, 2009). This marked the beginning of a broader shift in the literature, which moved from asking whether foods were high or low in specific nutrients to questioning how foods were produced, transformed, and incorporated into daily diets. This transition became more structured with the introduction of the NOVA classification, which proposed a new categorization of foods based on the extent and purpose of processing (Monteiro et al., 2010). NOVA provided the conceptual basis for later work on ultra-processed foods and helped reframe the debate beyond the nutrient profile alone. However, during this phase, research on FOPL and consumer understanding did not disappear. On the contrary, studies continued to show that consumers responded favorably to simplified labeling systems and that front-of-pack information could support better understanding under certain conditions (Kim & Kim, 2009; Barreiro-Hurlé et al., 2010; Campos et al., 2011). At the same time, the literature increasingly linked dietary change to broader structural transformations in food systems (Fanzo et al., 2014). Overall, this phase represented the bridge between a purely informational view of nutrition and the emergence of the processing paradigm.

4.2.3 Third Phase: Empirical Consolidation of UPFs and Policy Shift (2015–2019). From 2015 to 2019, the literature moved from conceptual discussion to empirical consolidation of the UPF/NOVA framework. Research increasingly documented the concrete dietary and environmental implications of ultra-processed foods, showing that higher levels of processing were associated with poorer nutritional quality in household food purchases and food environments (Poti et al., 2015; Luiten et al., 2016). In addition, studies on the composition of national diets demonstrated that ultra-processed foods contributed substantially to excessive sugar intake and to broader patterns of nutritional imbalance, reinforcing concerns about their public health significance (Martínez Steele et al., 2016). This phase was also characterized by stronger evidence linking ultra-processed food consumption to diet quality and health outcomes (Moubarac et al., 2017; Schnabel et al., 2019; Srour et al., 2019). At the same time, the literature became more policy-oriented. Research on traffic-light systems and warning labels demonstrated that simplified FOPL tools could improve understanding of nutritional risk and raise awareness of unhealthy foods (Freire et al., 2017; Olivares-Cortés et al., 2017). Comparative work on different FOPL schemes also showed that the format of the label mattered significantly for consumer interpretation and use (Egnell et al., 2019; Mazzù et al., 2022). Overall, this phase marked the transformation of the UPF paradigm into an empirically grounded and policy-relevant field, supported by evidence from dietary studies, supermarket environments and regulatory experiments.

4.2.4 Fourth phase: globalization of the debate, comparison of schemas and integration of nutrients and processing (2020-2026). In the most recent phase, the literature became broader, more international, and more explicitly connected to regulatory and policy debates. Reviews, meta-analyses and umbrella reviews played an important role in consolidating the evidence linking ultra-processed food consumption with multiple adverse health outcomes, thereby strengthening the epidemiological basis of the field (Elizabeth et al., 2020; Lane et al., 2021; Lane et al., 2024). Compared with earlier phases, the debate was no longer limited to defining ultra-processed foods or documenting their spread; it increasingly focused on how this evidence should inform consumer policy, dietary guidelines and public health action. At the same time, comparative research on FOPL systems became more central. Studies showed that different schemes, such as interpretive summary labels and other front-of-pack formats, influence consumer understanding and food choices in different ways, suggesting that the design of the label is crucial for policy effectiveness (Egnell et al., 2020). Another important development was the growing recognition that food evaluation should not rely only on nutrient profiles but should also incorporate the degree of processing. This perspective is well reflected in work arguing that nutritional value and processing represent two distinct yet complementary dimensions of food quality (Romero Ferreiro et al., 2021). In parallel, the literature expanded to include the ways in which consumers interpret ultra-processed foods in everyday life. Studies showed that consumers often rely on heuristics and simplified judgments when assessing the healthiness of packaged foods, which helps explain why labels, packaging cues, and cultural meanings matter so much in food choice (Machín et al., 2020). The field also became more geographically diverse, with research highlighting the policy dynamism of Latin America in the development of warning labels and stronger regulatory tools (Reyes & Corvalán, 2020; Nieto et al., 2021), as well as the social and symbolic meanings attached to highly processed foods (Venkateshmurthy et al., 2021), also expanding to the broader structure of food supply (Sylvetsky et al., 2020). Overall, this phase reflects the global maturation of the field, where health evidence, consumer behavior, labeling policies and food system transformation are increasingly integrated. This phase highlights the growing importance of consumer perception as the interface between scientific evidence, regulation, and market practices.

5. Managerial implications. The paper highlights several implications for policymakers, food producers, and retailers operating in markets increasingly shaped by nutrition policies and consumer health concerns. These findings suggest that policy design benefits from maintaining analytical clarity between process-based classifications and nutrient-based labeling systems, while remaining open to their complementary application in public health interventions. For food companies, the coexistence of nutrient-profiling labels and processing-based classifications implies that product reformulation strategies must consider multiple dimensions of food evaluation. For policymakers, the results suggest that communication strategies addressing ultra-processed foods should acknowledge how consumers interpret both nutrient-based and processing-based signals when making food choices.

6. Originality of the paper. The review shows that research on ultra-processed foods has rapidly expanded from a relatively narrow topic into a broad and multidimensional field, driven by growing evidence on health outcomes and by increasing attention to the role of industrial processing in diet quality. First, a key finding concerns the conceptual tension between the UPF paradigm and FOPL systems. While FOPL summarizes nutritional composition and NOVA focuses on the degree and purpose of industrial processing, the literature increasingly suggests that these frameworks, though conceptually distinct, may be deployed in complementary ways within integrated food policies. Second, the analysis highlights the strong link between scientific research and policy development. The literature increasingly interacts with debates on how to regulate food environments and address the rise of obesity, with different regions experimenting with various strategies such as labeling systems, warning labels, taxes, or marketing restrictions. Geographical differences also play an important role, as research trajectories often reflect national policy priorities and transformations in local food systems. Lastly, the historical perspective reveals that this paradigm shift - from nutrient-based to processing-based frameworks - has not been linear or uncontested. Debates on NOVA's operationalization, comparisons with alternative

profiling systems, and the practical constraints of food policy implementation suggest that both frameworks coexist and interact in shaping contemporary regulatory and consumer information strategies.

7. Research limitations. This review has some limitations. Its future research agenda remains conceptual rather than empirically tested, and the breadth of topics covered means that several important areas—such as digital food environments, industry responses, and sustainability—are identified as promising directions but not examined in depth.

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Hedonic and Utilitarian Orientations Embedded in AI Agents: Implications for Emotions and Impulsive Buying

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Abstract. *Questo studio analizza come l'orientamento edonico e l'orientamento utilitaristico incorporati nel design di un AI agent influenzino le emozioni e l'intenzione di acquisto impulsivo. Adottando il modello Stimulus–Organism–Response, è stato realizzato un esperimento tra soggetti (N=135) con assegnazione casuale a due scenari: un agente AI con orientamento edonico, focalizzato su esperienza, piacere e coinvolgimento emotivo, e un agente con orientamento utilitaristico, centrato su efficienza, performance e ottimizzazione della scelta. Dopo l'interazione, sono state rilevate le risposte emotive e l'urgenza di acquisto impulsivo. I risultati evidenziano che l'orientamento utilitaristico incrementa le emozioni positive, che mediano positivamente l'acquisto impulsivo, pur mostrando un effetto diretto negativo. L'originalità risiede nella prospettiva intra-AI, che dimostra come differenti orientamenti valoriali, simulati dall'agente attraverso il framing di comunicazione, producano effetti psicologici e comportamentali distinti.*
Keywords: *AI agent, Hedonic orientation, Utilitarian orientation, Emotions, Impulsive buying.*

Framing of the research. L'intelligenza artificiale sta ridefinendo il processo decisionale di acquisto, comprimendo i tempi, riducendo lo sforzo cognitivo e favorendo risposte rapide e spesso automatiche (De Cosmo and Guido, 2025; Dellaert et al., 2020). In questo contesto emergono gli Agenti di Intelligenza Artificiale (AI agent), una nuova generazione di sistemi intelligenti con elevata autonomia decisionale rispetto alle applicazioni AI tradizionali (Wiesinger et al., 2024), la cui diffusione è in crescita nello smart retailing e nell'e-commerce, con un impatto economico stimato rilevante nei prossimi anni (Hale, 2025; Kim, 2025).

Nei contesti di servizio, gli AI agent sono progettati per interagire in modo naturale attraverso caratteristiche antropomorfiche – linguaggio conversazionale, nomi umani, avatar e voci simili a quelle umane – aumentando percezione di calore, coinvolgimento emotivo e risposte affettive positive, influenzando fiducia, gradimento e intenzioni comportamentali (Araujo, 2018; Liu et al., 2024; Schillaci et al., 2024). I progressi nel linguaggio naturale e nell'adattamento al contesto consentono agli AI agent di assumere un ruolo sempre più assimilabile a quello umano nei processi decisionali e nelle dinamiche interattive (Ali et al., 2024). Grazie ai Large Language Models, questi sistemi possono sostenere conversazioni coerenti, apprendere dall'esperienza e adattare le proprie azioni lungo il funnel di acquisto, ampliando la loro capacità di influenzare le scelte dei consumatori (Gonzalez et al., 2026).

Gli AI agent non sono strumenti passivi, ma partecipano attivamente al processo decisionale, influenzando intenzioni, fiducia e comportamenti. Operano sia sul piano cognitivo, semplificando le informazioni e riducendo lo sforzo decisionale, sia su quello emotivo, generando coinvolgimento e sicurezza. Per questo, la loro adozione dipende non solo da fattori funzionali, ma anche da dimensioni socio-emotive e relazionali, grazie alla capacità di creare connessioni affettive con l'utente (Affandi et al., 2025; Badghish et al., 2024; Huh et al., 2023). Attraverso la personalizzazione dell'interazione favoriscono legami emotivi tra consumatore e brand (Cachero-Martínez and Vázquez-Casielles, 2021), rafforzando il ruolo delle emozioni e aumentando la probabilità di scelte rapide e impulsive (Lo and Lin, 2024).

In ambito online, l'acquisto d'impulso è guidato dal valore edonico e dal coinvolgimento emotivo, mentre l'orientamento utilitaristico favorisce decisioni più razionali (Shamim and Misra, 2025). I sistemi AI sono percepiti come più competenti nelle valutazioni utilitaristiche, mentre gli umani in quelle edoniche, dando origine al "word-of-machine effect" per effetto della credenza secondo cui l'importanza di attributi utilitaristici aumenta la preferenza per l'AI (Longoni and Cian, 2022).

Inoltre, gli utenti sviluppano orientamenti utilitaristici o relazionali verso gli agenti in funzione di caratteristiche individuali come tolleranza all'imprevedibilità e sensibilità alla privacy e all'autonomia (Kim et al., 2021), mentre compiti fortemente edonici possono ridurre la percezione di calore e accettazione dell'AI (Kim et al., 2021; Yanit et al., 2023).

La letteratura si è concentrata principalmente su antropomorfismo e confronto AI–umano, evidenziando effetti su fiducia, coinvolgimento ed empowerment decisionale (Araujo, 2018; Longoni & Cian, 2022) ed ha attribuito la distinzione edonico–utilitaristica principalmente a prodotti e contesti (Botti and McGill, 2011; Jin and Zhang, 2025). Tuttavia, ha trascurato il ruolo dell'AI come attore attivo capace di generare e orientare tali dimensioni valoriali attraverso le proprie modalità di interazione.

Sebbene le emozioni favoriscano l'acquisto d'impulso (Baumeister, 2002; Bagozzi, 1999; Zhang et al., 2024), resta poco chiaro come specifiche configurazioni di design dell'AI — in termini di orientamento valoriale e framing — influenzino stati emotivi e impulsività (Longoni and Cian, 2022).

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Nonostante i contributi esistenti, persistono lacune teoriche ed empiriche, con evidenze prevalentemente concettuali e pochi studi sperimentali sul design (Anayat et al., 2025). In particolare, la distinzione edonico–utilitaristica è stata raramente applicata agli AI agents (Babin et al., 1994; Botti & McGill, 2011), lasciando poco esplorato il loro impatto su emozioni e acquisto impulsivo.

Per colmare questo gap, lo studio interpreta gli orientamenti edonico e utilitaristico come valori simulati dall'AI agent e veicolati attraverso il framing: edonico, che enfatizza esperienza e coinvolgimento, ed utilitaristico, che privilegia efficienza e ottimizzazione, configurando l'AI come partner esperienziale o strumentale.

Purpose of the paper. Lo scopo di questo articolo è indagare come l'orientamento edonistico o utilitaristico incorporato in un AI agent, attraverso framing comunicativi, influenzi le risposte emotive e l'intenzione di acquisto impulsivo dei consumatori, adottando il modello teorico Stimulus–Organism–Response (S–O–R) di Mehrabian e Russell (1974) come cornice interpretativa. In questa prospettiva, l'orientamento comunicativo e di raccomandazione dell'AI agent — di natura edonica o utilitaristica — rappresenta lo stimolo (S), ossia un input ambientale in grado di incidere sull'esperienza decisionale. Tale stimolo attiva l'organismo (O), inteso come l'insieme dei processi interni del consumatore, in particolare le risposte emotive generate dall'interazione con l'AI agent, che possono variare in intensità e valenza a seconda che l'agente sia percepito come strumento funzionale o come partner esperienziale. Queste risposte emotive costituiscono il meccanismo attraverso cui lo stimolo tecnologico si traduce in una risposta comportamentale (R), rappresentata dall'intenzione d'acquisto impulsivo, caratterizzata da decisioni rapide, automatiche e poco deliberate.

Integrando dimensioni cognitive e affettive, lo studio mette in luce il percorso causale alla base delle interazioni mediate dall'intelligenza artificiale, evidenziando come il design valoriale dell'AI agent, modulato dal framing comunicativo, attivi stati emotivi che finiscono per orientare l'intenzione di acquisto impulsivo.

Le neuroscienze evidenziano che le emozioni influenzano in modo decisivo i processi cognitivi e le decisioni di acquisto attraverso circuiti legati a piacere e gratificazione (Bechara and Damasio, 2005). Da una visione universalistica (Ekman, 1992), la letteratura le interpreta oggi come fenomeni dinamici e contestuali costruiti attraverso valutazioni cognitive e influenzati da esperienza e cultura (Barrett, 2006; Russell, 2003). In questa prospettiva, le emozioni emergono dall'interazione tra valutazione degli stimoli, attivazione fisiologica e risposta comportamentale (Izard, 2009; Scherer, 2009) e contribuiscono ad orientare i comportamenti di consumo (Sun et al., 2024).

In marketing, la teoria dell'attaccamento mostra come i legami emotivi con brand e prodotti influenzino fedeltà e acquisto impulsivo (Guido et al., 2016; Thomson et al., 2005). Le emozioni positive favoriscono l'intenzione di acquisto, mentre quelle negative la inibiscono (Fredrickson, 2013; Liu et al., 2025), rendendo il marketing emozionale particolarmente efficace (Bagozzi et al., 1999; Guo, 2024).

La letteratura evidenzia che l'acquisto impulsivo è fortemente guidato da emozioni, attaccamento al brand e stimoli digitali contestuali. Un attaccamento emotivo profondo, come l'attaccamento fervido, aumenta la propensione agli acquisti non pianificati quando il brand diventa parte dell'identità del consumatore (Guido et al., 2016; Thomson et al., 2005). L'acquisto impulsivo è definito come una decisione immediata, emotivamente carica e poco deliberata, favorita da bassi livelli di autocontrollo, tratti di impulsività e stimoli ambientali (Baumeister, 2002; Verplanken and Herabadi, 2001).

Nel contesto digitale, piattaforme online, social media, live streaming, mobile shopping e ambienti immersivi amplificano tali dinamiche riducendo le barriere cognitive e temporali all'acquisto (Borges-Tiago et al., 2023; Cho and Sagynov, 2015). Studi basati sul modello Stimolo–Organismo–Risposta mostrano che strategie come personalizzazione, interazione sociale, scarsità e promozioni attivano emozioni di piacere ed eccitazione, rafforzano la risonanza del brand e aumentano l'urgenza di acquisto (Lazaris et al., 2022; Park and Lin, 2020; Safeer, 2024;). In particolare, tecnologie emergenti come live streaming, influencer virtuali e realtà virtuale intensificano l'arousal emotivo e l'interesse parasociale, rendendo l'acquisto impulsivo più frequente e guidato da processi affettivi piuttosto che razionali (Wang et al., 2024; Yan et al., 2024; Zhang et al., 2024).

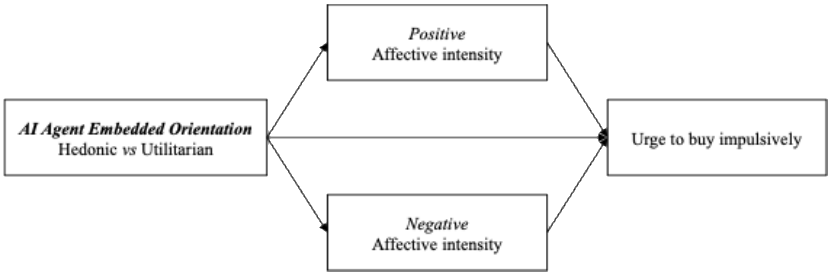
Le emozioni e i comportamenti di acquisto sono collegati sia ai valori utilitaristici sia a quelli edonistici dello shopping. La distinzione tra valore edonico e valore utilitaristico rappresenta una delle cornici teoriche più consolidate per comprendere il comportamento del consumatore. Secondo Babin, Darden e Griffin (1994), il valore utilitaristico è legato all'efficienza funzionale dell'esperienza di consumo e al raggiungimento di obiettivi strumentali, mentre il valore edonico deriva dal piacere, dall'intrattenimento e dal coinvolgimento emotivo generati durante l'esperienza.

Anche se la letteratura distingue tra dimensioni utilitaristiche ed edoniche dell'esperienza, l'interazione uomo–AI è stata prevalentemente analizzata in chiave strumentale, con un focus su task e usabilità (Wittek et al., 2019). In questo quadro, efficienza funzionale, riduzione dello sforzo cognitivo e risparmio di tempo sono stati considerati i principali driver del valore percepito delle tecnologie intelligenti. In linea con questa prospettiva, nella scelta dell'AI agent gli utenti, pur attratti da componenti edoniche, tendono a privilegiare opzioni utilitaristiche, percepite come più razionali; in caso di conflitto tra piacere ed efficienza, reinterpretano le componenti edoniche in termini funzionali per ridurre la dissonanza cognitiva (Diefenbach & Hassenzahl, 2011).

La letteratura evidenzia che il valore edonico dello shopping favorisce l'acquisto impulsivo attraverso l'attivazione di emozioni positive (Aggarwal et al., 2025; Park et al., 2006), mentre dimensioni edoniche e utilitaristiche interagiscono nel definire l'esperienza complessiva (Vieira et al., 2018). Di conseguenza, anche un orientamento utilitaristico può generare emozioni positive quando l'interazione è percepita come fluida ed efficace.

In linea con questa prospettiva, studi recenti sullo smart retailing mostrano che la voice AI è prevalentemente percepita come uno strumento di supporto decisionale efficiente e conveniente, più che come un attore relazionale (Huh and Kim, 2025). Tuttavia, tale ottimizzazione cognitiva può attivare emozioni positive funzionali — come soddisfazione e riduzione di incertezza — che riducono la resistenza decisionale e favoriscono scelte rapide, aumentando la propensione all'acquisto impulsivo.
Pertanto:
HP – L'intensità affettiva positiva (positive affective intensity) media positivamente la relazione tra l'orientamento utilitaristico dell'agente AI, veicolato tramite il framing comunicativo, e l'urgenza di acquisto impulsivo (urge to buy impulsively).

Figure 1. Conceptual framework



Methodology. Per verificare le ipotesi formulate, è stato condotto uno studio sperimentale quantitativo volto ad analizzare l'effetto dell'orientamento edonico e utilitaristico di un AI agent sulle risposte emotive e sull'intenzione di acquisto impulsivo. Lo studio ha coinvolto un campione di 135 partecipanti, 76 uomini e 59 donne, di etá compresa tra i 22 e i 67 anni (M= 33,94 e SD = 13,17), di cui il 69,3% possedeva un titolo almeno universitario.

Tramite un focus group (composto da 8 componenti esperti di marketing e un moderatore) è stato selezionato uno stimolo per l'esperimento. Il prodotto doveva essere caratterizzato da un consumo con finalità sia di natura edonistica sia utilitaristica. La scelta è ricaduta su una scarpa sneaker. L'esperimento principale, ha previsto che i partecipanti interagissero con un agente di intelligenza artificiale configurato tramite la piattaforma Algho di The Digital Box, utilizzata per il design conversazionale e la marketing automation, che proponeva il prodotto adottando uno specifico framing comunicativo. Sono stati predisposti due scenari sperimentali (between-subject study): nel primo scenario il messaggio era strutturato secondo un framing edonico (gruppo EU = 0), caratterizzato da uno stile comunicativo orientato all'esperienza edonica e alla gratificazione emotiva; nel secondo scenario, invece, il framing era di tipo utilitaristico (gruppo EU = 1), con una comunicazione focalizzata su efficienza e performance. Un manipulation check ha verificato la differenza degli stimoli. I partecipanti sono stati assegnati casualmente a una delle due condizioni sperimentali e indirizzati, tramite link o QR code, a una conversazione con l'AI agent sulla piattaforma dedicata. All'interno della chat, l'agente presentava brevemente lo scenario sperimentale e lo scopo generale dello studio, invitando poi i partecipanti a compilare il questionario. Prima della compilazione venivano garantiti anonimato, riservatezza e uso esclusivamente scientifico dei dati, al fine di ridurre bias di desiderabilità sociale e common method bias.

Il questionario è stato strutturato per misurare le risposte emotive attivate dall'esperienza con l'AI agent e la conseguente urgenza di acquisto impulsivo, oltre a raccogliere alcune informazioni socio-demografiche utili alla descrizione del campione e al controllo statistico del modello. Per rilevare l'intensità delle emozioni sperimentate è stata utilizzata la versione breve dell'International Positive and Negative Affect Schedule (I-PANAS-SF o PNAS; Thompson, 2007). L'intenzione di acquisto impulsivo è stata misurata attraverso la scala Urge to Buy Impulsively sviluppata da Beatty e Ferrell (1998), opportunamente adattata allo scenario sperimentale con AI agent.

Infine, il questionario includeva una sezione dedicata alle variabili socio-demografiche: età (espressa in anni), genere e livello di istruzione, misurato attraverso categorie ordinali corrispondenti ai principali gradi di formazione. Tali variabili sono state utilizzate per descrivere il profilo del campione.

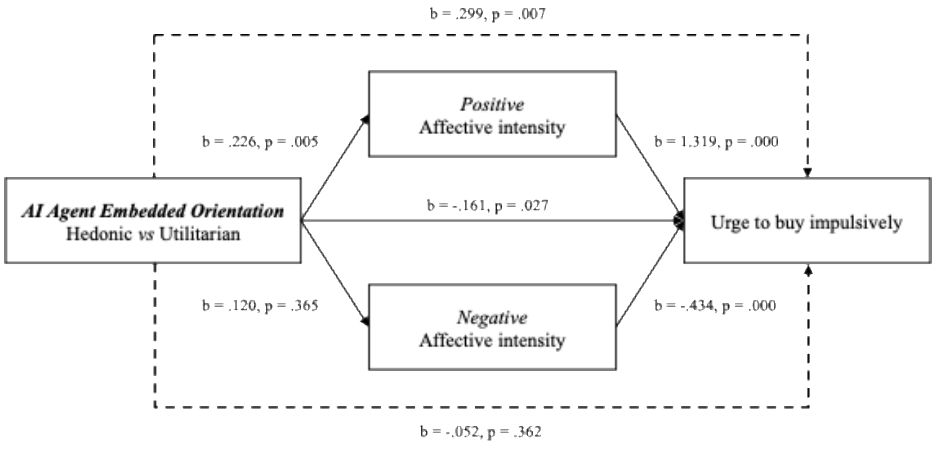
Data analysis and Results. L'analisi dei dati è stata condotta seguendo un percorso progressivo volto a verificare le assunzioni statistiche, la qualità del modello di misura e la robustezza delle relazioni strutturali. In primo luogo, è stata testata la normalità multivariata mediante il test di Mardia. I risultati hanno evidenziato una skewness multivariata pari a 1,104.97 ($p < .001$) e una kurtosis multivariata pari a 9.37 ($p = .000$), indicando un discostamento dalla normalità multivariata. Pertanto, per le analisi principali è stata utilizzata la tecnica del bootstrapping (k = 1,000), così da ottenere stime robuste degli effetti e delle relative significatività. Per valutare l'eventuale presenza di Common Method Variance (CMV), è stata applicata la tecnica del Common Latent Factor (CLF). La varianza attribuibile al fattore comune è risultata pari al 31.8%, valore inferiore alla soglia critica del 50% generalmente considerata problematica in letteratura. Tale evidenza suggerisce che il bias non rappresenti una minaccia sostanziale per l'interpretazione dei risultati.

Successivamente, è stata condotta un'analisi fattoriale confermativa (CFA) al fine di testare il modello di misura relativo alle tre dimensioni considerate: affettività positiva (PANAS_P), affettività negativa (PANAS_N) e urgenza di acquisto impulsivo (UBI). Gli indici di fit del modello hanno mostrato valori complessivamente accettabili: $\chi^2/df = 2.141$, $p < .001$; CFI = .918; TLI = .899; RMSEA = .089; SRMR = .089. Sebbene il chi-quadrato risulti significativo, come frequentemente accade in modelli con più indicatori, gli indici incrementali (CFI e TLI) e quelli di errore (RMSEA e SRMR) indicano un adattamento del modello complessivamente adeguato. Per quanto riguarda i loadings fattoriali standardizzati, gli item relativi all'affettività positiva hanno mostrato saturazioni comprese tra .561 e .873 (tutti $p < .001$), mentre quelli relativi all'affettività negativa hanno evidenziato loadings compresi tra .573 e .816 (tutti $p < .001$), confermando la solidità delle due dimensioni emotive. Con riferimento alla scala di Urge to Buy Impulsively, tre item (UBI1, UBI2 e UBI3) hanno mostrato loadings elevati e statisticamente significativi (.892, .867 e .918; $p < .001$). Al contrario, l'item UBI4 ha presentato una bassa saturazione standardizzata (.447), pur risultando significativa. Poiché tale valore indica una debole coerenza con il costrutto latente e compromette la qualità della misura complessiva, si è proceduto alla sua esclusione dalle analisi successive. L'indice composito di urgenza di acquisto impulsivo è stato pertanto calcolato sulla base dei tre item rimanenti, garantendo maggiore affidabilità e coerenza interna della scala.

La Path Analysis rivela come l'orientamento dell'agente AI influenzi l'intenzione di acquisto impulsivo attraverso una complessa dinamica emotiva. Sebbene l'orientamento utilitaristico sia efficace nel generare risposte emotive specifiche, esso produce effetti contrastanti sul comportamento finale rispetto all'orientamento edonico. L'agente con orientamento utilitaristico (focalizzato su efficienza e ottimizzazione) ha generato un aumento significativo dell'affetto positivo ($b = .226$, $p = .005$) rispetto all'agente edonico. Questo suggerisce che un linguaggio focalizzato su efficienza e ottimizzazione della scelta sia in grado di suscitare una risposta di gratificazione superiore rispetto a un approccio puramente esperienziale. Al contrario, lo scenario non ha influenzato in modo significativo l'affetto negativo ($b = .120$, $p = .365$), indicando che lo stile utilitaristico non viene percepito come più frustrante o irritante rispetto a quello edonico. L'affettività positiva (PNAS_P) si conferma la determinante principale dell'acquisto impulsivo ($b = 1.319$, $p < .001$), al contrario, l'affetto negativo deprime fortemente tale intenzione ($b = –.434$, $p < .001$). Poiché l'orientamento utilitaristico è in grado di stimolare queste emozioni positive, esso esercita anche un effetto indiretto positivo sull'acquisto impulsivo ($b = .299$, $p = .007$) al contrario l'effetto indiretto tramite le emozioni negative non è significativo ($b = –.052$, $p = .362$). I risultati evidenziano inoltre un effetto diretto negativo dell'orientamento utilitaristico sull'acquisto impulsivo ($b = –.161$, $p = .027$). Questo risultato indica che, al netto della componente emotiva, un framing fortemente orientato all'efficienza attiva un'elaborazione più razionale e deliberata, che attenua la spontaneità della risposta impulsiva.

Tra le variabili di controllo, il livello di istruzione è emerso come un predittore critico della reattività emotiva. I soggetti con una scolarizzazione più alta hanno riportato livelli significativamente inferiori sia di affetto positivo ($b = –.326$, $p = .001$) che di affetto negativo ($b = –.382$, $p = .038$), manifestando una risposta psicologica più distaccata e meno polarizzata verso l'agente. L'età ($b = .003$, $p = .417$) e il genere ($b = .076$, $p = .359$) non hanno invece mostrato impatti rilevanti sulla genesi delle emozioni durante l'interazione.

Figure 2. Risultati della path analysis



Research limitations. Lo studio presenta alcune limitazioni. L'utilizzo di uno scenario sperimentale controllato può non riflettere pienamente la complessità delle decisioni reali online, influenzate da molteplici stimoli contestuali. Inoltre, il campione, pur adeguato al test del modello, limita la generalizzabilità dei risultati, rendendo opportune future replicazioni su campioni più ampi e in diversi contesti culturali. L'acquisto impulsivo è stato misurato tramite intenzioni auto-riferite e non comportamenti effettivi, suggerendo la necessità di studi basati su dati osservabili. Infine, l'analisi si concentra su un'unica categoria di prodotto e considera esclusivamente le emozioni come mediatore, aprendo a ricerche che includano ulteriori variabili psicologiche, quali fiducia e percezione di umanità dell'agente.

Managerial implications. I risultati offrono implicazioni rilevanti per retailer, brand e sviluppatori di AI agent nei contesti di smart retailing e digital commerce. In primo luogo, l'orientamento incorporato nell'AI agent non è neutrale: un framing utilitaristico può attivare emozioni positive funzionali, come soddisfazione e senso di efficacia, che incrementano indirettamente l'intenzione di acquisto impulsivo. Tuttavia, lo stesso orientamento produce anche un effetto diretto negativo sull'impulsività, suggerendo che un approccio eccessivamente focalizzato su efficienza e performance possa generare una forma di resistenza decisionale. Per i manager, ciò implica che la progettazione degli AI agent dovrebbe evitare configurazioni esclusivamente strumentali, privilegiando un equilibrio tra efficienza cognitiva e coinvolgimento emotivo, agendo sulla comunicazione verbale, paraverbale e non verbale dell'agente e sull'antropomorfismo (Barros et al., 2024; Wölfel et al., 2022). In secondo luogo, lo studio conferma che le emozioni positive rappresentano il principale driver dell'acquisto impulsivo mediato da AI. Le imprese dovrebbero progettare interazioni capaci di generare attivazione emotiva non solo tramite contenuti edonici, ma anche attraverso fluidità conversazionale, personalizzazione dinamica e riduzione dello sforzo cognitivo (Araujo and Bol, 2024). L'ottimizzazione del journey interattivo diventa così una leva strategica per stimolare decisioni rapide e meno deliberate. In terzo luogo, il design valoriale dell'AI agent costituisce una leva di marketing strategico: la configurazione dell'orientamento comunicativo può modulare stati emotivi e comportamenti d'acquisto in tempo reale, trasformando l'AI da strumento operativo a interlocutore capace di influenzare il processo decisionale, richiedendo un approccio integrato tra marketing, UX design e data analytics. Infine, il livello di istruzione emerge come variabile significativa. Consumatori più istruiti mostrano risposte emotive più attenuate, suggerendo la necessità di strategie adattive: gli AI agent dovrebbero modulare tono, intensità e contenuti comunicativi in funzione delle caratteristiche del target.

Originality of the paper. L'articolo contribuisce alla letteratura sul consumo basato su AI offrendo una spiegazione teoricamente fondata dei meccanismi psicologici ed emotivi che collegano l'orientamento edonico o utilitaristico incorporato nel design dell'agente AI agli esiti di acquisto impulsivo nel contesto decisionale in tempo reale (Piper, de Cosmo and Guido, 2024). Il contributo principale consiste nell'adottare una prospettiva intra-AI, superando il tradizionale confronto AI vs. umano e mostrando che l'AI non è una categoria neutra: differenti orientamenti valoriali si traducono in contenuti comunicativi distinti, capaci di generare effetti psicologici e comportamentali diversi. Lo studio estende così il word-of-machine effect (Longoni and Cian, 2022), evidenziando che un orientamento utilitaristico dell'agente, coerente con le aspettative di razionalità attribuite alle macchine, attiva emozioni positive funzionali che mediano significativamente l'intenzione di acquisto impulsivo, confermando l'ipotesi proposta. Questo contributo assume particolare rilevanza alla luce dell'emergere dell'intelligenza artificiale agentica, caratterizzata da sistemi dotati di crescente autonomia decisionale nelle interazioni digitali (de Cosmo and Piper, 2020; de Cosmo, Piper and Di Vittorio, 2022; Mileti et al., 2025).

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How to Innovate Personalization

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Abstract. *This study develops the Innovation Patterns for Personalization (IPP), a parsimonious pattern map that integrates fragmented personalization and customization taxonomies with emerging managerial design concerns. Drawing on a comparative synthesis of influential frameworks in marketing, operations, and information systems, IPP organizes personalization design decisions into five orthogonal dimensions—Where, What, Who, How, and Why. Specifically, the map captures the execution locus of personalization (Design, Production, Distribution, Consumption, After-sales), the personalization object (Product, Content, Structure, Function, Appearance) complemented by interface modality (Physical, Digital, Phygital), governance choices (Firm, Prosumer, Customer, with prosumer and customer roles such as Proposer, Selector, Assembler, Authoring), delivery logic (AI-based decisioning, Individual vs. Collaborative collaboration mode, and R&D Driven vs. Market Driven decision approach), and scaling conditions. The resulting framework provides a structured lens for describing, comparing, and intentionally recombining personalization configurations as innovation patterns, supporting both cumulative academic analysis and actionable managerial design choices. While conceptual, IPP is designed for empirical validation through interviews and broader cross-industry applications.*
Keywords: *personalization; customization; innovation; pattern; framework;*

Framing of the research. *Over the past decade, personalization has moved from a premium differentiator to a strategic requirement as consumers increasingly expect offerings that feel tailored to them. Large-scale evidence already signaled this shift: McKinsey reports that 71% of consumers expect companies to deliver personalized interactions, and 76% become frustrated when personalization does not occur (McKinsey, 2021). At the firm level, the performance stakes are equally material: companies that excel at personalization can generate 40% more revenue from those activities than average players, and McKinsey estimates that reaching top-quartile personalization performance could unlock more than $1 trillion in value across US industries (McKinsey, 2021).*

These trends have been further amplified by advances in Artificial Intelligence (AI). By learning from prior interactions and behavioral traces, AI-enabled systems can anticipate customer needs and preferences and scale personalization beyond what rule-based approaches can realistically deliver (Forbes, 2021). It is therefore unsurprising that personalization and customization have attracted sustained scholarly attention, from early foundational work to more recent contributions (Lampel and Mintzberg, 1996; Gilmore and Pine, 1997; Da Silveira et al., 2001; Piller, 2022). Moreover, personalization can be conceptualized as operating across levels of value creation—shifting goods into services, services into experiences, and experiences into more meaningful personal transformations (Pine, 2022).

Building on prior work, we introduce the Innovation Patterns for Personalization (IPP) as a unifying scaffold for understanding and designing personalization innovation in products and services. While extant scholarship has produced valuable taxonomies of personalization and customization (e.g., Da Silveira et al., 2001; Rincon-Guevara et al., 2018; Altoe and Pinto, 2023), these frameworks primarily describe what personalization is at a point in time. What remains underdeveloped is an explicit, cumulative understanding of how personalization becomes innovative: the strategic moves, recombinations, and sequencing decisions through which firms expand personalization from bounded experiments into routinized, organization-wide capabilities. In other words, the literature lacks a systematic map of innovation trajectories—the pathways by which personalization is progressively developed, governed, and scaled. Accordingly, we ask: What are the recurrent patterns through which firms innovate personalization, and how can these patterns be systematically identified, compared, and used to guide managerial decision-making? Our study addresses this gap by integrating theoretical perspectives with observed managerial practice and by extending the design space to reflect the rapidly evolving frontier of contemporary personalization, thereby constructing the IPP.

Purpose of the paper. *The purpose of this short paper is to advance research and practice on personalization by introducing the Innovation Patterns for Personalization (IPP), a structured framework for explaining how personalization is innovated—not only what personalization is. As personalization has become a strategic necessity rather than a premium option (Piller, 2022), prior work has clarified key forms and levels of customization and personalization, distinguishing cosmetic versus deeper approaches and separating changes to the offering from changes to its representation (Gilmore & Pine, 1997), as well as positioning personalization along a continuum of customer involvement from standardization to design-stage customization (Lampel & Mintzberg, 1996; Da Silveira et al., 2001). Subsequent research has increasingly framed personalization and customization as a multi-dimensional design problem*

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rather than a single continuum. Early taxonomies located differentiation along the value chain (design, fabrication, assembly, distribution) (Lampel & Mintzberg, 1996) and specified levels of customization from standardization and usage through packaging/distribution and upstream production stages (Da Silveira et al., 2001). In parallel, marketing frameworks distinguished approaches to customization—cosmetic, transparent, adaptive, and collaborative—based on how the customer is addressed and what is adapted (Gilmore & Pine, 1997), while operations research emphasized feasibility constraints such as customer involvement and modularity (Duray, 2002). Reus (2006) further clarified that customization regimes vary by product and delivery context (physical vs. digital; bundled vs. unbundled; online vs. offline). In digital settings, taxonomies have formalized personalization through user modeling (data type, acquisition method, lifespan) and system adaptation (object of change—content/presentation/structure—volatility, scope, and control) (Weinmann et al., 2013), and extended these distinctions to SaaS by specifying stakeholders, layers/assets, and lifecycle timing of customization (Ali et al., 2019). Complementary work has highlighted boundary conditions in product architecture and flexibility (Rincon-Guevara et al., 2018), as well as decoupling/COPP logic (e.g., MTS/ATO/MTO) and manufacturing process typologies that constrain scalable variety (Tien, 2011; Bayou & Reinstein, 2003; Piller, 2022). More recent contributions have also refined governance by detailing control locus and customer roles (inputter/selector/assembler/designer), degrees of freedom, and collaboration mode (individual vs. community) (Pallant et al., 2020), and by introducing AI-relevant distinctions such as supervised versus unsupervised approaches and explainability (Altoe & Pinto, 2023). At the same time, the rapid diffusion of AI-driven personalization in digital marketing highlights how algorithmic systems increasingly tailor content and experiences at scale (Aguirre et al., 2015; Bleier & Eisenbeiss, 2015; Qadri et al., 2026), while digital transformation expands personalization across touchpoints and organizational processes (Galindo-Martín et al., 2019; Arya et al., 2019). Despite this rich body of work, existing studies largely focus on classifying personalization features and design choices, rather than systematically mapping the innovation pathways through which firms develop, extend, and operationalize personalization capabilities over time. To address this gap, we draw on the broader innovation literature on pattern-based approaches, with particular relevance from business model innovation research that codifies recurrent innovation logics into actionable patterns (Sawhney et al., 2007; Gassmann et al., 2013; Clauss, 2016; Weking et al., 2018). Notably, Sawhney et al. (2007) propose the "innovation radar" as a 360-degree view of innovation organized around interrelated dimensions of what, who, how, and where firms innovate. Building on this logic, IPP synthesizes prior theory and observed managerial approaches into an integrative design space that organizes the key patterns underlying personalization innovation and supports both cumulative academic comparison and actionable managerial design choices.

Methodology. *To build the Innovation Patterns for Personalization (IPP) that is both academically rigorous and managerially useful, we carried out a broad review of prior work on product and service personalization and customization. We examined conceptual frameworks developed in the academic literature as well as practitioner-oriented models produced by major consulting firms. Our procedure was guided by the taxonomy development method introduced by Nickerson et al. (2009), which blends inductive, deductive, and intuitive reasoning. This approach was adopted to ensure that the resulting IPP satisfies core taxonomy criteria, including conciseness, inclusiveness, comprehensiveness, and extendibility.*

Following this method, we first compiled a set of eighteen theoretical and managerial models on personalization and customization published over the last three decades, starting from 1996. Model selection relied on two criteria. The first was alignment with the specific scope of this study, and the second was citation frequency, which served as a proxy for scholarly visibility and influence. Beyond highly cited contributions, we also incorporated additional classifications with clear managerial relevance, even when they were not indexed in Scopus or widely cited. This choice allowed us to capture emerging viewpoints that are shaping the field in practice.

The analysis proceeded through three iterative phases, as described in Table 1. In Phase 1 (Inductive), we systematically extracted, compared, and organized the variables and dimensions used across the eighteen frameworks, identifying both shared themes and distinctive elements. In Phase 2 (Deductive), we leveraged these comparisons to consolidate the most recurrent and consequential variables into an integrated set of patterns. In Phase 3 (Intuitive), we further expanded the model with patterns that reflect the evolving frontier of personalization, drawing on recent industry developments, technological progress, and insights from practitioner reports.

Overall, this structured process anchors the proposed IPP in established scholarship while keeping it responsive to the fast-moving and continually reconfigured nature of personalization in contemporary business contexts.

Table 1: Method used (Authors' elaboration)

Phase	Objective	Process	Output
Phase 1 - Inductive	Identify the full set of dimensions used in prior work	Conducted a systematic literature review in Scopus, complemented by backward and forward snowballing to expand coverage; extracted and coded variables/dimensions from the resulting academic and practitioner sources; compared definitions and labels; clustered recurring constructs and noted divergent assumptions	Comprehensive variable inventory (full set of dimensions) + preliminary clusters and overlap notes
Phase 2 - Deductive	Consolidate recurrent variables into a parsimonious structure	Selected the most recurrent and consequential dimensions; formalized higher-order groupings; defined boundaries to reduce overlap and enforce orthogonality	Draft IPP structure (core dimensions and sub-dimensions) + consolidated labels and definitions
Phase 3 - Intuitive	Extend the structure to reflect emerging practice and the technological frontier	Added/refined dimensions to capture developments underrepresented in older models; aligned terminology with recent practitioner frameworks; integrated patterns observed in contemporary personalization practice	IPP map

Results. *The literature review included foundational typologies of personalization approaches and customer involvement (Gilmore & Pine, 1997; Lampel & Mintzberg, 1996; Da Silveira et al., 2001), operations-based boundary conditions and feasibility logics (Duray, 2002; Tien, 2011; Bayou & Reinstein, 2003; Piller, 2022; Rincon-Guevara et al., 2018), digital personalization mechanisms centered on user modeling and system adaptation (Weinmann et al., 2013), SaaS-specific customization layers and lifecycle timing (Ali et al., 2019), and recent work capturing configurator-based inputs and the function–appearance distinction (Cadenas USA, 2025), as well as emerging AI-related distinctions such as explainability and mining approaches (Altoe & Pinto, 2023). Across these streams, the analysis revealed two persistent patterns. First, existing contributions offer strong classification logics for what is personalized (e.g., content vs. structure vs. functionality) and where personalization is introduced (e.g., design vs. production vs. distribution), but they often treat governance, delivery mechanisms, and scalability conditions as secondary or implicit design choices. Second, more recent technology-driven advances—especially AI-based decisioning and platform ecosystems—expand personalization beyond isolated product or interface tweaks into configurations that span value-chain locus, decision rights, and explicit monetization and legitimacy considerations.*

Synthesizing these insights, our main result is our four design dimensions—Where, What, Who, and How— and a Why conditioning layer, so that any initiative regarding innovation for personalization can be described as a coherent configuration of interdependent choices rather than as a standalone feature. We propose a Innovation Patterns for Personalization (IPP), presented in Figure 1, as a directional chart useful to focus different ways to innovate. The figure's first contribution is to make execution locus explicit and comparable: Where captures whether customer-specific information is first translated into differentiated output in Design, Production, Distribution, Consumption, or After-sales, thereby distinguishing upstream specification- and fulfillment-based personalization from channel-time, in-use, and post-purchase interventions. This locus framing consolidates value-chain perspectives in the customization literature while highlighting that "personalization" may be operationally enacted in very different parts of the system, with distinct feasibility and governance implications. Second, IPP provides an object-level grammar for specifying what changes: What distinguishes five personalization targets—Product, Content, Structure, Function, and Appearance—and complements them with the interface modality through which personalization is experienced (Physical, Digital, Phygital). This separation clarifies two frequent ambiguities in prior work: (i) distinguishing changes to contractual/entitlement composition (Product) from changes to behavioral logic (Function) and from changes to choice architecture (Structure), and (ii) separating the personalization object from the medium through which it is encountered. In doing so, IPP supports consistent comparison across initiatives that may share a locus (e.g., distribution) but differ fundamentally in object (e.g., content vs. structure), or that share an object (e.g., content) but differ in interface modality (digital vs. phygital). Third, IPP elevates governance from a contextual assumption to a core design dimension. Who formalizes personalization governance by locating decision authority in the Firm, Prosumer, or Customer and, when authority resides with Prosumer or Customer, characterizes the contribution role through which the outcome is produced (Proposer, Selector, Assembler, Author). This makes explicit whether personalization is firm-determined, mediated by external producers, or customer-determined, and it distinguishes between different modes of customer contribution that are often conflated in "involvement" measures. As a result, the same personalization object (e.g., product configuration) can be represented as materially different innovation patterns depending on where decision rights sit and what role the customer plays in producing the final outcome. Finally, IPP specifies delivery as a set of mechanism choices rather than a residual technical detail. How captures three elements: AI-based decisioning, Collaboration mode (Individual vs. Collaborative), and Decision approach (R&D Driven vs. Market Driven). This decomposition clarifies whether personalization is produced through automated decision policies, whether the option space is built from firm-provided elements versus co-created or

community-sourced corpora, and whether decisioning is oriented primarily toward customer-fit optimization or toward commercial steering objectives. By disentangling these elements, the framework avoids treating "AI" as a single monolithic innovation lever and instead locates innovation in the specific way decisioning, collaboration, and steering are configured.

IPP anchors personalization as an innovation initiative by specifying conditions under which it can scale. IPP includes a Why layer, but Why is not an innovation pattern in the same sense as the design choices captured in Where, What, Who, and How. Instead, Why specifies the boundary conditions, the various benefits to be gained and selection criteria that determine which personalization configurations are strategically appropriate and scalable in a given context. In particular, it shapes the feasibility, acceptability, and sustainability of any pattern, and can therefore steer firms toward different configurations (or constrain multiple configurations simultaneously). Making Why explicit addresses a recurring limitation of prior taxonomies: personalization initiatives may be readily classifiable by object and locus, yet fail to scale when they lack an articulated capture logic, enforceable legitimacy safeguards, or institutionalized learning routines.

Moreover, consistent with structured diagnostic approaches used in practitioner frameworks (e.g., BCG, 2025), each IPP dimension is intended to be operationalized through a second-step "deepening" layer—i.e., a set of focused diagnostic prompts and sub-criteria that guide systematic assessment and design choices within each variable.

Taken together, IPP consolidates fragmented pattern insights into a single, managerially usable representation that supports systematic comparison across cases and explicit design of personalization innovation patterns. In practical terms, the map enables researchers to code initiatives as configurations across the four pattern dimensions (Where–What–Who–How) and enables managers firstly to asses them through the Why conditioning layer, to diagnose misalignment across design choices (e.g., AI-based decisioning without clear authority or without explicit legitimacy and learning provisions) and to intentionally explore alternative innovation patterns by shifting locus, object, governance, delivery logic, or scaling conditions.

Figure 1: Innovation Patterns for Personalization (Source: Authors' elaboration)



Research limitations. *This analysis is conceptual and integrative in nature; accordingly, its contributions are subject to several limitations. First, the IPP map is derived from a structured synthesis of existing taxonomies and frameworks, rather than from primary empirical evidence. As a result, the framework should be interpreted as a theoretically grounded design representation that still requires empirical corroboration, particularly through expert and managerial interviews aimed at verifying interpretability, completeness, and practical usability. Second, although IPP is anchored in established streams of personalization, customization, and innovation research, its congruence with the broader literature should be further assessed through additional systematic coverage and triangulation across adjacent domains (e.g., service operations, platform governance, and algorithmic accountability), to ensure that no relevant dimensions or boundary conditions have been inadvertently omitted. Third, IPP prioritizes parsimony to meet the constraints of a short paper; consequently, it does not capture all sector-specific contingencies and should not be read as a fully specified causal model. Fourth, several constructs—especially within How and Why—may be partly unobservable from public descriptions of personalization initiatives, limiting replicable coding without access to firm-internal documentation.*

Finally, because personalization technologies and governance practices evolve rapidly—particularly with the diffusion of generative AI—the IPP map should be viewed as iterative and extensible, requiring refinement as new decisioning paradigms, interaction modalities, and legitimacy expectations emerge.

Managerial implications. *IPP provides managers with a practical map to design, diagnose, and evolve personalization initiatives as coherent configurations rather than isolated features. First, it supports structured design by forcing explicit choices across Where, What, Who, How, and Why, thereby reducing ambiguity in cross-functional decision making and aligning personalization with a 360-degree innovation logic akin to the "innovation radar" perspective (Sawhney et al., 2007). Second, IPP helps managers anticipate feasibility and operational trade-offs: shifting personalization upstream (Design/Production) typically raises modularity, flexibility, and process requirements (Duray, 2002; Rincon-Guevara et al., 2018; Piller, 2022), whereas downstream personalization (Distribution/Consumption/After-sales) increases reliance on data and decisioning capabilities characteristic of digital personalization systems (Weinmann et al., 2013). Third, the map enables governance-by-design by making decision authority and customer roles explicit, helping managers choose participation architectures (e.g., selector vs assembler vs authoring) that fit both operational constraints and strategic objectives (Pallant et al., 2020). Fourth, IPP supports risk and legitimacy management by treating acceptability as a design requirement, consistent with evidence that personalization effectiveness can be offset by perceived intrusiveness and privacy concerns if trust and control are not managed (Aguirre et al., 2015; Bleier & Eisenbeiss, 2015). Finally, IPP encourages scalable implementation by embedding business model logic and learning routines: managers are prompted to specify value capture mechanisms and KPIs (Clauss, 2016; Weking et al., 2018), and to institutionalize experimentation and monitoring before scaling personalization initiatives.*

Originality of the paper. *This analysis is original in that it reframes personalization from a feature-level classification problem—dominant in prior taxonomies that separately emphasized customization approaches (Gilmore & Pine, 1997), value-chain and production loci (Lampel & Mintzberg, 1996; Da Silveira et al., 2001; Piller, 2022), product architecture and flexibility constraints (Duray, 2002; Rincon-Guevara et al., 2018), and digital user modeling/system adaptation (Weinmann et al., 2013; Ali et al., 2019)—to an innovation-pattern and configuration problem. Building on the logic of pattern-based innovation perspectives in adjacent domains (Sawhney et al., 2007; Gassmann et al., 2013; Clauss, 2016; Weking et al., 2018), we introduce the Innovation Patterns for Personalization (IPP) as an integrative pattern map that organizes personalization design decisions into Where, What, Who, How, and Why.*

The contribution is not merely integrative. First, IPP provides a common representational grammar for personalization innovation, enabling initiatives to be described as combinations of interdependent design choices rather than as isolated tactics (e.g., "adding recommendations" or "adding AI"). This configuration logic supports cumulative comparison across studies and sectors by making explicit which dimension is changing (locus, object, authority, mechanism, or rationale) when personalization is said to "innovate." Second, IPP resolves a recurring limitation in existing classifications: while prior frameworks often specify where personalization occurs or what is adapted, they tend to leave the governance problem implicit. IPP makes decision rights and customer participation core design variables by distinguishing authority (Firm, Prosumer, Customer) and customer roles (e.g., proposer/selector/assembler/author), allowing researchers and managers to compare personalization strategies that may look similar on the surface but differ fundamentally in accountability and responsibility allocation (Piller et al., 2010; Pallant et al., 2020; Loef et al., 2017). Third, IPP clarifies the delivery logic of personalization by separating technology-enabled decisioning from the structure of collaboration and the dominant decision orientation—capturing how AI-based decisioning, collaboration mode, and decision approach jointly shape the space of feasible personalization designs, rather than treating "AI" as a monolithic innovation lever.

Finally, by incorporating these constraints explicitly, IPP connects personalization design to broader pattern-based innovation work in business models and organizational learning (Clauss, 2016; Weking et al., 2018), and offers a compact, theory-grounded lens for analyzing how firms expand personalization from bounded experiments into routinized innovation capabilities over time.

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Neurodiversity in the Agentic Economy: A Systematic Literature Review

CHIARA COLACCHIO [1], DANIELA CORSARO [2]

Abstract. *Negli ultimi due decenni, il fenomeno della neurodivergenza si è evoluto da un inquadramento clinico-patologico verso una prospettiva sociale e organizzativa. Tuttavia, la sua integrazione nella Consumer Research e nella Marketing Research rimane marginale.*

Il presente lavoro analizza sistematicamente come la neurodivergenza sia stata concettualizzata nella letteratura accademica non clinica, con l'obiettivo di valutarne la presenza nel dibattito scientifico e il modo in cui viene trattata in relazione ai processi di consumo.

Attraverso una Systematic Literature Review (SLR), lo studio identifica i pattern ricorrenti e le traiettorie evolutive del campo, delineando lo stato dell'arte della neurodivergenza all'interno del dominio del Business & Management.

L'analisi evidenzia tre fasi principali: un'eredità medico-psichiatrica, una transizione identitaria-comunitaria e un consolidamento nella prospettiva del capitale umano (contesti organizzativi e formativi). I risultati rivelano una persistente marginalità teorica nel marketing: la neurodivergenza è raramente considerata una dimensione identitaria dotata di agency nei processi di creazione di valore.

Il contributo dimostra che l'invisibilità del consumatore neurodivergente non è una mera lacuna tematica, ma il risultato di un modello implicito di consumatore cognitivamente omogeneo che ha storicamente orientato la disciplina (Smith, 1776/2003). Oltrepassando il binomio neurodivergenza-vulnerabilità, il lavoro fornisce le basi concettuali per integrare la diversità cognitiva nelle teorie contemporanee di Consumer Research.

Keywords: *Neurodiversity; Consumer Research; Consumer Agency; Market Heterogeneity; Symbolic Consumptions; Systematic Literature Review.*

Framing of the research. La presente analisi della letteratura esamina come il tema della neurodivergenza viene trattato nell'ambito della Consumer Research (Muniz & O'guinn, 2001; Schau, 2009).

A partire dai primi anni Duemila, il concetto di neurodivergenza è progressivamente passato da un inquadramento clinico-patologico (Happé, 2008; Baker, 2006) alla prospettiva della neurodiversità. Tale transizione, supportata dai contributi seminali di Singer (1998) e successivamente sistematizzata da Walker (2014), sottrae la divergenza neurologica alla sola sfera clinica per estenderla a dimensioni sociali, educative e organizzative che ne riconoscono il valore come variazione naturale dell'umanità.

L'integrazione di queste prospettive nasce da un processo di maturazione epistemologica consolidatosi a partire dagli anni '90. In quel periodo, nonostante la letteratura specifica sulla neurodiversità fosse quasi esclusivamente limitata ai contributi seminali di Singer (1998), si affermarono riferimenti teorici fondamentali come il modello sociale della disabilità e il postmodernismo liberatorio (Firat & Venkatesh, 1995). Tali istanze hanno fornito gli strumenti concettuali per mettere in discussione l'assunto di un "consumatore standard" (Lancaster, 1966), riconoscendo i mercati come contesti caratterizzati da soggettività plurali che sfidano i modelli tradizionali basati sulla normalità statistica (Porter & Kramer, 2011; Zuboff, 2019). Tale evoluzione teorica amplia il campo di analisi oltre i confini istituzionali dell'apprendimento e del lavoro, aprendo la strada a un'indagine sulla agency della persona neurodivergente come soggetto attivo nei mercati. In questa prospettiva, Armstrong (2015) contesta il "mito del cervello normale", osservando che, a differenza delle misure fisiche standardizzate (come il metro), non esiste un prototipo biologico universale a cui paragonare il funzionamento cerebrale umano. Argomentando che la neurodiversità è per la specie umana ciò che la biodiversità è per l'ecosistema, Armstrong evidenzia come i modelli dominanti abbiano storicamente ignorato i punti di forza evolutivi associati alla divergenza (come le capacità sistemizzanti o la creatività superiore) per focalizzarsi esclusivamente sulle mancanze. In linea con questo orientamento, Dwyer (2022) propone di spostare l'attenzione dalla "correzione" del deficit individuale alla trasformazione dei sistemi di potere e delle architetture sociali. In questo quadro, Dwyer introduce il concetto di neuro-neutralità, suggerendo che le organizzazioni e i contesti istituzionali non dovrebbero favorire sistematicamente i funzionamenti neurotipici, ma strutturarsi per accogliere la varietà neurologica naturale, riconoscendo che la disabilità emerge spesso dall'interazione tra caratteristiche individuali e contesti escludenti, piuttosto che da una condizione intrinseca del soggetto.

Nonostante questa evoluzione teorica, la letteratura mostra una marcata polarizzazione tematica: l'attenzione si è finora concentrata prevalentemente su contesti istituzionali circoscritti, quali i luoghi di lavoro e i sistemi educativi, dove la neurodivergenza viene esaminata attraverso la lente delle pratiche di gestione, del supporto pedagogico e dell'integrazione funzionale.

In tali ambiti, il focus è posto sulle condizioni atte a favorire la partecipazione e la performance nelle organizzazioni

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(es: Austin & Pisano, 2017; Walkowiak, 2024), lasciando inesplorate le implicazioni del funzionamento divergente in ambiti non istituzionalizzati. Tale asimmetria riflette una visione della neurodivergenza legata al concetto di vulnerabilità (Baker, 2006), interpretata come una deviazione da correggere o una fragilità da tutelare, oppure come una risorsa strategica da valorizzare in termini di performance e inclusione (Austin & Pisano, 2017; Walkowiak, 2024; Lai, Aoki & Seera, 2025). Sebbene queste prospettive abbiano contribuito a rendere visibili soggetti precedentemente esclusi, tendono a inscriverli in una logica di protezione e compensazione.

In tale configurazione, l'invisibilità concettuale del consumatore neurodivergente nella letteratura non rappresenta solo una lacuna tematica, ma il risultato di una specifica "costruzione culturale della conoscenza" (O'Dell et al., 2016). Secondo questa prospettiva, la comprensione della neurodiversità è mediata dalle comunità epistemiche dominanti.

La Consumer Research ha dedicato finora un'attenzione marginale al tema: i processi di consumo sono raramente considerati come contesti di analisi primaria e la persona neurodivergente non viene esplicitamente concettualizzata come soggetto dotato di agency nelle dinamiche di scambio o di creazione di valore. Quando presenti, i riferimenti al consumo risultano indiretti, spesso mediati da prospettive istituzionali o da attori terzi come caregiver e organizzazioni (Paletta, 2013; Cascio, 2015; Houdek, 2022; Sutherland et al., 2025). Questa configurazione della letteratura è particolarmente critica se si considera che il marketing interpreta i mercati come sistemi complessi in cui si intrecciano dimensioni economiche, simboliche ed esperienziali (Hirschman & Hirschman, 1982).

Nel contesto di un'economia sempre più descritta come "agentica", caratterizzata dalla diffusione di sistemi autonomi e tecnologie di agentic AI che partecipano ai processi decisionali e alla creazione di valore (Ratten et al., 2024; Martinelli, 2025; Mathew et al., 2026), emergono nuove forme di soggettività economica che includono attori umani, organizzativi e artificiali. Questa trasformazione sta ridefinendo modelli di business, confini organizzativi ed ecosistemi di mercato (Chatterjee et al., 2023; Secundo et al., 2025), rendendo necessario interrogarsi sui modelli impliciti di soggetto che guidano la teoria e la pratica manageriale. Se l'agentic economy presuppone pluralità di attori e configurazioni di agency, la persistenza nei modelli di marketing di consumatore cognitivamente omogeneo (Lancaster, 1966; Holbrook & Hirschman, 1982) rappresenta una tensione teorica rilevante. Nel caso della neurodivergenza, questa tensione evidenzia i limiti di framework che continuano a presupporre processi cognitivi standardizzati (Simon, 1955; Lancaster, 1966) nell'interpretazione dei segnali di mercato. In tale prospettiva, il presente contributo si inserisce nel dibattito sulla trasformazione dei modelli manageriali e di marketing, proponendo una riflessione critica sugli assunti cognitivi che guidano la concettualizzazione del consumatore nei mercati contemporanei.

Purpose of the paper. Lo scopo della presente Literature Review è analizzare la concettualizzazione della neurodivergenza nella letteratura accademica non clinica, valutandone l'integrazione nella Consumer Research con riferimento alle dinamiche di mercato e alla comunicazione di marca. A tale scopo, la ricerca risponde alla seguente domanda di ricerca:

Come è stata concettualizzata la neurodivergenza nella letteratura accademica non clinica?
Come la Consumer Research affronta il tema della neurodivergenza?

A fronte della marginalità della prospettiva market-based, la presente SLR esamina l'evoluzione del dibattito sulla neurodivergenza e identifica gli orientamenti teorici dominanti. L'analisi della letteratura mira a distinguere le dimensioni del fenomeno già consolidate, da quelle che rimangono marginali o assenti nella ricerca orientata al marketing. Il lavoro intende quindi offrire una base analitica per integrare la diversità cognitiva nella Consumer Research, definendo le premesse per future ricerche teoriche ed empiriche sul rapporto tra neurodivergenza, agency e consumo.

Methodology. Per analizzare il tema della neurodivergenza nella letteratura accademica, è stata condotta una revisione sistematica della letteratura, secondo il modello PRISMA 2020 (Page et al., 2021). Questo approccio ha garantito la tracciabilità di ogni fase, attraverso una valutazione sequenziale di titoli, abstract e testi completi.

Il disegno metodologico segue un protocollo definito a priori e articolato in fasi sequenziali di pianificazione, identificazione, selezione, estrazione e sintesi dei contributi, in linea con l'approccio di Sauer e Seuring (2023) e con i principi di trasparenza e replicabilità suggeriti da Tranfield et al. (2003).

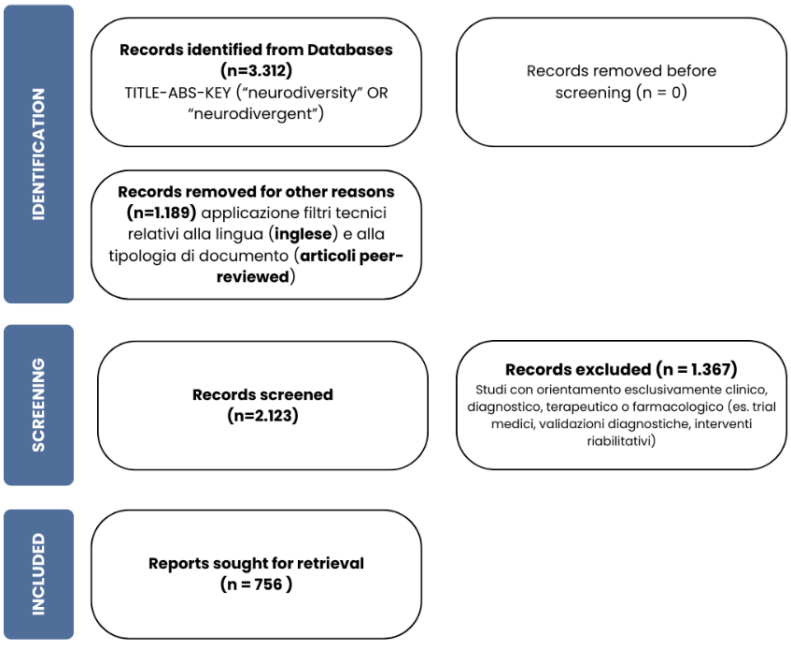
Il processo è iniziato con la definizione dell'ambito di analisi e la costruzione di un quadro metodologico volto ad individuare le lacune rilevate nella letteratura esistente. In questa fase sono stati inoltre definiti la strategia metodologica e il protocollo di ricerca, sviluppati sulla base dei criteri consolidati da Davies e Crombie (1998). Coerentemente con le linee guida del Cochrane Handbook (Chandler et al., 2019), il protocollo ha stabilito chiaramente gli obiettivi e i criteri di eleggibilità prima dell'inizio della ricerca, assicurando che la selezione degli studi non fosse influenzata dai risultati. La ricerca bibliografica è stata condotta utilizzando il database Scopus, scelto per l'ampia copertura di fonti accademiche e per gli strumenti avanzati di filtraggio e analisi disponibili (Franceschet, 2010).

Lo screening dei titoli e degli abstract, nonché la valutazione full-text dei contributi, sono stati condotti da due ricercatori. I casi di disaccordo classificatorio sono stati risolti attraverso discussione congiunta fino al raggiungimento del consenso; nei casi di ambiguità persistente, è stato coinvolto un terzo valutatore esterno, in linea con le raccomandazioni di Tranfield et al. (2003).

Successivamente, l'analisi si è concentrata sull'esame qualitativo dei contributi attraverso operazioni di estrazione e sintesi dei dati finalizzate a raccogliere gli insight più rilevanti. Infine, i risultati sono stati organizzati sistematicamente in un report complessivo, finalizzato a una comunicazione efficace delle evidenze riscontrate.

Le principali fasi del processo di revisione sono sintetizzate nel diagramma metodologico riportato in Figura 1.

Figura 1. Diagramma metodologico



La stringa di ricerca iniziale, volutamente ampia, è stata costruita utilizzando gli operatori booleani e combinando i termini "neurodiversity" OR "neurodivergence", con l'obiettivo di intercettare l'insieme più esteso possibile dei contributi pertinenti. Tale interrogazione ha restituito 3.312 documenti complessivi.

Sebbene le radici del dibattito risalgano agli anni '90, il periodo di osservazione analitica considerato in questo studio inizia dal 2006, primo anno in cui il database Scopus registra contributi scientifici indicizzati e coerenti con i criteri di ricerca adottati. L'analisi si estende fino al primo trimestre del 2026 per includere i contributi in fase di pubblicazione (Early Access).

Nel processo di raffinamento del dataset sono stati applicati filtri relativi alla tipologia di documento (articoli peer-reviewed) e alla lingua (inglese), ottenendo un database di 2.123 contributi. Successivamente, per verificare l'eventuale presenza di studi esplicitamente collocati nell'ambito della Marketing Research o della Consumer Research, sono state effettuate ulteriori interrogazioni nello stesso database utilizzando stringhe di ricerca più restrittive, combinando termini relativi alla neurodivergenza con parole chiave collegate agli ambiti di interesse.

Durante lo screening preliminare sono stati esclusi i contributi con un focus esclusivamente clinico, diagnostico o terapeutico. Sono stati inoltre esclusi studi il cui impianto teorico e metodologico risultava prevalentemente orientato a finalità mediche o sanitarie, in quanto non coerenti con l'obiettivo della ricerca. Questo processo ha permesso di isolare un corpus di 756 articoli, focalizzati su prospettive sociologiche, educative e manageriali.

In questa fase, i criteri di inclusione hanno privilegiato studi che, pur partendo da basi sociologiche o organizzative, offrissero spunti per un'analisi della neurodivergenza come soggettività economica potenzialmente rilevante nei processi di creazione di valore e nelle interazioni di mercato. Gli articoli individuati sono stati inizialmente sottoposti a uno screening di titoli e abstract; solo quelli ritenuti potenzialmente pertinenti sono stati successivamente analizzati in full-text per verificarne l'effettiva rilevanza teorica.

L'architettura della ricerca adotta il metodo di Gioia et al. (2013) per l'analisi e la sintesi sistematica delle informazioni, superando la descrizione cronologica degli studi attraverso un processo di codifica qualitativa articolato su tre livelli. L'analisi muove dall'identificazione dei concetti di primo ordine, basati sulla terminologia originale dei contributi, per risalire attraverso un'astrazione teorica ai temi di secondo ordine e, infine, alla definizione delle dimensioni aggregate. Tale approccio favorisce un'integrazione critica basata su temi trasversali (Papaioannou et al., 2016) e permette di mappare pattern ricorrenti e ambiti marginali all'interno del campo d'indagine.

I contributi analizzati sono stati classificati nelle tre fasi evolutive sintetizzate nella Tabella 1 sulla base di criteri definiti a priori. Per ciascun contributo sono state estratte e codificate cinque dimensioni analitiche: il focus disciplinare, la definizione di neurodivergenza adottata, l'obiettivo dichiarato della ricerca, il contesto applicativo primario e gli autori principali di riferimento. L'attribuzione di ciascun contributo a una delle tre fasi è stata effettuata considerando congiuntamente queste dimensioni, con particolare peso assegnato all'orientamento teorico prevalente e al contesto applicativo.

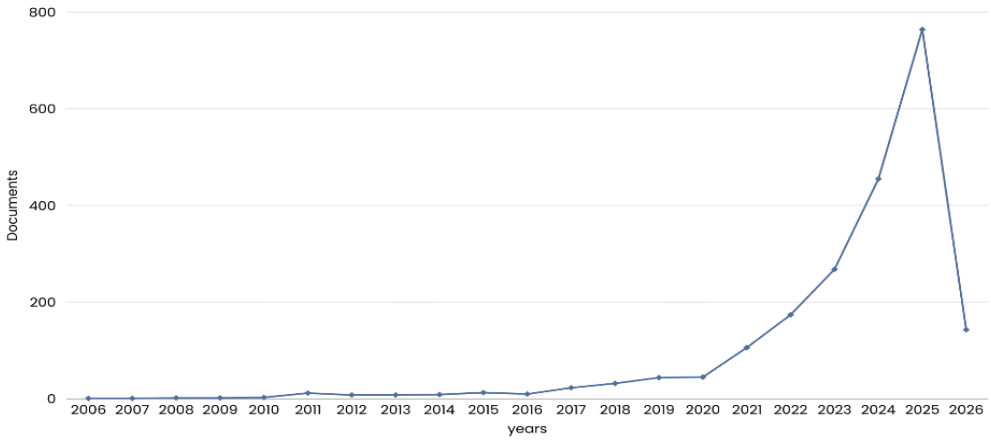
Results. I risultati presentati hanno una natura preliminare ed esplorativa, coerente con gli obiettivi della presente SLR. Il contributo si configura come una ricognizione sistematica di un dominio emergente, con l'obiettivo di valutarne la praticabilità come area di ricerca autonoma nell'ambito della Consumer Research, piuttosto che di fornire conclusioni

definitive. In questa prospettiva, i pattern identificati segnalano tendenze significative e aprono uno spazio teorico per indagini future, configurando il presente contributo come una feasibility analysis di un dominio di ricerca emergente.

L'analisi evidenzia un'evoluzione temporale nel modo in cui la neurodivergenza è affrontata nei contributi accademici dal 2006 al 2026, distinguibile in tre fasi principali.

Sebbene la produzione scientifica indicizzata parta formalmente dal 2006, essa affonda le proprie radici nei contributi pionieristici degli anni '90, riconducibili a studi seminali come il discorso di Jim Sinclair (1993), "Don't Mourn for Us", e il lavoro della sociologa Judy Singer (1998), "Odd People In", che ha formalizzato il termine "neurodiversity" per descrivere la variazione neurologica umana come categoria sociale. Nel periodo compreso tra la fine degli anni '90 e il 2006, il dibattito sulla neurodivergenza ha attraversato una fase di consolidamento extraaccademico, evolvendo dalle prime comunità di attivisti verso la stampa generalista e preparando il terreno per la successiva legittimazione scientifica. È da questo substrato teorico che il dibattito accademico si è poi strutturato nel ventennio analizzato, riflettendo una progressiva maturazione del tema.

Figura 2. Documents by year (Scopus, 2026)



Nel periodo iniziale, a partire dal 2006, prevale un inquadramento di tipo medico e psichiatrico, in cui la neurodivergenza è principalmente descritta, classificata e interpretata all'interno di un framework clinico, con un'attenzione concentrata sulle differenze neurologiche e sulle dimensioni diagnostiche (Faraone et al., 2006; Ronald et al., 2006; Gillberg, 2010). In questa fase, la ricerca accademica si focalizza sull'identificazione di biomarcatori, sull'ereditarietà genetica e sulla definizione di deficit cognitivi specifici (Happé & Ronald, 2008; Thapar et al., 2007).

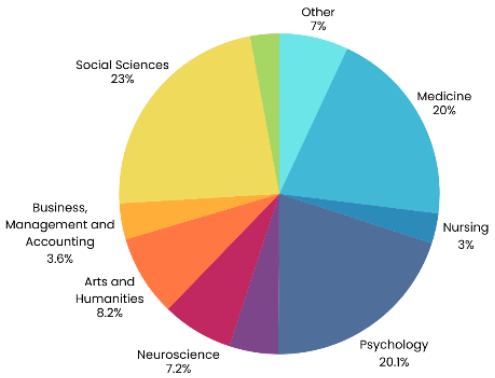
A partire dal 2010, si osserva una progressiva integrazione delle dimensioni sociali e collettive. In questa seconda fase, un numero crescente di studi si concentra sulla formazione di community neurodivergenti, analizzate come spazi di conversazione, condivisione di esperienze e costruzione di consapevolezza. Questo orientamento è stato alimentato dal consolidamento del movimento neurodivergente, che ha rafforzato il modello sociale della disabilità applicandolo specificamente alla neurodivergenza (Kapp et al., 2013). Tale dinamica si è concretizzata nella nascita delle prime community online autogestite, come la lista Independent Living on the Autistic Spectrum (InLv), la cui evoluzione è analizzata da Dekker (2019), che ha rappresentato uno spazio di confronto per lo sviluppo di concetti legati all'identità e all'auto-advocacy. In questo contesto si afferma una prospettiva che promuove la rimozione delle barriere sociali attraverso l'adozione di un linguaggio positivo e il superamento delle categorizzazioni basate esclusivamente sul deficit (Woods, 2017). Tali contributi enfatizzano il ruolo delle pratiche di advocacy e delle relazioni sociali, aprendo una riflessione sull'impatto di tali dinamiche nei contesti organizzativi (Silverman, 2015). Ciò segna un parziale allontanamento dalle interpretazioni esclusivamente cliniche, pur senza abbandonarle del tutto, ponendo le basi per il passaggio dall'"integrazione" del singolo alla valorizzazione della diversità neurologica (Doyle, 2020). Questa integrazione concettuale prepara il terreno per la successiva fase di managerializzazione del tema, in cui la neurodivergenza viene inquadrata come una risorsa strategica per il capitale umano.

L'eredità del cambiamento di prospettiva consolidato da Silverman (2015) apre la strada, a partire dal 2017, ad una terza fase in cui la neurodivergenza viene sempre più frequentemente associata a contesti organizzativi e formativi (Gurbuz et al., 2019). In particolare, la letteratura progressivamente considera la neurodivergenza in relazione ad employability, inclusione lavorativa, capitale umano e ambienti di apprendimento, spostando il focus dalla pedagogia speciale al supporto alla carriera accademica (Gurbuz et al., 2019). Questo filone conosce un'ulteriore intensificazione nel periodo compreso tra il 2020 e il 2026, durante il quale si registra un aumento significativo dei contributi che interpretano la neurodivergenza come possibile vantaggio competitivo (Austin & Pisano, 2017), consolidando il cosiddetto "Business Case" per la neurodiversità (Kirby & Smith, 2021). Tale prospettiva dimostra come l'inclusione di stili cognitivi differenti non risponda solo a istanze etiche, ma generi valore economico attraverso l'innovazione di processo, la riduzione dei bias decisionali e il miglioramento del benessere organizzativo complessivo (Doyle, 2020). Tuttavia, la letteratura evidenzia come la piena espressione del capitale umano neurodivergente sia ostacolata dalla "minaccia dello stereotipo", che incide sulla scelta individuale di manifestare apertamente la propria condizione –

disclosure (Lindsay et al., 2021) - o, al contrario, di celarla attraverso strategie di adattamento – masking (Hull et al., 2017) - nei contesti professionali (Priscott & Allen, 2021). Questo costante sforzo di mimetizzazione sociale, pur favorendo un'apparente integrazione, genera un elevato carico cognitivo (Cage & Troxell-Whitman, 2019) e aumenta il rischio di burnout, limitando di fatto l'efficacia delle politiche di inclusione aziendale (Hurley-Hanson et al., 2020).

Questa progressiva associazione tra neurodivergenza e contesti organizzativi non implica un ampliamento della prospettiva disciplinare in senso economico o di mercato. L'analisi della distribuzione per subject area (fig.3) evidenzia infatti una marcata concentrazione nelle Social Sciences (23%), nella Medicine (20%) e nella Psychology (20,1%), mentre l'area Business & Management rappresenta una quota relativamente contenuta (3,6%).

Figura 3. Documents by Subject Area (Scopus, 2026)



È importante sottolineare che, anche all'interno dell'area Business & Management, la letteratura non si apre a una prospettiva di Consumer Research: pur richiamando la nozione di "valore", essa la circoscrive prevalentemente all'inserimento lavorativo, interpretandola come una risorsa strategica capace di generare innovazione e vantaggio competitivo (Austin & Pisano, 2017; Doyle, 2020). Sebbene la neurodivergenza sia ormai un fenomeno sociale consolidato, la sua integrazione nelle Marketing Theories rimane ancora limitata, riflettendo un ritardo rispetto all'ambito delle risorse umane, dove la letteratura sul tema risulta più consolidata (Khan et. al., 2023). In questo contesto, la letteratura di marketing ha finora adottato un modello di "consumatore standard", trascurando le specifiche esigenze sensoriali e decisionali di circa un quinto della popolazione globale (Doyle, N., 2020). In questa direzione, emerge la necessità di riconoscere la neurodivergenza come una legittima variazione del comportamento di consumo che richiede nuove strategie di mercato.

La Tabella 1 sintetizza l'evoluzione concettuale della letteratura e le principali configurazioni tematiche emerse dall'analisi. Come evidenziato dalla sintesi dei temi, la ricerca risulta prevalentemente concentrata nei contesti lavorativi e istituzionali, mentre non emergono contributi specificamente orientati a indagare la soggettività economica dell'individuo neurodivergente nei mercati e nei processi di consumo.

Tabella 1. Data Structure dell'evoluzione della letteratura sulla neurodivergenza

Dimensioni analitiche	**FASE 1 (2006 – 2010)**: Clinico-Diagnostica	**FASE 2 (2010 – 2017):** Sociale e Advocacy	**FASE 3 (2017 – 2026)**: Managerial, Educational e del Capitale Umano
Focus disciplinare	*Psichiatria, Genetica, Neuroscienze cliniche.*	*Sociologia, Disability Studies, Attivismo online.*	*Business & Management, Higher Education, HRM, Digital Transformation.*
Definizione della neurodivergenza	*Patologia/Deficit: Condizione medica da diagnosticare, classificare e trattare.*	*Identità/Differenza: Categoria politica e sociale; variazione naturale del genoma umano.*	*Risorsa Strategica/Talento: Vantaggio competitivo e leva di innovazione organizzativa e accademica.*
Obiettivo della ricerca	*Eziologia, identificazione di biomarcatori e standardizzazione diagnostica.*	*Empowerment, rimozione delle barriere sociali, auto-advocacy e costruzione di community.*	*Employability, inclusione lavorativa, supporto alla carriera accademica e neuro-inclusion.*

Contesti prevalenti di analisi	*Cliniche, centri di ricerca medica, contesti di riabilitazione.*	*Community online (InLv), movimenti sociali, stampa generalista di alto profilo.*	*Organizzazioni (Aziende tech/corporate), Università (Atenei), Processi di HRM e Digital Learning.*
Autori principali di riferimento	*Ronald et al. (2006); Faraone et al. (2006); Gillberg (2010); Happé & Ronald (2008); Pennington (2006); Thapar et al. (2007); Ronald et al. (2006); Belmonte et al. (2004); Constantino & Todd (2003).*	*Sinclair (1993); Singer (1998); Dekker (2019); Kapp et al. (2013); Silberman (2015); Woods (2017); Hull et al. (2017); Blume (1998); Molloy & Vasil (2002); Ortega (2009).*	*Silverman (2015); Austin & Pisano (2017); Gurbuz et al. (2019); Doyle (2020); Priscott & Allen (2021); Lindsay et al. (2021); Walkowiak (2024); Kirby & Smith (2021); Hurley-Hanson et al. (2020); Higgins (2020); Acquah et al. (2025).*

La gap analysis conferma questa polarizzazione, classificando i contributi non clinici in due macro-ambiti:

1. Education/Social, focalizzato su advocacy e processi socioculturali (es. Sarret, 2018; Clouder et al., 2020; Botha et al., 2025)
2. Workplace/HR, orientato a performance e human capital (es. Austin & Pisano, 2017; Kirby & Smith, 2021; Walkowiak, 2024).

L'analisi rileva l'assenza di un ambito strutturato riconducibile al marketing, evidenziando come la neurodivergenza non emerga ancora come categoria teorica nelle pratiche di mercato. Questa lacuna non indica necessariamente l'assenza di studi sulla disabilità o sull'inclusione nei mercati, ma la mancata tematizzazione della neurodivergenza come costrutto concettuale autonomo nel campo del consumo. La gap analysis evidenzia quindi non solo uno squilibrio quantitativo tra ambiti tematici, ma anche una discontinuità di natura epistemologica. Mentre la neurodivergenza è progressivamente incorporata nel management come variabile di capitale umano e inclusione organizzativa (Kirby & Smith, 2021; Acquah et al., 2025), rimane marginale come categoria interpretativa delle soggettività di mercato, riflettendo un frame disciplinare che privilegia la dimensione produttiva rispetto a quella economico-simbolica.

Tale dinamica di invisibilità dei soggetti nei mercati (Callon, 1998) è coerente con il cosiddetto Double Empathy Problem (Milton, 2012; Ekdahl, 2024), secondo cui le difficoltà comunicative non derivano da un deficit individuale, ma da una mancata reciprocità intersoggettiva tra individui con stili cognitivi differenti. Da questa prospettiva, l'assenza della neurodivergenza nella Consumer Research deriva da modelli di marketing cognitivamente omogenei, che assumono un consumatore allineato ai codici simbolici del mercato.

Alcuni studi recenti iniziano tuttavia a indicare nuove direzioni di ricerca. Lee et al. (2024) mostrano come lo storytelling credibile possa favorire una rappresentazione più autentica della disabilità nel branding del lusso, mitigando il rischio di reazioni negative legate ai canoni di perfezionismo del settore. Parallelamente, l'utilizzo dei big data (come l'analisi dei flussi di Twitter) ha consentito una prima segmentazione "bottom-up" degli utenti neurodivergenti, identificando cluster di consumatori basati su specifiche preoccupazioni e dinamiche di benessere, piuttosto che su etichette cliniche (Go Jefferies & Ahmed, 2022). A queste prospettive si affianca il filone emergente della service innovation, in cui l'impiego di tecnologie immersive come il Metaverso viene analizzato come uno strumento per migliorare l'accessibilità dei servizi attraverso il concetto di "customer augmentation" (Alimamy & Saifeddin, 2024). Tale approccio supera la visione della neurodivergenza come limitazione, posizionando il service design come strategia per valorizzare le risorse operanti dei clienti e favorire la co-creazione di valore durante le interazioni di servizio. In questo quadro, la diversità neurologica può essere interpretata come una risorsa sociale e di innovazione, capace di aprire nuove prospettive nei mercati. Tuttavia, in letteratura la neurodivergenza non emerge ancora come categoria interpretativa negli studi dedicati ai settori simbolicamente più densi, come quello del lusso, considerato un caso emblematico delle dinamiche simboliche del consumo.

Research limitations. Lo studio presenta alcune limitazioni da considerate nell'interpretazione dei risultati.

In primo luogo, la revisione si basa su articoli peer-reviewed pubblicati in lingua inglese e indicizzati nel database Scopus. Sebbene questa scelta sia giustificata dalla natura esplorativa del contributo e dall'ampia copertura accademica garantita da tale database (Franceschet, 2010), essa può aver comportato l'esclusione di contributi rilevanti presenti nella letteratura grigia, in pubblicazioni professionali, in altri contesti linguistici o in altri archivi come Web of Science. Future ricerche potranno estendere la copertura includendo database multipli e fonti non indicizzate, al fine di aumentare la completezza della revisione. Considerata inoltre la natura interdisciplinare e in parte community-driven del dibattito sulla neurodiversità, è possibile che alcune prospettive emergenti non siano pienamente rappresentate nel corpus analizzato.

In secondo luogo, la SLR ha una finalità prevalentemente mappante ed esplorativa. L'approccio consente di ricostruire l'evoluzione temporale e tematica del campo e di identificare polarizzazioni disciplinari, ma non permette di valutare in modo approfondito la qualità metodologica dei singoli studi né di trarre conclusioni causali sulle relazioni tra neurodivergenza, mercati e consumo.

Infine, l'analisi si concentra sulle modalità attraverso cui la neurodivergenza è stata concettualizzata nella letteratura accademica non clinica, senza includere dati empirici primari né il punto di vista diretto delle persone neurodivergenti. Questa scelta, coerente con l'obiettivo di chiarificazione concettuale, limita la possibilità di esplorare empiricamente le

esperienze di consumo e le forme di agency nella Consumer Research.

In prospettiva, è opportuno riconoscere alcune barriere metodologiche rilevanti che la ricerca empirica sul consumatore neurodivergente dovrà affrontare. Una prima sfida concerne l'accesso ai dati, poiché il reclutamento di campioni neurodivergenti sufficientemente ampi presenta sfide etiche, logistiche e di privacy che, pur non essendo insormontabili, richiedono un'attenta progettazione metodologica e protocolli di consenso informato adeguati alle specificità della popolazione studiata. A ciò si aggiunge la complessità interpretativa legata all'eterogeneità intra-individuale: il comportamento di consumo neurodivergente non è solo variabile tra individui, ma anche all'interno dello stesso individuo nel tempo, in funzione del contesto sensoriale, del carico cognitivo e delle strategie di adattamento adottate (Hull et al., 2017; Cage & Troxell-Whitman, 2019). Queste sfide segnalano la necessità di sviluppare disegni di ricerca ad hoc (metodologie partecipative, longitudinali e multi-method) capaci di restituire la complessità del consumatore neurodivergente senza ridurla a categorie diagnostiche standardizzate.

Managerial implications. La SLR evidenzia come la gestione della neurodivergenza sia stata finora confinata quasi esclusivamente all'ambito organizzativo e alla gestione delle performance interne (Austin & Pisano, 2017; Walkowiak, 2024), trascurando il potenziale della neurodiversità come dimensione identitaria attiva nei processi di consumo. Da una prospettiva di marketing, tale lacuna riflette una forma di miopia strategica che spinge le imprese ad adottare modelli di consumatore "standard", alimentando il "mito del cervello normale" (Armstrong, 2015). Operativamente, questo si traduce in strategie di segmentazione e posizionamento uniformi, che presuppongono erroneamente una ricezione dei messaggi di marca basata su schemi cognitivi omogenei.

Il superamento di questa logica di standardizzazione richiede l'integrazione della variabilità neurocognitiva nei processi di progettazione della Customer Experience e nella gestione dei touchpoint lungo il customer journey. Da una prospettiva market-based, ciò implica ripensare la progettazione delle esperienze di marca in funzione della diversità percettiva e cognitiva dei consumatori, introducendo indicatori in grado di monitorare come i diversi stimoli di mercato vengano recepiti nei vari momenti di interazione. Tali indicatori possono includere metriche relative alla chiarezza dei messaggi di marca, alla fruibilità sensoriale degli ambienti di consumo e alla prevedibilità delle interazioni nei diversi touchpoint.

Riconoscere la neurodivergenza come una componente dell'eterogeneità di mercato permette inoltre di rivedere criticamente i presupposti che orientano segmentazione, il design dell'offerta e la comunicazione di marca. In termini manageriali, questo significa integrare la variabilità percettiva e cognitiva nei processi di progettazione dei prodotti, dei servizi e delle esperienze di consumo. Non si tratta di una semplice istanza etica, ma di una leva di innovazione radicale (Hamel, 2001), capace di trasformare la diversità neurologica da variabile da "gestire" a driver di valore distintivo.

Le raccomandazioni operative che emergono da questo lavoro invitano il management a riconsiderare le fondamenta delle strategie di mercato, superando la logica della semplice aggiunta di nuove categorie ai modelli esistenti. Seguendo la prospettiva dell'innovazione radicale (Hamel, 2001), le imprese sono chiamate a ripensare l'idea di normalità cognitiva su cui i mercati sono stati storicamente progettati. In questo modo, la neurodivergenza può diventare una lente strategica per ridefinire l'esperienza di marca e il design dell'offerta, contribuendo allo sviluppo di forme di valore più sensibili alla diversità delle esperienze di consumo. Un esempio applicativo di queste dinamiche può essere osservato nei mercati ad alta intensità simbolica e relazionale, come il settore del lusso. In tali contesti, la neurodivergenza consente di riconsiderare i driver del valore percepito. Mentre il marketing del lusso tradizionale si è storicamente focalizzato sul prestigio sociale e sull'esibizione di status (Veblen, 1899; Wiedmann, 2009), l'analisi della neurodiversità suggerisce uno spostamento verso il valore edonico e sensoriale intrinseco dell'esperienza di consumo.

Queste considerazioni confermano la rilevanza strategica di un approccio market-based alla neurodivergenza, i cui benefici si estendono a molteplici categorie di attori.

Coerentemente con la natura esplorativa e di ricognizione preliminare del presente lavoro, i risultati si rivolgono a tre categorie principali di beneficiari, ciascuna delle quali può utilizzare le evidenze in modo differenziato e complementare rispetto alle proprie finalità. Gli accademici di Consumer Research e Marketing possono utilizzare le lacune identificate come punto di partenza per sviluppare nuovi framework teorici ed empirici che integrino la neurodivergenza come categoria interpretativa del comportamento di consumo. I manager e i professionisti del marketing possono trarre indicazioni operative per ripensare i processi di segmentazione, design dell'offerta e comunicazione di marca in chiave neuro-cognitivamente inclusiva, riducendo il rischio di escludere sistematicamente circa un quinto della popolazione globale (Doyle, 2020). Infine, i policy maker e le organizzazioni che si occupano di inclusione possono trovare in questo lavoro una base concettuale per estendere il dibattito sulla neurodiversità oltre i confini istituzionali del lavoro e dell'istruzione, verso una prospettiva più ampia che riconosca il consumatore neurodivergente come soggetto attivo nei mercati.

Originality of the paper. L'originalità della ricerca risiede nell'integrazione sistematica di due domini finora disallineati: la letteratura sulla Neurodivergenza e la Consumer Research. A differenza dei contributi esistenti, prevalentemente concentrati su contesti clinici, educativi o organizzativi, il paper propone una prospettiva esplicitamente market-based, trattando la neurodivergenza come possibile dimensione identitaria e simbolica rilevante nei processi di consumo. Il contributo consiste nell'individuazione di una lacuna nella letteratura, mostrando come l'invisibilità del consumatore neurodivergente non sia una semplice svista quantitativa, ma il risultato di frame disciplinari che hanno storicamente

ignorato la variabilità neurocognitiva. Coerentemente con la prospettiva della Service-Dominant Logic (Vargo & Lusch, 2008), questo contributo apre la strada a studi futuri che riconoscono l'individuo come attore capace di partecipare attivamente ai processi di co-creazione di valore, integrando le proprie risorse cognitive nelle interazioni di mercato.

Sul piano del posizionamento teorico, il presente contributo intrattiene un rapporto di prossimità con due tradizioni di ricerca, senza tuttavia coincidere con esse.

La prima è la letteratura sui Vulnerable Consumers, che ha storicamente incluso individui con disabilità cognitive o sensoriali in categorie di consumatori meritevoli di protezione e supporto (Baker, 2006; Higgins, 2020). Il presente lavoro condivide l'interesse per soggetti sistematicamente esclusi dai modelli dominanti di Consumer Research, ma se ne distanzia nel frame interpretativo: anziché inquadrare la neurodivergenza come condizione di fragilità da tutelare (Baker, 2006), la tratta come una dimensione identitaria dotata di agency nei processi di consumo. L'obiettivo non è estendere pratiche di marketing assistenziali a una categoria vulnerabile, ma riconsiderare i presupposti cognitivi impliciti su cui i mercati sono stati progettati.

La seconda è la letteratura sulla Consumer Neuroscience: la presente ricerca non si colloca all'interno di tale tradizione né ne rappresenta un sottocampo. La Consumer Neuroscience studia i meccanismi neurali sottostanti ai processi decisionali d'acquisto (Kenning & Plassmann, 2005; Ariely & Berns, 2010), con l'obiettivo di identificare pattern del comportamento del consumatore attraverso metodologie quantitative e strumenti di misurazione neurofisiologica. Il presente contributo si distanzia da questo approccio adottando una prospettiva critica sulla variabilità neurologica tra i soggetti, riconoscendola come dimensione identitaria e dotata di agency rilevante nei processi di mercato. Il rapporto tra i due ambiti è quindi da intendere come un'intersezione parziale: condividono l'oggetto di interesse - il consumatore e le sue basi neurologiche - ma divergono nell'impostazione teorica e negli obiettivi. Il presente contributo si inscrive nella tradizione critica della Consumer Research (Firat & Venkatesh, 1995; O'Dell et al., 2016), riconoscendo la neurodivergenza come prospettiva attraverso cui riconsiderare i presupposti cognitivi impliciti che orientano la disciplina. L'approfondimento dei meccanismi cognitivi sottostanti al comportamento di consumo rappresenta uno sviluppo futuro auspicabile che richiede strumenti metodologici specifici, non affrontati in questa sede.

Su queste basi, le direzioni di ricerca future identificate dalla presente SLR si articolano in una sequenza logica che riflette la progressiva maturazione del campo. Il lavoro contribuisce al dibattito accademico proponendo un'agenda di ricerca articolata in tre direzioni principali:

1. l'esplorazione dei customer journey non lineari derivanti da diverse modalità di elaborazione sensoriale;
2. l'analisi delle subculture di consumo neurodivergenti e delle loro pratiche di resistenza o adattamento ai mercati "neurotipici";
3. lo sviluppo di metodologie di ricerca partecipative (co-design) che includano attivamente i consumatori neurodivergenti nella validazione degli stimoli di marketing.

Sul piano organizzativo, lo sviluppo di questo campo richiede un approccio interdisciplinare che sappia connettere Consumer Research, Disability Studies e scienze sociali, riconoscendo nel metodo partecipativo non solo una scelta metodologica, ma una condizione per garantire che la ricerca sul consumatore neurodivergente non riproduca i bias dei modelli che intende superare.

Senza limitarsi a una critica dei modelli esistenti, il lavoro apre uno spazio teorico per ripensare le fondamenta cognitive implicite su cui si costruiscono le strategie di mercato contemporanee, configurandosi come un intervento critico volto a ridefinire il perimetro analitico entro cui la neurodivergenza può essere concettualizzata nei mercati, fornendo le basi concettuali per una teoria del marketing che sia realmente rappresentativa della complessità umana.

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Perceived Brand Honesty: An Exploratory Study on Consumer Perceptions of Honest (vs. Dishonest) Brands

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Abstract. *Brand honesty is increasingly mentioned as a desirable brand quality, yet it remains under-specified and is often addressed only indirectly through related constructs such as trust, transparency, sincerity, and equity/fairness. This study explores how consumers form honesty and dishonesty judgments about brands by combining a qualitative grounding phase with an exploratory survey. We first ran ZMET interviews to surface consumers' metaphor-based meanings of honesty, then used these insights to build a survey where participants named an honest or dishonest brand and rated it "as if it were a person" on a 7-point scale. The instrument included personality-like items grouped into four batteries: honesty-related traits, sincerity, equity/fair dealing, and ZMET-derived meanings. Using paired comparisons of the four batteries within each condition, we find an asymmetric pattern in consumers' inference routes. Perceptions of an honest brand are most strongly associated with equity/fair dealing cues, whereas perceptions of a dishonest brand are most strongly associated with lack of sincerity. The findings suggest that brand honesty is not simply the opposite of brand dishonesty and highlight the need for a multidimensional view of perceived brand honesty that integrates fair dealing and sincerity-based cues. Implications are discussed for both future measurement development and managerial strategies aimed at credibly signaling honesty.*
Keywords: *perceived brand honesty; honesty; fairness; ZMET*

Framing of the research. Consumers increasingly evaluate brands not only on functional performance but also on perceived character, whether a brand "plays fair", communicates truthfully, and deserves confidence. Conceptually, these judgments map onto a broader honesty domain that extends beyond simple truth-telling to include sincerity, fairness/justice, and restraint from opportunism (Ashton et al., 2000; Ashton and Lee, 2007; Ashton and Lee, 2008). Despite its relevance, however, brand honesty remains comparatively underdeveloped and rarely measured as a distinct consumer perception in marketing research, where adjacent work more commonly examines trust, transparency, fairness, or brand equity as separate constructs rather than as components of an honesty judgement (Mayer et al., 1995; Morgan and Hunt, 1994; Schnackenberg and Tomlinson, 2016).

Two theoretical foundations motivate a focused treatment of Perceived Brand Honesty (PBH). First, psycholexical research provides a robust anchor. Across languages, researchers repeatedly recover a sixth personality factor labeled with honesty-relevant terms (e.g., integrity, trustworthiness, truthfulness) and defined by adjectives such as truthful, honest, fair/just, and sincere versus sly, greedy, and hypocritical (Ashton et al., 2000; Ashton and Lee, 2007). Importantly, the semantic core of this domain is interpreted as reluctance versus willingness to exploit others, particularly when exploitation is profitable and low-risk (Ashton et al., 2000). This conceptualization implies that honesty is inherently tied to non-opportunism and fair dealing, making it especially relevant to marketplace contexts characterized by information asymmetries and persuasive communication.

Second, trust and transparency research clarifies why honesty-related perceptions matter in exchange relationships. Trustworthiness judgments hinge on perceived integrity (i.e., adherence to principles the evaluator finds acceptable) and on cues such as justice and congruence between words and actions (Mayer et al., 1995; Simons, 2002). In parallel, transparency theory conceptualizes transparency as information quality, a three-dimensional construct composed by disclosure, clarity, and accuracy, and shows that transparency predicts perceived trustworthiness, including integrity (Schnackenberg and Tomlinson, 2016; Schnackenberg et al., 2021). Together, these perspectives suggest that PBH can be theorized as an integrative perception grounded in (i) non-exploitation and fairness (Honesty-Humility), (ii) sincere word–deed alignment (integrity/behavioral integrity cues), and (iii) clear, accurate, and sufficiently disclosed communication (transparency as information quality).

At the same time, honesty is abstract and morally loaded, which makes it likely that consumers represent it through metaphors and images rather than only through explicit verbal definitions. For this reason, we use the Zaltman Metaphor Elicitation Technique (ZMET) as a qualitative foundation to surface consumer-native meaning structures of honesty through participant selected images and metaphor-based probing (Zaltman, 1997; Coulter et al., 2001). Building on this foundation, the present paper structures PBH around four conceptual pillars that are both theory-consistent and meaning-grounded: (1) honesty-humility, (2) sincerity, (3) equity/fair dealing, and (4) ZMET-derived meanings.

To explore how consumers apply honesty meanings to real brand targets, we conducted a two-condition survey. Participants were assigned to one condition, either honest or dishonest, and were asked to first identify a brand they personally consider honest (or dishonest), and then to evaluate the chosen brand "as if it were a person" on a 7-point

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Likert scale using personality-like items. This anthropomorphic framing is consistent with the brand personality tradition, which shows that consumers naturally ascribe human-like traits to brands and use those traits to structure evaluations (Aaker, 1997). Items were organized into four batteries aligned with the four conceptual dimensions identified through literature and the ZMET approach.

Because the aim of this study is exploratory, seeking to clarify what consumers draw on when they judge brand honesty, rather than to validate a finalized PBH scale, we focus on the relative salience of the underlying honesty-related dimension. Specifically, we address the following research questions:

1. When consumers evaluate a brand they perceive as honest, which underlying honesty-related dimension is most salient in shaping that judgment? In other words, what characteristics must a brand exhibit to be perceived as honest?

2. When consumers evaluate a brand they perceive as dishonest, which underlying dishonesty-related dimension is most salient in shaping that judgment? In other words, what characteristics lead consumers to perceive a brand as dishonest?

From a managerial perspective, clarifying what consumers mean by "honest brand" is strategically relevant because honesty claims are increasingly used in positioning (e.g., transparent, authentic, fair), yet firms often lack guidance on which cues actually drive honesty inferences. If perceived honesty is constructed from multiple components, such as fair dealing, sincerity, word–deed alignment, and information quality, then investments in communication alone may be insufficient when behavioral cues contradict the message. By identifying the dimensions consumers rely on when they label brands as honest versus dishonest, this research helps managers prioritize actions and touchpoints that most credibly signal honesty (e.g., pricing and terms, complaint handling, claims substantiation, consistency across channels), and it offers an evidence-based basis for auditing honesty-related risks before they escalate into trust erosion.

Purpose of the paper. Honesty-humility. A recurring challenge in studying brand honesty is conceptual clarity: "honesty" is often treated as self-evident, yet consumer judgments draw on layered and sometimes competing meanings. Psycholexical research provides unusually strong guidance here, because it derives construct structure directly from everyday language (Ashton and Lee, 2007). Across languages, a sixth major dimension of personality – beyond the Big Five (i.e., surgency, agreeableness, conscientiousness, emotional stability, and intellect/imagination) – consistently emerges and is labeled honesty (Ashton et al., 2000). Its semantic content has been characterized across lexical studies through terms such as integrity, trustworthiness, and truthfulness at the positive pole, and slyness, greed, and hypocrisy at the negative pole (Ashton et al., 2000; Ashton and Lee, 2007). Importantly, Ashton et al. (2000) interpret the semantic core of this factor not as accurate communication per se, but as the disposition to refrain from exploiting others, particularly when exploitation would be profitable and carry little risk. This reframing shifts honesty from a purely epistemic property to a moral commitment to non-opportunism. Subsequent research has formalized this structure within the HEXACO model, a six-dimensional personality framework whose factors are Honesty–Humility (H), Emotionality (E), Extraversion (X), Agreeableness (A), Conscientiousness (C), and Openness to Experience (O) (Ashton and Lee, 2007). The Honesty–Humility dimension specifically captures sincerity and fairness as defining features and is directly implicated in tendencies toward unethical, exploitative, and self-serving behavior (Ashton and Lee, 2007; Ashton and Lee, 2008). This body of work carries a clear implication for the study of perceived brand honesty: consumer honesty judgments are unlikely to rest on informational accuracy alone. When consumers invoke "honesty" as an evaluative lens for brands, they are likely drawing on cues that signal restraint from opportunism and a disposition toward fair dealing, not merely on whether the brand communicates truthfully. Accordingly, perceived brand honesty should be theorized and measured in ways that capture this broader moral dimension, rather than reducing it to communicative transparency.

Sincerity. While Honesty-Humility captures the broader moral core of honesty, consumer judgments often turn on a more proximal diagnostic cue: sincerity, or whether the brand is perceived to mean what it says and to act consistently with what it claims. Behavioral integrity theory provides a clear theoretical mechanism, defining integrity judgments as perceived alignment between an actor's words and deeds, with particular emphasis on promise keeping and consistency between espoused and enacted values (Simons, 2002). Trust theory reinforces this logic: in the Ability-Benevolence-Integrity (ABI) model, integrity is the perception that a party adheres to principles the evaluator finds acceptable, and integrity judgments are shaped by cues such as justice and congruence between words and actions (Mayer et al., 1995).

Together, these perspectives establish sincerity as a distinct pillar within PBH: sincerity translates brand communications into credibility and attenuates perceived opportunism by signaling that the brand is unlikely to misrepresent its motives or conceal inconsistencies between its claims and conduct.

Equity and Fair Dealing. In the present study, the equity/fair dealing dimension is conceptualized not as a comprehensive measure of customer-based brand equity, but as a set of honesty-relevant brand associations (e.g., perceptions of fairness, non-deception, and worthwhile exchange) that plausibly contribute to brand equity rather than constituting it in full. Customer-based brand equity is commonly defined as the differential effect of brand knowledge on consumer response to marketing activity, with favorable, strong, and unique brand associations playing a central role (Keller, 1993). Aaker (1991) similarly defines brand equity as a set of brand-linked assets and liabilities that add to or subtract from value for both the firm and its customers, and later proposes the "Brand Equity Ten" as a multi-dimensional measurement framework (Aaker, 1996). Within this tradition, perceptions of fairness, non-deception, and mutually valuable interaction can be understood as honesty-relevant associations that reinforce brand meaning and shape downstream consumer responses, making them legitimate components of an honesty-centered framework even if they do not exhaust the brand equity domain.

Transparency fits naturally within this dimension as well. Transparency theory conceptualizes transparency as information quality, encompassing disclosure, clarity, and accuracy, and demonstrates that these perceptions predict perceived trustworthiness, including integrity (Schnackenberg and Tomlinson, 2016; Schnackenberg et al., 2021). When a brand is seen as transparent, communicating clearly and accurately rather than selectively, consumers may infer reduced opportunism and greater fairness, thereby reinforcing overall honesty judgments. In this sense, equity/fair dealing associations offer a marketplace translation of Honesty-Humility's non-exploitation core: a brand appears honest because it is perceived to create value without exploiting, deceiving, or withholding material information.

It is therefore theoretically coherent that consumers may arrive at an "honest brand" judgment primarily through cues of equitable exchange and non-deceptive conduct - cues that are also central to perceived value and long-term brand strength. By drawing on this body of work, we incorporate equity/fair dealing into our framework in order to capture the perceived moral and communicative reliability that underlies consumer honesty attributions.

Methodology. We adopted an exploratory sequential design in which qualitative insight grounds construct meaning and supports subsequent quantitative operationalization. Specifically, we first employed the Zaltman Metaphor Elicitation Technique (ZMET) to elicit consumers' deep meaning structures of honesty, leveraging participant-selected images and metaphor-based probing to surface constructs that may remain implicit in purely verbal approaches (Zaltman, 1997). We then translated this conceptual domain into a brand-as-person survey instrument, consistent with the view that consumers readily ascribe human-like traits to brands and use those inferences to structure their evaluations (Aaker, 1997). The survey operationalizes PBH through four complementary measurement dimensions: (1) Honesty-Humility-based scale, (2) sincerity as word–deed alignment, (3) equity and fair dealing associations, and (4) ZMET-derived meanings.

Study 1: ZMET interviews (construct elicitation). ZMET is designed to elicit metaphors and deep meaning structures through visual stimuli and guided probing, enabling researchers to move from concrete image descriptions to abstract constructs and to map the relational links among them (Zaltman, 1997; Coulter, Zaltman, and Coulter, 2001). In the present study, 22 in-depth interviews were conducted to explore what "honesty" means to individuals and which cues people rely on to recognize honesty versus dishonesty in practice. Participants were asked to express the concept through self-selected images and to explain why those images represented honesty to them. This procedure allowed the research team to identify recurring constructs, including fairness, non-exploitation, authenticity, transparency, and manipulation avoidance, as well as the perceived relationships among them.

The output of the ZMET phase served two purposes. First, it supported domain specification for perceived brand honesty by clarifying which facets of honesty are salient in consumer meaning (Zaltman, 1997). Second, it informed the development of a ZMET-derived item battery that captures consumer-native honesty meanings in survey form, complementing the theory-driven batteries derived from established literature on honesty-humility, sincerity, and equity/fair dealing. Details on the qualitative coding procedure and theme synthesis are reported in the item development subsection below.

The survey was developed following established principles for construct operationalization in marketing research, combining theory-driven content with qualitatively grounded items to strengthen content validity (Churchill, 1979). Because the goal of this study is exploratory and brand honesty remains underdeveloped in prior measurement work, items were not drawn verbatim from any single published scale. Instead, each battery reflects the theoretical meaning associated with its respective literature, with wording adapted to a brand referent through a brand-as-person framing. Participants were explicitly instructed to think about the brand they had selected "as if it were a person" and to evaluate the extent to which each trait described that person, consistent with brand personality logic and the anthropomorphic brand inference tradition (Aaker, 1997).

The instrument comprises four measurement batteries.

- The first, Honesty–Humility (four items), captures honesty as truthfulness and authenticity, as well as deserved trust, consistent with the honesty domain's emphasis on sincerity and fairness over opportunism and deception. Representative items include descriptors such as "direct and transparent", "authentic", and "deserves trust".
- The second battery, Sincerity (four items), captures promise-keeping and authentic communication as word–deed alignment cues, consistent with integrity-based inference (Simons, 2002) and with integrity as a component of trustworthiness (Mayer et al., 1995).
- The third battery, Equity and Fair Dealing (five items), captures perceptions of interaction value and fair conduct, including whether the brand is seen as fair, whether interaction with it is worthwhile, and whether it refrains from winning consumers over through deceptive means. Conceptually, these items represent honesty-relevant brand associations that plausibly contribute to customer-based brand equity (Aaker, 1991; Aaker, 1996; Keller, 1993) while remaining directly aligned with the non-exploitation and fairness core of the honesty domain.
- The fourth battery, ZMET-derived meanings (ten items), was developed from the qualitative elicitation results to capture consumer-native meanings such as non-exploitation of trust, justice and fairness, manipulation avoidance, and balanced exchange, consistent with ZMET's purpose of surfacing deep meaning structures (Zaltman, 1997; Coulter et al., 2001).

Study 2: Survey procedure and design. The quantitative phase employed a between-subjects framing design in which participants were randomly assigned to evaluate either an honest or a dishonest food brand. The survey was administered online via Qualtrics. A total of 301 participants were recruited through Prolific and were welcomed, informed that their

data would be treated anonymously and used solely for academic research purposes, and asked to provide informed consent before proceeding.

Participants first completed a brand elicitation task. In the honest condition, they were asked to think of a brand they personally considered honest and to enter the brand name. In the dishonest condition, the prompt followed the same procedure for a brand they considered dishonest. Participants were then instructed to imagine the brand they had named as if it were a person, with an illustrative example provided to clarify the type of human characteristics that might be attributed to a brand. They were asked to indicate their agreement with a series of statements describing that person on a 7-point Likert scale.

The 23 personality-like items were presented in blocks corresponding to the four batteries described in the previous section. In the honest condition, items were positively valenced, with descriptors such as "direct and transparent" and "deserves trust". In the dishonest condition, items used parallel negatively valenced wording, such as "not transparent", "does not deserve trust", and "uses manipulative communication strategies".

For each respondent, four composite scores were computed corresponding to the four batteries: Honesty–Humility, Sincerity, Equity/fair dealing, and ZMET-derived meanings. Paired-samples t-tests were then conducted within each framing condition to compare the relative endorsement of these four dimensions and to identify which pillar was most salient in shaping participants' honesty and dishonesty judgments respectively.

Results. Honest-brand condition. Table 1 reports the paired-samples comparisons among the four composites in the honest-brand condition. Equity/fair dealing received significantly higher endorsement than Honesty–Humility (Mean Diff = 0.145, t(149) = 3.075, p = .003), Sincerity (Mean Diff = 0.150, t(149) = 2.671, p = .008), and ZMET-derived meanings (Mean Diff = 0.109, t(149) = 2.539, p = .012). By contrast, the Honesty–Humility, Sincerity, and ZMET composites did not differ significantly from one another. Taken together, when participants described an honest brand as a person, their judgments were most strongly aligned with equity, fair dealing, and perceived value of interaction, rather than with the other honesty-related dimensions.

Dishonest-brand condition. In the dishonest-brand condition, all items were negatively worded such that higher scores reflect stronger endorsement of dishonest traits. As reported in Table 2, the Sincerity composite received significantly higher endorsement than the Honesty–Humility composite (Mean Diff = 0.161, t(150) = 2.734, p = .007), the Equity/fair dealing composite (Mean Diff = 0.517, t(150) = 6.865, p < .001), and the ZMET composite (Mean Diff = 0.239, t(150) = 4.296, p < .001). The Honesty–Humility composite was also endorsed significantly more strongly than Equity/fair dealing (Mean Diff = 0.357, t(150) = 5.323, p < .001), while it did not differ significantly from the ZMET composite. Finally, the Equity/fair dealing composite received significantly lower endorsement than ZMET-derived meanings (Mean Diff = 0.278, t(150) = 5.037, p < .001). Overall, judgments of a dishonest brand were most strongly anchored in perceived insincerity and inauthenticity, pointing to a failure of word–deed alignment as the primary driver of dishonesty attribution.

Table 1. Honest-brand condition (n = 150): paired-samples t-tests among composite batteries

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Hhon - sincon	,00500	,60650	,04952	-,09285	,10285	,101	149	,920
Pair 2	Hhon - Beon	-,14467	,57618	,04704	-,23763	-,05171	-3,075	149	,003
Pair 3	Hhon - Zmeton	-,03533	,54353	,04438	-,12303	,05236	-,796	149	,427
Pair 4	sincon - Beon	-,14967	,68619	,05603	-,26038	-,03896	-2,671	149	,008
Pair 5	sincon - Zmeton	-,04033	,58404	,04769	-,13456	,05390	-,846	149	,399
Pair 6	Beon - Zmeton	,1093	,5274	,0431	,0242	,1944	2,539	149	,012

Table 2. Dishonest-brand condition (n = 151): paired-samples t-tests among composite batteries (negative wording)

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Hhdison - sincdison	-,16060	,72189	,05875	-,27667	-,04452	-2,734	150	,007
Pair 2	Hhdison - Bedison	,35662	,82326	,06700	,22424	,48900	5,323	150	,000
Pair 3	Hhdison - Zmetdison	,07848	,62036	,05048	-,02128	,17823	1,554	150	,122
Pair 4	sincdison - Bedison	,51722	,92587	,07535	,36834	,66610	6,865	150	,000
Pair 5	sincdison - Zmetdison	,23907	,68381	,05565	,12912	,34903	4,296	150	,000
Pair 6	Bedison - Zmetdison	-,2781	,6785	,0552	-,3872	-,1690	-5,037	150	,000

Conclusions. This study explores how consumers construct a judgment of brand honesty when asked to evaluate a chosen brand through a brand-as-person lens.

Two patterns emerge clearly from the results. In the honest-brand condition, respondents' evaluations were most strongly anchored in the equity/fair dealing dimension, a cluster of cues capturing fairness, non-deceptive conduct, perceived value of interaction, and transparency. This finding is theoretically consistent with psycholexical work showing that the honesty domain is centrally concerned with reluctance to exploit others rather than being reducible to factual accuracy alone. It also aligns with the HEXACO framing of Honesty-Humility as sincerity and fairness in contrast to greed and manipulation. In marketing context, "honesty" appears to be inferred most readily from fair exchange and non-opportunism, which consumers may treat as the most diagnostic evidence that a brand will not take advantage of information asymmetries.

In the dishonest-brand condition, judgments were most strongly anchored in lack of sincerity, with the sincerity construct exceeding the other three batteries by a significant margin. This pattern is compatible with integrity-based inference in trust research, where integrity is defined as adherence to principles the evaluator finds acceptable and is shaped by cues of justice and congruence between words and actions (Mayer et al., 1995). It also fits behavioral integrity theory, which centers evaluations on the perceived alignment between words and deeds (Simons, 2002). When consumers characterize a brand as dishonest, they appear to rely heavily on cues of inauthentic intent and value-pretense, such as manipulative communication and lack of authenticity, even more than on perceptions of inequitable conduct.

A key implication of these two patterns is that honest and dishonest brand judgments do not operate as simple opposites along a single continuum. Rather, consumers appear to draw on different diagnostic routes depending on the valence of the judgment: honesty is most strongly inferred from equitable conduct and non-exploitation, whereas dishonesty is most strongly inferred from insincerity and word–deed misalignment. This asymmetry is consistent with the broader finding in the trust literature that negative evaluations tend to be driven by perceived intent violations and credibility failures, while positive evaluations are more sensitive to evidence of fair dealing (Simons, 2002). Regarding transparency, it did not emerge as a dominant standalone dimension in either condition, though it is embedded within the equity/fair dealing battery and is conceptually present in several individual items. This is consistent with transparency research that conceptualizes transparency as disclosure, clarity, and accuracy, and links these properties to perceived trustworthiness and integrity (Schnackenberg and Tomlinson, 2016; Schnackenberg et al., 2021). Our results suggest that transparency cues may carry greater persuasive weight when they are bundled with fair dealing and perceived interaction value, rather than when they are presented as abstract or self-referential claims.

Research limitations. Taken together, the findings support conceptualizing perceived brand honesty as an integrative perception grounded in three complementary components: non-exploitation and fair dealing, reflecting the honesty–humility core; sincerity and behavioral integrity as word–deed alignment cues; and transparency as information quality. A natural next step is to move from mean comparisons to measurement modeling: confirming dimensionality through confirmatory factor analysis, testing measurement invariance across the honest and dishonest framing conditions, and assessing nomological validity by linking PBH dimensions to relational outcomes such as trust and commitment (Morgan and Hunt, 1994). Because multiple paired comparisons were conducted in the present study, future work should also evaluate the robustness of these findings under multiplicity controls and through model-based approaches.

Managerial implications. PBH functions not merely as an ethical aspiration but as a practical lever for relationship building and risk reduction. Trust research suggests that integrity-based judgments govern whether stakeholders are willing to accept vulnerability in exchange relationships, meaning that perceived dishonesty can rapidly undermine willingness to buy, repurchase, or forgive failures (Mayer et al., 1995; Morgan and Hunt, 1994). The challenge for managers is that honesty is frequently communicated as a broad corporate value, yet consumers appear to infer it through specific, concrete signals that sit at the intersection of conduct, consistency, and communication quality. The present findings help identify where those signals are most diagnostic.

First, honesty perceptions are most likely earned through observable fair dealing rather than through honesty claims in communication alone. This aligns with the semantic core of the honesty domain as a disposition to refrain from exploiting others (Ashton et al., 2000) and with the principle that integrity is inferred from justice and principle-consistent conduct (Mayer et al., 1995). In practice, managers should treat honesty positioning as a cross-functional governance issue in which pricing mechanics, clarity of terms and conditions, complaint handling, and the trade-offs offered to consumers become key touchpoints where fairness, or perceived opportunism, is diagnosed. Honest brand narratives are most credible when they are grounded in equitable exchange design, encompassing transparent conditions, non-exploitative pricing policies, and straightforward guarantees, rather than in messaging alone.

Second, perceptions of dishonesty appear to be strongly connected to insincerity and perceived word-deed misalignment, consistent with integrity-based inference and behavioral integrity theory (Mayer et al., 1995; Simons, 2002). For managers, this points to a fragility dynamic: even a brand that is broadly perceived as fair may still attract dishonesty attributions when its communications are read as value-pretense, manipulative persuasion, or inconsistency between stated values and observed actions. This underscores the importance of claim-delivery alignment, including substantiation of product claims, consistency across channels, and the avoidance of vague virtue-signaling.

Originality of the paper. The originality of this study lies in integrating a meaning-centered qualitative approach with an exploratory quantitative test to clarify what consumers mean by "honest brand." Instead of importing honesty indirectly from adjacent constructs, we anchor the construct domain through ZMET-derived metaphors and translate them into a survey alongside theory-based batteries (honesty-related traits, sincerity, and equity/fair dealing). In addition, our honest-versus-dishonest framing offers an uncommon lens to examine whether consumers use asymmetric inference routes, advancing conceptual clarity and measurement development for perceived brand honesty.

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Smart Labeling Impact on Consumer Behavior Perception in Agrifood Production: A Systematic Literature Review

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Abstract. *Increasing concerns about food safety, sustainability, and transparency have heightened consumer expectations in agrifood systems. Traditional labeling often limits access to product information, reducing trust and informed decision-making. Smart labeling technologies such as QR codes, and intelligent packaging enable consumers to access detailed information on origin, production practices, and sustainability. This study systematically reviews the literature to examine how these technologies influence consumer perceptions. The primary findings indicate that smart labels enhance perceived authenticity and food safety while fostering informed purchasing decisions, though challenges remain regarding awareness, usability, and adoption.*
Keywords: *Smart labeling, QR code, consumer behavior, traceability, agrifood systems*

1. Framing of the research. In the last few years, concerns about food safety, sustainability, and transparency have been major factors affecting consumer perceptions regarding food products and the agrifood chain as a whole. The availability of information regarding a product's origin, production process, environmental impact, and ethical issues is more important to modern consumers (Grunert, 2011). However, traditional labeling methods do not usually provide adequate information to a consumer, which leaves a gap between consumers and producers. This gap might affect consumers' perceptions and their ability to make informed purchasing decisions.
Considering the above issues and challenges, the agrifood sector is increasingly using smart labeling technologies to provide consumers with adequate and reliable information about the product through digital interfaces such as smartphones and other digital platforms. For instance, QR codes are used to provide consumers with adequate information about the product's origin, production process, and other related attributes (Lombardi et al., 2017). Similarly, blockchain technology is used to develop transparent traceability systems to verify production and distribution processes along the entire agrifood chain (Casino et al., 2019).
The adoption of smart labeling technology has the potential to alter a more transparent and trust worthy connection between consumers and food. Existing literature expects that smart labeling technology is likely to have a positive impact on consumers' perceptions of food safety, product authenticity, and sustainability (Galati et al., 2019). Consumers are also prepared to pay more for products that offer reliable traceability and sustainability.
In spite of these advances in smart food labeling technology, existing literature is fragmented, with a majority of studies focusing on technological and consumer behavior separately. However, there is a lack of understanding of how smart food labeling technology impacts consumer perception and behavior in food production.

2. Purpose and research question. This study is guided by the following research question: How do smart labeling technologies influence consumer behavior and perception in agrifood production systems?
The growing digitalization of agrifood supply chains has stimulated the development of innovative labeling solutions aimed at improving transparency, traceability, and consumer access to product information. Digital labeling technologies, such as QR codes and interactive information platforms, are increasingly recognized as effective tools for reducing information asymmetry between producers and consumers and for supporting more informed purchasing decisions.
Existing studies suggest that these technologies can positively influence consumer perceptions by providing detailed and verifiable information regarding product origin, production processes, and food safety attributes (Lombardi et al., 2017; Bradford et al., 2022; Lau et al., 2022). For instance, QR code–based traceability systems have been shown to increase consumers' willingness to pay by communicating reliable information about product provenance and production practices (Lombardi et al., 2017).
Similarly, digital labeling tools that convey information related to food safety, sustainability, and production standards can reduce perceived risks and strengthen consumer purchase intentions (Bradford et al., 2022; Lau et al., 2022). Collectively, these findings highlight the growing relevance of smart labeling technologies as mechanisms for shaping consumer perceptions and promoting greater transparency in agrifood systems. The purpose of this study is therefore to provide a comprehensive understanding of how smart labeling technologies influence consumer perceptions and behavioral responses within agrifood production systems. Through a systematic literature review, this research synthesizes existing empirical and conceptual studies to identify the key mechanisms through which digital labeling affects trust formation, perceived product authenticity, risk perception, and willingness to pay.

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By consolidating current knowledge in this emerging research domain, the study contributes to the broader discussion on digital innovation in agrifood systems and provides insights for researchers, policymakers, and industry stakeholders seeking to design effective labeling strategies that enhance transparency, strengthen consumer confidence, and support the transition toward more sustainable and accountable agrifood supply chains.

3. Methodology.

3.1 Database and search strategy

The systematic literature review was conducted using the Scopus database, which provides extensive coverage of peer-reviewed academic journals in the fields of business, management, economics, and food systems research.
The literature search was performed using the following keywords:
Query: QR OR "Quick Response" OR " smart label" OR "smart packaging" OR "digital technology" AND "consumer behavior" OR perception* and food OR agrifood OR agriculture OR "food product"

3.2 Methodology

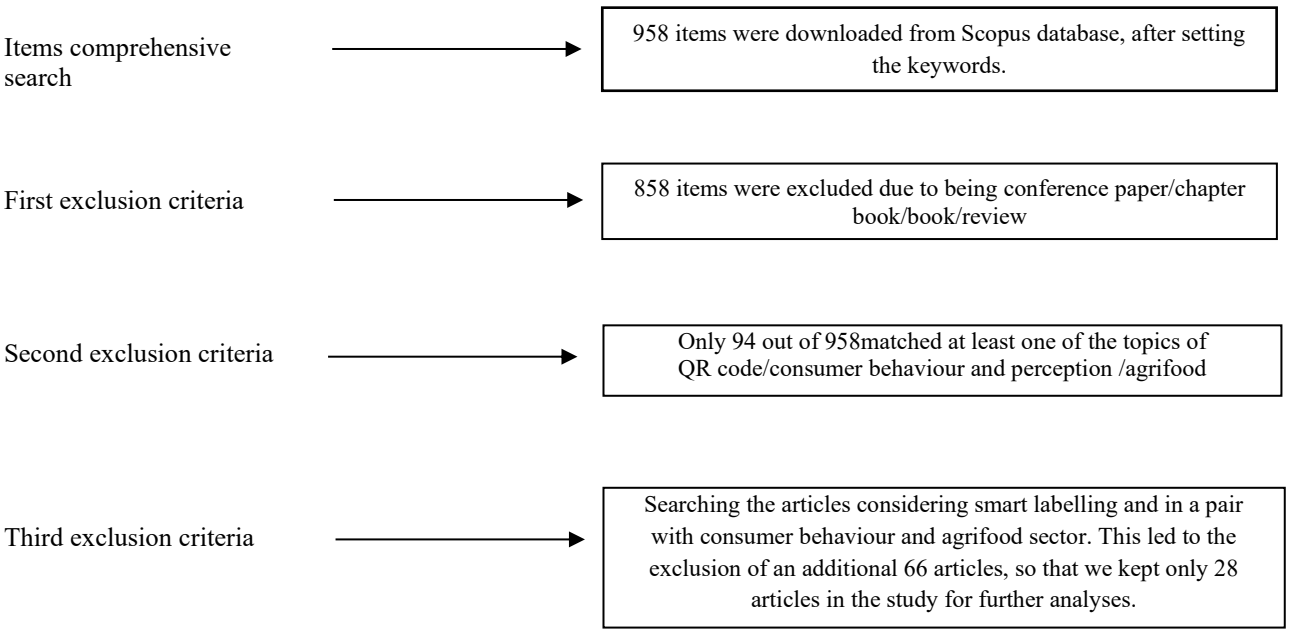
Selection bias develops in an SLR, whenever the subject area is taken into account. Relevant articles run a risk of being left out if it is hard to define SLR literature, however, offers strategies to lower this risk. Identifying which papers to include in a thorough literature search is a further step to take. To select the papers that should be included, we focused on the Scopus database. This choice is coherent with previous studies argument which concurs that Scopus database provides extensive coverage of academic journals as it embraces more than20,000 peer-reviewed journals (Mishra et al., 2017). According to (Secondo et al, 2020) in another study similar to our article following the PRISMA protocol, which precisely confirms what was highlighted by the aforementioned authors.

Table1. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Peer-journal articles, reviews	Books, book chapter, conference proceedings, editorials, and grey literature
Articles published in journals indexed the subject areas of business, management and accounting, economics and economics and finance	Articles primarily classed in other disciplinary domains
Articles published in the English languages	Articles published in languages other languages than English

Author's collaboration

The analysis was conducted in January 2026, all records were independently screed for typical relevance in line with established review practices (Grafton et al.,2011) with titles and abstracts independently screed by two researchers to identify studies eligible for in-depth analysis.



4. Results. Based on the systematic screening and assessment of the selected articles' relevance to the research topic, it is noted that the emerging body of research on QR code technology in agrifood systems creates an important foundation for understanding the impact of digital traceability tools on consumer behavior and product transparency and trust in agrifood systems. At the same time, the analysis of the articles reveals some gaps regarding the use of behavioral theories and cross-sector comparisons and sustainability communications in the context of QR codes in agrifood systems, which is an important aspect to be further explored in the specific research domain.

A first highly relevant contribution is offered by the study of (Fiore et al.,2024), which focuses on the theme of the integration of blockchain technology and QR code technology in the regional agrifood supply chain of Apulia, Italy. The purpose of the investigation is to evaluate the impact of digital traceability tools on the theme of transparency and trust of consumers with regard to the quality of food products. By adopting a case study method with the support of a survey of consumers, the authors of the study examine the use of QR codes to access information on the origin of the product, the production process, and the actors of the supply chain. The results of the investigation highlight the potential of the use of QR technology to improve the theme of trust of the consumer with regard to the authenticity of the product.

Another notable contribution is provided by (Daoud et al.,2019). The study aims to explore consumer perceptions regarding smart packaging solutions, including QR codes, used in food products. The main aim of the research is to identify how smart packaging solutions, which allow consumers to interact with the packaging, can impact consumer behavior during the purchase decision. The study also aims to evaluate the usefulness of smart packaging solutions to consumers. According to the research findings, consumers believe that having access to detailed product information via QR codes is a means to enhance product reliability. The research findings also indicate that smart packaging solutions, including QR codes, can impact consumer behavior favorably. This is because consumers believe that having access to detailed product information via QR codes is a means to enhance product reliability.

A third study that is pertinent to the topic is conducted by (Barone and Aschemann-Witzel .,2018). This study examines the relationship between QR code labeling and the purchase intention of consumers in the context of the food market. The aim of the study is to find out if the additional information provided by the QR code has the ability to affect the attitudes of the consumers towards the purchase of the product. The study uses a quantitative survey method combined with behavioral intention modeling to evaluate the attitudes of the consumers towards the purchase of food products with QR codes containing information about the origins, ingredients, and methods of production used to produce the food. According to the study, the purchase intention of the consumers is positively affected by the QR codes, especially if the information provided is credible and meaningful.

A related perspective is offered by a study on the willingness to pay for QR codes on food labeling (2017). The purpose of this research is to assess the economic value that consumers assign to digital traceability technologies in food products. Using a discrete choice experiment and willingness to pay analysis, the research measures consumer responses to products that include traceability information through QR codes. The results show that consumers are willing to pay a price premium for products that include digital transparency, particularly when the use of QR codes provides verifiable information on food safety, production processes, and geographical origin. This indicates that the use of QR codes on food labeling can potentially add economic value to food producers through a price premium strategy.

Another important contribution is offered by the research on consumer purchase intention regarding QR codes on food labels (2022), which focuses on the psychological factors affecting consumers' willingness to use QR codes on food packaging. The research uses structural equation modeling to explore the impact of perceived usefulness, trust, and information quality on consumer behavior. The findings show that perceived usefulness and trust are the most important factors affecting consumers' willingness to scan the QR codes on food packages, and that the quality and relevance of the information affect consumers' satisfaction. The authors conclude that QR codes can be an effective tool to engage consumers when used to provide them with clear and valuable information on food safety, sustainability, and production processes.

Additional insights into the matter can be found in the study on "Customer Perceptions of Traceable Meat Products" (2024). The purpose of the study is to examine the role of digital traceability tools, like QR codes, on the trust of customers within meat supply chains. The authors of the study use the method of perception analysis to examine how the potential to access information on the origin of the animal, farming practices, and quality labels by means of scanning the QR code on the packaging of the meat product affects the trust of the customers. The results of the study demonstrate the potential of traceability tools like QR codes to build trust within meat supply chains by increasing the perceived safety of the meat product.

Another important contribution is centered on consumer perceptions of the use of QR codes in technology related to food products (2022). The aim of the research is to evaluate consumer attitudes regarding the use of QR codes as a medium for obtaining additional product information. Based on consumer acceptance surveys and technology adoption analysis, the research evaluates the factors affecting consumer interaction with the technology. The findings suggest that the use of QR codes increases consumer awareness regarding product origin and sustainable practices, and younger consumers show a higher adoption rate of the technology. The importance of using QR codes as a digital medium of communication between consumers and the supply chain is highlighted.

A current contribution by research on bio-QR codes for sustainable packaging (2024) further broadens the scope of the topic by relating digital traceability technologies to environmental sustainability. The purpose of the research is to investigate the consumer acceptance of biodegradable QR code technology in sustainable food packaging. Using an experimental consumer research approach, the authors investigate the perception of consumers regarding the relationship

between digital traceability and environmental sustainability in packaging materials. The findings show that consumers have a positive perception of products that associate both digital traceability and environmental sustainability.
Another relevant study deals with the heterogeneity of the preferences of consumers regarding the use of traceability technologies for food products (2021). The main purpose of the research is to evaluate the importance of the use of traceability information by means of digital tools such as QR codes for different segments of the population. The results of the study reveal the existence of important differences between the preferences of the consumers depending on some personal, risk perception, and buying-related factors. The results of the study highlight the importance of traceability for specific segments of the population concerned with the safety of the food product.
Finally, the research on QR code application in the dairy industry of Slovenia (2023) is a study that offers relevant insights into QR code application in a specific industry. The purpose of the research is to explore how QR codes are used to convey to consumers various aspects of milk origins, production methods, or quality marks. The research utilizes a case study method along with a consumer perception study to highlight how QR codes improve consumer engagement by providing a clear farm-to-table experience. The research findings highlight how QR codes improve consumer interaction with dairy brands, leading to increased trust levels. This is a relevant example of how QR codes can improve consumer interaction with various brands.
Collectively, these studies collectively demonstrate that QR-code-based traceability systems offer a potentially promising technological means for enhancing consumer trust, transparency, and engagement within agrifood systems, while also pointing to a need for further research on behavioral aspects, sustainability communications, and cross-sector extensions of digital food label technologies.

5. Research limitations. Despite the fact that the study provides informative results regarding the impact of smart labeling technologies in affecting the perceptions of consumers within the agrifood system, the current study has some limitations that must be addressed. First and foremost, it is crucial to remember that the current study is based on a systematic literature review approach, which is subject to limitations depending on the availability of literature. In the current study, the Scopus database was used, which is well known for containing a large volume of publications. However, the use of only one database may have left out significant literature that was published on other databases such as the Web of Science or Google Scholar.
The current study was based on the use of English literature only. This may have been a limitation since literature published in other languages may have been ignored. In the agrifood system, it is possible that literature on traceability is often published at the regional or national level.
Thirdly, the review mainly emphasizes consumer perception and behavioral responses to QR-code-based smart labeling technologies without incorporating any primary empirical data from consumers and/or firms. Therefore, although the research attempts to synthesize the existing knowledge base on the topic, it fails to test behavioral models and/or measure consumer interactions with smart labeling technologies.
Last but not least, the reviewed literature on smart labeling primarily focuses on certain product groups and/or specific regions, such as the dairy and meat sectors and/or regional studies. As a result, the applicability of the findings to other product groups and/or regions might be limited. The research could be further expanded to solve some of the above-mentioned weaknesses by conducting consumer experiments and/or cross-country studies on the adoption of smart labeling technologies in the agrifood sector.

6. Managerial implications. The research findings offer several key managerial implications for agrifood businesses and stakeholders in the value chain who are interested in leveraging the advantages of transparency, trust, and competitiveness in the marketplace through the adoption of smart labeling systems.
The research findings suggest that agrifood businesses can leverage the advantages of QR-code-based labeling systems in enhancing consumer trust and product authenticity. Therefore, agrifood businesses can consider leveraging the advantages of smart labeling systems in creating a strategic communication tool to communicate in detail with consumers about product origin, production processes, sustainability standards, and quality standards. By leveraging the advantages of QR-code-based labeling systems, agrifood businesses can leverage the advantages of creating long-term trust with consumers. In the marketplace, there is an increased demand for transparency among consumers. Therefore, the adoption of digital traceability tools can serve as a key competitive advantage in the marketplace to differentiate agrifood products on the basis of product authenticity.
Second, the literature review used in this study also revealed that consumers are willing to pay a premium price for food products that ensure reliable traceability and transparency. From a managerial point of view, it is also important to note that smart labeling technologies can be used to support value creation and differentiation strategies. Firms that use digital traceability technologies can be able to differentiate their products and place them in a higher market segment. In other words, it is important to note that smart labeling should not be considered solely as a technological innovation, but also as a tool that can be used to support brand and product positioning strategies in a highly competitive market environment.
Third, it is also important to note that the information quality, accessibility, and usability are critical success factors for the success of smart labeling technologies. It is important for the manager to ensure that the digital platforms used in conjunction with the QR codes are capable of providing information to the consumers in a clear, concise, and relevant manner. Too much technical information may limit the success of the digital platforms used to support the smart labeling

technologies. It is also important to note that firms can consider the use of narrative storytelling approaches to ensure that the consumers are capable of understanding the information provided through the digital platforms.
Finally, there is scope for the application of smart labeling technologies to contribute to the development of more resilient forms of sustainability communication and accountability within the agrifood sector. Agrifood businesses are able to utilize the QR codes to access the digital platforms, which are capable of providing information pertaining to the environmental practices, ethical sourcing policies, and food safety certifications, to meet the increasing demand for responsible and sustainable forms of agrifood production.
This approach to transparency has the potential to contribute to the development of more resilient corporate reputations, while at the same time meeting the requirements of emerging regulatory requirements pertaining to the development of more resilient forms of agrifood supply chains. From a strategic perspective, the application of smart labeling technologies within the wider context of sustainability and transparency has the potential to contribute to the development of more resilient forms of agrifood supply chains.

7. Originality of the paper. This study presents a valuable contribution to the increasing volume of research on the digital transformation of agrifood systems by providing a comprehensive synthesis of the relationship between smart labeling technologies and consumer behavior perception. While prior investigations on the topic addressed either technological advancement in food traceability systems or consumer behavior within food markets individually, this research attempts to integrate both perspectives by specifically examining the impact of QR-code labeling technology on consumer behavior perception.
The originality of the paper is its interdisciplinary approach to the topic, which brings together concepts from consumer behavior research, digital technology adoption, and agrifood system transparency. Through a comprehensive synthesis of existing research on the topic, the research was able to identify the major behavioral drivers that explain the impact of smart labeling technology on consumer behavior perception.
Moreover, the paper also points to emerging research gaps, such as the limited use of behavioral theories, the importance of cross-sector comparisons in agrifood systems, and the role of smart labeling technologies in communicating sustainability attributes. In doing so, the paper creates a foundation for future empirical research on the topic of how digital labeling innovations can be used to promote more transparent and sustainable agrifood supply chains.

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The Institutionalization of Person-Centredness: A Three-Stream Convergence Model Across Management Fields

SABINA DE ROSIS

Abstract. *Person-centredness has become one of the most pervasive principles in contemporary management discourse. Across private, public, and healthcare settings, organisations are increasingly expected to be customer-oriented, citizen-centred, patient-centred, or people-centred. This apparent convergence has often been interpreted through a diffusion narrative, according to which person-centredness originated in private-sector management and was later transferred to public management and healthcare through managerial reforms. This paper challenges that interpretation.*

The study develops a cross-field, theory-building analysis of person-centredness across three managerial streams: private management, public management, and healthcare management. Rather than treating person-centredness as a concept invented in one field and exported to others, the paper argues that contemporary person-centred governance emerged through the convergence of three semi-autonomous institutional streams: professional-relational ethics, public-service normative commitments, and managerial measurement rationality.

Methodologically, the paper adopts a structured integrative review combined with abductive theory building and mechanism-based institutional analysis. The review does not aim at bibliometric exhaustiveness; instead, it seeks theoretical saturation through the selection of foundational and conceptual contributions across the three streams. The analysis reconstructs the temporal evolution of person-centred constructs, distinguishes ethical and professional origins from later managerial institutionalisation, and interprets convergence through the combined lenses of institutional isomorphism and translation theory.

The paper develops a three-stream convergence model of person-centred governance. The preliminary model shows that the central innovation of late managerial developments was not the moral discovery of the person, but the emergence of measurement infrastructures, accountability systems, and governance architectures capable of embedding person-centredness at organisational and system levels. In this perspective, convergence across fields does not imply conceptual identity: similar instruments travel across fields, but are translated and hybridised according to sector-specific institutional logics.

The paper is currently a work-in-progress and want to contribute to management scholarship in three ways. First, it clarifies the genealogy of person-centredness by distinguishing proto relational centrality from institutionalised person-centred governance. Second, it integrates institutional isomorphism and translation theory to explain convergence without conceptual homogenisation. Third, it proposes person-centredness as a site of institutional complexity across management fields. More broadly, the study suggests that person-centredness should not be understood only as a normative ideal or a managerial technique, but as a hybrid governance construct emerging from the intersection of multiple value regimes.

Keywords: *person-centredness; institutional logics; translation; institutional complexity; public value; customer orientation*

Framing of the research. *The centrality of the person has become one of the most pervasive principles in contemporary management discourse. Across sectors and institutional contexts, organisations are increasingly urged to be customer-oriented, client-focused, citizen-centred, patient-centred, or people-centred. Although the vocabulary changes, the underlying imperative appears similar: organisations are expected to recognise, involve, and respond to the needs, experiences, and values of their direct stakeholders. In management scholarship, this broad convergence is often read through a diffusion narrative, according to which person-centredness was first developed in private-sector management, especially in marketing and service management, and later transferred to public management and healthcare through reform waves such as New Public Management (Hood, 1991; Osborne & Gaebler, 1992). However, this interpretation is analytically too narrow.*

What makes the diffusion narrative problematic is that it conflates two different phenomena: the earlier emergence of person-related sensibilities within professional and public-service traditions, and the later managerial institutionalisation of person-centredness through organisational tools, measurement systems, and governance architectures (DiMaggio & Powell, 1983; Czarniawska & Sevón, 1996). Long before marketing and service management formalised customer orientation and service quality models, public and healthcare-related fields had already developed forms of relational attention to the person. In social case work, for instance, the "culture of the client" was already recognised as central in the 1930s (Boie, 1937). In psychotherapy, client-centred therapy placed the individual's subjective experience at the core of professional action (Rogers, 1946; Rogers, 1951). In medicine and healthcare, critiques of paternalistic and biomedical models progressively foregrounded the person beyond the disease, through patient-centred medicine and the biopsychosocial perspective (Balint, 1969; Engel, 1977; Mead & Bower, 2000; Stewart et al., 2003). These developments did not originate from private-sector managerial logic, but from professional ethics, care relationships, and evolving understandings of responsibility and dignity.

A similar argument applies to public management. Public administration has long embedded the idea that public officials serve citizens and communities, and not merely organisational efficiency goals. The concept of public value further consolidated this orientation by arguing that the legitimacy of public action derives from its capacity to contribute to citizens' and society's wellbeing (Moore, 1995; Benington & Moore, 2011; Osborne, 2010). Thus, the normative foundations of person-centredness cannot be reduced to imported market principles. Rather, they are also deeply rooted in public-service traditions and collective value frameworks.

The relevant analytical question, therefore, is not whether person-centredness originated in private management, public management, or healthcare. The more important question is how person-centredness became institutionalised as an organisational and governance paradigm that can be formalised, measured, compared, and scaled across sectors. In this respect, private management did play a major role, not by inventing the moral salience of the person, but by developing managerial tools capable of embedding experiential and relational dimensions into performance and organisational systems. Service quality and customer orientation models made perceptions and experiences actionable through formal measurement infrastructures (Parasuraman et al., 1985; Parasuraman et al., 1988; Cronin & Taylor, 1992). Later developments around value co-creation and customer experience further reinforced the treatment of experience as a managerial object (Vargo & Lusch, 2004; Prahalad & Ramaswamy, 2004; Lemon & Verhoef, 2016).

This distinction makes it possible to reframe the issue more productively. Rather than asking which sector first generated person-centredness, this paper asks how distinct institutional logics converged to produce the contemporary model of person-centred governance. Institutional theory is particularly useful here. Institutional isomorphism explains why organisations across different fields tend to adopt similar forms under conditions of uncertainty, accountability pressures, and professionalisation (DiMaggio & Powell, 1983). However, isomorphism alone is not sufficient, because it cannot explain why person-centredness retains different meanings across sectors. Translation theory complements this perspective by showing that ideas do not travel unchanged: they are edited, reframed, and hybridised within new contexts (Czarniawska & Sevón, 1996; Røvik, 2007). In this sense, customer orientation, public value, and patient-centred care should not be interpreted as identical concepts diffusing intact from one field to another, but as different institutional articulations of a broader shift toward relational and service-based governance (Osborne et al., 2016; Thornton et al., 2012).

This paper addresses that gap by developing a cross-field interpretation of person-centredness across three management streams: private management, public management, and healthcare management. It argues that contemporary person-centred governance emerged not through linear diffusion, but through the convergence of three semi-autonomous streams: professional-relational ethics, public-service normative commitments, and managerial measurement rationality. On this basis, the paper proposes a three-stream convergence model and positions person-centredness as a hybrid institutional construct shaped by convergence, translation, and institutional complexity across management fields.

Purpose of the paper. *The purpose of this paper is to develop a cross-field theoretical explanation of how person-centredness became institutionalised as a governance paradigm across different management domains. While the concept is widely used across private management, public management, and healthcare management, existing literature often treats these developments either as sector-specific phenomena or as the outcome of a linear diffusion from private-sector managerial thought. This paper challenges that interpretation and proposes an alternative explanation grounded in institutional theory.*

More specifically, the study aims to distinguish between early forms of relational attention to the person—rooted in professional ethics and public-service traditions—and the later managerial institutionalisation of person-centredness through organisational design, measurement systems, and governance mechanisms. By reconstructing the historical trajectories of person-centred constructs across marketing and service management, public management, and healthcare management, the paper seeks to clarify how similar governance principles emerged across sectors while retaining distinct normative meanings.

To address this objective, the study develops a cross-field theoretical synthesis based on a structured integrative review of foundational contributions across the three domains. The analysis focuses on identifying the institutional mechanisms that explain the convergence of person-centred governance across fields. In particular, the paper integrates insights from institutional isomorphism and translation theory to explain how organisational forms and managerial instruments spread across sectors while being reframed according to sector-specific institutional logics.

The paper therefore addresses the following research question: How did person-centredness become institutionalised as a governance paradigm across private management, public management, and healthcare management, and what institutional mechanisms explain the convergence of these trajectories?

This paper is presented as a work in progress. The current version develops the theoretical framing and the initial architecture of the proposed three-stream convergence model. Further stages of the research will refine the conceptual boundaries of the model and expand the cross-field literature base in order to strengthen the explanatory mechanisms and support future empirical applications.

By addressing this research question, the study aims to contribute to management scholarship in three ways. First, it clarifies the genealogy of person-centredness by distinguishing its ethical and professional origins from its later managerial codification. Second, it proposes a three-stream convergence model that explains the emergence of contemporary person-centred governance as the intersection of professional-relational ethics, public-service normative

commitments, and managerial measurement rationality. Third, it positions person-centredness as a site of institutional complexity across management fields, highlighting how similar governance mechanisms can embody different value logics depending on their institutional context.

Methodology. *This study adopts a structured integrative review combined with abductive theory development to reconstruct and theorise the institutional evolution of person-centredness across different management fields. The objective of the research design is not to provide an exhaustive bibliometric mapping of the literature, but rather to develop a theoretically informed explanation of how person-centredness became institutionalised as a governance paradigm across private management, public management, and healthcare management.*

The methodological approach is grounded in the recognition that person-centredness does not belong to a single disciplinary field. Instead, it has emerged through parallel developments in heterogeneous institutional environments governed by different normative frameworks and institutional logics. Consequently, the methodological challenge is not simply literature aggregation, but cross-field synthesis capable of identifying conceptual trajectories, temporal developments, and institutional mechanisms that explain convergence across sectors.

The research design follows three main analytical principles.

First, the study adopts a field-comparative perspective. The analysis is organised around three semi-autonomous managerial streams: private management (including marketing and service management), public management, and healthcare management. Each stream is treated as an institutional field characterised by its own epistemic traditions, normative foundations, and evaluative criteria. This structure helps avoid retrospective diffusion bias, namely the tendency to interpret later managerial codifications as evidence of conceptual origin.

Second, the study combines historical reconstruction and mechanism-based theorising. Rather than simply documenting the appearance of terms such as customer orientation, citizen-centred governance, or patient-centred care, the analysis aims to explain how and why these concepts became institutionalised within organisational and governance systems. Particular attention is paid to identifying the institutional mechanisms that contributed to convergence across fields.

Third, the research adopts an abductive orientation. The study began with the empirical observation that similar forms of person-centred discourse appear across different management literatures. Through iterative engagement with scholarship in marketing, public administration, healthcare management, and institutional theory, the research progressively refined the conceptual distinctions and explanatory mechanisms underlying this convergence.

The literature review was structured around the three institutional streams described above.

The private management stream includes research on customer orientation, service management, service-dominant logic, customer experience, and value co-creation. Foundational contributions in service quality measurement and customer-centric organisational models were prioritised because they represent key moments in the managerial formalisation of experiential dimensions of value.

The public management stream includes literature on public value, public service logic, citizen engagement, co-production, and governance reforms. Particular attention was given to conceptual contributions that interpret value creation as a collective and multi-actor process and that examine the translation of managerial tools into public-sector contexts.

The healthcare management stream includes scholarship on patient-centred care, patient engagement, shared decision-making, patient experience, and the governance institutionalisation of patient-reported outcome and experience measures.

Across all streams, the literature selection prioritised: (i) conceptual and theoretical contributions rather than purely empirical case studies; (ii) foundational texts that shaped field-level discourse; (iii) publications in influential journals in management, organisation studies, public management, and healthcare management.

The aim was to reach theoretical saturation, meaning the point at which additional sources no longer significantly altered the emerging cross-field explanation.

The analytical process developed in four stages. First, a temporal reconstruction identified key conceptual inflection points within each stream, distinguishing early relational and professional formulations from later managerial codifications. Second, a conceptual differentiation stage analysed terminological variations (customer, citizen, patient, user) as indicators of underlying institutional logics rather than simple semantic diversity. Third, a mechanism identification stage interpreted convergence through institutional theory, focusing on institutional isomorphism and translation processes as key explanatory mechanisms. Finally, the findings were synthesised into a three-stream convergence model, which conceptualises person-centred governance as the outcome of the interaction between professional-relational ethics, public-service normative commitments, and managerial measurement rationality.

This methodological approach is consistent with theory-building traditions in management research. Rather than introducing a new construct, the study seeks to re-theorise an established but conceptually fragmented one, offering a structured explanation of how person-centredness emerged as a hybrid governance paradigm across management fields. As noted earlier, the present paper represents a work in progress, and further stages of the research will refine the conceptual model and expand the empirical and theoretical grounding of the proposed framework.

Results *(*work in progress). *The analysis provides preliminary insights into how person-centredness evolved and became institutionalised across different management fields. Although the study is still in progress, the cross-field synthesis conducted so far allows the identification of three main analytical results that support the development of the proposed three-stream convergence model.*

A first result concerns the distinction between proto relational centrality and institutionalised person-centred governance. The literature review shows that early forms of attention to the person emerged primarily within professional and public-service traditions. In healthcare and social care, relational approaches developed in response to paternalistic models of intervention and emphasised the importance of understanding the individual beyond technical or clinical dimensions (Balint, 1969; Mead & Bower, 2000). Similarly, in public administration, traditions of public service and later public value scholarship emphasised responsiveness to citizens and societal wellbeing (Moore, 1995; Osborne, 2010).

These early developments, however, did not initially take the form of organisational governance systems. The managerial transformation occurred when person-centred principles were translated into measurement infrastructures, performance indicators, and organisational design mechanisms capable of embedding experiential dimensions into organisational decision-making. Contributions from service management and marketing scholarship played a key role in this process by formalising tools for measuring service quality and customer experience (Parasuraman et al., 1985; Cronin & Taylor, 1992; Lemon & Verhoef, 2016).

A second result is the identification of three semi-autonomous institutional streams that evolved in parallel before intersecting. The first stream can be described as professional-relational ethics, where attention to the individual emerges as part of professional responsibility and care relationships, particularly in healthcare and social care contexts. The second stream concerns public-service normative commitments, where responsiveness to citizens and the pursuit of public value shape the relationship between organisations and the individuals they serve. The third stream is managerial measurement rationality, developed especially in private management literature, which introduced analytical tools and performance systems capable of translating subjective experience into managerial signals.

The preliminary analysis suggests that contemporary person-centred governance emerged when these three streams gradually intersected, enabling relational principles to be embedded within organisational and governance architectures.

A third result concerns the mechanisms that explain convergence across fields. The analysis indicates that two institutional mechanisms appear particularly relevant.

First, institutional isomorphism helps explain why organisations in different sectors increasingly adopt similar forms of person-centred language, feedback systems, and engagement mechanisms under conditions of accountability pressure and organisational uncertainty (DiMaggio & Powell, 1983).

Second, translation processes explain why these similar forms maintain different meanings across sectors. When managerial tools travel across institutional fields, they are adapted and reframed according to local value frameworks and professional traditions (Czarniawska & Sevón, 1996; Røvik, 2007).

Taken together, these preliminary findings support the development of a three-stream convergence model in which contemporary person-centred governance emerges from the intersection of professional relational ethics, public-service normative commitments, and managerial measurement rationality. Because the study is still ongoing, the current results should be interpreted as initial theoretical insights rather than definitive conclusions. Further stages of the research will refine the model and expand the literature base in order to strengthen the explanatory mechanisms underlying the convergence of person-centred governance across management fields.

Research limitations. *This study presents several limitations that should be acknowledged, particularly given its current stage as a work in progress.*

First, the paper relies on a structured integrative review aimed at theory development rather than on a systematic bibliometric review or empirical analysis. Although the literature selection prioritised foundational and influential contributions across the three management streams, the review does not claim exhaustive coverage of all relevant publications. The objective was theoretical saturation rather than comprehensive mapping of the field.

Second, the analysis focuses on conceptual and theoretical contributions within private management, public management, and healthcare management. As a consequence, empirical studies examining the practical implementation of person-centred approaches across sectors are not systematically included at this stage. Future research could complement the theoretical model proposed here with empirical investigations exploring how the convergence of person-centred governance unfolds in organisational practice.

Third, the reconstruction presented in this paper primarily reflects developments within Western advanced service economies, where service-sector expansion, public management reforms, and digital accountability infrastructures have jointly influenced organisational evolution. The historical trajectories and institutional dynamics identified here may therefore require adaptation when considering other institutional contexts.

Finally, the three-stream convergence model proposed in this paper remains a preliminary theoretical framework. While the integrative review provides initial support for the model, further research will be necessary to refine the conceptual boundaries of the construct and to test its explanatory power across different organisational and institutional settings.

Managerial implications. *The preliminary findings of this study offer several implications for managers and policymakers operating in organisational contexts where person-centredness is promoted as a governance principle.*

First, the analysis suggests that person-centredness should not be approached as a universal managerial template that can be transferred unchanged across sectors. Although similar instruments—such as experience measurement systems, feedback mechanisms, or engagement strategies—are increasingly adopted across organisations, their effectiveness depends on their alignment with the institutional logic of the sector in which they are implemented. Managers should therefore avoid treating person-centred approaches as purely technical tools and instead consider how they interact with professional norms, organisational values, and accountability frameworks.

Second, the results highlight that measurement alone does not constitute person-centred governance. The introduction of indicators, satisfaction surveys, or experience metrics does not automatically produce meaningful organisational change. Person-centred governance requires the integration of these tools into broader organisational processes, including decision-making routines, performance management systems, and service design practices.

Third, the findings underline the importance of recognising the layered origins of person-centredness. In many sectors, especially healthcare and public services, relational traditions already play a central role in professional practice. Reforms that attempt to impose standardised managerial instruments without acknowledging these traditions may encounter resistance or symbolic compliance. Managers should therefore design person-centred initiatives in ways that build upon existing professional and organisational cultures.

Finally, the study suggests that contemporary organisations increasingly operate within hybrid institutional environments, where market-oriented, public-service, and professional logics coexist. In such contexts, person-centred governance can function as a bridging concept that facilitates coordination among different stakeholders. However, this potential can be realised only if managers recognise the underlying institutional complexity and actively translate person-centred principles into governance arrangements that are coherent with the organisation's broader mission and value framework.

Originality of the paper. *This paper contributes to management scholarship by offering a cross-field theoretical interpretation of person-centredness across private management, public management, and healthcare management. While the concept is widely used across these domains, existing literature typically examines it within sector-specific boundaries or assumes a diffusion from private-sector managerial thought to public and healthcare contexts. This study challenges that assumption by proposing an alternative explanation based on institutional convergence.*

The paper advances the literature by distinguishing between proto relational centrality, rooted in professional and public-service traditions, and institutionalised person-centred governance, which emerges when relational principles are embedded within organisational structures, measurement systems, and accountability frameworks. This distinction helps clarify the historical evolution of person-centredness and prevents conflating its ethical origins with its later managerial codification.

The study also contributes to institutional theory by combining insights from institutional isomorphism and translation theory to explain why similar person-centred governance mechanisms appear across sectors while maintaining different normative meanings. By doing so, the paper conceptualises person-centredness as a hybrid institutional construct resulting from the convergence of three streams: professional-relational ethics, public-service normative commitments, and managerial measurement rationality.

More broadly, the paper positions person-centredness as a site of institutional complexity across management fields, offering a theoretical framework that enables more precise cross-sector comparison and a deeper understanding of how relational governance principles become institutionalised in contemporary organisations.

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The Internal Brand Equity Lift: How Internal Marketing Strategies and Brand Fit Influence Employees' Identification in Nonprofit Partnerships

ALESSANDRO SIGNORINI

Abstract. *Corporate–nonprofit partnerships are widely employed to enhance corporate social responsibility (CSR) and strengthen external brand equity. However, their impact on internal brand perceptions remains largely unexplored. Grounded in Social Identity Theory (SIT) and Self Categorization Theory (SCT), this study investigates how employees internalize, or fail to internalize, the values of nonprofit partners, and how internal marketing strategies and brand personality fit shape this process.*

While existing CSR literature assumes that social impact initiatives naturally translate into positive internal values, employees often detect inconsistencies, potentially causing skepticism and weakened identification. Internal marketing practices are essential to establish whether a partnership is perceived as an authentic commitment or as a superficial reputational strategy. Also, when the company and nonprofit show brand personality fit, employees are more likely to view the partnership as a genuine extension of company's ethical principles.

To examine these mechanisms, a scenario-based experiment is conducted with 600 employees of an Italian coffee company. Participants evaluated one of two nonprofit partnerships, one with high brand-fit vs. one with low brand-fit, and assigned to one of three communication conditions: transactional (financial-based), transformational (narrative storytelling), or participatory (active employee involvement). Organizational Identification (OI) served as the primary dependent variable.

Preliminary findings indicate that narrative and participatory communication styles result in significantly higher OI than transactional messaging, as they are perceived as more emotionally resonant and personally relevant. Brand fit moderates these effects since high-fit partnerships are more readily internalized, while low-fit collaborations risk appearing as opportunistic unless communicated with transparency.

These insights suggest that companies should prioritize narrative communication that emphasizes nonprofit missions and social impact, and provide meaningful employee engagement opportunities treating nonprofits as true co-branding partners. Nonprofits, in turn, can demonstrate a deeper partnership value proposition by stressing internal brand benefits for companies, including, improved employee attitudes, stronger OI, and potentially lower turnover.

Keywords*: Internal Brand Equity; Internal Marketing; Brand Personality Fit; Organizational Identification; Nonprofit Organizations; Corporate Fundraising*

Framing of the research. Traditionally, Corporate Social Responsibility (CSR) has been defined as a set of voluntary corporate practices, which address social and environment problems beyond legal and regulatory requirements. Foundational Stakeholder Theory (Donaldson & Preston, 1995; Freeman, 2010) states that companies are accountable and responsible not only to shareholders but to a multi-constituent model formed by consumers, employees, communities, regulators, and civil society organizations. Therefore, CSR functions turn out to be mechanisms to reconcile and mediate the conflicting interests of these various groups. Within the context of corporate fundraising, nonprofit organizations function less as autonomous partners and more as operational mechanisms through which firms absolve their corporate social responsibility (Harrison et al., 2010).

In recent times, Instrumental (McWilliams & Siegel, 2001; Porter & Kramer, 2006) and Partnership (Austin & Seitanidi, 2012; Porter & Kramer, 2011) CSR Theories frame responsibility as a strategic instrument to enhance firm performance and differential advantage. CSR is reshaped as a process of value co-creation where social and economic value are jointly produced through partnerships. CSR becomes embedded in the business model and is an integral part of the corporate reputation and its market appeal. In the corporate fundraising perspective, nonprofits become strategic resources and are co-producers of social value. Social causes are leveraged to achieve corporate objectives, and funding decisions are tied to visibility, measurability, and brand consistency (Seitanidi & Crane, 2009). Nonprofits provide expertise and implementation capacity, and are assessed as partners rather than beneficiaries. However, this creates increased corporate influence and blurred boundaries between mission and market logic (Barnett, 2007).

Corporate sponsorship to nonprofits is connected with the external halo effect, which refers to the phenomenon where consumers' perceptions of a for-profit brand are positively moderated by the association with a charitable cause or nonprofit organization (Lafferty & Goldsmith, 2005). Through this associative mechanism, positive attributes of the nonprofit, specifically, its social impact, moral legitimacy, or its active social campaigns, are transferred to the corporate brand. This transfer influences consumer evaluations even if consumers get no direct information on the product quality or performance (Becker-Olsen et al., 2006; Sen & Bhattacharya, 2001).

Theoretically, the external halo effect is based on the associative learning (Till & Nowak, 2000) and signaling theories (Connelly et al., 2011; Herbig & Milewicz, 1995). In environments with information asymmetry, where consumers often

have incomplete information about corporate strategies or CSR quality, they rely on charitable partnerships as cues when evaluating firms. Consequently, the nonprofit may become a symbolic asset that improves the brand's equity (Bendapudi et al., 1996).

Nevertheless, while corporations make substantial investments in nonprofit partnerships to strengthen external brand equity, these initiatives often fail to generate comparable positive effects within the company's employees at different ranking levels. Research (Bernardino, 2021; Gupta et al., 2025) confirms that when companies engage in external collaborations with non-profits with no authentic internal integration within their own organizations, numerous negative consequences can emerge. Employees, in particular, may act as internal detectors of corporate authenticity. If they perceive that a partnership is driven by self-interest or purely promotional motives rather than altruistic reasons, their levels of cynicism may increase (Ji & Jan, 2019). This cynicism can generate deep skepticism in the organization's motives, and often leads to reduced job performance and lower organizational commitment (Ji & Jan, 2019; Serrano Archimi et al., 2018). The failure to integrate a nonprofit partnership within the organization is defined in academic literature as CSR decoupling. This occurs when an organization publicly adopts social initiatives and high-visibility charity collaborations but makes little or no changes to internal practices (Forliano et al., 2025). Employees who observe this gap often assess the company's actions as symbolic CSR rather than substantive CSR, which can generate a sense of work alienation and even counterproductive workplace behaviors (Elshaer et al., 2025; Vollero et al., 2016). For CSR investments to be effective internally, they should be supported by transparent, consistent, and structured internal communication (Gupta et al., 2025), otherwise, employees may perceive the company's claims as insincere or hypocritical. Authenticity in CSR communication is essential in employee trust and engagement because employees sense that the corporate actions are consistent with its own values and actions and promote internal brand advocacy (Bernardino, 2021; Gupta et al., 2025).

In addition, CSR initiatives, in many cases, do not enable employees to identify with the values behind the sponsorship activities or with the mission of the nonprofit organization. As employees struggle to develop a meaningful connection with these initiatives, they get the impression that nonprofit collaborations are exclusively employed for "social washing" purposes to refine the reputation of corporate marketing efforts (Siano et al., 2017). To mitigate this risk, this research investigates the for-profit/nonprofit partnerships not as marketing investments or financial transactions, but instead grounds the analysis in the Social Identity Theory. This approach sets to bridge the gap between the corporate projected external brand equity and the employees' internal brand perceptions.

Social Identity Theory (SIT) (Tajfel et al., 1971), and the following Self-Categorization Theory (SCT) (Tajfel et al., 2001) state that people tend to categorize others, identify in internal groups ("in-groups"), even when groups are formed for completely trivial reasons, and discriminate against the external groups ("out-groups"). In-group members tend to apply cognitive mechanics to "depersonalize" their identities and adopt group norms (Turner, 1987). Moreover, in-group members desire their groups to perform better that the out-groups boosting their individual self-esteem, even if this implies that in-group members will take less for themselves in absolute terms (Abrams & Hogg, 2006).

This research seeks to examine how corporate employees evaluate the values conveyed through sponsorships and partnerships with non-profit organizations and the extent to which they internalize, or fail to internalize, these values as components of the broader corporate identity. Within a Social Identity framework, it is investigated how partnership values are incorporated into the broader corporate identity (the "in-group" identity) and how employees come to perceive themselves as members of this in-group.

Social Identity Theory has been extensively applied across a wide range of research topics on charity organizations, with numerous articles that employ the framework in various contexts, for example, organizational support and volunteering (Traeger et al., 2023), stakeholders' responses to major nonprofit crises (Ma, 2023), barriers to informal caregiving among older people (Pettigrew et al., 2019), and issues related to women's and girls' advocacy (Dale et al., 2018). However, despite these several applications, a review of the current literature shows that the SIT theory has not yet been integrated in the field of internal marketing. There are no major studies that explore the reactions of corporate employees to nonprofit sponsorships and partnerships.

Moreover, the concept of internal marketing has not been applied to understanding employees' attitudes and responses toward collaborations with nonprofit organizations. In contrast, internal marketing theories have been used to study volunteer dynamics in nonprofits, who are essential resources for these organizations. Specifically, the Employee Brand Equity (EBE) models have been adapted to examine the role that volunteers play in shaping nonprofit brand equity (Nogueira et al., 2020). Internal marketing applications are positively linked to volunteers' supportive behaviors toward a nonprofit. The relationship with the organization is mediated by volunteer satisfaction and their organizational identification (Gross & Rottler, 2019). In addition, it is explored how collaborations with for-profit organizations can encourage nonprofits to adopt internal marketing practices and how these practices may influence overall nonprofit performance (Álvarez-González et al., 2017). In conclusion, internal marketing practices are recommended for nonprofits to improve managerial effectiveness and knowledge sharing, however, duplicating corporate internal strategies may be challenging in unique nonprofit environments, and value propositions for internal marketing must be carefully evaluated (Hume & Hume, 2015).

Purpose of the paper. The primary objective of this research is to investigate how partnerships with nonprofit organizations influence Organizational Identification (OI) among employees through the conceptual foundations of Social Identity Theory (SIT) and Self-Categorization Theory (SCT). When a company contributes to and engages in a partnership

with a nonprofit organization, the nonprofit's symbolic attributes, in detail, its mission, values, and social impact, can be transmitted to the corporate external brand equity through the external halo effect. Within this context, OI measures the degree by which corporate employees identify with the values of the nonprofit and consequently with the broader corporate organizational identity of their employer. Therefore, OI provides a measure of how employees feel part of and internalize the nonprofit's value system as an element of their own organizational membership. Specifically, this paper aims to identify the internal marketing strategies that favor the employee value identification and minimize employee skepticism toward corporate/nonprofit collaboration. Internal marketing practices may play a critical role in shaping whether employees interpret a partnership as sincere and genuine or as superficial way to boost brand reputation.

Additionally, the paper plans to analyze to which extent the brand personality consistency between a corporation and a nonprofit affects the internal adoption of the partnership. The assumption here is that when the values of the two entities differ, employees are more likely to perceive that the collaboration is driven by strategic self-interest or promotional motives. In contrast, when the values show consistency, employees are more inclined to internalize the initiative as a true extension of the corporate ethical commitments.

In conclusion, this paper proposes a new strategic contribution to the field of corporate fundraising. In detail, it argues that nonprofit organizations may reinforce their value proposition to potential corporate donors by showing how sponsorships can generate an internal brand equity lift. Nonprofit may offer corporations a more compelling reason for long-term engagement because partnerships can be significant contributors to internal brand identification and higher employee morale.

To summarize, this paper aims to investigate:

1) How Organizational Identification (OI) is affected by partnerships with nonprofit organizations among corporate employees
2) How the level of brand personality consistency between a corporation and a nonprofit organization influences the internal adoption of the partnership
3) How the internal brand equity lift can serve as a new variable for nonprofits to include in their value proposition to corporate donors

Ultimately, this research tries to demonstrate that the strength of the employee-organization connection is not only determined by the financial relevance of a corporate donation but also by its genuineness and sincerity as well as the narrative of the partnership internal communication. The perceived authenticity of a corporation's social engagement, more than the quantitative scale of its contribution, is expected to shape employees' identification with the firm and reinforces their sense of belonging with its values.

Methodology. This research adopts a scenario-based experimental design (Lelo de Larrea, 2025; Werner & Muradova, 2022) to identify the causal effects of different nonprofit marketing strategies and communication approaches on employees' Organizational Identification (OI). Scenario experiments allow researchers to manipulate core independent variables and ensure a high degree of internal validity and control over extraneous factors.

In this study, participants will be randomly assigned to one partnership with nonprofit organizations, and subsequently one of three experimental conditions, each representing a distinct marketing communication style commonly employed by companies.

The empirical setting involves an Italian coffee roasting and processing company. The partnerships under investigation are established with two Italian nonprofit organizations. The first nonprofit focuses on sustainable coffee production and fair remuneration for local producers in developing countries, while the second nonprofit provides humanitarian aid, medical support, and emergency response in conflict-affected areas. Methodologically, the first partnership can be classified as a "high-fit" collaboration given its consistency with the company's brand identity and core operations, while the second partnership represents a "low-fit" condition, due to its peripheral connection with corporate brand identity and operational activities.

A sample of 600 employees will be recruited through an online panel provider. Eligibility criteria will include being currently employed full-time and being involved in office-based, administrative, and intellectual roles. Participants will first complete baseline socio-demographic questions, including, age, educational level, income, professional expertise, and more specific questions on their engagement with humanitarian activities, including, general interest in humanitarian issues and sectors, past donation or volunteering in non-profit organizations outside corporate partnerships, prior exposure and detailed knowledge to CSR or corporate-supported charitable initiatives.

At first, participants will be assigned to one of the partnership conditions. Following this initial allocation, they will then be exposed to one of the three experimentally manipulated communication scenarios:

Condition A – Transactional Frame: Participants will view a marketing message that emphasizes the tangible, economic, and Environmental, Social, and Governance (ESG)-related outcomes of charitable giving. The scenario highlights the specific monetary contribution, tax incentives, and reputational and sustainability benefits. This condition reflects a traditional transactional CSR approach.

Condition B – Transformational/Narrative Frame: Participants will read a message that emphasizes narrative storytelling, including beneficiary testimonials, long-term community outcomes, and the broader social impact of the nonprofit operations. This condition employs a transformational communication style that fosters emotional resonance and perceived significance of the sponsorship.

Condition C – Participatory Frame: Participants will be exposed to a message centered on employee involvement, such as volunteering opportunities, skill-based contributions, and co-creation of social initiatives. This condition tests the effects of a participatory approach on employee engagement and identification.

Manipulation checks will verify that participants perceived the intended message characteristics, e.g., transactional cues, narrative depth, opportunities for participation. Participants will then complete validated scales measuring Organizational Identification (OI), as well as potential co-variates such as perceived CSR authenticity and general attitudes toward corporate giving.

A multiple regression analysis will be accomplished using OI as the dependent variable to test the hypothesized relationships. Dummy coding will be used to represent the three experimental conditions, with the transactional condition designated as the reference group. The model incorporates two key predictors:

$OI=\beta0+\beta1(\text{Narrative Style})+\beta2\ (\text{Employee Participation})+\epsilon$

In this model, Narrative Style summarizes the extent to which the message relies on storytelling and transformational approach and should be the highest in Condition B, while Employee Participation reflects perceived opportunities for employees for active engagement in the partnership initiative and should be the highest in Condition C.

The OI should be significantly higher for the "high-fit" first group, where a perceived consistency between the corporate identity/values and the nonprofit's mission and operations is most relevant.

The regression model will allow to examine both the direct effects of message approaches and the potential mediating or moderating roles of brand fit and employee participation. Additional robustness checks will be implemented to ensure the reliability of results.

Results. At this stage of the study, the questionnaires are nearly fully completed, and only initial results are currently available.

Preliminary expectations suggest that employees will respond more positively to communication strategies that portray authenticity, emotional engagement, and a sense of individual relevance. Specifically, participants exposed to the Transformational/Narrative condition (Condition B) and the Participatory condition (Condition C) are expected to show significantly higher levels of Organizational Identification (OI) relative to those in the Transactional condition (Condition A). Purely instrumental, transactional messages, which focus on financial contributions or ESG compliance benefits, often fail to generate emotional engagement or a perception of shared purpose. Employees typically do not connect with the abstract notion of a monetary donation, but they rather connect with narratives of social impact and opportunities to contribute to social change. This phenomenon can be described as a sincerity premium, where employees interpret narrative or participatory approaches as more genuine, human, and consistent with real motivations. Under these conditions, identification processes are reinforced because the organization is perceived as acting out from a sincere commitment to society, rather than reputational management or institutional obligation.

Brand Fit is expected to have a moderating role in the intensity and direction of identity transfer. High-Fit partnerships offer a coherent organizational narrative that employees can easily integrate into their perception of the corporate identity. In these cases, consistency between the corporate competencies and values and the nonprofit's mission and operations facilitates a readier and faster internalization of the partnership as part of the real identity as an organization. Conversely, Low-Fit partnerships may cause identity friction, especially when the nonprofit's mission appears in contradiction with the company's industry or historical reputation. In such cases, employees may view the initiative as inconsistent or strategically opportunistic ("social washing"), which can weaken trust and reduce identification. Importantly, the negative effects of Low-Fit partnerships may be mitigated only when internal communication adopts radical transparency and openly acknowledges potential tensions rather than hiding them.

It is particularly relevant to examine how employees perceive the Low-Fit partnership under investigation in this study. The partnership is distant from the corporate brand core values, however, the nonprofit involved operates with reputable humanitarian goals and is active in highly sensitive conflict zones such as Syria, Iran, and Ukraine. These contexts are risky, politically delicate, and can cause reputational problems to the external brand image of the company. Therefore, the nonprofit humanitarian mission makes it more difficult for employees to attribute opportunistic motives to the partnership. In addition, the company sponsors a project located in a region from which the company buys a substantial amount of high-quality coffee beans and is likely to be a direct consequence of some employees directly experiencing the poor conditions of the region and encouraging the sponsorship. Therefore, employees are expected to perceive the tension with the brand identity less significantly, although, a moderating variable can be the detailed and long-term knowledge of the nonprofit operations and historical relationship with the company.

Moreover, it is interesting to investigate whether a deep involvement with nonprofit issues and sectors as well as previous donation and volunteer experience changes the perspective of the employees. Employees with high commitment to social causes may react more favorably to Transformational/Narrative condition (Condition B) and especially Participatory condition (Condition C), since these approaches resonate with their personalities and motivations. Nonetheless, a more profound familiarity with humanitarian dynamics may make these employees more aware of potential "social washing" and opportunistic behavior of humanitarian causes and increase the risk of skepticism and lack of trust.

In conclusion, the impact of the professional role in the company is difficult to be determined. Employees working in marketing and communication may question the authenticity of the partnerships because they are more aware of the strategic advantages that these types of sponsorships provide. Conversely, their deeper understanding of brand positioning

may convince them to perceive these partnerships as legitimate contributions to the broader social role of the company. In this perspective, these collaborations may be viewed as opportunities to achieve relevant marketing objectives while contributing to important social causes. In this way, marketing objectives can be reached benefitting external communities rather than spending marketing budgets in different communication strategies.

Research limitations. The main limitation of the study lies in the possibility that employees may feel pressured to report higher levels of compliance and support to the partnerships with the nonprofits. Before the survey, participants were assured that the responses would remain completely anonymous and would be processed exclusively by an external university researcher with no ties to the company. However, some employees may still have been skeptical and perceive their negative evaluations as a form of dissent toward top management's strategic decisions, potentially exposing them to criticism and not being viewed as team players.

Moreover, all respondents work within the coffee industry, whose brands may have distinctive brand personalities and unique marketing strategies. Hence, findings may be difficult to generalize, as companies in other sectors may operate under different strategic, cultural, and competitive priorities. A similar issue applies to the nonprofit organizations considered in this investigation, as only two causes were examined. Other typologies of humanitarian causes may generate completely different effects on corporate brand personality perceptions and employee preferences. Some nonprofits may work on more local initiatives or adopt more adversarial and controversial approaches, thus generating significant different reactions from respondents.

Another limitation of this research is that it evaluates employees' identification with the corporate brand at only one point of time. This does not consider that the corporate brands may evolve significantly if companies modify their business models, because of, for example, an adoption of a diversification strategy, or a merger and acquisition. In this case, the brand modifications may completely reshape the meaning of and the consistency with the nonprofit partnerships. A similar consideration applies to the nonprofit organizations involved. Nonprofits can also evolve their projects, strategic priorities, or communication over time, which can redesign the core nature of their mission. As their focus changes, the degree of compatibility or perceived authenticity in the partnership may also shift. As a consequence, respondents' reactions and identification levels may vary if the research was accomplished at a different stage in the lifecycle of either organization.

A further relevant limitation concerns the sample. The vast majority of respondents are Italian nationals and Italian speakers, as the survey was administered entirely in Italian. Social Identity Theory functions differently across cultural contexts, particularly for individualistic versus collectivistic cultures. Thus, findings based on an Italian sample may not perfectly reflect dynamics in countries with more collectivistic approaches or dissimilar social reference points, such as the Northern European countries or Eastern Asian societies. The application of these results to other cultural contexts may therefore be limited, and further research may consider diverse national samples.

In conclusion, this study is subject to the methodological limitations of the scenario-based experimental design. Indeed, participants respond to hypothetical situations that may lack the complexity, emotional depth, or social pressures of real-world decision-making. As a result, their reported intentions or attitudes may differ from actual behavior, reducing the validity and generalizability of the findings. Additionally, the relatively small sample size further restricts the generalizability of the research results beyond the study's specific context.

Managerial implications. The findings offer several actionable insights for organizational practitioners. First, internal communication strategies should switch from transactional, metric-reporting style to narrative-based communication. Rather than emphasizing the economic aspects of corporate donations, human resources and marketing managers should adopt a storytelling approach that highlights the specific mission and operations of nonprofit beneficiaries and the tangible social impact that these contributions created. Nonprofit field experts should be employed as the primary communicators through internal webinars or presentations to further enhance authenticity and employee engagement.

Secondly, companies should carefully develop opportunities for employees to actively engage with nonprofit partners. Companies may plan volunteering activities that are fully integrated into the standard work schedule, allocating for example 10 or 20% of professional time to provide support to a nonprofit's internal departments, or introduce donation matching programs for employee individual contributions, or redirecting the budget reserved for customary holiday gifts toward the partner organization. In addition, organizations should approach nonprofit collaborations with the framework of co-branding strategy, treating the nonprofit organization as a legitimate brand partner rather than a peripheral beneficiary. Internally distributed co-branded materials can serve as symbolic markers of identity that reinforce employees' sense of belonging to the internal brand equity.

Third, communication initiative should involve all the organizational levels. Companies should avoid restricting the perceived value of the nonprofit partnership to executive leadership and should design initiatives and messaging that reach the entire workforce, including those in operational or administrative roles. Expanding the internal audience ensures that the identity benefits of the partnership spread more evenly throughout the organization.

Nonprofit organizations can also obtain strategic insights from these findings. When negotiating with potential corporate sponsors, nonprofits should consider reframing their value proposition shifting the focus from external social impact toward internal brand benefits. If nonprofits show how sponsorships and partnerships can contribute to improved employee attitudes, stronger organizational identification, and even lower turnover outcome, they may increase the

perceived strategic significance of these collaborations for companies. In addition, nonprofits should emphasize that when employees choose to volunteer with nonprofits, they can achieve meaningful and productive experiences that can help them develop new expertise and professional skills which can then be brought back and internalized into the company.

Moreover, nonprofits should assist corporate sponsors by offering internal communication toolkits. In addition to logo or basic visual material, nonprofits should provide ready-to-use video content, internal personnel narratives and case studies, and tailored templates for internal communication channels. These resources can help firms communicate the partnership more effectively and strengthen the employee engagement and the perceived legitimacy of the collaboration.

Originality of the paper. This study offers several original contributions to the fields of CSR, internal marketing, and nonprofit–business relationships. Previous research has primarily investigated nonprofit affiliations as mechanisms for generating external halo effects, specifically, improvements in consumer perceptions, brand value, and market reputation. Conversely, this study focuses on the internal marketing benefits of these collaborations. It examines how employees process and internalize nonprofit associations, and challenges the established assumption that external CSR strategies naturally translate into internal organizational advantages. Therefore, this research introduces the concept of an internal brand equity lift, and frames nonprofit collaborations as potential agents of employees' organizational identification.

Second, the paper innovatively employs Social Identity Theory (SIT) and Self-Categorization Theory (SCT) within the specific framework of corporate–nonprofit partnerships. SIT and SCT are well-established in nonprofit research, in areas such as in volunteer management or stakeholder responses, however, they lack systematic integration into the study of internal marketing or employee perceptions and reactions to CSR partnerships. This new theoretical application shows how employees assess the consistency between corporate identity and nonprofit's missions and how this evaluative process shapes their perceived sense of belonging within the organization.

Third, the study offers interesting insights on the under-examined role of brand personality consistency between firms and nonprofit organizations. The empirical investigation on high-fit and low-fit partnerships demonstrates how the perceived consistency, or lack of, determines employee interpretations of authenticity, strategic motivation, and organizational sincerity.

Finally, this paper advances the corporate fundraising literature by suggesting that nonprofits can strategically position themselves not only as instruments of external social impact but also as contributors to firms' internal cultural connection. Nonprofit partnerships may reinforce employee morale and identification, hence, this study reshapes the value proposition of nonprofit organizations for internal marketing purposes in addition to external reputational strategies.

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Tourism pressure and gastronomy: A comparison between Italy and Croatia[1]

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Abstract. *Gastronomy is widely recognized as a strategic resource in destination branding and tourism marketing. While existing research has mainly focused on how food influences tourists' motivations and experience, less attention has been paid to how tourism, in turn, reshapes local culinary systems and destination identities. This paper explores how tourism pressure affects gastronomic identity and the projected destination image from the perspective of local hosts.*

The study adopts a qualitative comparative approach, analyzing through 24 semi-structured interviews with chefs and restaurant owners, two Adriatic destinations characterized by different forms of tourism pressure: Venice (Italy), affected by overtourism, and Istria Region (Croatia), marked by strong seasonality and peak demand.

Findings reveal that tourism acts as both a direct and indirect driver of transformation. Directly, tourists' demand for standardized or iconic national dishes encourages menu homogenization and deviations from local traditions. Indirectly, structural constraints, such as limited availability of local ingredients, workforce erosion, and rising costs, further reshape restaurateurs' practices and identities. Nonetheless, some actors adopt resistance strategies, including market-based daily menus and collaborative networks promoting local sourcing or take the opportunity to innovate traditional dishes.

The study contributes to debates on destination identity and brand co-creation by highlighting tourists' ambivalent role in transforming local gastronomic identities.

Keywords: *tourism marketing; destination image; destination projected image; overtourism*

Framing of the research. *Gastronomy can contribute to the attractiveness of a destination, often captures tourists' attention, and diversifies tourism offerings. Thanks to its interaction with the tourism sector, it might help in the promotion of sustainable local economic development by mobilizing different professional communities and industries.*

Many Destination Management Organizations (DMOs) have increasingly positioned local food as a strategic destination attribute and a distinctive tourism resource (Dixit, 2020). However, tourists' perceptions and overall satisfaction are strongly influenced by how DMOs construct, communicate, and reinforce the culinary image of a place. Such an image is not shaped solely through promotional narratives, but also through actions and initiatives, including the organization of food-related festivals and events, and, more critically, through the everyday gastronomic offerings delivered by local operators, such as cafes, restaurants, and catering services. In this stance, these actors may be considered internal stakeholders whose offerings and communicative practices directly contribute to the projection and co-construction of destination image (Stoica et al., 2022).

Most of the research on food tourism investigates how traditional food and gastronomy influence tourists' motivation and destination experience (Su et al., 2020), consistently finding that food exerts a positive effect on both. Furthermore, positive gastronomic experiences have been shown to enhance tourists' intentions to revisit a destination (Choe & Kim, 2018; Gupta & Sajnani, 2019). A further strand of research examines the relationship between food tourism and destination image by exploring the gap between projected and perceived image, generally revealing a lack of alignment between the two: the image intentionally communicated by DMOs and stakeholders (projected image) tends to diverge from the image tourists actually form (perceived image) (Wacker & Groth, 2020).

Unlike other travel activities and attractions, gastronomy is available year-round. Gastronomy can contribute to a destination's positioning and can also be conceived as a driving force behind the revival of tourism in destinations that are struggling at a critical stage of the tourist-product life cycle (Kivela & Crotts, 2006). Traditional food and cuisine have been conceptualized as one of the elements contributing to destination brand image, which is the perception of a destination in terms of its qualities and associations, usually organized by tourists in meaningful ways and held in memory (Lai et al., 2019). In recent years, especially in localities pressed by overtourism, scholars have begun to investigate the topic by inverting the perspective and considering the impact of tourism on the development, preservation, or restructuring of cities' and regions' cultural heritage and its influence on specific cultural domains such as gastronomy (Ganzaroli, 2017). This argument stems from the fact that tourist hotspots are characterized by large numbers of culturally diverse visitors, who often prefer local dishes modified to suit their foreign tastes (Freire Varela, 2025; Şengül et al., 2024). At the same time, although tourists often dine out in search of new tastes and culinary experiences, they may

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also encounter disappointment because some offerings are a parody of the culinary destination image, or what Finkelstein (1989) calls "manufactured images".

From a consumer perspective, food experience in a destination is composed of "what is served, where it is served, and how it is served" (Björk and Kauppinen-Räisänen, 2014), thus the role of restaurants and how they craft their offering are pivotal in affecting tourists' perceptions and satisfaction. When a restaurant operates in a tourist context, it potentially addresses a wide range of target segments, including residents, domestic visitors, international tourists, and tourists with specific needs or preferences. As highlighted by Ganzaroli et al., (2017; 2021) analyzing restaurants' reviews, products and services' quality tend to decline over time because of the standardization of the culinary offering and the fact that most tourists are not foodies.

Various streams of literature emphasized the self-reinforcing mechanism triggered by the touristification of cities: as an effect of increasing tourist flows, they witness the crowding out of non-touristic economic activities and gentrification. Gentrification and the general redefinition of the urban fabric of the city (e.g. residential buildings devoted to short-term rentals) to fit the archetype of the contemporary global tourist "magnet" are sustained by the parallel spread of restaurants and places devoted to food preparation and consumption. Some researchers explicitly designate such a phenomenon with the term "foodification" (e.g.: Bourlessas et al., 2022; Varela, 2025). Food and beverage activities and the surrounding public spaces become stages where food cultures are represented. Such representations entail complex interactions between authentic local food experiences, revisited and adapted ones, and globalised standards (e.g. food chains and local variants of hegemonic food formats). Moreover, a destination's foodification influences the surrounding food producing sectors: what a city or an area reclaims in turns of supply will channel the production choices of neighboring enterprises and value chains.

Thus, the impact of tourist pressure on the cities and restaurants' offering is already confirmed by the literature, but despite the relevance that food plays in travel-related decisions (European Travel Commission, 2024) and in shaping a destination's image (Gupta et al., 2024), little is known about how restaurants maintain their authenticity and adhere to local culinary traditions, contributing to the projected image of the destination, especially in destinations primarily known for other attractions and push factors (Antara & Prameswari, 2018).

The aim of this paper is to capture these interplays in destinations affected by (over)tourism and document how they unfold, with a particular focus on how the structure of global tourism induces transformations and evolutions of local food systems (distribution, retail and restaurants, production of food) and how these evolutions affect the local actors' self-perceived identity and thus the projected destination image.

Purpose of the paper. *Instead of analysing how food and gastronomy affect tourism perception and experience, the research presented in this paper moves from the opposite direction and delves into the role of tourism in affecting, shaping, and transforming a destination's culinary culture and identity, adopting the perspective of the host (Lai et al., 2019). In particular, our analysis considers how foodscapes –the physical, sociocultural and economic space in which people encounter meals and food–, culinary culture, identity, and gastronomy are more or less induced to transform as a result of tourists' requests and expectations. Much literature on the intersection between tourism and destinations' foodscapes (Björk & Kauppinen-Räisänen, 2019) has delved into the mechanisms according to which local food systems characterize destinations and contribute to their differentiation. Mass tourism, nonetheless, shows signs of reversal in the direction of such influence: the global structural characteristics of tourism address and influence the agency, and thus the identity, of destinations and their economic actors, including food producers and distributors. Touristification, in other words, might erode and transform local cultures, including those providing the frameworks on how specific economic activities (e.g. food production, restaurants) are interpreted and performed, transforming their nature and redefining professional identities, material and entrepreneurial cultures (Cheer et al., 2019). In this paper's parlance, thus, we are interested in shedding light on an under-investigated topic in previous research: are chefs, food retailers, and ultimately local foodscapes influenced by the pressures and forces of global tourism? And despite the different conditions, what are the main challenges for restaurants in enhancing and protecting their gastronomy identity?*

Methodology. *Our selection of the field for the empirical work was guided by the search for theoretically significant contexts. First, we aimed at identifying critical case studies of destinations targeted by high touristic pressure. To be significant, each context had to be home for elaborate, history-laden, and widely recognized food traditions, cultures, and gastronomic identities. Thus, we searched for locales hosting thick culinary cultures, rich in gastronomic heritage, and distinguished by the production of various and heterogeneous typical products used in a variety of traditional dishes and recipes. Our search took into consideration the existence of codified or consolidated cooking techniques and cultures of eating. To grasp the main foundational elements of each region's culinary and food traditions' culture, we resorted to desk research on extant literature, books, and historical accounts. Then we turned to semi-structured interviews with chefs and restaurant owners to capture if and how they were aligned with these traditions and the underlying professional identities, if and how they detached themselves from "authentic" and orthodox interpretations of these traditions, and whether such deviations were due to factors we could connect with tourism. To compare different yet culturally related national contexts, we considered two contexts that are geographically close yet interested by tourism flows of different sizes, even if both remarkable: Venice in Italy and the Istria Region, in Croatia. The two areas have distinctive food cultures but their histories present some overlaps as the result of past political contingencies. Italy represents a particularly relevant context for the topics of this paper. Its strengths in the culinary field are widely acknowledged: in*

2025, Italian cuisine was recognized by UNESCO as Intangible Cultural Heritage, further legitimizing the country's traditional food culture and reinforcing its gastronomic image. Italy is celebrated for its diverse regional cuisines, high-quality wines, and artisanal products, supported by robust local supply chains that keep high-quality ingredients at the core of culinary practices. Despite these advantages, the sector also faces important challenges, particularly in highly touristic areas. Like Italy, each region of Croatia has its own special culinary recipes, ingredients and personality. In particular, Croatia is rich in natural, cultural, and historical heritage, and it represents a cross-cultural meeting place that has also been shaped by numerous nations that have left their mark on its culinary heritage.

Among these countries, we focus on destinations (a city and a region) where gastronomy is just one of the push factors contributing to the overall destination image, rather than the most important one. Within the Croatian tourism industry, Istria Region represents one of the most important tourist destinations (Krajnović et al. 2013), playing a strategic role in the national tourism economy and in the promotion of local cuisine. Venice, likewise, is a globally renowned tourist city with a strong but often not well-renowned culinary tradition. The two destinations share flavors, recipes, and food cultures shaped by a common Adriatic history.

The elaboration of the answers to our research questions relies on 24 semi-structured interviews conducted between July and December 2024 with chefs and restaurateurs from the selected areas. Specifically, 12 interviews were carried out in 9 different towns of the Istria Region and 12 in the city of Venice (Table 1). The restaurants and taverns included in the study were selected with reference to the leading restaurant guides and rankings featured on official tourism websites for both destinations. This sampling approach was complemented by the analysis of secondary sources, including social media pages and websites of additional establishments cited in such guides and rankings but not directly interviewed, to broaden the contextual understanding of each destination's food scene.

Table 1 – The sample

N	*Destination*	*N employees*	*Years of activities*
1	*Venice*	*>10*	*4-6*
2	*Venice*	*>10*	*>10*
3	*Venice*	*>10*	*>10*
4	*Venice*	*>10*	*>10*
5	*Venice*	*>10*	*>10*
6	*Venice*	*>10*	*>10*
7	*Venice*	*7-10*	*>10*
8	*Venice*	*7-10*	*>10*
9	*Venice*	*4-6*	*>10*
10	*Venice*	*>10*	*>10*
11	*Venice*	*7-10*	*>10*
12	*Venice*	*4-6*	*>10*
13	*Istria Region*	*4-6*	*>10*
14	*Istria Region*	*7-10*	*7-10*
15	*Istria Region*	*>10*	*>10*
16	*Istria Region*	*7-10*	*>10*
17	*Istria Region*	*>10*	*>10*
18	*Istria Region*	*>10*	*>10*
19	*Istria Region*	*>10*	*>10*
20	*Istria Region*	*>10*	*>10*
21	*Istria Region*	*1-3*	*>10*
22	*Istria Region*	*>10*	*>10*
23	*Istria Region*	*4-6*	*>10*
24	*Istria Region*	*1-3*	*>10*

Results. *The findings confirm that touristic pressure has significantly influenced the gastronomic offering and, consequently, the image projected by local restaurants. In particular, this pressure has made it increasingly challenging for them to preserve a clear and coherent culinary identity. One of the main reasons lies in the multiplicity of tourists and culinary cultures converging in the destination. On the one hand, such diversity generates demand for simpler, more international and standardized dishes; on the other, it makes it more difficult to identify and attract those visitors who might be genuinely interested in discovering the local cuisine. Several Venetian restaurateurs emphasized that customers' requests are often oriented towards the most famous dishes of national Italian cuisine rather than local Venetian staples, without considering seasonality, nor considering the origin of ingredients: "They ask us caprese, in January". Even those who initially sought to avoid offering the most iconic dishes of Italian cuisine, reported having gradually given in to market pressure. Some restaurateurs justify this choice as a matter of customer service "if they ask me for an Italian dish and I can prepare it, I satisfy the request". The posture that emerges is one where this concession is framed as an additional service rather than a deliberate shift away from culinary identity. Others acknowledge having made compromises due to the overwhelming frequency of such requests, not to provide a service but to follow the (mass)demand. At the same time, another attitude emerging from the fields is one where actors adopt a more resistant*

stance aimed at preserving a clear culinary identity. This second group of operators asserts that "if customers are not interested in the local cuisine, they are free to dine elsewhere". This attitude is more evident in Venice than in the Istria Region, where foreign requests represent an opportunity too. In fact, a further strategy observed among restaurateurs involves adapting the culinary offer to meet the evolving expectations of tourists from different cultural backgrounds. Rather than preserving tradition in a static form, some operators embrace innovation as a means of broadening their appeal, introducing, as one Istrian restaurateur described it, "modern twists on traditional dishes for new audiences". This approach reflects a deliberate balance between cultural authenticity and contemporary relevance, allowing establishments to remain competitive without renouncing their gastronomic identity.

The evolution and transformation of local cultures and identities might not just be dictated by framings of different actors, but also by structural characteristics of the local foodscape and mismatches between the size of touristic demand and the local endowment of food and availability of products. When it comes to tourism, the issue becomes particularly relevant. While some actors aim to promote local cuisine, the limited availability of certain local ingredients—especially during peak tourist season in Istria and, more persistently, in Venice—leads them to deviate from a commitment to local authenticity. Although the two geographical areas are characterized by different conditions (overtourism versus strong seasonality and peak demand), the lack of ingredients affects the culinary identity, even if some restaurants try to resist. In Venice, some restaurants seek to preserve local culinary traditions by focusing on a "menu of the day," offering dishes based on what is available at the fish and vegetable markets each morning. Similarly, one of the observed restaurants in Istria has adopted a "from the sea to the table" approach as its core strategy. In this case, the menu is created daily according to what fishermen bring in with their nets that very morning. Rather than providing a printed menu, the staff presents the evening's selection of dishes orally, as the catch of the day determines each course. A challenge for these restaurants lies in differentiating themselves within a highly competitive and crowded hospitality landscape. One strategy through which restaurateurs simultaneously embody and communicate authenticity involves the development of labels and brands explicitly linked to local ingredients and traditional food practices. Such initiatives are perceived as opportunities to reinforce the authenticity of the offer while enhancing the visibility of local products. In Venice, for instance, a notable example is the network Osti in Orto, a farm-to-table initiative established by 13 restaurateurs, whose logo appears on the menus, signaling their shared commitment to locally sourced ingredients and seasonal produce.

Both in Venice and Istria, some restaurateurs reported that they are not sufficiently supported by DMOs in promoting traditional and local dishes, nor are they adequately protected from mass, low-quality foodservice, which often relies on pre-cooked meals and appears indistinguishable from the outside creating a"mismatch between quality and price" as some interviewees in Istria highlighted. There is a need for stronger coordination between local hosts, who concretely shape the destination experience through their activities and culinary practices, and DMOs, which are responsible for ensuring coherence, strategic direction, and visibility. One interviewee in the Istria Region pointed to the limited international recognition of the destination, suggesting that greater visibility could support the development of its gastronomic heritage. At the same time, another one stated that he benefited from operating in a place "positioning also as a gastronomic destination". By contrast, several Venetian interviewees described tourism as a potential threat to local gastronomy, as visitors are more likely to request generic "Italian" dishes rather than traditional Venetian cuisine that are not promoted by the DMO. From these emerging findings, we can conclude that destination international recognition is not enough to help develop the gastronomic heritage if there is no support from the DMO.

An additional critical aspect concerns the erosion of the professional workforce in both the kitchen and the dining room. Rising living costs driven by tourism make it difficult for qualified workers to afford to live in the city, and for those who can, their quality of life is reduced. As a result, non-professional staff is increasingly employed in both back and front-desk roles. This leads to a loss of storytelling and advisory competencies that are crucial to enhancing the dining experience. The findings are particularly relevant when considering the established role of sales personnel in shaping customer decisions. Retail salespeople, as the final point of contact before a purchase decision, play a crucial role in linking the store with customers by providing information and services that support customers' problem-solving processes (Ma & Kim, 2022). This dynamic is highly transferable to the restaurant context. Moreover, compared to home consumption, restaurant settings foster greater openness to wine exploration, with variety-seeking behavior being more likely to emerge when waitstaff are able to effectively guide consumers' choices (Dodd et al., 2005). It follows that a decline in professional service competencies deprives the establishment of a key mechanism through which it can influence decision-making, enhance perceived value, and differentiate the overall dining experience. This challenge is not yet solved by any of the interviews.

To conclude, our findings shed light on the intersection between how tourists develop the image of local food (Björk & Kauppinen-Räisänen, 2014; Aaltojärvi et al., 2018) and how restaurateurs craft their identity which is not only a matter of food, but a combination of tradition, place, and people. Based on these preliminary data, we can confirm that global tourism induces transformations and evolutions of local actors' self-perceived identity and thus the projected destination image. Although the two contexts present different structural conditions, several challenges are shared. In particular, the intense inflow of tourists can exert both economic and cultural pressure on the local culinary supply, prompting operators to adapt their offerings to the predominant tastes of tourists and thus changing the projected image of the gastronomy associations in the destination. Moreover, findings confirm that the true meaning of local gastronomy quality is embedded in subtle differences that are hardly visible to visitors and tourists, but self-evident to locals and hosts (Russo, 2001; Checchinato et al., 2025). In a city like Venice, where tourists constitute the primary target for a large share of bars and restaurants, operators may reduce the quality of their products while maintaining market share

(Russo, 2001), as visiting consumers lack the familiarity required to detect such deterioration. In the absence of coordinated action by restaurants, agrifood firms and DMOs to preserve local ingredients, recipes, and culinary traditions — and to communicate their value effectively — opportunistic behaviors are likely to prevail. This is particularly critical given that the destination's gastronomic image is not an intrinsic property of the place, but a socially constructed outcome of its operators' choices: as the composition and orientation of the local food supply changes, so too does the projected image of the destination. Crucially, individual operators cannot be assumed to be inherently committed to safeguarding culinary heritage, especially when short-term market incentives point in the opposite direction.

Research limitations. *An important limitation of this research concerns its generalizability. The findings are based on only two specific contexts and therefore reflect the socio-cultural and culinary characteristics of these settings. The results cannot be readily extended to other countries, particularly those with very different culinary traditions and restaurant cultures. Further studies in more diverse contexts — encompassing both high tourism pressure cities and micro-destinations such as mountain areas — are needed to assess the transferability of these findings and identify potential differences. In addition, it would be useful to address this topic using alternative methods, such as network analysis, or adopting a different level of analysis, for example, that of DMOs, to better understand the relationships among local actors and how the issue is being tackled at a central level.*

Managerial implications. *While restaurateurs and other local actors actively produce and embody the gastronomic culture of a place, their efforts risk remaining fragmented if not supported by a broader destination strategy. From a marketing perspective, this challenge calls for strong and coordinated communication, both at the level of the individual restaurant and at the collective level of destination branding. In particular, collaborations among restaurant owners, chefs, and gastronomy professionals — together with local institutions — could lay the groundwork for a shared positioning strategy, identifying the recipes, ingredients, and elements of gastronomic hospitality around which the destination seeks to be recognised. Only once such a positioning is collectively defined, targeted communication efforts can be developed, aimed at educating international tourists and introducing them to the specificities of the local cuisine and foodscapes.*

In destinations where food is not the primary reason to visit, tourists are often less interested in traditional gastronomy and more attracted to standardized or "safe" consumption options (e.g., tourist menus or generic dishes rather than local specialties). The high tourist demand may therefore encourage processes of homogenization in the gastronomic offer, rather than preserving local cultural and culinary specificity. This homogenization can be further exacerbated by structural factors such as the limited availability of typical products in the local market, rising procurement and commercial costs, and competition for scarce resources (e.g., seasonal ingredients and skilled labor). In this context, standardization becomes a strategic response to market logics rather than the outcome of a shared choice.

From this perspective, several strategies emerge as potential solutions to mitigate these dynamics. First, organizing gastronomic events during the low season could help attract tourist segments that are more oriented towards cultural experiences, and strengthen the link between local products and territorial identity. Second, the creation of structured networks among producers, restaurateurs, and tourism operators can foster collaborative relationships that support the supply of typical products, facilitate knowledge sharing, and promote offerings that are more consistent with local traditions. Finally, the development of consumer education or tasting initiatives and gastronomic storytelling - that is, narrating the cultural, historical, and productive context behind each dish - can enhance perceptions of authenticity and valorize the specific identity of destinations, moving beyond the mere satisfaction of functional needs.

Originality of the paper. *This research aims at analysing how the gastronomy destination identity is constructed and then projected, taking the perspective of the host (Lai et al., 2019) and considering the role of tourists as one of the stakeholders involved in the creation of the destination identity. Our paper contributes to the debate about the meanings associated with stakeholders' involvement, brand co-creation and its benefits in the destination identity (Stoica et al. 2022) not only considering the restaurant's point of view, but analyzing how other external stakeholders - tourists - affect a destination's offering and its projected image.*

Our findings depict a situation in which, under conditions of high tourism pressure, tourists become co-creators of gastronomic identity in both direct and indirect ways. Directly, their demands contribute to reshaping local restaurants' strategies — in terms of menu composition and differentiation — and the products they offer, most notably through the progressive standardization of dishes. Indirectly, tourism pressure reduces the availability of local ingredients, thereby undermining the authenticity of the gastronomic offer, while simultaneously generating bottlenecks in the skilled workforce and accelerating residential displacement. This last dynamic is particularly consequential: residents are not passive bystanders in this process, but active bearers of culinary memory and practice whose continued presence would sustain local food culture, anchor local demand, and exert an implicit pressure on restaurateurs to maintain authentic offerings and practices. When tourism pressure displaces them, it does not merely alter the social fabric of the destination, it systematically erodes the very custodians of gastronomic identity, accelerating an irreversible drift toward cultural homogenisation and the loss of the culinary traditions that once defined the place.

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When Gender Meets Super-Expertise: Perceptual Bias and Behavioral Effects in AI–Human Hybrid Recommendations

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Abstract. *Consumers increasingly rely on algorithmic and human recommendations to navigate complex purchase decisions, yet research has predominantly examined either human or AI recommendation sources in isolation. This study focuses on AI–human hybrid recommendation systems, in which algorithmic outputs are combined with human expertise. Specifically, it examines whether recommender gender and expertise level jointly shape consumer perceptions and behavioral responses. Using a 2 × 2 between-subjects experiment (N = 169), participants evaluated an AI–human hybrid recommendation for a virtual reality headset. Gender was treated as a social cue and expertise as a boundary condition. Results show a differentiated pattern across expertise conditions. When the recommender is described as an expert, perceived transparency does not differ significantly between male and female recommenders. When the recommender is described as a super-expert, the female recommender is perceived as more transparent than the male recommender. In addition, perceived transparency was negatively associated with purchase intention, indicating that greater informational openness may activate caution rather than commitment in high-technology experience contexts. The paper provides preliminary evidence relevant to the debate on AI–human hybrid systems, suggesting that gender and expertise may function as joint determinants of perceived transparency, and offering initial insights into the conditions under which social identity cues shape consumer responses within algorithmic recommendation environments.*
Keywords: *Product recommendations; Artificial Intelligence; AI–human hybrid systems; Expertise signaling; Gender bias; Experience goods; Behavioral decision-making.*

Framing of the research.

AI-assisted recommendations in experience-based, high-technology contexts. *AI-assisted recommendation systems are increasingly designed as hybrid configurations, in which algorithmic outputs are combined with human expertise to guide consumer decisions (Puntoni et al., 2021; Mazzù et al., 2025). Examples of these configurations include e-commerce platforms that combine algorithmic product recommendations with advice from certified specialists, or retail interfaces that integrate AI-generated suggestions with human advisors presented as industry experts. This design logic rests on the assumption that human cues — such as credentialed expertise and recognizable identity — can enhance the legitimacy of algorithmic advice and reduce the uncertainty consumers face when evaluating complex or unfamiliar products. Yet the conditions under which human source characteristics shape how hybrid recommendations are perceived and acted upon remain poorly understood.*

Existing research has primarily compared human and AI recommendation sources, while largely overlooking how identity cues embedded in the human component of hybrid systems influence consumer evaluations. Do social identity cues such as gender influence how transparent an AI–human recommendation system is perceived to be? Does this effect depend on the level of expertise attributed to the human recommender? And does any perceptual influence translate into purchase intention? These questions are especially relevant for experience-based, high-technology products, where objective pre-purchase evaluation is limited and consumers must rely heavily on external signals to guide economically consequential decisions.

In hybrid environments, the distinction between AI-generated and human-provided advice is increasingly blurred. Algorithmic systems supply analytical depth and scale; human experts provide contextual framing, legitimacy, and socio-emotional resonance (Puntoni et al., 2021; De Cicco et al., 2025). Prior work has established that recommendation source type shapes consumer reactions (Mazzù et al., 2024), but substantially less attention has been devoted to the identity characteristics of the human component embedded within hybrid systems. In high-technology experience contexts, where product quality cannot be fully assessed before purchase (Nelson, 1970) and financial stakes are salient, the characteristics of the human source — including their perceived expertise and their gender — may function as diagnostic cues that shape how the entire recommendation system is evaluated. Specifically, such cues may influence perceived transparency (Mazzù et al., 2023), defined here as perceived informational openness — the extent to which the recommendation is seen as providing clear, accessible, and candid product information — rather than algorithmic transparency concerning how the AI system operates.

This paper examines precisely this question. Focusing on gender as a social cue and expertise level as a boundary condition, we test whether their interaction shapes perceived transparency of an AI-human hybrid recommendation and whether perceived transparency, in turn, predicts purchase intention. The study extends prior work on source effects in recommendation systems (Baccelloni et al., 2025a) by moving beyond binary human-vs-AI comparisons to examine how the identity characteristics of the human component moderate perceptual evaluations within a constant AI-supported framework. By doing so, it addresses a gap in research that has predominantly focused on attitudinal outcomes while

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leaving the process mechanisms and behavioral consequences of human source cues in hybrid AI environments underexplored.

Gender and perceptual legitimacy in AI-assisted high-technology contexts. *Gender is among the most pervasive social categorization cues in interpersonal and mediated communication (Eagly & Karau, 2002). In source evaluation contexts, gender operates not as an explicit evaluative criterion but as an implicit heuristic that activates gender-role expectations and stereotypic associations. In domains stereotypically linked to technical authority — such as engineering, computing, and high-technology consumption — these associations often favor male sources. When a recommendation is presented by a male versus female expert, consumers may draw on gendered competence schemas to interpret the information (Kim et al., 2024; Calluso et al., 2025).*

Research on gender and expertise evaluations consistently shows that the influence of gender depends on contextual moderators, including task type and perceived congruence between the domain and gender-role expectations (Calluso et al., 2025; Eagly & Karau, 2002). In technology-related contexts, male sources are generally perceived as more congruent with the domain, which may lead female sources — particularly those positioned at high levels of authority — to face evaluative penalties linked to expectancy violation (Rudman & Glick, 2001). Importantly, this effect is most likely to emerge when the recommender's identity is made salient — as occurs when expertise is strongly signaled. At the same time, expectancy violations may also produce the opposite effect. When individuals occupy positions that contradict stereotypical expectations, their behavior and communication style may be evaluated more carefully and perceived as more deliberate and informative. In such cases, a female recommender presented as a super-expert may be perceived as providing more transparent and detailed information precisely because her authority signals exceptional competence within a domain where expectations are typically male-oriented. In conditions of lower expertise, when identity cues are less diagnostic, gender effects on perceptual evaluations may be suppressed or absent.

While prior work has examined gender effects on trust and credibility perceptions in advisory contexts, less attention has been devoted to how gender shapes perceived transparency — an evaluative dimension particularly relevant to AI-assisted settings, where consumers assess the extent to which the recommendation provides clear guidance. Perceived transparency in hybrid recommendation systems is not simply a property of the algorithmic component; it is also colored by the identity of the human source through whom the recommendation is communicated. If a female super-expert is perceived as occupying a role at odds with domain expectations, the informational openness of the entire recommendation may be interpreted more carefully, even when the content of the advice is identical.

A further consideration concerns the link between perceived transparency and purchase behavior. In high-technology, experience-based contexts, greater informational openness does not necessarily translate into greater commitment. On the contrary, detailed disclosure of product complexity and limitations may increase consumers' awareness of risk and uncertainty, leading to more cautious allocation decisions (Schilke & Reimann, 2025). This "transparency caution" mechanism provides an important theoretical complement to the perceptual effects of source cues: even if gender and expertise shape how transparent the recommendation is perceived to be, the downstream behavioral consequence of transparency may reflect risk activation rather than trust formation.

Expertise as a legitimacy cue and boundary condition under uncertainty. *A foundational insight from source credibility research is that, when consumers cannot directly evaluate the quality of information, they rely on source characteristics as proxies for reliability and relevance (Hovland et al., 1953; Chaiken, 1980; Pornpitakpan, 2004). Expertise — the degree of domain-relevant knowledge and experience attributed to a source — is among the most consistently studied of these cues. In complex, technically sophisticated product categories, high expertise is generally associated with greater persuasiveness and stronger recommendation uptake (Donovan et al., 2024). Expertise signals not only technical competence but also normative authority, indicating that the recommender is institutionally qualified to guide decisions under uncertainty (Wiener & Mowen, 1986; Pornpitakpan, 2004).*

In AI-assisted recommendation environments, the authority function of expertise becomes particularly salient. When consumers encounter an AI-human hybrid system, the presence of a credentialed human expert may serve as a signal of informational legitimacy — not merely of the human's personal knowledge, but of the entire recommendation configuration. This is consistent with dual-process accounts, which suggest that source cues become especially influential under conditions of uncertainty or when cognitive elaboration is constrained, leading consumers to rely on heuristic processing rather than systematic evaluation (Petty & Cacioppo, 1986). Empirical research in AI-assisted retail contexts extends this principle, showing that expertise-related cues modulate how recommendation systems are evaluated as a whole, with higher expertise signals increasing the perceived authority of the overall human-algorithm configuration (Chinchanachokchai et al., 2021). For high-technology experience products, where most consumers lack the domain expertise to independently assess recommendation quality, the perceived authority of the human source may thus shape how the system as a whole is evaluated.

Importantly, elevated expertise may also amplify the diagnostic value of other source characteristics. When a recommender is perceived as a routine expert, consumers may focus primarily on the informational content of the recommendation. When the recommender is positioned as an outstanding authority — for instance, through extensive experience, certifications, and institutional recognition — the identity of the source itself becomes more salient. Under these conditions, expertise functions not only as a direct credibility cue but as a boundary condition that modulates how additional characteristics, including gender, are interpreted and weighed. This amplification logic suggests that the effect

of gender on perceptual evaluations may emerge specifically in high-expertise conditions, where the recommender's identity is most foregrounded.

This perspective treats expertise level as a structural feature of the recommendation environment rather than a simple additive predictor. Its relevance lies not in whether more expertise leads to better outcomes, but in whether it changes the interpretive context within which other cues — such as gender — operate. We accordingly treat expertise as a boundary condition in the analytical model.

Purpose of the paper. *This paper examines how human source cues embedded in AI-assisted recommendation systems shape consumer perceptions and purchase intention. Specifically, it investigates (i) whether recommender gender and expertise jointly influence perceived transparency in an AI–human hybrid recommendation, and (ii) whether perceived transparency, in turn, predicts purchase intention in a high-technology experience context. Gender is treated as a social cue, expertise as a boundary condition, perceived transparency as the focal perceptual outcome, and purchase intention as the downstream behavioral response. Rather than assuming a fully supported mediation chain, the study assesses whether social identity cues operate primarily at the perceptual stage and whether their effects extend downstream to behavioral outcomes. Based on the foregoing theoretical arguments, the following hypotheses are advanced:*

H1. The effect of recommender gender on perceived transparency of an AI-human hybrid recommendation is moderated by expertise level, such that gender differences in transparency perceptions are more pronounced when the recommender is described as a super-expert than when described as an expert.

H2. Perceived transparency of an AI-human hybrid recommendation negatively predicts purchase intention, such that higher levels of perceived transparency are associated with lower purchase intention toward the recommended product.

RQ (Exploratory). As an exploratory question, this study examines whether the indirect effect of recommender gender on purchase intention through perceived transparency differs as a function of expertise level (i.e., whether the conditional indirect effect is consistent with a moderated mediation pattern). Given the partial and marginal nature of the first-stage interaction (H1), no directional hypothesis is advanced regarding the full indirect path.

Methodology. *The study employed a 2 (human recommender gender: Female = 0 vs. Male = 1) × 2 (expertise level: expert = 0 vs. super-expert = 1) between-subjects experimental design within an AI-assisted recommendation context. Participants were randomly assigned to one of four conditions and exposed to an online shopping scenario involving a virtual reality (VR) headset, selected as a high-technology experience product characterized by high ex ante uncertainty. Across conditions, recommendations were consistently presented as AI-assisted, with an identifiable human expert integrated into the system; only the recommender's gender and level of expertise were manipulated. Expertise was manipulated by describing the recommender either as an industry expert or as a highly credentialed authority with over 30 years of experience, while all other elements of the stimulus (product information, layout, and wording) were held constant. As intended, the expertise manipulation was successful: participants in the super-expert condition perceived the recommender as significantly more expert than those in the expert condition, confirming the effectiveness of the manipulation (see Appendix).*

Descriptive statistics indicated that perceived transparency averaged 4.34 (SD = 1.36), and purchase intention equaled 2.01 (SD = .46). Recommender gender was approximately balanced across conditions (M = 0.51, SD = 0.50), as was expertise level (M = 0.51, SD = 0.50). Bivariate correlations revealed a negative association between perceived transparency and purchase intention (r = −.378). Gender and expertise level showed negligible correlations with purchase intention (r = .153 and r = −.001, respectively) and with each other (r = .065).

After exposure to the recommendation scenario, participants completed a behavioral allocation task in which they were asked to distribute a hypothetical budget of $499 — matching the price of the VR headset — across three mutually exclusive options: purchase the recommended product (fully following the recommendation), seek additional information (partial deferral), or retain the budget (full rejection of the recommendation). This three-option forced allocation design, scored on a 1–3 scale, was chosen as the primary dependent variable because it captures financial commitment as a consequential and mutually exclusive decision rather than as a self-reported attitude. Unlike intention scales, the budget allocation task imposes a concrete trade-off and thereby introduces behavioral realism into an experimental setting (Chandon et al., 2005). The task is particularly appropriate for experience products involving financial risk, where the willingness to allocate real resources constitutes a meaningful proxy for downstream purchase behavior. Response distributions indicated that 10.1% of participants chose to purchase (option 1), 78.7% opted to seek additional information (option 2), and 11.2% retained the budget (option 3), confirming that the distribution across response categories, while concentrated on option 2, reflects a behaviorally coherent pattern in a high-uncertainty, high-involvement product context. While the compressed 1–3 range may reduce statistical sensitivity relative to continuous scales — a limitation acknowledged in the Research Limitations section — the forced-choice structure is theoretically justified by the discrete and mutually exclusive nature of the financial commitment it represents. Although the budget was hypothetical, prior research has shown that incentive-compatible framing of trade-off tasks elicits behaviorally consistent responses in experimental consumer research. Participants also completed self-reported measures of intention to follow the recommendation; results on this variable have been reported elsewhere (Mazzù et al., 2025) and serve here as a reference for situating the behavioral findings.

Additional perceptual measures assessed perceived transparency, credibility, warmth, competence, and gender fit using validated multi-item 7-point Likert-type scales adapted from prior research. Perceived transparency (5 items; e.g.,

"I believe the recommendation source will provide me with transparent product information") was operationalized as perceived informational openness — the extent to which the recommendation source was seen as providing clear, accessible, and in-depth product information — rather than procedural or algorithmic transparency per se, following Mazzù et al. (2023). Credibility was measured with 10 items assessing both trustworthiness (e.g., dependable, honest, reliable) and expertise (e.g., expert, knowledgeable, qualified) dimensions, adapted from Hovland et al. (1953) and Pornpitakpan (2004). Warmth and competence were each assessed with 3-item scales following established social perception research. Gender fit was assessed through two complementary 6-item scales capturing both general domain-gender congruence beliefs and the perceived suitability of the specific recommender for the product category. All scales were drawn from validated instruments. These measures were included to support the interpretation of behavioral outcomes; however, in line with the conditional process framework, perceived transparency was specified as the focal mediator in the analytical model.

*Data were collected via Prolific from a European sample. Of 224 initial respondents, 169 participants (aged 18–65) passed attention checks and were retained for analysis, yielding approximately 42 participants per cell. Participants were randomly assigned to one of the four experimental conditions. A post-hoc power analysis using G*Power (Faul et al., 2007) for a multiple regression model with three predictors and a medium effect size ($f^2 = .15$, $\alpha = .05$) indicated that a sample of 169 provides statistical power of approximately .90. For the moderated mediation pathway, in which effect sizes tend to be smaller, the present sample provides sufficient power for an initial test of the proposed framework, though future studies should employ larger samples to detect more distal conditional indirect effects with greater precision.*

Effects of the experimental manipulations were examined using Hayes' (2022) PROCESS macro for SPSS (Model 7), testing a first-stage moderated mediation model in which recommender gender predicted purchase intention indirectly through perceived transparency, conditional on expertise level. Interaction terms were computed directly from these coded variables. Indirect effects were estimated using 5,000 bootstrapped samples with 95% confidence intervals. All analyses were conducted using SPSS.

Results.

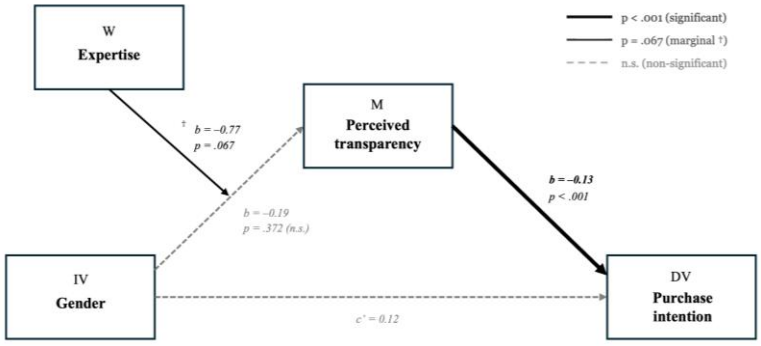
Interaction effects on perceived transparency. *The regression model predicting perceived transparency explained a modest portion of variance ($R^2 = .026$, $F(3,165) = 1.48$, $p = .221$). Neither the main effect of recommender gender ($b = -0.19$, $p = .372$) nor the main effect of expertise ($b = 0.12$, $p = .571$) was statistically significant. However, the interaction between gender and expertise was marginally significant ($b = -0.77$, $SE = .42$, $p = .067$), indicating that the effect of gender on perceived transparency depends on the level of expertise attributed to the recommender.*

Conditional effects analysis showed that when the recommender was portrayed as a super-expert, gender negatively predicted perceived transparency ($b = -0.56$, $p = .056$), whereas no significant gender effect emerged in the expert condition ($b = 0.21$, $p = .486$). This pattern indicates that gender differences in perceived transparency arise only when expertise is framed as particularly high. Specifically, in the expert condition male recommenders were perceived as slightly more transparent than female recommenders, whereas in the super-expert condition the opposite pattern emerged. Figure 1 illustrates this interaction.

The indirect effect of gender on purchase intention through perceived transparency was not statistically significant at either level of expertise. In the expert condition, the indirect effect was small and non-significant, and in the super-expert condition it was larger in magnitude but also non-significant (both 95% CIs included zero). Consistent with these results, the index of moderated mediation was not statistically significant (index = .097, 95% CI [−.008, .212]).

Overall, the results indicate that gender and expertise jointly influence early perceptual evaluations of transparency, but these perceptual differences do not translate into statistically reliable conditional indirect effects on purchase intention. The findings therefore provide partial support for the proposed interaction hypothesis, suggesting that expertise acts as a boundary condition shaping how gender cues are interpreted at the perceptual stage.

Figure 1. Moderated mediation model – estimated coefficients



Summary of results. *Overall, the results provide partial support for the proposed model. The interaction between gender and expertise on perceived transparency was marginally significant, with gender differences emerging only in the super-expert condition. Perceived transparency negatively predicted purchase intention, suggesting that greater informational openness may activate caution rather than commitment in a high-uncertainty technology context. The conditional indirect effects of gender on purchase intention through transparency were not statistically significant at either level of expertise, and the index of moderated mediation was likewise non-significant. Taken together, these findings suggest that human source cues in AI-assisted recommendation environments operate primarily at the early perceptual stage, with limited downstream effects on behavioral outcomes.*

Research limitations. *This study has several limitations that suggest directions for future research. First, the analysis focuses on a single high-technology, experience-based product category. Although a virtual reality headset is well suited to examining decision-making under uncertainty, future research should assess whether similar dynamics emerge across other experience goods and in mixed search–experience contexts. Second, the sample size is sufficient for detecting the focal direct effects but remains relatively limited for moderated mediation analysis, where interaction-based indirect effects tend to be small in magnitude and require larger samples to achieve adequate statistical power. The marginal significance of the first-stage interaction (p = .067) and the non-significant indirect effects may in part reflect this power constraint rather than a true absence of the hypothesized processes. Future research should therefore employ larger samples specifically designed to provide adequate power for detecting conditional indirect effects of the expected magnitude. Third, the study concentrates on gender and expertise as the focal human cues embedded within AI-assisted recommendations. Other characteristics—such as age, communication style, perceived similarity, or visual presentation—may shape consumer responses in different ways. Future studies should investigate how broader combinations of human attributes influence perceptual mechanisms in hybrid AI–human systems. Fourth, the dependent variable — a three-option forced allocation task scored on a 1–3 ordinal scale — while theoretically grounded in behavioral realism, imposes constraints on statistical sensitivity. The compressed response range may reduce variance and limit power to detect small conditional effects, particularly in the moderated mediation pathway. Future research might explore continuous allocation formats (e.g., percentage-based budget distribution from 0 to 100%) or multi-item behavioral indices to improve measurement resolution. Fifth, although the budget allocation task required participants to make a concrete and mutually exclusive monetary trade-off, it remained hypothetical. Research on hypothetical bias suggests that stated willingness to pay or act may diverge from actual behavior, particularly when financial stakes are salient (Chandon et al., 2005). Future research might employ incentive-compatible designs — such as bonus-conditional choice tasks on crowdsourcing platforms — or field experiments in partnership with retail operators. Finally, further theoretical work is needed to clarify the role of perceived transparency in high-uncertainty contexts. The present findings suggest that informational openness may not always facilitate commitment and, under some conditions, may instead activate caution. Future studies should examine more closely when transparency enhances trust and when it heightens perceived complexity or risk, thereby refining its role in AI-assisted decision environments.*

Managerial implications. *For managers, the findings suggest that evaluating AI-assisted recommendation systems solely through attitudinal metrics may provide an incomplete picture of system performance. Although the direct behavioral effects of recommender gender were limited, the results indicate that human cues can shape perceptual interpretations of transparency under specific expertise conditions. This highlights the importance of complementing attitudinal indicators with behavioral metrics when assessing the effectiveness of hybrid AI–human recommendation systems. The findings also indicate that integrating highly credentialed human experts into AI-supported interfaces is not a neutral design choice. Elevated expertise increases the salience of the recommender's identity, which may activate gender-related interpretive biases in technology-related contexts. Managers should therefore consider not only the credentials they communicate, but also how the identity of the human recommender interacts with expertise framing in shaping users' early evaluations of the system.*

In addition, the negative association between perceived transparency and purchase intention suggests that informational openness does not always function as a straightforward conversion mechanism. In high-technology, experience-based contexts, detailed disclosure may increase awareness of product complexity and uncertainty. Managers should therefore carefully consider how and when transparency-related information is presented along the customer journey.

For platform designers, the way human experts are visually and descriptively integrated into AI-supported interfaces may influence how the recommendation system as a whole is interpreted by users. Interface elements such as displayed credentials, biographies, or authority signals can increase the salience of identity cues and shape how recommendations are evaluated.

Finally, the results highlight the importance of the moment of financial commitment within AI-assisted customer journeys. Interface design efforts aimed at supporting clarity, reducing cognitive overload, and managing perceived uncertainty at the point of action may be more consequential than further optimizing upstream trust perceptions alone.

Originality of the paper. *This study contributes to research on AI-human hybrid recommendation systems by examining whether social identity cues embedded in the human component of such systems influence early-stage perceptual evaluations and whether these evaluations relate to purchase intention. The results provide partial evidence that gender*

differences in perceived transparency emerge when the human recommender holds a very high level of signaled expertise — a finding consistent with the view that elevated authority amplifies the salience of identity-related cues in uncertain, high-technology evaluation contexts. Theoretically, the study contributes at the intersection of expectancy violation theory (Rudman & Glick, 2001) and source credibility research (Hovland et al., 1953; Pornpitakpan, 2004) by showing that the evaluative consequences of role-incongruent identity cues are not uniform but are contingent on the intensity of authority signaling. In particular, the finding that a female super-expert — rather than a standard expert — elicits higher perceived transparency aligns with expectancy violation accounts: when a communicator occupies a role that defies stereotypical expectations and does so at an especially high level of authority, the resulting incongruence may focus evaluative attention on the informational content rather than activating backlash. This mechanism extends prior work by specifying expertise level as the structural condition under which gender-based expectancy violations shift from producing evaluative penalties to producing perceptual amplification. Furthermore, by connecting this perceptual amplification to a "transparency caution" effect on purchase behavior — consistent with Schilke and Reimann's (2025) transparency dilemma framework — the paper integrates source credibility, social identity, and behavioral decision-making literatures within a unified process model of hybrid AI–human recommendation influence.

Perceived transparency negatively predicted purchase intention, suggesting that informational openness may activate risk awareness rather than facilitate commitment in technology-uncertainty contexts — a finding that qualifies commonly held assumptions about transparency as a uniformly trust-enhancing mechanism. The conditional indirect effects linking gender to purchase intention through transparency were not statistically significant, which the study interprets as evidence of attenuation along the causal chain rather than as disconfirmation of the perceptual-stage effects.

More broadly, the study contributes to a process-oriented understanding of AI-human hybrid influence in digital retail by clarifying the scope and limits of human source cues within recommendation environments. The results indicate that social identity signals may shape perceptual stage evaluations even within algorithmic systems, but that their downstream behavioral consequences are more limited and context-dependent than prior attitudinal research might suggest. This boundary-condition perspective offers a grounded basis for further research on when and how hybrid AI-human designs translate source characteristics into consumer behavior.

In sum, the paper offers a calibrated account of hybrid recommendation influence: human source characteristics can shape how algorithmic advice is perceptually interpreted, but this influence may attenuate before reaching economically consequential outcomes. Transparently reporting where the evidence is strong and where it remains partial represents, in itself, a contribution to the growing body of research seeking to understand the conditions under which hybrid AI-human systems exert behavioral effects on consumers.

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Appendix

Figure A1. AI-assisted recommendation with male expert

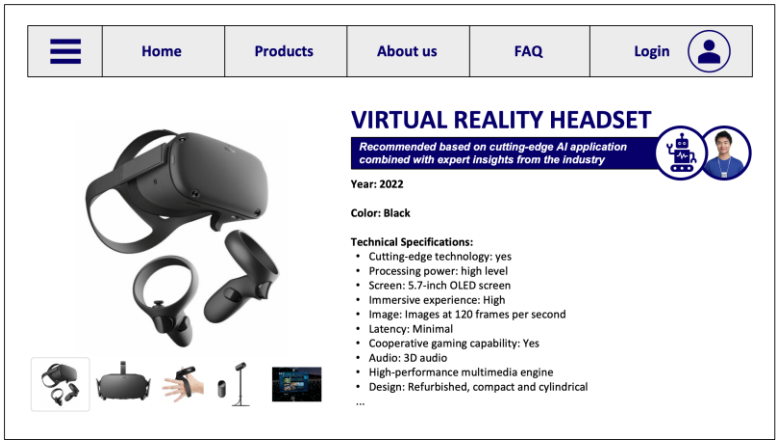


Figure A2. AI-assisted recommendation with female expert

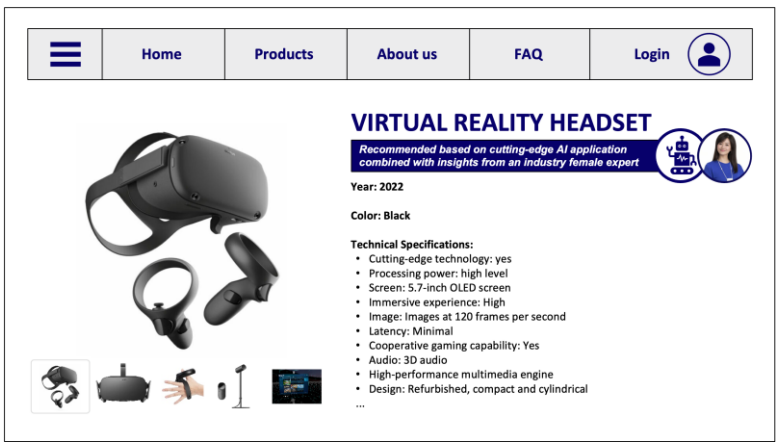


Figure A3. AI-assisted recommendation with male super-expert

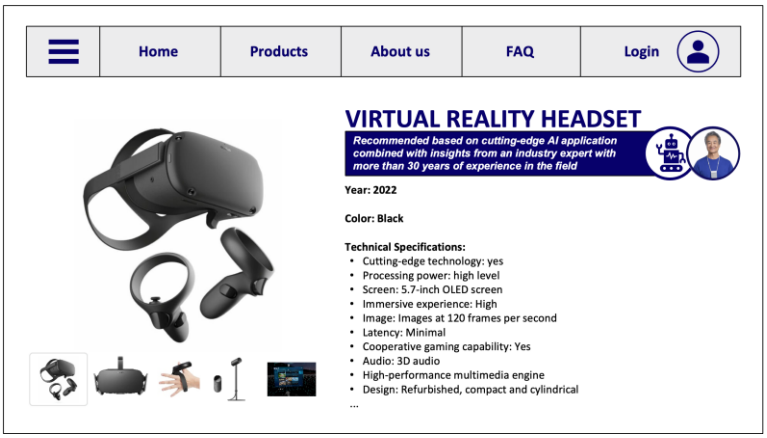
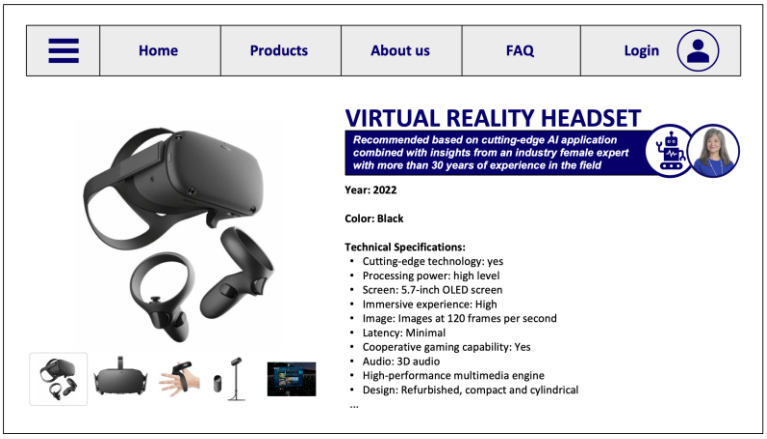


Figure A4. AI-assisted recommendation with female super-expert



When the Community Speaks: Generational Differences in the Effectiveness of Brand versus User-Generated Content in the Digital Beauty Market

ANNUNZIATA TARULLI[1], DOMENICO MORRONE[2], MIRIAM MASELLIS[3]

Abstract. *The growing diffusion of social media has profoundly reshaped brand communication, shifting the creation of brand meaning from firm-controlled messages to participatory digital environments in which consumers actively contribute to brand narratives. In this context, User-Generated Content (UGC) has emerged as a powerful mechanism influencing trust formation, engagement, and purchase intention. Nevertheless, despite its increasing strategic importance, empirical evidence comparing the effectiveness of UGC and brand-generated content across generational cohorts remains limited, particularly within specific industry contexts. This study addresses this gap by examining whether UGC is more effective than brand-generated content in shaping consumer perceptions and purchase intentions in the cosmetic sector, and by analysing how these effects vary across generations. Building on community marketing and participatory brand communication theories, the research develops an empirical framework to investigate consumer responses to different forms of digital communication. Data were collected through an online survey distributed among consumers belonging to four generational cohorts: Baby Boomers, Generation X, Millennials, and Generation Z. Exploratory Factor Analysis was applied to identify latent dimensions associated with trust, engagement, and purchase intention in relation to both UGC and brand-generated content. The results indicate that UGC significantly enhances perceived credibility and engagement among younger generations, particularly Generation Z and Millennials, whereas brand-generated content maintains relatively greater influence among older cohorts. As a result, the study contributes to the literature on digital branding and community marketing by providing empirical evidence on generational differences in content effectiveness and offering managerial insights for designing generationally differentiated digital communication strategies.*

Keywords: *User-Generated Content; Community Marketing; Generational Marketing; Gen Z; Digital Branding; Cosmetic Industry*

Framing of the research. *The rapid diffusion of digital platforms and social media has profoundly transformed the dynamics of marketing communication, progressively shifting the locus of brand meaning from firm-controlled messages to participatory environments in which consumers actively create, interpret, and circulate brand-related content (Kaplan & Haenlein, 2010; Kietzmann et al., 2011). Within these digital ecosystems, marketing communication increasingly takes place through interaction, dialogue, and content co-creation rather than through traditional top-down persuasion. This transformation has altered not only the channels through which brand messages circulate but also the underlying logic of persuasion itself. Consumers are no longer passive recipients of communication; rather, they participate in the symbolic construction of brands, influence reputational dynamics, and shape product evaluation through networked interactions and social validation processes (Hollebeek et al., 2019).*

In this context, User-Generated Content (UGC) has emerged as a central mechanism through which consumers exchange experiences, opinions, and evaluations of products and brands (Dennhardt, 2014). Compared with brand-generated communication, UGC is often perceived as more authentic, socially embedded, and trustworthy because it originates from peers rather than from corporate sources. Increasingly, digital consumer journeys are influenced by algorithmically curated environments in which peer-generated narratives coexist with brand messages, creating hybrid communication spaces where credibility is negotiated through social interaction and community endorsement. In such environments, UGC functions not only as complementary communication but also as a key informational resource that helps consumers reduce uncertainty and evaluate products more confidently. Prior research has shown that such peer-generated information significantly shapes consumer attitudes, trust formation, and purchase intentions, especially in digitally mediated settings characterised by information asymmetry and strong reliance on social proof (Cheong & Morrison, 2008; Mathur et al., 2022). The growing importance of electronic word-of-mouth (eWOM) further reinforces this dynamic. Online reviews, comments, and peer recommendations function as informational cues that guide consumers' evaluation of products and services, often exerting stronger influence on purchase decisions than traditional advertising messages (Ismagilova et al., 2021). Empirical studies confirm that eWOM credibility, source trustworthiness, and message quality significantly influence consumer attitudes, brand perceptions, and behavioural intentions across different digital contexts (Filieri et al., 2018).

The persuasive influence of UGC can also be interpreted through broader behavioural and motivational perspectives. Social learning mechanisms suggest that individuals form attitudes and behavioural intentions not only through direct

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experience but through the observation of others' evaluations and actions (Bandura, 2001). In digital environments, reviews, tutorials, testimonials, and peer commentary therefore operate as cues for behavioural modelling and risk reduction. In parallel, self-determination arguments explain why users actively produce and share content within digital communities when these environments enable them to express themselves, gain recognition, and relatedness (Deci & Ryan, 2000). In this sense, rather than being merely promotional artefacts, consumer-generated contents become a meaningful social signal that shape interpretation, trust, and participation.

These dynamics are closely related to the rise of community marketing. In contrast with traditional approaches centred on control and broadcasting, community marketing emphasises relational engagement, brand-consumer dialogue, and the co-creation of value inside online communities. In this perspective, brands act less as unilateral senders and more as facilitators of interaction, conversation, and shared meaning-making (Matute et al., 2021; Brand et al., 2025; Srivardhana & Boonchoo, 2025). Research on virtual brand communities shows that participation in these communities fosters consumer engagement, brand attachment, and advocacy behaviours, reinforcing the strategic relevance of community-based communication (Gilal et al., 2023).

Alongside peer-generated content, influencer marketing has also emerged as a key mechanism shaping contemporary digital communication strategies. Influencers act as intermediary communicators who combine elements of traditional endorsement and peer-to-peer communication, often enhancing message credibility through perceived authenticity and relational proximity with followers (Lou & Yuan, 2019). Recent research suggests that influencer credibility, perceived authenticity, and parasocial interaction significantly affect consumer trust, brand attitudes, and purchase intentions, particularly among younger audiences (Schouten et al., 2020; Ki et al., 2023). Influencer-generated content therefore represents a hybrid form of communication situated between brand-controlled and consumer-generated narratives, further blurring the boundaries between advertising and peer communication.

Consumer responses to these communication mechanisms, however, are not homogeneous. Generational differences significantly shape how individuals use platforms, evaluate information sources, and respond to brand communication. Generation Z (Gen Z), in particular, represents the first cohort fully socialised in highly digital environments where social media interactions play a fundamental role in identity formation, recognition, and consumption practices (Benavides et al., 2023). As a consequence, younger consumers tend to attribute greater importance to authenticity, interaction, transparency, and peer-generated narratives than older cohorts do (Hermanda et al., 2019; Tirocchi, 2024). Studies on Gen Z consumer behaviour indicate that authenticity, relatability, and value alignment strongly influence brand perceptions and engagement in digital contexts (Djafarova & Bowes, 2021). Moreover, research suggests that younger consumers rely more heavily on peer evaluations, influencer recommendations, and social media communities when forming purchase intentions compared with older generations (Casaló et al., 2020).

These dynamics are particularly relevant in the cosmetic industry. The Italian cosmetics market remains economically strong and highly dynamic, while simultaneously being shaped by digitalisation, omnichannel consumption, sustainability concerns, and the growing relevance of clean beauty among younger consumers. Cosmetica Italia reports that the domestic cosmetics market in Italy reached almost €13.4 billion at the end of 2024, with continued growth expectations for 2025, confirming the economic relevance of this sector and its strong digital orientation (Cosmetica Italia, 2025). At the same time, recent research also shows that safety, ethicality, and sustainability attributes are increasingly salient among Millennial and Gen Z cosmetics consumers, making the beauty sector an appropriate empirical setting for examining differences in digital content effectiveness (Shim et al., 2024).

Despite the increasing relevance of these phenomena, empirical studies comparing the effectiveness of UGC versus brand-generated content across generational cohorts remain relatively limited, particularly in the European context and within the cosmetic industry. Therefore, this research addresses this gap and attempts to compare, under controlled conditions, the relative effectiveness of the "voice of the community" and the "voice of the brand" across generational cohorts in the Italian beauty market.

Purpose of the paper. *The purpose of this study is to investigate the relative effectiveness of User-Generated Content and brand-generated content in shaping consumer perceptions and purchase intentions in the cosmetic sector. Specifically, the study examines whether consumer-created communication generates higher levels of trust, engagement, and behavioural intention than traditional brand communication, while also analysing whether User-Generated Content exerts a stronger influence than brand-generated content and how this effect varies across generational cohorts.*

A second objective is to explore the role of digital socialisation in explaining such differences. In this sense, the study contributes to the understanding of how participatory communication mechanisms operate in contemporary digital markets and how brands may design more effective communication strategies by accounting for generational differences in media use, platform familiarity, and trust formation. Recent literature supports the relevance of this focus, showing that younger audiences, and especially Gen Z, are more responsive to participatory and peer-centred forms of communication than to purely institutional messaging (Shim et al., 2024).

To address these objectives, the research is guided by three specific research questions.

RQ1: How does User-Generated Content influence consumer perceptions of credibility, engagement, and purchase intention, compared with brand-generated content in the cosmetic sector?

RQ2: What differences emerge across generational cohorts in the way consumers interpret and respond to User-Generated Content and brand-generated communication?

RQ3: How does digital socialisation shape the relative effectiveness of community-driven versus brand-driven communication in influencing consumer behaviour?

In addition, the study seeks to explore the behavioural mechanisms through which participatory digital communication influences consumer decision-making, by examining the role of credibility, engagement, and social validation as potential pathways linking exposure to User-Generated Content with purchase intention.

By addressing these questions, the study aims to provide a more nuanced understanding of the mechanisms through which participatory communication influences consumer decision-making in digital environments. At the same time, it seeks to offer insights into how firms operating in highly digitalised industries such as cosmetics can adapt their communication strategies to better align with evolving patterns of media consumption, peer influence, and trust formation across generational segments.

Methodology. *Data were collected using a structured questionnaire distributed via online channels. It consisted of 58 items organised into 28 questions and was designed to measure consumer perceptions of both User-Generated Content and brand-generated content. Following previous research, several constructs were widely examined, including perceived content credibility, consumer engagement with digital content, brand trust, and purchase intention. These constructs were selected in order to capture the main behavioural mechanisms through which User-Generated Content may influence consumer decision-making processes in online environments. All constructs were operationalised using Likert scales adapted from previous literature to capture respondents' agreement with statements related to digital marketing communication.*

The final sample consisted of 285 respondents across three generational cohorts – i.e., Generation X, Millennials, and Generation Z – enabling us to examine how digital communication effectiveness varies across consumer groups characterised by different levels of digital familiarity and social media usage.

To identify the latent dimensions underlying consumer perceptions of digital content, an Exploratory Factor Analysis (EFA) was conducted. After confirming the suitability of the dataset through the Kaiser–Meyer–Olkin measure of sampling adequacy and Bartlett's test of sphericity, factors were extracted using principal component analysis with varimax rotation. This procedure enabled the identification of the underlying constructs associated with the evaluation of User-Generated Content and brand-generated communication. The use of EFA is consistent with the exploratory nature of the study, which aims to examine how key variables such as trust, engagement, and purchase intention cluster across the two communication conditions.

Results. *The results reveal a clear generational gradient in the evaluation of digital marketing content. In general, User-Generated Content demonstrates a stronger impact on perceived credibility and consumer engagement among younger cohorts, particularly Millennials and Generation Z. In particular, the "point of overtaking" appears among Millennials and becomes markedly stronger among Generation Z across trust, engagement, and purchase intention. These consumers tend to interpret peer-generated information as more authentic and trustworthy, reflecting their higher familiarity with participatory digital environments and social media communication dynamics (Mathur et al., 2022). In contrast, Generation X consumers appear to attribute greater authority to official brand communication. For these consumers, brand-generated content still plays a relatively stronger role in shaping brand trust and influencing purchase decisions.*

Overall, the empirical findings suggest that the effectiveness of digital marketing communication depends not only on the type of content but also on the generational background of the audience. These results are consistent with prior research showing that attitudes towards UGC mediate online purchase intention and that content credibility is one of the strongest drivers of this mechanism. They also align with recent work on younger cosmetics consumers, which highlights the growing importance of authenticity, sustainability, and socially validated information in beauty-related decisions.

A more detailed examination of the factor structure emerging from the Exploratory Factor Analysis provides further insight into these generational dynamics. The analysis reveals that trust, engagement, and purchase intention tend to cluster more strongly around UGC-related variables for Millennials and Generation Z respondents. For these cohorts, the perception of authenticity appears to operate as a central mechanism linking exposure to peer-generated content with behavioural intention. Consumers in these groups often interpret reviews, tutorials, testimonials, and other forms of experiential storytelling as credible signals of product performance and brand reliability. This effect is particularly visible in digital contexts where consumers rely heavily on visual demonstrations, social validation, and peer endorsement when evaluating products.

For Generation Z, the relationship between UGC and engagement appears particularly pronounced. Respondents belonging to this cohort report higher levels of interaction with peer-generated content, including liking, commenting, and sharing content related to beauty products. This behavioural engagement reflects a broader pattern of digital participation that characterises younger consumers, who are accustomed to navigating interactive online environments where brand meanings are continuously negotiated through social interaction. In such contexts, content created by other users is often perceived as more relatable and transparent than official brand communication. Consequently, exposure to UGC tends to reinforce trust formation and increase the likelihood of purchase consideration.

Millennials show a similar, though slightly less pronounced, pattern. While they also demonstrate strong responsiveness to UGC, they appear to maintain a somewhat more balanced evaluation between peer-generated and

brand-generated content. Although UGC exerts a strong influence on credibility and engagement, brand-generated communication still retains a meaningful role in providing product information and reinforcing brand positioning.

The generational contrast becomes more evident when analysing the responses of Generation X consumers. In this group, brand-generated communication retains a higher level of perceived authority. Official brand messages, including promotional campaigns and corporate communication, continue to play an important role in shaping brand trust and purchase decisions. While Generation X respondents do not reject peer-generated information, they tend to interpret it as complementary rather than primary information.

Table 1 highlights the different ways in which generational cohorts interpret the credibility, engagement potential, and behavioural influence of digital content.

Table 1: Generational interpretation of digital content effectiveness

Dimension	*Generation X*	*Millennials*	*Generation Z*	*Interpretation*
Perceived credibility of UGC	*Moderate*	*High*	*Very high*	*Credibility of peer-generated information increases across younger cohorts, reflecting greater familiarity with participatory digital environments.*
Perceived credibility of brand-generated content	*High*	*Moderate*	*Lower*	*Older consumers continue to attribute authority to official brand communication, while younger audiences rely more strongly on peer validation.*
Engagement with UGC	*Moderate*	*High*	*Very high*	*Interactive behaviours such as commenting, sharing, and reacting to content are significantly more frequent among Millennials and Gen Z.*
Engagement with brand-generated content	*Moderate*	*Moderate*	*Lower*	*Brand content generates lower levels of interaction compared with UGC among younger audiences.*
Role of authenticity	*Moderate*	*High*	*Very high*	*Authenticity becomes a central evaluation criterion for younger consumers, strongly influencing trust formation and engagement.*
Influence on purchase intention	*Moderate*	*High*	*Very high*	*UGC significantly influences purchase intention among Millennials and Gen Z, particularly when perceived as credible and relatable.*
Role of brand authority	*High*	*Moderate*	*Lower*	*Generation X consumers rely more strongly on brand expertise and official messaging when evaluating products.*
Importance of social validation	*Moderate*	*High*	*Very high*	*Younger consumers rely more heavily on peer opinions, reviews, and community interaction when making purchase decisions.*

Source: Authors' elaboration.

These generational differences can be interpreted through the lens of digital socialisation. Younger cohorts have grown up in highly interactive online environments where social media participation, peer communication, and user-generated narratives constitute central elements of everyday digital behaviour. As a result, credibility tends to emerge through collective validation and relational interaction rather than through institutional authority.

The results also highlight the role of engagement as a mediating mechanism linking content exposure to behavioural intention. Among Millennials and Generation Z, higher levels of interaction with peer-generated content contribute to reinforcing emotional connection with the brand and strengthening perceived product relevance. Engagement with UGC often involves both passive consumption and active participation in digital conversations surrounding the brand, thereby reinforcing relational bonds between consumers and brands.

These behavioural mechanisms are synthesised in Table 2, which illustrates the pathways through which exposure to User-Generated Content translates into consumer behavioural outcomes.

Table 2: Mechanisms linking UGC to consumer behavioural outcomes

Mechanism	*Role in digital communication*	*Empirical pattern emerging from the analysis*	*Generational relevance*	*Implications for consumer behaviour*
Content authenticity	*Perception that information is genuine and experiential*	*UGC perceived as more authentic than brand-generated content*	*Strong among Millennials and Gen Z*	*Authenticity strengthens credibility and brand evaluation*
Trust formation	*Confidence in reliability of information source*	*Peer-generated content increases perceived trustworthiness*	*Stronger among Millennials and Gen Z*	*Trust mediates the effect of content on behavioural intention*
Consumer engagement	*Interactive participation with digital content*	*UGC stimulates higher levels of interaction*	*Highest among Gen Z*	*Engagement reinforces emotional connection with brands*
Social validation	*Influence of peer opinions and community endorsement*	*Consumers rely on reviews and testimonials*	*Stronger among Millennials and Gen Z*	*Reduces perceived risk in product evaluation*
Purchase intention	*Willingness to consider or buy the product*	*Higher purchase intention associated with credible UGC*	*Particularly strong among Millennials and Gen Z*	*UGC influences behavioural intention through trust and engagement*

Brand authority	*Perceived expertise of official brand communication*	*Brand content remains influential among Gen X*	*Stronger among Gen X*	*Institutional credibility still influences purchase decisions*

Source: Authors' elaboration.

Taken together, the findings suggest that contemporary digital marketing effectiveness emerges from the interaction between content type, perceived authenticity, and generational patterns of media use. While User-Generated Content represents a particularly powerful driver of trust, engagement, and purchase intention among younger consumers, brand-generated communication continues to retain strategic relevance for older cohorts. Consequently, effective digital marketing strategies should combine community-driven communication with credible brand messaging, adapting content strategies to the media habits and credibility expectations of different generational audiences.

Research limitations. *Although the study provides relevant insights into digital marketing communication, several limitations should be acknowledged. First, the sample is geographically concentrated and not fully balanced across generational groups, which may limit the generalisability of the results. Second, the research focuses exclusively on the cosmetic industry, a sector characterised by strong social media engagement and high levels of consumer interaction. The observed dynamics may therefore differ in industries where digital community participation is less central. Finally, the analytical approach remains exploratory. While Exploratory Factor Analysis is appropriate for uncovering latent dimensions, future research could adopt more advanced analytical techniques – such as Confirmatory Factor Analysis (CFA) or Structural Equation Modelling (SEM) – in order to test causal relationships among variables.*

Managerial implications. *From a managerial perspective, the findings suggest that firms should abandon one-size-fits-all communication logics and adopt differentiated content strategies based on generational and usage profiles. Younger and highly socialised audiences are more responsive to peer-generated narratives and brand community participation, whereas Generation X consumers still rely on official brand communication. The results therefore suggest that companies should adopt hybrid communication strategies that combine brand-generated messaging with consumer-driven narratives. While peer-generated content appears particularly effective in stimulating trust and engagement among younger audiences, official brand communication continues to play an important role for older consumers. Integrating both communication sources may therefore allow firms to maximise credibility while maintaining strategic brand control. Furthermore, a more participatory approach to communication strategy was also supported. Therefore, rather than treating consumers merely as message receivers, brands should facilitate the creation, circulation, and amplification of testimonials, reviews, and peer narratives, especially in digitally native segments. In categories such as beauty, where symbolic meaning, trust, and identification are especially important, the ability to foster authentic interactions between the brand and its community may represent a key source of competitive advantage.*

Originality of the paper. *While previous research has examined the persuasive role of UGC, relatively few studies have analysed how generational differences influence the effectiveness of digital marketing communication in specific industry contexts. This study contributes to the literature debate by identifying the behavioural mechanisms through which User-Generated Content influences consumer decision-making, highlighting the role of credibility, engagement, and social validation as key drivers, linking participatory communication to purchase intention. It provides a comprehensive framework for understanding how participatory communication mechanisms influence consumer behaviour by integrating insights from digital marketing, community marketing, electronic word-of-mouth, and generational consumer research. Moreover, by focusing on the Italian beauty market, the research offers context-specific empirical evidence that contributes to both academic research and managerial practice.*

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Short papers

Track:
Purpose-driven Businesses



A compass or merely a caption?
Corporate Purpose Language in Italian Benefit Companies

JORDANA RECH GRACIANO DOS SANTOS, ELISA FIORE, GABRIELE GALLI

Abstract. *The concept of corporate purpose has moved to the centre of management scholarship and business practice, yet a fundamental tension persists between purpose as genuine organizational commitment and purpose as rhetorical or legal gesture. The emergence of hybrid corporate legal forms, most notably the società benefit in Italy, the benefit corporation in the United States, and the société à mission in France, represents an attempt to institutionalize purpose beyond voluntary declaration, embedding social and environmental obligations directly into corporate statutes. Yet whether legal mandates for purpose produce substantive organizational reorientation or merely a new register of compliance remains an open and empirically underexplored question.*

This paper presents an ongoing research project that addresses this question through a systematic thematic analysis of statutory purpose declarations in a sample of 295 Italian società benefit. Drawing on corporate object clauses (oggetto sociale) retrieved from the AIDA database, the study maps the thematic landscape of declared corporate purpose across the population and assesses the depth of purpose articulation by examining the linguistic specificity and structural integration of benefit language, distinguishing between companies that engage with purpose substantively and those that reproduce generic or boilerplate formulations drawn directly from the founding legislation.

Preliminary inspection of the data reveals three dominant thematic clusters and considerable variation in how benefit companies' structure and articulate their statutory purpose, from richly specific and operationally grounded declarations to near-verbatim reproductions of statutory language that carry little organizational content.

Corporate purpose, as the theoretical framing makes clear, is not a static declaration but a dynamic organizational process, one that must be continuously enacted, negotiated, and translated into concrete practices, metrics, and outcomes. The statutory document is only the beginning of that journey, but it is also, in a meaningful sense, its foundation: the moment at which an organization is asked to articulate, publicly and legally, not only what it does, but why it exists and for whom. By examining how organizations respond to that moment, with specificity or vagueness, integration or isolation, ambition or mere compliance, this study contributes empirical grounding to debates at the intersection of corporate law, institutional theory, and sustainable governance, with implications for scholars, policymakers, and practitioners navigating the boundary between genuine purpose commitment and purpose washing.
Keywords: *corporate purpose; benefit; hybrid corporate forms; thematic analysis*

Framing the research. *Defining and enacting corporate purpose has become integral to the corporate governance process, increasingly shaped by multistakeholder approaches that extend organizational accountability beyond shareholders to encompass a broader constellation of interests (Aguilera, 2023). A clearly articulated corporate purpose provides executives with a guiding compass, enabling them to maintain a broader strategic perspective and steer the organization through periods of instability and uncertainty (Lee et al., 2023). In this way, purpose should work not only as a rhetorical device but as an organizational anchor that shapes how firms set priorities, distribute resources, and respond to external pressures.*

The concept of purpose is increasingly recognized as a pivotal driver of both sustainable and financial performance, gaining attention in both academic literature and business practice (Gartenberg et al., 2019; Jones-Khosla and Gomes, 2023). Influential practice-oriented thinkers, most notably Sinek (2009), have popularized the foundational question "Why do we exist?", prompting organizations across sectors to reflect on what it means to remain relevant and valuable to society over the long term. This has contributed to a growing wave of firms presenting themselves as purpose-led corporations, committed to reconciling the pursuit of financial value with the fulfillment of broader societal goals (Walls et al., 2021). In this context, results from the literature indicate that purpose-driven companies are often better positioned to align with societal expectations and stakeholder interests, leading to enhanced performance and the creation of sustainable value (Edmans, 2021; Gartenberg, 2023).

Central to this discussion is the relationship between an organization's goal system and its overarching purpose. Organizational goals are typically aligned with, and derive legitimacy from, the organization's mission or purpose (Aguilera, 2023), and this alignment plays a pivotal role in shaping how organizations navigate crises and become genuinely purposeful over time (Hollensbe et al., 2014). Understanding the determinants, processes, and outcomes of this goal-purpose relationship remains an evolving area of inquiry, with many facets still insufficiently understood (Aguilera et al., 2024).

Yet, despite this proliferation, significant gaps remain in our understanding of how purpose is effectively enacted and sustained in practice. While the benefits of corporate purpose for organizational performance are widely acknowledged by both scholars and practitioners (Davis, 2021; Mayer, 2021; Gartenberg et al., 2019; Gartenberg, 2023; Hollensbe et al., 2014), there is limited empirical evidence on the factors that influence organizations' decisions to adopt specific objectives (Aguilera et al., 2024), on how purpose is communicated across the organization and among stakeholders, and on how it is ultimately translated into tangible impact (George et al., 2023). This gap is further compounded when purpose

is connected to the outcomes of innovative activity, that is, to impact in the fullest sense of the term (Smith et al., 2010; Busco, 2022).

Achieving meaningful impact requires deliberate strategic action and comprehensive programs operating across multiple timeframes, all guided by long-term goals and communicated in ways that genuinely involve corporations, their employees, and their broader stakeholder ecosystems (Schultz, 2022). In this sense, purpose is not a static declaration, but a dynamic organizational process: it must be continuously enacted, negotiated, and translated into concrete practices, metrics, and outcomes. Most contemporary organizations have thus embarked on an ambitious journey to connect their enduring reason for being with their strategy, business models, and performance systems , attempting to reconcile traditional financial imperatives with emerging societal values (Walls et al., 2021; George et al., 2023).

It is precisely this tension between what organizations are and what they aspire to become that places corporate purpose at the center of contemporary governance, strategy, and accountability debates. In 2019, the Business Roundtable announced a landmark redefinition of corporate purpose, committing its members to lead their companies for the benefit of all stakeholders, employees, customers, suppliers, communities, and shareholders alike (Business Roundtable, 2019). The announcement marked a decisive break from its own 1997 statement, which had embraced shareholder primacy as the organizing principle of corporate life, with profit maximization as the corporation's paramount obligation. This shift from shareholder value to stakeholder value rapidly diffused through the global business community, echoed by major trade associations, leading consulting organizations, and business schools. Yet the announcement also prompted an uncomfortable question: how dramatic a change in corporate purpose does all this represent?

It is against this backdrop that a parallel and more structurally ambitious development has appeared: the proliferation of corporate legal forms designed to institutionalize purpose beyond voluntary declaration. Referred to generically as "profit-with-purpose corporations", these new hybrid forms embed social and environmental considerations directly into corporate bylaws, alongside, and in tension the traditional objective of generating profit. Unlike classic CSR approaches or soft law instruments, which rely on voluntary commitment and reputational incentives, these legal forms propose frameworks with more clear-cut legal implications (Levillain and Segrestin, 2019; Bandini et al., 2022). The benefit corporation in the United States, the società benefit in Italy, and the société à mission in France are among the most prominent examples.

According to this, società benefit are grounded in the idea that an enterprise is not only an economic organization for producing goods and services; it is also an organization of "collective creation" that invents new technologies and develops new knowledge and expertise. It consequently has a much more radical impact, negative or positive, on society and the environment.

This growing variety of purpose-embedded corporate forms is not incidental. It reflects a broader recognition that voluntary commitments are insufficient to address the scale and urgency of contemporary grand challenges, climate change, social inequality, biodiversity loss, and that corporate governance and corporate law must become active instruments of sustainable transformation, particularly at the European level. Alongside traditional environmental policy tools, legal scholars and policymakers have increasingly turned their attention to how corporate law can propel change not only by preventing corporations from causing social or environmental harm, but by actively orienting them toward public policy goals (Sjåfjell et al., 2020; Segrestin et al., 2021; Mayer, 2021).

Italy occupies a particularly significant position in this landscape. Introduced with Law 208/2015, the società benefit was among the earliest European experiments with a legally mandated hybrid corporate form, requiring companies that adopt the status to pursue common benefit alongside profit and to operate in a responsible, sustainable and transparent manner toward a broad range of stakeholders. Nearly a decade later, the number of Italian benefit companies has grown substantially, making Italy one of the most important national laboratories for understanding whether purpose-embedded legal forms can deliver on their promise.

Yet a fundamental question remains underexplored. While scholars have examined the legal architecture, the governance implications, and the comparative landscape of profit-with-purpose corporations, far less attention has been paid to what these companies actually say when they articulate their purpose, and whether what they say constitutes genuine organizational commitment or a sophisticated form of legal compliance. The statutory document is the primary site where a benefit company is required to define its reason for existing beyond profit.

This study addresses that gap directly. Drawing on a sample of 295 Italian società benefit, we conduct a systematic thematic analysis of statutory purpose declarations to map the thematic landscape of corporate purpose in this population and to assess the depth and authenticity of purpose articulation. In doing so, we contribute empirical grounding to a debate that has so far been dominated by normative argument and legal analysis, asking not whether benefit companies should pursue purpose, but what pursuing purpose looks like when companies are required to put it in writing.

Purpose of the paper. *This paper investigates how Italian società benefit articulate corporate purpose in their statutory documents, with the aim of mapping the thematic landscape of purpose declarations and assessing whether such articulations reflect genuine organizational commitment or merely fulfil a formal legal requirement. This study pursues two interrelated objectives.*

The first is descriptive and empirical: to provide a systematic mapping of the thematic content of corporate purpose as declared in the statutory documents of Italian società benefit. By identifying dominant themes, thematic clusters, and patterns of variation across a population of 295 companies, the study establishes what Italian benefit companies actually

say when required by law to articulate their reason for existing beyond profit, responding directly to a gap in the literature, which has engaged extensively with the legal architecture of profit-with-purpose corporate forms while paying considerably less attention to the substantive content of purpose declarations themselves.

The second objective is evaluative and analytical: to assess the depth and authenticity of these declarations by examining the structural integration and linguistic specificity of benefit language across statutory documents. Together, these aims move the analysis beyond the question of how many benefit companies exist, toward the more fundamental question of what the benefit company form means in practice. They are translated into the following research questions: How do Italian benefit companies articulate corporate purpose in their statutory documents, and to what extent does the language of purpose reflect substantive organizational commitment rather than mere legal compliance? What thematic patterns characterize the declared purposes of Italian società benefit, and how do variations in purpose statements reveal meaningful differences in how companies conceptualize and communicate their broader social and environmental ambitions?

Methodology. *The dataset was constructed from two publicly available lists of Italian società benefit. Following deduplication, 18 duplicate entries were removed, yielding a final sample of 295 unique companies. Combining two independent lists rather than relying on a single registry reduces the risk of systematic omission, while acknowledging that, in the absence of an official national registry of benefit companies, complete population coverage cannot be guaranteed. Each company was matched to the AIDA database (Bureau van Dijk) to retrieve the full text of the statutory corporate object clause (oggetto sociale), which constitutes the primary unit of analysis.*

The year of benefit status adoption was identified through a triangulated approach: corporate websites and public documents were consulted first; where unavailable, AIDA records were checked for the year in which the company name was formally modified to include "S.B." or "Società Benefit"; where neither source yielded reliable information, the value was coded as missing.

The primary unit of analysis is the corporate object clause as recorded in AIDA. Under L. 208/2015, benefit companies are required to specify their common benefit purposes within their corporate statute, making this document the legally mandated and publicly accessible site of purpose articulation. Unlike voluntary disclosures such as sustainability reports or mission statements, the statutory clause is legally binding and structurally comparable across companies, making it particularly suitable for systematic thematic analysis. The data will be analyzed using thematic analysis (Braun and Clarke, 2006), implemented through Atlas.ti. The analysis will happen in two sequential phases. The first phase applied an inductive open coding process to map the thematic content of purpose declarations across the corpus, allowing dominant themes, thematic clusters and patterns of variation to emerge from the data without a predetermined framework.

Results. *This research is ongoing, and the findings reported here reflect preliminary inspection of the corpus rather than completed analysis. Nevertheless, the material already reveals patterns of sufficient clarity to warrant structured presentation. The results are organized in two parts, corresponding to the study's two sequential objectives.*

The most prevalent concerns sustainability and social responsibility. Declarations within this cluster reference environmental care, responsible resource use, community engagement, and transparent conduct toward a broad range of stakeholders. A second cluster foregrounds innovation, particularly technological innovation, framed explicitly as a means of serving social or environmental ends. Companies in this cluster articulate their benefit purpose through the development of new solutions, tools, or services whose value is defined not only in commercial terms but in terms of broader societal impact, safer digital environments, more accessible services, or more sustainable production processes. The coherence of this framing varies: in some cases, the social dimension is genuinely integrated into the innovation logic; in others it reads as a secondary justification appended to what is essentially a commercial activity description.

The third cluster centers on stakeholder welfare, with declarations extending organizational commitment beyond shareholders to encompass employees, clients, communities, and territories. This cluster is the most heterogeneous of the three. Some declarations within it articulate a clear and specific account of how different stakeholder groups are considered in decision-making and resource allocation; others rely on generic language of care and excellence that could apply to any commercial enterprise and carries little distinctive benefit content.

Taken together, these three clusters account for the large majority of purpose content in the corpus, though the degree of specificity, integration, and organizational grounding varies considerably both across and within each theme.

Research limitations. *Several limitations should be acknowledged. First, the sample of 295 società benefit was drawn from two independent lists rather than an official national registry, since no such registry exists in Italy, which means complete population coverage cannot be guaranteed, and some selection bias may be present. Second, the analysis is restricted to the statutory corporate object clause (oggetto sociale), which, while legally mandated and systematically comparable, represents only one moment in what is ultimately a dynamic and ongoing organizational process. As the theoretical framing suggests, purpose must be continuously enacted and translated into practices and outcomes that extend well beyond the founding document; what companies write in their statutes and what they do in practice may diverge in ways this study cannot capture. Third, thematic analysis, even when rigorously applied through a combined inductive-deductive approach, involves interpretive judgment; coding decisions, carry a degree of subjectivity that cannot be fully eliminated.*

Managerial implications. *The study contributes empirical grounding to a debate that has so far been dominated by normative argument and legal analysis, shifting the focus from whether benefit companies should pursue purpose to what pursuing purpose actually looks like when organizations are required to put it in writing. In doing so, it also speaks to the broader conversation about the conditions under which corporate purpose moves from declaration to commitment, and from commitment to consequential action.*

The implications of this inquiry extend beyond academic debate. For managers and executives, the findings offer a reflective mirror: a systematic account of how peer organizations across the Italian benefit company landscape have chosen to define, frame, and communicate their broader social and environmental ambitions. In a context where the articulation of purpose is not merely a strategic choice but a legal obligation, the quality, specificity, and integration of purpose language becomes a meaningful signal, both internally, as a driver of organizational alignment and employee engagement, and externally, as a marker of credibility and accountability toward stakeholders, investors, and regulators.

For boards and governance practitioners, the study highlights the risk of what might be termed purpose inflation: the proliferation of purpose declarations that are sufficiently broad to satisfy legal requirements while remaining too generic to guide strategic decision-making or to differentiate one organization from another. Understanding where this risk is most acute and what substantive purpose articulation looks like in practice equips governance actors with a more refined set of criteria for evaluating and strengthening their own purpose statements.

For policymakers and regulators, the findings carry implications for the design and enforcement of purpose-embedded legal frameworks. If a significant share of benefit companies reproduces boilerplate formulations without meaningful specificity, this raises questions about whether the current regulatory architecture provides sufficient incentives or obligations to ensure that legal form translates into genuine organizational transformation. The Italian experience, as one of Europe's earliest and most developed experiments with the benefit company model, offers valuable lessons for jurisdictions currently considering or refining analogous frameworks, including at the European level in the context of ongoing debates around sustainable corporate governance.

For investors and capital allocators increasingly attentive to ESG considerations and impact measurement, the study provides a framework for distinguishing between organizations that have substantively embedded purpose into their foundational documents and those that have adopted the benefit company status primarily as a reputational or marketing instrument. As impact investing matures and demands greater rigor in the assessment of organizational intent, the ability to read and interpret statutory purpose language becomes a relevant due diligence competence.

Finally, and perhaps most fundamentally, the study speaks to the conditions under which purpose-driven organizational models can deliver their transformative potential. Corporate purpose, as the theoretical framing makes clear, is not a static declaration but a dynamic organizational process, one that must be continuously enacted, negotiated, and translated into concrete practices, metrics, and outcomes. The statutory document is only the beginning of that journey. But it is also, in a meaningful sense, its foundation: the moment at which an organization is asked to articulate, publicly and legally, not only what it does, but why it exists and for whom. How organizations respond to that moment, with specificity or vagueness, with integration or isolation, with ambition or compliance, tells us a great deal about whether purpose, in their hands, is a compass or merely a caption.

Originality of the paper. *This study makes contributions to emerging literature on hybrid corporate forms and corporate purposes. Empirically, it offers a systematic analysis of statutory purpose declarations in Italian società benefit, moving beyond the legal and normative debates that have dominated scholarship in this area to interrogate what benefit companies say when they must articulate their reason for existing. The use of thematic analysis provides a methodological approach that is both rigorous and replicable, and which can serve as a template for comparative studies across national contexts. Finally, the paper speaks to policy-relevant debates about the effectiveness of purpose-embedded corporate law: by examining the extent to which legal mandates for purpose produce genuine organizational reorientation versus a new register of compliance, it offers empirical grounding for policymakers and regulators assessing hybrid corporate forms at the national and European levels, as well as for managers seeking to translate purpose commitments into coherent organizational goals and everyday practices.*

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Does sustainability pay off? Evidence from a staggered DID analysis on Italian BCorps

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Abstract. *In recent years, sustainability has become a strategic lever for firms seeking to remain competitive while handling multiple interests and responding to growing external and internal social and environmental stimuli. Within this context, and considering the heterogenous hybrid organizational structure, BCorp has emerged as the prominent one, allowing to balance economic viability with social and environmental goals. Moreover, BCorp certification itself has gained prominence in the economic and managerial debate related to its usefulness for achieving some measurable economic benefits. Against this backdrop, this study aims at investigating the effect of B Corp certification on firms' economic performance, evaluated through two complementary, yet related, performance measures: operating profitability, measured by return on assets (ROA), and operational efficiency, measured by the ratio of sales revenues to total assets.*

We focus on a sample of 101 Italian BCorps, certified in the period 2018-2022, and using a 1:1 nearest neighbor approach, we identify a control group of 101 non-certified matching firms. On the final sample of 202 Ital firms, we employ a staggered difference-in-differences design. Our results suggest that embarking on a certification path does not guarantee short-term gains, as it does not have a statistically significant effect on both profitability and operational efficiency. Overall, our findings suggest that B Corp certification should not be interpreted as a short-term driver of financial returns, but rather as a strategic investment in organizational alignment, sustainability integration, and long-term capability building. In doing so, our study contributes to the broad literature on sustainability certification and economic performance, while providing some evaluable insights for firms seeking to approach sustainability through a certification path.

Keywords: *BCorp; sustainability certification; performance; difference-in-differences*

Framing of the research. *In recent years, sustainability has become a strategic lever for firms willing to remain competitive in global markets, while responding to both internal and external stimuli and innovating their business models (Moroz et al., 2021). As a consequence, firms are compelled to overcome the classical profit-maximization paradigm in order to better anchor sustainability in their business model, through social and environmental value creation (Costa et al., 2025; Carvalho et al., 2022). This shift has fostered the emergence of new hybrid organizational forms, attempting to embed purpose into firms' structure, thereby resulting in new sustainable practices (Asselle & Piccaluga, 2019; Stubbs, 2017). Within this evolving landscape, BCorp has gained prominence as one of the most visible and structured business models of hybrid organizations (Moroz et al., 2021), aiming at combining a market-based logic with explicit social and environmental purposes. Through a voluntary third-party certification process, firms are required to adopt a multidimensional assessment of performance across governance, workers, community, environment, and customers (Krist et al., 2021), thereby moving beyond a classical stakeholder-oriented logic toward a systemic perspective of value creation (Poponi et al. 2019). In this regard, BCorp can be understood not only as a signal of commitment, but also as an organizational device through which firms formalize and operationalize the management of multiple competing objectives (Pollmeier et al., 2025; She & Michelon, 2023).*

Yet, whether this formalization generates economic benefits remains theoretically ambiguous (e.g., Patel et al., 2022; Parker et al., 2019). On one hand, previous literature suggest that business can "do well by doing good" (Richardson & O'Higgins, 2019), that implies that certification and corporate financial and nonfinancial performance are closely linked. Along this perspective, BCorp certification has been found to have the power of increasing legitimacy and strengthen stakeholder relationships (Vilella et al., 2021), while also increasing productivity and maximizing revenues (Chen et al.,2015). On the other hand, others show negative effects of the certification on firm performance, not only as the certification standards require more demanding and costly governance and accountability structures, but also because of additional burdens associated with the sustainable transition undertaken by the firms, that can outweigh economic benefit, especially in the short term (e.g., Bringas-Fernández et al., 2024;Parker et al.,2019) .

Additionally, from a competitive advantage perspective, sustainability certification such as BCorp are often considered as a lever for differentiation rather than mechanisms consistent with a cost-leadership logic (Lee & Jay, 2015), suggesting that the need of reorganizing downstream value chain activities – such as branding, communication, customer engagement – add costs and organization complexity to effectively signal a credible commitment to social and environmental goals (Colamartino et al., 2025). In the same line, from the demand side the market does not slways immediately recognize the value associated with the transition toward a purpose-driven model (Narayanan & Singh, 2023). This implies that consumers' willingness to pay may not evolve at the same pace as the certification process,

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especially when consumers base their evaluations on more tangible product- or firm-level attributes.

Consequently, the certification effects are considered highly context-dependent, varying according to firms' capabilities, strategic positioning, and ability to convert sustainability commitments into competitive outcomes. Moreover, as firms do not enter the certification process randomly (Chen & Kelly, 2015): financially sound firms are more likely to undertake certification, while less resource-endowed firms may be less able to do so. This obviously makes it difficult to establish whether post-certification performance differences are driven by the certification itself or rather reflect ex-ante firms' heterogeneity.

Against this backdrop, BCorp certification represents an ideal empirical setting in which to examine whether the formal adoption of a purpose-driven organizational model translates into measurable performance effects, and their dynamic effects.

Purpose of the paper. *This paper aims to investigate the effect of BCorp certification on firms' economic performance. In particular, we focus on two related dimensions of BCorp performance (Richardson & O'Higgins, 2019; Chen & Kelly, 2015): operating profitability – captured by ROA – and operating efficiency in the use and organization of assets – measured by the ratio between sales revenues and total assets. Cupertino et al. (2021) show that best sustainable companies usually improve future profitability, by means of eco-innovation and sustainability commitment that compensate for losses of sustainable strategy execution and chain management. This is in line with the logic of the certification itself, often imposing firms to simultaneously intervene across multiple impact areas to align internal structures and routines with a broader purpose, thereby increasing the likelihood of developing product, organizational and societal-level innovative solutions (Attanasio et al., 2025). This increase in profitability has been found to be more pronounced for firms operating under stronger market logic (Kirca et al., 2005), as such firms are better positioned to sense customer expectations and easily translate these sustainability-related changes into measurable value for the market. In this sense, firms are able to strength trust and customer loyalty, as well as to maximize value of relational capital. This, in turn, enhances firms' resilience and adaptive capacity in periods of uncertainty, ultimately increasing their survival through sustained stakeholders (Stubbs, 2017)*

However, these positive effects are unlikely to be uniform across firm. This is in part explained by the long-term perspective associated with sustainable certifications (Childress & Jones, 2025). Although explicitly designed to be applicable across industries, firms entering the certification process differ in terms organizational complexity and resource availability, meaning that the certification process may require some prior costly adjustments. Rosca & Taylor (2022), for instance, specifically refer to supply chain design as one of the most important adjustments required by BCorp certification, in terms of supplier selection criteria, localization choices, reverse supply chains and monitoring mechanisms that usually entail substantial costs prior to the certification. Similarly, Lepkowska-White et asl. (2023) draw on signaling theory to stress the importance of strengthening community engagement, in order to fully externalize the internal values embedded in such sustainable certification – through reputational benefits. Given these premises, the following hypothesis is proposed:

***H_1:** In the short term, BCorp certification does not have a significant effect on firms' operating profitability.*

Moving beyond profitability, certification may affect how efficiently firms organize and deploy their resources. As stated by Pedrecca et al. (2025), BCorp certification helps firm optimize resource allocation while safeguarding operational efficiency, though the development of new internal capabilities. This aligns with the well-established research on management standards and voluntary certification, emphasizing the ability of such certification to foster process formalization, clearer routines and stronger coordination structures (Pagell et al., 2015). In addition, sustainability-oriented certifications may foster both process and product innovation when firms are able to manage complementarities across inputs and activities (Blasi et al., 2024). Accordingly, BCorp certification is expected to have a positive effect on firms' efficiency in the use of assets. Formally:

***H_2:** BCorp certification has a positive effect on firms' efficiency in the use of assets.*

Methodology. *To test the above-mentioned hypotheses***,** *this research uses a difference-in-differences (DiD) approach, that allows to empirically verify the effect of a treatment on an outcome variable, by comparing the evolution over time with that of a control group.*

Accordingly, our treated group consists of all the Italian firms that obtain the BCorp certification, extracted from Data.World[4]- that lists all firms obtained the certification from 2014 to 2025. Following previous research (e.g., Bringas-Fernández et al., 2024; Callaway & Sant'Anna, 2021), we start from our initial sample of 222 firms and restricted the sample to all certified Italian BCorps in the period 2018-2022 to ensure an homogeneous observation windows across treatment cohorts (a three-year pre-treatment window and at least two-year post-treatment window), resulting into 128 firms. We further restricted our sample to firms with minimum financial information data required for matching and subsequence analysis – by excluding firms with completely missing information on pre-treatment variables – resulting into a final treated sample of 101 BCorps.

To address non-random self-selection into certification, we adopt a structured matching algorithm to define a balance control group (Rosembaum, 2020). We first restrict the AIDA population to active Italian limited liability and joint-stock companies operating in the same 2-digit NACE industries as treated firms and with financial statements available over

[4] *https://data.world/blab/b-corp-impact-data*

the study period. Matching was then performed separately by treatment cohort, on the basis of a 1:1 nearest neighbor algorithm, based on the pre-treatment firm size (log of the average total assets over the three years pre-certification) and firm age (numbers of year since incorporation in the year before certification). This leads to a final matched sample of 101 treated firms and 101 never-treated controls

The matched sample was then used in the staggered DiD analysis, that allows to account for the heterogeneous timing of BCorp certification across firms (Freedman et al., 2023), that is firms contribute to the comparison group as long as they have not yet been exposed to certification; accordingly, the control group includes both never-treated firms and future-treated firms prior to their own treatment year.

Let G_i denote the first treatment year of firm i, defined as the first fully post-certification fiscal year. Firms that are never treated during the observation window are assigned to $G_i = 0$, whereas treated firms belong to certification cohorts $G_i \in \{2018,2019,2020,2021,2022\}$. Let Y_{it} denote the outcome of interest for firm i in year t. We estimate group-time average treatment effects:

$$ATT(g,t) = E[Y_t(1) - Y_t(0) \mid G_i = g]$$

where $ATT(g,t)$ measures the average treatment effect for firms first treated in year g at calendar time t.

$ATT(g,t) = E[Y_t(1) - Y_t(0)|G_i = g]$, which was subsequently aggregated into dynamic event-time effects.

As a further validation exercise, we complement the baseline staggered DiD estimates with a set of placebo tests.

Results. *Results of the staggered DiD analysis are reported in Table 1.*

To test H1, in order to assess the impact of BCorp certification on firms' profitability, we use ROA (defined as the ratio between net income and total asset). Results show a positive treatment effect (0.162), even if not statistically significant, implying that even if the BCorp certification may be associated with a modest improvement in firms' profitability, it is not possible to draw any conclusion about a causal effect. Additionally, placebo tests provide support for the validity of the identification strategy: none of the placebo estimates are statistically significant at the 5% level, ultimately supporting the parallel trend assumption for ROA. However, when looking at the dynamic estimates, some heterogeneity over time emerges: despite the positive, yet non-significance, of the estimated coefficients after certification, five years after the certification, the coefficient turns negative and statistically significant, thereby pointing to a possible decrease in profitability and emphasizing more uncertain longer-term implications of the certification itself.

Moving to the operational efficiency effect (hypothesis H2), we operationalize operational efficiency as the ratio between sales revenues and total assets.

The estimated treatment effect is negative but very close to zero (-0.0106) and not statistically significant (95% CI [-0.1187; 0.0975]), suggesting that BCorp certification does not produce a meaningful change in firms' operational efficiency. Contrary to our expectation, this implies that BCorp certification does not generate a substantial improvement in firms' resource allocation, process formalization and stronger internal coordination mechanisms. This result is also confirmed by the results of all placebo tests. Overall, the evidence does not support H2. Although BCorp certification may foster internal capability development and process formalization, these benefits do not appear to translate into a significant improvement in the short-term.

Table 1. Results of staggered DiD on firms' profitability (ROA) and operational efficiency (sales revenues/total assets)

		Profitability			***Operational Efficiency***	
	Estimate	***SE***	***95% CI***	***Estimate***	***SE***	***95% CI***
Treatment effect	*0.162*	*1.488*	*[-2.7545 3.0785]*	*-0.0106*	*0.0552*	*[-0.1187 0.0975]*
Placebo1	*-0.0142*	*0.744*	*[-1.47 1.44]*	*-0.0216*	*0.0243*	*[-0.813 0.0382]*
Placebo 2	*-0.427*	*1.34*	*[-3.04 2.19]*	*-0.0178*	*0.0204*	*[-0.0679 0.0322]*
Placebo 3	*1.47*	*1.3*	*[-1.08 4.02]*	*0.0230*	*0.0144*	*[-0.0124 0.0584]*

Research limitations. *Despite the novel approach adopted to study the impact of a holistic sustainable certification, we are aware that this study presents some limitations. First, the analysis is limited to Italian BCorps: even if this choice ensures institutional comparability across firms, it can limit the external validity of our results. Second, the empirical setting is based on a small sample of certified BCorps, that have achieved the certification in the period 2018-2022- Also in this case, even if the choice ensures a comparable pre- and post-treatment effect, the final sample size may reduce the statistical power of the analysis. Third, the selected time-horizon may capture only short-term and medium-term effect, thereby potentially undermining the long-term implications of this certification scheme. Fourth, it is important to remember that our study only estimates the impact of BCorp certification, which is only a proxy for the adoption of sustainable production behavior. Finally, we limit the measure of performance to financial ones – through profitability and operational efficiency- but this does not allow us to fully capture broader value creation processes associated with certification.*

Moreover, even if we account for potential self-selection bias through a matched control group, the possibility of residual endogeneity cannot be excluded. Finally, additional controls should be added.

Managerial implications. *This research offers several managerial implications for managers and firms considering BCorp certification as a potential innovation pathway for their business models. In particular, the non-significance of short-term effects on profitability and operational efficiency suggest that certification must be interpreted as a strategic investment aimed at anchoring sustainability into the firm's business model, without expecting immediate financial benefits. Second, managers should be aware that the certification process itself may require some internal adjustments before the achievement of economic returns. This also suggests managers allocate specific financial resources to the sustainable transition, thereby lowering the expectations of rapid payoffs.*

Third, given the voluntary nature of the BCorp certification, in order to maximize its value, our results suggest firms to complement the sustainability transition with coherent upstream and downstream strategies, so that the purpose driven orientation become easier and more visible for the entire value chain. More generally, our results indicate that BCorp certification may be better considered as an instrument for organizational alignment and long-term capability building than as a concrete short-term lever.

Originality of the paper. *This study contributes to the growing literature on hybrid organizations and sustainability certifications, by providing empirical evidence on the economic impact of BCorp certification.*

While prior research has mainly focused on the normative, reputational, and organizational dimensions of BCorps, primarily based on single case studies and comparative analysis, this paper specifically examines whether certification translates into measurable changes in firms' economic performance. In this sense, the study helps bridge the gap between the literature on purpose-driven business models and the performances of sustainability-oriented organizational forms. Additionally, the adoption of a staggered DiD design allows to minimize the self-selection effect of firms entering the certification process, while also accounting for the heterogeneous timing in treatment adoption.

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Future managers confront ethical dilemmas: Insights from mediated interaction with students in economics and innovation

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Abstract. *Business ethics, corporate social responsibility (CSR), and sustainability are increasingly central topics in management education, yet teaching them effectively remains challenging. Students often perceive these subjects as abstract, distant from real business practices, or disconnected from their future professional roles. At the same time, younger generations tend to approach companies with skepticism, particularly regarding corporate communication around sustainability. This paper explores whether more participatory teaching methods can increase student engagement and provide deeper insights into how new generations perceive ethical issues in contemporary economic systems. A group of students participated in a session based on the Attentive Teaching methodology. In this setting, students were invited to actively interpret ethical concepts by creating visual representations of how they perceive business ethics and sustainability in today's economy. These drawings then became the starting point for discussion, allowing students to explain their ideas, compare perspectives, and reflect collectively on ethical dilemmas. The results show high levels of participation and engagement in the Attentive Teaching session. Students were willing to share their perspectives, debate interpretations, and express the emotions associated with ethical tensions in business contexts. The activity also revealed recurring perceptions among students, including skepticism toward corporate communication and a tendency to distinguish between themselves and companies as ethical actors. By combining insights from management, business ethics, education, and psychology, this study highlights the potential of participatory and emotionally aware teaching approaches to improve ethics education and to better understand how future managers perceive corporate responsibility and sustainability.*
Keywords: *business ethics; CSR; SDGs; attentive teaching; mediated interaction*

Framing of the research. *Business ethics (BE), Corporate Social Responsibility (CSR), and Sustainable Development (SD) in contemporary management education increasingly function as overlapping dimensions of responsible management and responsible leadership. Many of the most salient dilemmas in contemporary business (e.g. climate-risk disclosure, supply-chain labor rights, algorithmic bias) are simultaneously BE, CSR, and SD dilemmas, which make rigid curricular boundaries pedagogically artificial. The integration of BE/CSR/SD has been accelerated by legitimacy crises and by global governance frameworks, particularly SDG-oriented guidance. At the same time, integration can drift into superficial "coverage" when it becomes a bolt-on addendum rather than a coherent learning trajectory with assessment, faculty support, and institutional incentives aligned with stated values (Weybrecht, 2022). Similarly, too often the importance and impact of the individual decision maker is minimized even though at the end of the day it is individuals who stand behind any action of the business entity, whether it be expressed through the actions of individuals, corporate policy or technological mechanizations such as AI or algorithms (Kay, 2019).*

A complementary strand of scholarship reframes the aims of ethics education through the behavioral ethics turn. Ethical failure is often generated less by explicit endorsement of wrongdoing than by cognitive and social processes that reduce moral awareness and enable rationalization: ethical fading, motivated blindness, incrementalism, and moral disengagement (Bandura, 1999; Moore et al., 2012). As a result, learning outcomes extend beyond "knowing" ethical principles. Jeong et al. (2020) stressed the importance of emotions in ethical decision-making among business students, noting that that moral emotions can enhance ethical decision-making.

Considering the educational perspective, the concern with Business Ethics education is as old as the existence of professional and academic training in business (Abend, 2014). Recently, researchers have moved from asking whether Business Ethics can be taught (e.g. Park, 1998) to asking how best to teach Business Ethics (Martini et al., 2025). Specifically, cooperative learning designs and immersive simulations, including VR-based flipped learning, can support repeated practice in ethical implementation skills raising concerns, documenting risks, and negotiating tradeoffs, provided that debriefing, feedback, and assessment are rigorous (Martini et al., 2025). Contemporary business ethics education has moved substantially beyond traditional lecture-based approaches toward more interactive and experiential methods that engage students with realistic scenarios and authentic problems. Bibliometric and systematic reviews document the field's broad variety of methods most studied (Jaganjac et al., 2023; Liu et al., 2018; Calabretta et al., 2011)

Purpose of the paper. *New generations have a unique view on social and environmental challenges, since they grew up with constant exposure to such topics. Moreover, they are the businesspeople and entrepreneurship of the future, therefore their concerns, expectations and standards are of the utmost importance. While studying in universities, they are exposed*

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to theories and frameworks about such topics, but they often show disengagement and disinterest, but they also lack opportunities to share and discuss their thoughts in a structured, guided way. In our work, we use an interactive, mediated approach to discuss business ethics, CSR ad SDGs with students, with the aim on the one hand to identify if the disengagement shown is related to real disinterest rather than the disillusion and negativity, and on the other hand to understand the students' views on such important topics before they enter the world of work. The primary aim of our approach is to develop and incorporate fresh, innovative teaching materials and methods into the professional education of business students who will become the leaders of tomorrow. Results can motivate students in caring about ethical issues and can help companies understand what new generations are looking for, and their point of view can help companies remaining forward-thinking and adapt to a new vision, that is brought by the managers of the future.

Methodology. *Ethical breakdowns are often driven less by the deliberate approval of misconduct than by cognitive and social dynamics that diminish moral awareness and facilitate rationalization such as ethical fading, motivated blindness, and moral disengagement. (1999). For this reason, we aim to test new engaging pedagogical tools, like Attentive Teaching. Attentive Teaching (AT) is a student-centered approach based on dialogue and interaction between teacher and learners. It uses visual representations drawn by the students and recognizes that each student brings different prior knowledge, experiences, and learning processes, which teachers should actively explore and address in an open-minded way. Rather than transmitting concepts in a purely top-down manner, the teacher acts as a facilitator who listens, observes, and builds the discussion starting from the students' own interpretations. The teacher listens carefully to each learner's perspective and acts as a mediator, offering supportive feedback that helps clarify and connect ideas. In doing so, the teacher builds on students' contributions to deepen understanding at both the individual and group levels. While subject-matter expertise is essential, it should not be used to impose a particular viewpoint. Instead, the teacher encourages dialogue, welcomes diverse perspectives, and creates space for new ideas and questions to emerge. Familiarity with the basic principles and steps of Attentive Teaching is important, though a formal pedagogical background is not required. Above all, the environment must remain non-judgmental, ensuring that students feel heard and free to express their views openly. By introducing new concepts through the ideas and reactions that emerge from the group, the method encourages students to express their viewpoints, doubts, and emotions, fostering greater involvement and engagement with the topics (Gal et al., 2023; Schur, 2025). The visual component plays a central role in this process, as drawings help externalize thoughts that might otherwise remain implicit, allowing students to reflect on their assumptions and communicate them to others in the classroom. In our work, we selected 14 students and used this methodology to obtain both visual representations of their perceptions and an interactive discussion based on the Attentive Teaching approach. The students were drawn from the second year of a master's degree program for several reasons. First, we assume that those approaching the end of their academic journey and preparing to enter the job market are more mature in addressing issues they are likely to encounter soon, requiring less theoretical instruction and benefiting more from practical learning. In addition, we expect these students to be more receptive to novel and varied teaching approaches compared to those at earlier stages of their studies. Finally, their level of experience allows for more open interaction, enabling us to gather feedback and evaluate their perceptions of the approach. This does not imply that the methodology cannot be applied to other student levels; its suitability depends on the topic and the instructor's objectives. The objective was to better understand students' priorities, levels of engagement, and possible feelings of disillusion toward topics such as business ethics, corporate responsibility, and sustainability. The session began with a brief introduction of the key concepts of Business Ethics (BE), Corporate Social Responsibility (CSR), and the Sustainable Development Goals (SDGs), presented mainly as evocative themes rather than as a traditional lecture. Students were then asked to interpret these topics by creating visual representations of how they perceive ethical issues in the contemporary economic system. Participants were given approximately 20–30 minutes to produce their drawings. They could choose to draw manually or use artificial intelligence tools, such as ChatGPT, to support the creative process, provided that they shared the prompts used. Interestingly, around half of the students decided to draw by hand despite the availability of digital tools. This phase was designed to allow students to reflect individually and translate their perceptions into visual form, without strong guidance from the instructors. Once the drawings were completed, each student presented their work to the class and explained the ideas behind it. This moment becomes the starting point for a collective discussion, where students compare interpretations, question one another's viewpoints, and connect their ideas with broader ethical themes related to business practices and sustainability. The mediation was managed by two professors, the authors of the article, with background in economics and business ethics. The discussion was intentionally open and exploratory, allowing different perspectives to emerge and evolve through dialogue. Attention was also given to the emotions that surfaced during the activity, since the Attentive Teaching methodology recognizes that ethical reflection often involves not only rational arguments but also feelings such as uncertainty, frustration, or hope. Through this process, the classroom becomes a shared space of interpretation and reflection, where students could explore ethical dilemmas, discuss the role of companies in society, and critically examine their own assumptions about business practices. The combination of visual expression, peer interaction, and facilitated discussion allows to collect qualitative insights about how students perceive ethical challenges in contemporary economic systems and how they emotionally and cognitively relate to these issues. To collect data, we relied on written notes taken during the discussion, including detailed summaries of each student's contribution and selected direct quotes. When possible, recording the session can also be useful for revisiting and analyzing the discussion. Additionally, after some time to have an objective view, we reached out to seven students who had attended the session and invited them to provide honest feedback on their experience.*

Results. *The activity produced a high level of engagement, with almost all students actively participating in the discussion and defending or revising their ideas in response to peers' comments. Compared to traditional lecture dynamics, the atmosphere was more interactive and collaborative, and students appeared more willing to share their personal interpretations and doubts. Even those who initially seemed less confident eventually contributed to the discussion by reacting to the ideas presented by their classmates. The session also revealed a strong emotional dimension: students openly expressed feelings such as anxiety, frustration, and uncertainty when confronting ethical tensions or conflicting perspectives. In several moments of the discussion, emotions such as anger toward perceived unfair economic dynamics or distrust toward corporate communication clearly emerged. Rather than being treated as distractions, these emotions were incorporated into the discussion to explore how feelings interact with rational reasoning in ethical decision-making. In many cases, the discussion moved naturally between emotional reactions and attempts to rationalize or justify certain positions, showing how ethical reflection often involves both dimensions. The drawings themselves often reflected contrasting attitudes toward the contemporary economic system. Some representations conveyed negative perceptions, such as depictions of ethical dilemmas as traps or references to manipulative practices like greenwashing or "marketing of guilt." Other drawings suggested more hopeful interpretations, using symbols such as trees, green landscapes, compasses, or lighthouses to represent guidance, sustainability, and the possibility of responsible economic behavior. These visual contrasts highlighted how students can simultaneously hold critical and optimistic views about the role of business in society. Interestingly, while emotions were strongly expressed during the discussion, they were rarely depicted explicitly in the drawings. Instead, several visualizations emphasized cognitive processes, including symbols such as brains, crossroads, or decision pathways. About a quarter of the drawings included a brain as a central element. This suggests that students often associate ethical judgment primarily with rational thinking even when emotional reactions are present and explicitly acknowledged during discussion. During the exchange of ideas, students reflected on the complexity of ethical decision-making and recognized that choices may be influenced not only by rational evaluation but also by intuition and emotional responses. This idea emerged clearly when students debated how individuals make moral decisions: some emphasized conscious reasoning and fairness as the main drivers of ethical choices, while others highlighted empathy, communication, or instinct as equally important elements. These discussions suggested a growing awareness among students that ethical decision-making is rarely a purely rational process. The activity also revealed a high degree of polarization in students' perceptions of contemporary economic actors. Many participants expressed strong criticism toward large corporations and economic practices perceived as unsustainable or manipulative, frequently mentioning examples such as greenwashing, over-capitalization, or aggressive commercial strategies. At the same time, several students framed ethical responsibility through a clear distinction between "us," representing individuals with moral values and ideals, and "them," referring to companies, politicians, or other powerful actors often perceived as unethical. This narrative appeared repeatedly throughout the discussion and reflects a broader generational tension in the way economic institutions are perceived. While this perspective demonstrates a strong ethical sensitivity, it also reveals a certain distance between students and the economic systems in which they will eventually participate. This tension became particularly visible when students acknowledged that, despite their skepticism toward corporate behavior, they would likely accept employment in such organizations if given the opportunity. Their justifications often referred to practical considerations, such as the need to work, build a career, or gain professional experience. In some cases, students did not perceive this separation between personal ideals and professional choices as contradictory, suggesting that ethical reflection may coexist with pragmatic decision-making. Another theme that emerged spontaneously was the ethical dimension of artificial intelligence and data privacy. One student, for example, initially planned to use ChatGPT only to generate ideas for her drawing but eventually relied on it to complete the image. Reflecting on this experience, she commented that in doing so she had "lost her dilemma," illustrating how easily practical convenience can override initial ethical intentions. This example sparked a broader discussion about the difficulty of maintaining ethical coherence when technological tools offer efficient but potentially problematic solutions. More generally, students showed awareness that digital platforms and AI systems create ethical dilemmas related to privacy, transparency, and responsibility, even when users willingly accept the trade-offs involved. Finally, the session also highlighted how students' apparent indifference toward ethical topics in traditional settings may sometimes hide deeper emotions or concerns. When given the opportunity to express themselves creatively and discuss their ideas openly, many students moved beyond passive attitudes and engaged with the ethical implications of contemporary economic practices in a more personal and reflective way.*

Overall, the AT session demonstrated that when students are invited to actively interpret ethical issues rather than passively receive information, they engage more deeply with the subject matter and express a wider range of reflections, emotions, and perspectives. The combination of visual expression, peer discussion, and emotional awareness allowed students to explore ethical dilemmas in a more personal and reflective way, highlighting not only their cognitive understanding of business ethics but also the underlying values, uncertainties, and tensions that shape their views of contemporary economic life.

In their subsequent oral feedback, all seven students emphasized the very positive impact this methodology had on their academic experience. They highlighted the value of being able to express their opinions without fear of judgment, which significantly increased their engagement. Some noted that they retained concepts from this session more effectively than from entire courses delivered through traditional lectures. One student pointed out that not knowing in advance how the session would unfold helped them feel more at ease and express themselves freely. While this initial uncertainty might seem like a limitation in repeated sessions, it is likely that, once students understand the non-judgmental nature of the

approach, any initial hesitation would diminish. Moreover, most students found that listening to their peers' perspectives and approaches to problem-solving greatly enriched their learning. Finally, they stressed the importance of the teacher's role as a mediator, appreciating how instructors positioned themselves on the same level as students, without imposing their views or dismissing alternative perspectives.

Research limitations. *The Attentive Teaching approach is not without limitations. First, it becomes more challenging as the number of students increases, particularly in relation to interaction, active listening, and the tracking of notes. Although the method has been shown to provide strong benefits, instructors who wish to adopt it should have some prior experience with the approach, to ensure that their facilitation does not unintentionally bias students' impressions or influence the topics discussed in class. To mitigate this risk, dedicated materials such as practical operational guidelines and suggested starting topics, which means prompt for what students can be asked to draw, could help ensure a smooth and meaningful learning experience. Moreover, the limited number of students and sessions makes this study only a first step in a broader experiment that is needed to identify common patterns among students. In fact, it is part of a project that aims to apply this approach across different countries and universities, collecting both qualitative data, as in this case, and quantitative results through dedicated surveys.*

Managerial implications. *From a company perspective, students frequently perceive firms as distant or morally problematic actors, and they tend to have a negative view of corporate communication, often associating it with greenwashing or overly polished narratives that do not reflect reality. Companies should therefore find ways to close this perception gap with younger generations, so that organizations are no longer perceived as distant or inherently unethical, but rather as a natural part of their future professional lives and, above all, as entities made up of human beings who are capable of making good decisions, behaving ethically, and sometimes making honest mistakes. Managers should break this perceived "wall of invincibility" and begin sharing their decision-making processes more openly, including the difficulties, emotions, and trade-offs involved in real business situations. Showing how decisions are made and acknowledging that ethical dilemmas often involve uncertainty and imperfect choices, could help make companies appear more credible and relatable.*

Moreover, marketing and communication strategies should consider how younger generations approach these messages: they tend to be skeptical, they question companies and focus on profit as the sole priority, they are more aware of social and environmental issues, and they have grown up with technology and social media, which they navigate naturally. As a result, traditional corporate communication that focuses only on positive narratives may be perceived as inauthentic or manipulative. Companies should therefore adopt more transparent and dialogic forms of communication, where stakeholders, especially younger audiences, can see not only the achievements but also the challenges and limitations organizations face. Creating spaces for dialogue with students and young professionals could also help companies better understand their expectations and concerns, turning this critical attitude into an opportunity for constructive engagement rather than mistrust.

Considering the pedagogical side, this project views the individual, the student in this case, as the focus of ethical business-related activities and aims to create new pedagogical materials and methods to optimally engage the student in education that might positively impact future professional ethical behavior, using novel approaches that have a positive effect on the students interaction, improving critical thinking and giving different perspectives on the topic. Considering the issue of moral disengagement (Bandura, 1999), we show that innovative teaching methods can positively influence student interaction and help reduce disengagement.

Originality of the paper. *Our work combines perspectives from management, business ethics, education, and psychology to identify effective ways to teach and engage future managers and workers. This multidisciplinary approach is distinctive, as it considers both the economic relevance and content of these topics and the ways in which students can be more effectively engaged with them. Our study does not focus only on what should be taught in business ethics and sustainability education, but also on how these topics can be experienced by students in a meaningful way. The added value of Attentive Teaching is that it works by emphasizing the teacher's role as a mediator while keeping learners actively engaged. The teacher listens to students' ideas and responds with feedback, often through individual contributions shared in whole-class discussions, allowing peers to learn from one another. Through this ongoing dialogic process, understanding is gradually developed, both individually and collectively among students. The initial visual representation allows the teacher to observe the learner's thinking process with no preconcepts or influence and their level of understanding: learners develop their own outputs to express their unique perspectives on the given topic, and this becomes the input level to develop the discussion. In our work, we show how this methodology could be applied in business ethics courses and shows that with this method there is a positive effect on the reduction of the moral disengagement theorized by Bandera (1999), and that this learning approach is positively welcomed by the students.*

Integrating participatory teaching methods and addressing emotions is crucial in ethics education, since ethical decision-making is rarely based only on rational reasoning but also involves feelings, values, and personal experiences. By encouraging students to express their ideas through drawings, discussion, and reflection, the Attentive Teaching approach allows deeper reactions, doubts, and expectations to emerge. At the same time, this approach provides companies with a way to receive direct, structured feedback from younger generations through creative and interactive activities. In this sense, the classroom can become not only a learning environment but also a space where organizations

can better understand how future employees and consumers perceive business practices, communication strategies, and ethical responsibilities.

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Il purpose dell'impresa come frame interpretativo della resilienza d'impresa

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Abstract. *Negli ultimi anni il corporate purpose ha acquisito crescente rilevanza nel dibattito accademico e manageriale come elemento fondativo per la creazione di valore di lungo periodo e per l'impatto sociale delle imprese. Tuttavia, le evidenze empiriche sui suoi effetti organizzativi restano ancora limitate. Questo studio analizza la relazione tra corporate purpose e resilienza dell'impresa, intesa come la capacità di assorbire shock, riconfigurare le proprie pratiche e mantenere la performance in condizioni di incertezza.*

L'analisi si basa su dati raccolti tramite survey su un campione di 268 imprese italiane. Attraverso modelli di regressione OLS viene testata l'esistenza di una relazione non lineare tra purpose e resilienza. I primi risultati evidenziano una relazione asimmetrica a forma di U: la resilienza tende a diminuire a livelli bassi o intermedi di purpose, ma aumenta significativamente quando il purpose è chiaramente definito e profondamente integrato nelle pratiche organizzative.

Lo studio analizza inoltre il ruolo moderatore di alcune caratteristiche organizzative, in particolare lo status giuridico di Società Benefit e la presenza di proprietà familiare. I risultati suggeriscono che, sebbene il purpose possa rafforzare la resilienza, la sua efficacia dipende dal modo in cui viene implementato e dal contesto organizzativo in cui opera.

Nel complesso, lo studio contribuisce alla letteratura fornendo evidenze empiriche sulla natura non lineare e contingente della relazione tra corporate purpose e resilienza organizzativa, evidenziando come il purpose possa agire come cornice interpretativa capace di sostenere le dimensioni cognitive ed emotive della resilienza.
Keywords: *Corporate purpose; resilienza organizzativa; sensemaking; Società Benefit;*

Framing of the research. Negli ultimi anni il concetto di corporate purpose ha acquisito crescente centralità nel dibattito accademico e manageriale, emergendo come uno dei principali riferimenti teorici per comprendere il ruolo contemporaneo delle imprese nella società (Chua et al., 2024; George et al., 2023; Mayer, 2023). La letteratura manageriale ha progressivamente superato una visione dell'impresa esclusivamente orientata alla massimizzazione del profitto, riconoscendo l'importanza di integrare obiettivi economici con finalità sociali e ambientali più ampie (Cucino et al., 2025; George et al., 2023; Mayer, 2023; Tafuro & Piccaluga, 2025). In questo contesto, il corporate purpose è stato interpretato come la ragione fondamentale dell'esistenza di un'organizzazione, ossia il principio guida che orienta le scelte strategiche e definisce il contributo che l'impresa intende apportare alla società (Mayer, 2023).

Questo cambiamento di prospettiva riflette l'emergere di un contesto economico caratterizzato da crescente complessità e da sfide globali di natura sistemica (Cucino et al., 2026; Gerorge et al., 2023). Fenomeni quali il cambiamento climatico (Di Minin et al., 2023), l'instabilità geopolitica, le crisi sanitarie (Cucino et al., 2026) e l'aumento delle disuguaglianze sociali legate a fenomeni di fragilità umana (Cucino et al., 2025) hanno infatti messo in discussione modelli tradizionali di gestione dell'impresa, evidenziando la necessità di sviluppare nuove capacità organizzative orientate alla resilienza e all'adattamento (Tafuro & Piccaluga, 2025). In tali contesti, le imprese sono chiamate non soltanto a reagire agli shock esterni, ma anche a sviluppare forme di adattamento dinamico che consentano loro di riorganizzare le proprie risorse e continuare a operare efficacemente nel lungo periodo (Crane et al., 2015; Cucino, 2023)

All'interno di questo quadro teorico, il concetto di resilienza organizzativa ha acquisito crescente rilevanza. La resilienza viene generalmente definita come la capacità delle organizzazioni di assorbire perturbazioni, adattarsi ai cambiamenti e continuare a perseguire i propri obiettivi anche in condizioni di forte incertezza (Burnard & Bhamra, 2011; Duchek, 2020). Tuttavia, la resilienza non dipende esclusivamente da fattori strutturali o operativi. Numerosi studi hanno evidenziato come essa sia profondamente radicata nei processi cognitivi ed emotivi che caratterizzano le organizzazioni, ossia nei modi attraverso cui gli attori interpretano gli eventi, attribuiscono significato alle situazioni e coordinano le proprie azioni.

In questa prospettiva, la teoria del sensemaking offre un quadro interpretativo particolarmente utile per comprendere il ruolo del corporate purpose nello sviluppo della resilienza organizzativa. Secondo Weick (1995), il sensemaking rappresenta il processo attraverso il quale gli individui costruiscono significati condivisi che consentono loro di interpretare eventi ambigui e orientare l'azione collettiva. Nei momenti di crisi o di cambiamento, gli attori organizzativi si trovano infatti a dover interpretare segnali spesso incompleti o contraddittori, cercando di costruire narrazioni coerenti che permettano di comprendere ciò che sta accadendo e di definire possibili risposte organizzative.

In tale contesto, il corporate purpose può essere interpretato come un vero e proprio frame interpretativo che orienta i processi di sensemaking all'interno delle organizzazioni. Il purpose fornisce infatti una cornice di significato attraverso

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la quale gli attori organizzativi interpretano gli eventi, attribuiscono priorità alle azioni e coordinano le proprie decisioni strategiche. Quando il purpose è chiaramente definito e condiviso, esso può contribuire a ridurre l'ambiguità interpretativa e favorire l'allineamento tra i diversi membri dell'organizzazione.

Nonostante queste potenzialità teoriche, la relazione tra corporate purpose e resilienza organizzativa rimane ancora relativamente poco esplorata dal punto di vista empirico. Gran parte della letteratura esistente si concentra infatti su analisi concettuali o su studi qualitativi, mentre risultano ancora limitate le ricerche empiriche che analizzano in modo sistematico gli effetti del purpose sulle performance organizzative o sulle capacità adattive delle imprese. Inoltre, alcuni studi recenti hanno iniziato a evidenziare possibili ambivalenze associate all'adozione del corporate purpose (Tafuro & Piccaluga, 2025). In particolare, è stato osservato che molte organizzazioni tendono ad adottare dichiarazioni di purpose principalmente per finalità reputazionali o comunicative, senza che queste siano realmente integrate nelle pratiche organizzative. Questo fenomeno, spesso definito purpose-washing, può generare disallineamenti interni e ridurre la credibilità delle iniziative aziendali orientate al purpose (Aguilera, 2023; Findlay, & Moran, 2019; Gulati & Wohlgezogen, 2023).

Alla luce di queste considerazioni, appare plausibile ipotizzare che la relazione tra corporate purpose e resilienza organizzativa non sia necessariamente lineare. In alcuni casi, livelli intermedi o superficiali di purpose potrebbero addirittura generare effetti negativi, soprattutto quando le dichiarazioni di purpose non sono accompagnate da cambiamenti concreti nelle pratiche organizzative. Al contrario, quando il purpose è profondamente radicato nelle strutture decisionali e nei processi organizzativi, esso può diventare un potente fattore di coordinamento e di interpretazione, contribuendo a rafforzare le capacità adattive delle imprese.

Purpose of the paper. Alla luce delle lacune presenti nella letteratura, il presente studio si propone di analizzare la relazione tra corporate purpose e resilienza organizzativa, con l'obiettivo di comprendere se e in quale misura il purpose possa contribuire allo sviluppo di capacità adattive nelle imprese.

In particolare, la ricerca intende indagare due questioni principali. La prima riguarda l'esistenza di una relazione tra corporate purpose e resilienza organizzativa. Più concretamente, si intende verificare se il corporate purpose contribuisca a rafforzare la resilienza delle imprese in contesti caratterizzati da elevata incertezza. Sebbene numerosi studi abbiano suggerito che le organizzazioni guidate da un forte purpose possano sviluppare maggiori capacità di adattamento, mancano ancora evidenze empiriche robuste che confermino tale relazione.

La seconda questione riguarda la natura di questa relazione. Come evidenziato in precedenza, alcune evidenze teoriche suggeriscono che l'impatto del purpose sulle dinamiche organizzative possa essere non lineare. In particolare, livelli iniziali di purpose potrebbero non essere sufficienti a generare benefici significativi, mentre livelli più elevati, caratterizzati da una forte integrazione del purpose nelle pratiche organizzative, potrebbero produrre effetti più marcati sulla resilienza.

Partendo dalla prospettiva del sensemaking (Weick, 1995; Maitlis & Christianson, 2014), il corporate purpose viene interpretato come una cornice interpretativa che consente ai membri dell'organizzazione di comprendere ambienti complessi, coordinare le proprie azioni e mobilitare risorse cognitive ed emotive in risposta alle avversità. Studi precedenti suggeriscono infatti che il purpose possa favorire l'allineamento interno e la costruzione di significati condivisi, elementi fondamentali per la capacità adattiva delle organizzazioni (Lengnick-Hall et al., 2011; George et al., 2023).

Lo studio analizza inoltre il ruolo moderatore di alcune caratteristiche organizzative. In particolare, viene esaminato l'effetto dello status giuridico di Società Benefit e della proprietà familiare sulla relazione tra corporate purpose e resilienza. Le Società Benefit incorporano formalmente obiettivi sociali e ambientali nelle proprie strutture di governance (Rawhouser et al., 2015), mentre le imprese familiari presentano spesso orientamenti valoriali e prospettive di lungo periodo che influenzano i processi decisionali (De Massis & Rondi, 2020).

Attraverso questa analisi, il paper contribuisce alla letteratura sul corporate purpose offrendo evidenze empiriche sul suo ruolo nel rafforzare la resilienza organizzativa.

Methodology. L'analisi empirica si basa su una survey condotta su un campione di imprese italiane. Il questionario è stato sviluppato utilizzando scale validate presenti nella letteratura.I dati sono stati raccolti attraverso interviste telefoniche assistite da computer tra settembre e dicembre 2024. Il dataset finale include 268 imprese operanti in diversi settori economici e distribuite su tutto il territorio italiano.

Particolare attenzione è stata dedicata alla costruzione del campione, al fine di garantire la comparabilità tra imprese con diverse caratteristiche organizzative. A tal fine è stata adottata una procedura di matched sampling che ha consentito di selezionare imprese simili in termini di dimensione, settore e localizzazione geografica.

La resilienza organizzativa è stata misurata utilizzando la scala sviluppata da Richtnér e Löfsten (2014), che consente di catturare sia la dimensione cognitiva sia quella emotiva della resilienza. Il corporate purpose è stato invece misurato utilizzando la Perceived Organizational Purpose Scale sviluppata da Jasinenko e Steuber (2022), che considera diverse dimensioni del purpose, tra cui contributo sociale, autenticità, capacità di orientamento e capacità ispirazionale.

Il campione comprende sia Società Benefit sia imprese tradizionali, oltre a imprese familiari e non familiari. Questa configurazione consente di analizzare come diverse forme organizzative possano influenzare la relazione tra corporate purpose e resilienza.

Tabella 1 - Distribuzione del campione

Caratteristica	Numero imprese	Percentuale
Società Benefit	134	50%
Imprese non Benefit	134	50%
Imprese familiari	120	44.8%
Imprese non familiari	148	55.2%
Totale	268	100%

Tabella 2 - Principali variabili analizzate nello studio

Variabile	Tipo	Descrizione
Resilience	Dipendente	Capacità organizzativa di adattamento
Corporate Purpose	Indipendente	Percezione del purpose organizzativo
Benefit status	Moderatore	Società Benefit vs imprese tradizionali
Family ownership	Moderatore	Imprese familiari vs non familiari

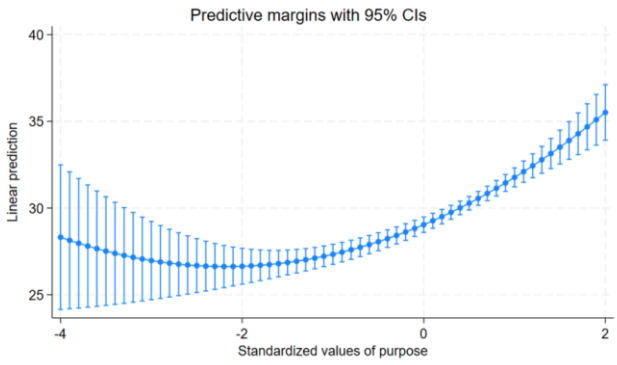
Per testare le ipotesi sono stati utilizzati modelli di regressione OLS. Per analizzare la possibile relazione non lineare tra corporate purpose e resilienza sono stati inclusi nei modelli sia il termine lineare sia il termine quadratico del corporate purpose (Ye & Zhang, 2011). Sono stati inoltre introdotti termini di interazione per analizzare gli effetti moderatori dello status di Società Benefit e della proprietà familiare. Infine, sono state incluse alcune variabili di controllo relative alla dimensione dell'impresa, all'età dell'organizzazione, al settore di attività, alla regione geografica e alla redditività.

Results. L'analisi empirica è stata condotta utilizzando modelli di regressione OLS, in linea con studi precedenti che analizzano relazioni tra corporate purpose e performance organizzative (Gartenberg et al., 2019; Gartenberg & Serafeim, 2023). L'obiettivo principale dell'analisi è stato verificare l'esistenza e la natura della relazione tra corporate purpose e resilienza organizzativa, nonché il ruolo moderatore di alcune caratteristiche delle imprese.

I primi risultati evidenziano un andamento a U asimmetrica: ai livelli iniziali di corporate purpose la resilienza tende a diminuire leggermente, mentre oltre una certa soglia essa cresce in maniera significativa. Questo andamento suggerisce che l'introduzione del purpose all'interno delle organizzazioni può inizialmente generare dinamiche di disallineamento o ambiguità interpretativa. Quando il purpose non è ancora pienamente integrato nei processi decisionali o nelle pratiche organizzative, esso può essere percepito come una dichiarazione retorica o come un elemento estraneo alla cultura aziendale.

Al contrario, quando il corporate purpose diventa progressivamente più chiaro, condiviso e integrato nelle routine organizzative, esso inizia a svolgere una funzione di orientamento strategico e interpretativo che rafforza le capacità adattive dell'organizzazione. Questo andamento è rappresentato graficamente nella Figura 1, che illustra la relazione quadratica tra corporate purpose e resilienza.

Figura 1 Predictive margins of corporate purpose on firm's resilience



La figura mostra come la resilienza diminuisca leggermente nella fase iniziale di sviluppo del purpose, per poi aumentare rapidamente quando il purpose diventa più profondamente radicato nell'organizzazione. Questo risultato conferma empiricamente quanto suggerito dalla letteratura sul sensemaking, secondo cui la presenza di un frame interpretativo condiviso consente agli attori organizzativi di coordinare le proprie azioni e interpretare in modo più efficace situazioni ambigue o incerte.

Oltre alla relazione principale tra corporate purpose e resilienza, l'analisi ha esaminato il ruolo moderatore di alcune caratteristiche organizzative, in particolare lo status di Società Benefit e la proprietà familiare dell'impresa.

Per quanto riguarda lo status di Società Benefit, i risultati mostrano che il suo effetto diretto sulla resilienza non è statisticamente significativo. Tuttavia, l'interazione tra corporate purpose e status di Società Benefit evidenzia un pattern più articolato. In particolare, il coefficiente associato al termine quadratico dell'interazione risulta negativo e debolmente significativo, suggerendo che nelle Società Benefit l'effetto positivo del purpose sulla resilienza tende ad attenuarsi ai livelli più elevati di purpose. In particolare, nelle imprese che hanno adottato lo status giuridico di Società Benefit, la relazione tra purpose e resilienza assuma un andamento leggermente diverso rispetto alle imprese tradizionali. Sebbene queste imprese presentino livelli medi di resilienza relativamente elevati, l'effetto marginale del purpose tende a ridursi ai livelli più alti. Questo risultato può essere interpretato considerando il fatto che nelle Società Benefit il purpose è spesso formalizzato nello statuto aziendale e integrato nei meccanismi di governance, il che può ridurre la variabilità dell'effetto del purpose sulla resilienza.

L'analisi ha inoltre esaminato il ruolo della proprietà familiare. I risultati indicano che le imprese familiari presentano livelli medi di resilienza più elevati rispetto alle imprese non familiari. Questo risultato è coerente con la letteratura sulle imprese familiari, che evidenzia come queste organizzazioni siano spesso caratterizzate da una forte identità organizzativa, da relazioni di fiducia consolidate e da una visione di lungo periodo.

Tuttavia, l'interazione tra corporate purpose e proprietà familiare mostra un effetto negativo significativo per il termine lineare dell'interazione. Ciò suggerisce che nelle imprese familiari livelli molto elevati di corporate purpose potrebbero generare tensioni o rigidità organizzative che limitano l'effetto positivo del purpose sulla resilienza.

Infine, il modello esplora anche l'effetto congiunto della combinazione tra status di Società Benefit e proprietà familiare. I risultati suggeriscono che le imprese che presentano entrambe queste caratteristiche tendono a mostrare livelli relativamente elevati di resilienza, ma l'effetto marginale del corporate purpose appare più limitato.

Nel complesso, i risultati confermano che il corporate purpose può rappresentare un importante fattore di resilienza organizzativa, ma evidenziano anche che la relazione tra queste due variabili è complessa e dipende da diverse condizioni organizzative.

Research limitations. Questo studio presenta alcuni limiti che aprono possibili direzioni per ricerche future. In primo luogo, l'analisi si basa su dati cross-sectional, il che limita la possibilità di stabilire relazioni causali tra corporate purpose e resilienza. Studi longitudinali potrebbero offrire una comprensione più approfondita dell'evoluzione del purpose nel tempo e del suo impatto sulla capacità adattiva delle imprese.

In secondo luogo, le misure utilizzate si basano su percezioni auto-riportate dai manager. Sebbene questo approccio sia utile per analizzare i processi di sensemaking all'interno delle organizzazioni (Weick et al., 2005), esso può essere soggetto a bias percettivi.

Infine, lo studio analizza solo due variabili moderatrici. Ricerche future potrebbero esplorare il ruolo di ulteriori fattori organizzativi, come gli stili di leadership, le strutture di governance o i processi di coinvolgimento degli stakeholder.

Managerial implications. I risultati dello studio offrono alcune importanti implicazioni per i manager.

In primo luogo, l'adozione di un corporate purpose superficiale o puramente simbolico può risultare controproducente. Quando il purpose non è integrato nelle pratiche organizzative, esso può generare scetticismo o confusione tra i membri dell'organizzazione, indebolendo la resilienza. Questo risultato evidenzia un aspetto spesso trascurato nel dibattito manageriale: adottare dichiarazioni di purpose senza un reale cambiamento nelle pratiche organizzative può generare ambiguità interpretativa, disallineamento interno e perdita di credibilità tra i membri dell'organizzazione. In altre parole, un purpose debole o puramente simbolico non rappresenta una condizione neutrale, ma può compromettere la capacità dell'organizzazione di interpretare correttamente le situazioni di crisi e di coordinare le proprie risposte.

Per i manager ciò implica che l'introduzione del corporate purpose richiede un processo di trasformazione organizzativa più ampio. Il purpose deve essere tradotto in criteri concreti di decisione strategica, integrato nei sistemi di governance e incorporato nei processi quotidiani dell'organizzazione. Ciò significa, ad esempio, che le decisioni di investimento, le politiche di gestione delle risorse umane e le strategie di innovazione dovrebbero essere coerenti con il purpose dichiarato. Solo quando il purpose diventa parte integrante delle pratiche organizzative esso può funzionare come un vero e proprio "frame interpretativo" che aiuta l'organizzazione a interpretare segnali complessi e a coordinare azioni collettive nei momenti di incertezza.

In secondo luogo, i risultati mostrano che il corporate purpose può diventare una leva importante per rafforzare la resilienza organizzativa quando è chiaramente articolato e profondamente radicato nella cultura aziendale. In queste condizioni, il purpose contribuisce a rafforzare sia la dimensione cognitiva sia quella emotiva della resilienza. Dal punto di vista cognitivo, esso fornisce una direzione chiara che aiuta i membri dell'organizzazione a interpretare eventi ambigui e a identificare priorità strategiche. Dal punto di vista emotivo, il purpose contribuisce a creare un senso di significato condiviso che può rafforzare motivazione, fiducia e coesione organizzativa nei momenti di crisi.

Per i leader organizzativi ciò implica che il purpose dovrebbe essere comunicato e coltivato non solo attraverso dichiarazioni formali, ma anche attraverso narrazioni organizzative, pratiche simboliche e comportamenti di leadership coerenti. Storytelling organizzativo, rituali aziendali e sistemi di riconoscimento dei comportamenti coerenti con il purpose possono contribuire a rafforzare la sua credibilità e a favorire la costruzione di significati condivisi all'interno dell'organizzazione.

Una terza implicazione riguarda il ruolo delle caratteristiche organizzative nel modulare l'effetto del corporate purpose. I risultati mostrano infatti che lo status di Società Benefit e la proprietà familiare influenzano il modo in cui il

purpose si traduce in resilienza organizzativa. Nel caso delle Società Benefit, la formalizzazione del purpose nello statuto aziendale e nei meccanismi di governance può contribuire a rafforzare la credibilità del purpose e a favorire l'allineamento tra gli stakeholder. Tuttavia, questa formalizzazione può anche introdurre elementi di rigidità procedurale che riducono la flessibilità organizzativa in alcune situazioni.

Per i manager delle Società Benefit ciò implica la necessità di trovare un equilibrio tra formalizzazione e flessibilità. Da un lato, è importante mantenere meccanismi di accountability e trasparenza che garantiscano la coerenza tra purpose dichiarato e azioni concrete. Dall'altro, è fondamentale preservare spazi di sperimentazione e apprendimento che consentano all'organizzazione di adattarsi rapidamente ai cambiamenti dell'ambiente esterno.

Nel caso delle imprese familiari, i risultati suggeriscono che la resilienza organizzativa tende a essere relativamente elevata grazie alla presenza di valori condivisi, relazioni di fiducia e orientamento di lungo periodo. Tuttavia, l'introduzione di un corporate purpose formalizzato può talvolta entrare in tensione con l'identità storica o con la legacy familiare dell'impresa. In questi casi, il purpose rischia di essere percepito come un elemento esterno piuttosto che come un'estensione naturale dei valori dell'impresa.

Per le imprese familiari diventa quindi cruciale sviluppare un purpose che sia coerente con la storia e con l'identità della famiglia imprenditoriale. Integrare il purpose con la narrativa familiare e con i valori fondanti dell'impresa può facilitare la sua accettazione da parte dei membri dell'organizzazione e rafforzare la sua capacità di orientare le decisioni strategiche.

Infine, i risultati di questo studio suggeriscono che lo sviluppo di un'organizzazione realmente purpose-driven rappresenta un processo graduale che richiede tempo, coerenza e impegno da parte del top management. I manager dovrebbero essere consapevoli che l'introduzione del purpose può inizialmente generare resistenze o scetticismo, soprattutto se i membri dell'organizzazione percepiscono un divario tra dichiarazioni e pratiche concrete. Superare questa fase iniziale richiede un forte impegno di leadership e una comunicazione trasparente sulle motivazioni e sugli obiettivi del purpose.

In questo senso, il messaggio principale che emerge da questa ricerca può essere riassunto in modo semplice: se un'organizzazione decide di adottare un corporate purpose come guida strategica, è fondamentale portare questo processo fino in fondo. Fermarsi a metà strada, limitandosi a dichiarazioni simboliche o a iniziative isolate, rischia di compromettere i benefici potenziali del purpose e di indebolire la resilienza dell'organizzazione stessa.

Originality of the paper. Questo studio contribuisce alla letteratura sul corporate purpose e sulla resilienza organizzativa in diversi modi.

In primo luogo, il paper contribuisce al crescente dibattito accademico sul corporate purpose fornendo evidenze empiriche sui suoi effetti organizzativi. Sebbene il concetto di purpose abbia ricevuto crescente attenzione negli ultimi anni, gran parte della letteratura si è concentrata su discussioni concettuali e normative piuttosto che su analisi empiriche sistematiche (George et al., 2023; Mayer, 2023). In questo senso, il presente studio risponde alla crescente richiesta di ricerche empiriche che analizzino come il purpose influenzi concretamente i risultati organizzativi.

In secondo luogo, lo studio contribuisce alla letteratura sulla resilienza organizzativa, introducendo il corporate purpose come possibile antecedente della resilienza. La ricerca esistente ha prevalentemente analizzato la resilienza in relazione a fattori strutturali, operativi o strategici, come le capacità organizzative, le risorse disponibili o i sistemi di gestione delle crisi (Burnard & Bhamra, 2011; Duchek, 2020). Questo lavoro amplia tale prospettiva mostrando come elementi simbolici e valoriali, quali il corporate purpose, possano influenzare la capacità delle organizzazioni di affrontare situazioni di incertezza.

In terzo luogo, il paper offre un contributo teorico alla letteratura sul sensemaking organizzativo interpretando il corporate purpose come una cornice interpretativa che guida i processi di costruzione di significato all'interno delle organizzazioni. In linea con la prospettiva del sensemaking (Weick, 1995; Maitlis & Christianson, 2014), il purpose può aiutare i membri dell'organizzazione a interpretare segnali provenienti dall'ambiente esterno, coordinare le proprie azioni e sviluppare risposte adattive in contesti complessi e incerti. In questo senso, lo studio evidenzia come il purpose possa sostenere sia la dimensione cognitiva sia quella emotiva della resilienza organizzativa (Lengnick-Hall et al., 2011).

In quarto luogo, lo studio mostra che la relazione tra corporate purpose e resilienza non è lineare ma segue una dinamica a forma di U. Questo risultato suggerisce che livelli intermedi di purpose possano generare ambiguità organizzativa o disallineamenti tra valori dichiarati e pratiche effettive, mentre livelli elevati di purpose, quando realmente integrati nelle pratiche organizzative, possano rafforzare la capacità adattiva dell'impresa. Tale evidenza contribuisce al dibattito recente sull'ambivalenza del corporate purpose, che evidenzia come un purpose superficiale o simbolico possa risultare inefficace o addirittura controproducente (Aguilera, 2023; Gulati & Wohlgezogen, 2023).

Infine, il paper contribuisce alla letteratura evidenziando il ruolo contingente delle caratteristiche organizzative. In particolare, l'analisi mostra come lo status di Società Benefit e la proprietà familiare possano influenzare la relazione tra purpose e resilienza. Studi precedenti hanno suggerito che le imprese familiari possano sviluppare forme specifiche di resilienza legate a relazioni di fiducia e orientamenti di lungo periodo (De Massis & Rondi, 2020), mentre le Società Benefit incorporano formalmente obiettivi sociali e ambientali nelle proprie strutture di governance (Rawhouser et al., 2015). Integrando queste prospettive, il presente studio evidenzia come il corporate purpose interagisca con tali caratteristiche organizzative, influenzando in modo diverso la capacità adattiva delle imprese.

Nel complesso, questo lavoro contribuisce alla letteratura mostrando che il corporate purpose può rappresentare una risorsa strategica per rafforzare la resilienza organizzativa, ma che la sua efficacia dipende dal grado di integrazione nelle pratiche organizzative e dal contesto istituzionale e organizzativo in cui l'impresa opera.

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Shared Dynamic Capabilities for Circular Economy in the Olive Oil Supply Chain: Evidence from an Italian Benefit Corporation

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Abstract. *Implementing circular economy (CE) practices in the olive oil industry is a supply-chain challenge, as circularity depends on coordinating multiple actors to redesign material flows, valorise by-products, and align quality and sustainability requirements. Yet, CE research still offers limited insight into how firms build the organisational and inter-organisational capabilities needed to scale circular initiatives beyond isolated projects, especially in Benefit Corporations. This short paper addresses this gap by adopting a dynamic capabilities lens and focusing on the development of shared (inter-organizational) capabilities enabled by boundary-spanning mechanisms. Drawing on an in-depth qualitative case study of Olio Carli, an Italian Benefit Corporation, we investigate how intra-organisational coordination and supply-chain relationships jointly support (i) sensing circular opportunities and constraints, (ii) seizing them through collaborative experimentation and partner engagement, and (iii) reconfiguring routines, standards, and governance arrangements to institutionalize circular practices. The analysis highlights boundary spanning as a key micro-foundation of shared dynamic capabilities, enacted through cross-functional integration, boundary objects, and relational governance with supply-chain partners. The paper contributes by conceptualizing CE scaling as a capability-building process across organizational boundaries and by clarifying how purpose-oriented governance can shape coordination choices and trade-off management in circular supply networks.*
Keywords: *Dynamic capabilities; hybrid organizations; boundary spanning; circular economy; olive oil supply chain; Benefit Corporations*

Framing of the research. CE is increasingly central to debates on how firms respond to resource scarcity, stakeholder pressure and regulatory demands. However, implementation remains far from straightforward. In many sectors, circularity cannot be achieved through isolated initiatives at the individual-firm level. Rather, it requires reconfiguring material flows, waste management and value recovery across a broader network of interconnected actors (Geissdoerfer et al., 2017; Kirchherr et al., 2017; Korhonen et al., 2018). This is particularly evident in agri-food supply chains, where circular solutions must be developed without compromising traceability, food safety and product quality. In these contexts, circularity is not only a technical issue, but also an organisational and relational one, as it depends on aligning routines, standards and decision criteria across suppliers, focal firms, logistics operators, packaging partners and downstream recovery or valorisation actors (Genovese et al., 2017; Farooque et al., 2019).

The olive oil supply chain provides a suitable context for examining these dynamics. On the one hand, upstream production is often fragmented and geographically dispersed. On the other hand, decisions regarding processing, packaging and distribution are highly sensitive to product quality and compliance requirements. The sector also generates by-products and waste streams whose circular recovery often depends on specialised infrastructure and collaborative arrangements beyond the control of a single organisation. This context is particularly relevant because it brings together priorities that do not always align easily. Companies must ensure reliability, consistency and cost control whilst also meeting traceability and certification requirements and responding to expectations on waste reduction, packaging redesign and resource efficiency. For this reason, the olive oil supply chain offers a useful context for studying how circularity is organised and scaled through coordination mechanisms extending beyond the focal firm.

Although the literature on the CE has expanded significantly in recent years, some key aspects remain only partially explored. A substantial part of this literature has focused on identifying circular practices, such as reuse, recycling, reverse logistics and waste recovery, as well as on classifying business model archetypes associated with circular strategies (Bocken et al., 2016; Lieder & Rashid, 2016). These contributions have clarified the forms that circularity can take at the operational and strategic levels. However, they often say less about the organisational conditions that enable such initiatives to become stable, repeatable and scalable. Similarly, the role of supply chain relationships is widely recognised in CE studies, but often in general terms. Collaboration is often presented as necessary, whilst less attention is paid to how it is built, governed and maintained when change involves different functions, knowledge bases and organisational interests (Korhonen et al., 2018; Murray et al., 2017). Consequently, CE is still rarely analysed as a capacity-building process through which firms and partners identify circular opportunities, mobilise resources, and progressively reshape routines and relationships.

To address this issue, this study adopts the perspective of dynamic capabilities. This line of research explains how organisations respond to changing contexts by sensing opportunities and threats, seizing them through strategic action, and reconfiguring resources and routines over time (Teece et al., 1997; Teece, 2007). Such a perspective appears particularly well-suited to the study of the CE. Circular transitions are, in fact, typically characterised by uncertainty, interdependence and path dependence. Firms often make decisions under incomplete knowledge about technologies, regulation and partner availability; they operate in systems where one actor's choices influence others; and they must contend with established infrastructures and routines that may hinder change. From this perspective, circularity should

not be interpreted simply as the introduction of a predefined set of practices. Rather, it can be understood as a continuous process of learning, experimentation and organisational adaptation (Eisenhardt & Martin, 2000; Helfat et al., 2007; Winter, 2003).

At the same time, an understanding of dynamic capabilities limited to the level of the individual firm is insufficient when the achievement of circular outcomes depends on supply chain partners. Many CE initiatives in supply chains cannot be implemented by the focal firm alone. This is the case, for example, with packaging redesign aligned with recycling systems, by-product valorisation through specialised external actors, or the creation of reverse flows requiring joint investment and operational synchronisation. In situations of this kind, knowledge, relevant assets and decision-making rights are distributed beyond organisational boundaries. This suggests the need to extend the analysis towards shared or relational forms of capacity development, in which adaptation and value creation become possible thanks to the quality of inter-organisational relationships (Dyer & Singh, 1998; Lavie, 2006). Previous research has shown how firms can generate relational rents through specific investments in the relationship, knowledge-sharing routines, complementary resources and appropriate governance mechanisms (Dyer & Singh, 1998). Applied to CE transitions, this implies that sensing, seizing and reconfiguring may need to take place not only within the focal firm, but also across the wider network of actors involved. In other words, the CE may depend on the development of shared dynamic capabilities, through which opportunities and constraints are jointly identified, responses are implemented collaboratively, and new routines or governance arrangements are progressively institutionalised along the supply chain.

Once CE is understood in these terms, the question becomes more specific: how are these shared capabilities actually developed in practice? The literature on boundary spanning offers a useful starting point for exploring this issue. Boundary spanning refers to the activities, roles and routines through which organisations connect internal domains and engage with external environments by crossing functional, cognitive and organisational boundaries (Aldrich & Herker, 1977; Tushman & Scanlan, 1981). Boundary spanners do not merely transfer information from one unit to another; they interpret, translate and mediate between actors with different skills and priorities. This aspect becomes particularly important when coordination requires interaction between groups that do not necessarily share the same language, assumptions or criteria for judgement. In such situations, coordination is often supported not only by individuals and teams, but also by boundary objects—that is, artefacts such as standards, templates, metrics, prototypes or dashboards that enable different communities to work together without requiring complete consensus or identical interpretations (Star & Griesemer, 1989; Carlile, 2002; Carlile, 2004). CE initiatives within supply chains are likely to be particularly boundary-intensive for this very reason. They typically involve procurement, quality and compliance experts, operations and sustainability managers, and logistics or recovery partners whose perspectives only partially converge.

Building on these contributions, this paper considers boundary spanning as a micro-foundation of shared dynamic capabilities in the circular transformation of the supply chain. More specifically, boundary spanning can support shared sensing by helping actors collectively identify and interpret circular opportunities and constraints. This can occur through material-flow mapping, the identification of waste hotspots, and the interpretation of regulatory developments and stakeholder expectations. These activities are not purely technical, as they also require negotiation regarding what should be considered a relevant problem and which circular options are feasible in light of cost, quality and compliance constraints. Boundary spanning can also support shared seizing, as opportunities must be translated into coordinated action through pilot projects, co-design initiatives and other forms of collaborative experimentation. At this stage, it becomes important to select partners, define responsibilities, align expectations and establish governance structures able to sustain cooperation under uncertainty. Finally, boundary spanning can contribute to shared reconfiguring when circular initiatives begin to impact routines, standards, metrics and governance criteria across the network. This is the stage at which circularity begins to transcend the scope of the isolated project and become embedded in the operational logic of the supply chain.

Crucially, the governance structure is not merely contextual but theoretically salient for CE implementation. As a Benefit Corporation, Olio Carli legally integrates common good and stakeholder considerations into its governance. While existing literature links hybrid organizations to long-term sustainability orientations (Battilana & Lee, 2014; Ebrahim et al., 2014; Haigh et al., 2015), the specific nexus between purpose-driven governance and shared dynamic capabilities remains underexplored. We argue that a B-Corp's legal mandate to engage external stakeholders structurally institutionalizes boundary-spanning mechanisms, directly enabling the sensing, seizing, and reconfiguring of circular practices. In this sense, purpose-oriented governance can create conditions conducive to building capacity for CE, legitimising investments whose short-term returns are uncertain, strengthening internal alignment around sustainability priorities, and supporting more enduring relational commitments with supply chain partners. At the same time, it can increase scrutiny and accountability pressures, making trade-offs more visible and heightening the need for robust measurement and governance systems.

Taken together, these arguments suggest that the relevant question is not simply whether firms adopt CE initiatives, but how they build the organisational and relational conditions that enable such initiatives to become scalable. The framework proposed in this paper is based on the idea that the scaling of CE in the olive oil supply chain depends both on the dynamic capabilities of the focal firm and on the emergence of shared dynamic capabilities among partners, with boundary spanning acting as a connecting mechanism between these two dimensions. From this perspective, boundary spanning is not a peripheral condition. It is central to the way in which internal coordination links to network orchestration through cross-functional alignment, inter-organisational governance practices and co-development, and the use of boundary objects and shared metrics that help stabilise action in conditions of heterogeneity and uncertainty. This

approach responds to the need, identified in the literature, to better clarify the organisational and inter-organisational foundations of circular transitions and to theorise how circularity is actually implemented under real constraints of compliance, quality and supply chain interdependence (Korhonen et al., 2018; Genovese et al., 2017; Farooque et al., 2019).

On this basis, the paper develops a qualitative case study aimed at investigating how dynamic capabilities are constructed and activated to pursue CE practices in the olive oil supply chain, which boundary-spanning mechanisms support the development of shared capabilities with partners, and how governance benefits influence coordination choices and the management of trade-offs in the pursuit of circular outcomes.

Purpose of the paper. This short paper aims to explain how CE initiatives are organised and progressively scaled up along the olive oil supply chain, focusing on capacity-building processes that link intra-organisational coordination with inter-organisational collaboration. Rather than viewing circularity as a set of practices or a sequence of distinct projects, this study interprets the scaling of CE as a dynamic and relational transformation, which requires, on the one hand, the development of dynamic capabilities at the firm level — that is, the ability to sense, seize and reconfigure in response to sustainability challenges — and, on the other, the emergence of shared inter-organisational capabilities, distributed amongst the various actors in the supply chain. Within this perspective, particular attention is paid to boundary-spanning mechanisms — roles, routines and boundary objects — understood as micro-foundations through which shared sensing, shared seizing and shared reconfiguring become possible in a context characterised by heterogeneous actors, stringent quality and safety constraints, and non-trivial trade-offs.

Empirically, the paper analyses these mechanisms through an in-depth qualitative case study of Olio Carli, an Italian company established as a Benefit Corporation. As a Benefit Corporation, Olio Carli operates within a purpose-oriented governance framework that formally incorporates public-benefit objectives and stakeholder accountability into the company's strategic orientation, potentially influencing how circular initiatives are prioritised, legitimised, measured, and coordinated across the supply network. The case therefore offers a useful setting not only for observing whether circular initiatives are pursued, but above all for understanding how they are translated into coordinated action through internal alignment and the orchestration of supply chain partners.

The analysis is guided by three research questions:

RQ1: How does a Benefit Corporation develop and activate dynamic capabilities to implement and scale up circular economy practices within the olive oil supply chain?

RQ2: What boundary-spanning mechanisms enable the development of shared dynamic capabilities with supply chain partners (e.g. suppliers, packaging and logistics operators, partners involved in recovery or valorisation)?

RQ3: How does purpose-oriented governance influence coordination choices and the management of key trade-offs (e.g. cost, quality/compliance, reliability, sustainability outcomes) within the context of supply chain circularity?

By addressing these questions, the paper aims to make three main contributions. Firstly, it contributes to the literature on the CE and supply chains by shifting the explanatory focus from 'which circular practices' to 'how circularity is scaled through capability development processes that span organisational boundaries'. Secondly, it contributes to studies on dynamic capabilities by clarifying the role of boundary spanning in enabling processes of shared sensing, shared seizing and shared reconfiguring, thereby extending theoretical reflection beyond the level of the individual firm and situating it within a supply chain context. Thirdly, the work offers empirically grounded insights into how a form of purpose-oriented governance, such as the Benefit Corporation, can influence circular transformation processes, affecting the legitimacy of choices, accountability mechanisms and the coordination and measurement architecture among partners.

Methodology. We adopt a qualitative research design based on an in-depth single case study, with the aim of explaining how CE initiatives are organised and progressively scaled up along the olive oil supply chain through the development of shared dynamic capabilities enabled by boundary-spanning mechanisms. The adoption of a case-based strategy is appropriate because the phenomenon under investigation is processual and relational in nature, and because research questions focused on 'how' require close attention to the context, the interdependencies between actors, and the sequence of decisions and instances of coordination. The focal case is Olio Carli, an Italian company established as a Benefit Corporation, selected via theoretical sampling as it combines, on the one hand, a supply chain context in which circularity depends on the coordination of multiple actors and, on the other, a form of governance that formally incorporates commitments to stakeholders and objectives of common benefit, with possible implications for accountability structures and the management of trade-offs. The empirical focus is therefore not limited to the focal firm in the strict sense; rather, the case is treated as an embedded context, in which intra-organisational interfaces and inter-organisational relationships jointly contribute to defining the unit of analysis through which to interpret the scaling mechanisms of the CE (Yin, 2018).

Data collection is based on a triangulation approach combining semi-structured interviews, documentary evidence and, where possible, observational data. The interviews aim to reconstruct the emergence and evolution of CE initiatives, the decision-making episodes through which circular options were evaluated and selected, the trade-offs encountered during the process — for example, in relation to quality and compliance constraints, operational reliability and cost implications — as well as the concrete mechanisms used to coordinate action across organisational boundaries. Documentary sources, such as benefit and sustainability materials, policies, project documentation, and technical and governance artefacts, support the chronological reconstruction of processes and provide useful elements for analysing

formal commitments, adopted standards, and the evolution of metrics and responsibilities. Observational materials, where accessible, are instead used to capture coordination practices as they unfold in practice and to document the boundary objects through which diverse actors align interpretations and actions, such as shared evaluation templates, performance indicators, technical prototypes or artefacts related to traceability.

Data analysis follows an abductive logic, based on a continuous dialogue between the empirical material and the theoretical lenses adopted in the paper. In an initial phase, the analysis identifies recurring episodes of coordination associated with CE initiatives and reconstructs the actors involved, the artefacts mobilised, and the rationales underpinning decisions. In a second phase, the mechanisms of boundary spanning — understood as roles, routines and boundary objects — that link internal alignment with external orchestration are conceptualised, relating them to the processes of shared sensing, shared seizing and shared reconfiguring. Third, emerging interpretations are refined through the comparison of accounts across informants and data types, the search for disconfirming evidence, and the construction of a transparent chain of evidence linking empirical materials to second-order themes and theoretical claims.

Results. Given that the empirical analysis is still ongoing, the results are presented as preliminary and aimed at identifying explanatory mechanisms. The case study is designed to show how CE initiatives in the olive oil supply chain become scalable when interpreted as a process of capability building that extends beyond the boundaries of the focal firm. More specifically, the analysis highlights how CE scaling depends on shared dynamic capabilities — distributed processes of sensing, seizing and reconfiguring — enabled by boundary-spanning mechanisms connecting internal functions and external partners in workable configurations of coordination and accountability (Teece, 2007).

A first emerging finding concerns shared sensing. In the olive oil supply chain, the identification of circular opportunities and constraints appears less as a unilateral ‘scanning’ activity and more as a collective problem-definition process spanning technical, operational and governance dimensions. The analysis should show that what can be considered a genuinely viable path to CE is negotiated at interfaces where diverse actors introduce different evaluation criteria, for example relating to quality and compliance, operational reliability, costs, reputational implications and environmental performance. At this stage, boundary spanning appears to operate through cross-functional routines and via the production and circulation of boundary objects — such as shared templates, artefacts related to traceability and compliance, or representations of material flows — which enable the establishment of a sufficiently common understanding to make action possible, without requiring full consensus. In other words, circularity becomes actionable when it is translated into a defined set of priorities, constraints and evaluation metrics that both internal units and partners can recognise as legitimate bases for decision-making (Carlile, 2004).

A second emerging finding concerns shared seizing, understood as coordinated mobilisation around pilot projects, co-development initiatives and partner engagement. The case is designed to capture how circular options are transformed into implementable initiatives through decision-making sequences that integrate multiple functions — such as procurement, quality, operations, logistics and sustainability — alongside selected external actors. Rather than assuming that ‘collaboration’ is spontaneously available, the analysis expects to show that seizing depends on an intentional orchestration of roles, responsibilities and expectations across different organisations. For this reason, the expected boundary-spanning mechanisms include not only forms of interpersonal brokerage—such as individuals or teams capable of translating between different domains—but also governance arrangements and boundary objects capable of reducing ambiguity and supporting coordinated commitments under conditions of uncertainty. In particular, we expect to observe how pilot-based experimentation is used to contain risk and to generate credible learning even in the eyes of stakeholders strongly focused on quality and compliance, thereby enabling circular initiatives to move from aspirational commitments to operationally viable solutions. This ability to seize circular opportunities is ‘shared’ insofar as it requires complementary assets and knowledge distributed among partners and insofar as the focal firm’s choices must align with their incentives and constraints.

A third emerging finding concerns ‘shared reconfiguring’, that is, the institutionalisation of circular practices through changes to the routines, standards and governance structures of the focal firm and its network. The analysis is designed to show that circularity only becomes truly scalable when it is embedded within the supply chain’s operating system: in procurement and supplier evaluation criteria, in performance indicators, in quality and compliance routines, in packaging and logistics specifications, as well as in stable agreements relating to valorisation or recovery. Reconfiguring should become evident when the lessons learnt from pilot projects are codified into revised standards and routines, when responsibilities are redistributed across different organisational interfaces, and when data-sharing practices become sufficiently routine to support ongoing coordination, rather than merely the resolution of isolated problems. The reconfiguring phase should also clarify that scaling does not amount to simple replication: it often requires redesigned interfaces and governance mechanisms so that circular practices remain robust under variability and the compliance constraints typical of food supply chains.

Across the three capability processes, a further emerging finding concerns the centrality of trade-off management. In the olive oil sector, CE initiatives appear set to grapple with persistent tensions between sustainability objectives, requirements for consistent quality, traceability and regulatory compliance, as well as operational and cost constraints. The analysis suggests that boundary-spanning mechanisms are crucial not only for enabling coordination, but also for ensuring that such trade-offs become explicit and manageable. From this perspective, boundary objects — shared metrics, assessment templates, standards — can function as genuine negotiating tools, enabling actors to clarify where compromises are acceptable and where they are not, as well as to define the conditions under which circular alternatives

can be adopted without compromising performance requirements deemed essential. In other words, the study aims to demonstrate that shared capabilities are not built by eliminating trade-offs, but by developing governance and coordination frameworks that make them manageable over time.

Finally, the Benefit Corporation status is not simply a contextual feature of the case, but a theoretically relevant condition that shapes inter-organisational capabilities. By legally mandating stakeholder accountability, it structurally forces boundary-spanning dynamics in at least two ways. On the one hand, purpose-driven governance can provide legitimacy and strategic clarity, supporting a long-term orientation, experimentation and stakeholder engagement, and thus strengthening the willingness to invest in capability-building processes whose returns are uncertain in the short term. On the other hand, the same governance context may accentuate accountability pressures and make the availability of credible measurement systems more relevant, increasing the importance of shared metrics and robust boundary objects. Overall, the findings offer a mechanism-based explanation of CE scaling, in which boundary spanning enables shared sensing, shared seizing and shared reconfiguring among supply chain partners, whilst purpose-oriented governance influences how coordination choices and trade-offs are interpreted and stabilised over time (Teece, 2007; Carlile, 2004).

Research limitations. This study is based on a single case study and therefore aims at analytical rather than statistical generalisation. Such a design is particularly appropriate for exploring the mechanisms through which boundary spanning and shared capability development support circular economy implementation in a complex supply chain setting. At the same time, the findings are necessarily grounded in the specific institutional, organizational, and sectoral context of the focal case, and should be interpreted considering the characteristics of the olive oil supply chain.

To strengthen the robustness of the analysis, the study relies on the triangulation of interviews, documentary sources, and, where possible, observational data. While this approach supports an in-depth understanding of the processes under investigation, future research could extend these insights through comparative multi-case studies, including other organizational forms or positions within the value chain, or through longitudinal analyses examining how shared dynamic capabilities evolve as circular initiatives mature across broader networks of partners.

Managerial implications. For managers keen to scale up the CE beyond the scope of isolated pilot projects, the analysis suggests viewing circularity first and foremost as a challenge of capability building and coordination. This implies investing in a boundary-spanning infrastructure linking sustainability ambitions to day-to-day operational decisions: cross-functional routines integrating procurement, quality/compliance, operations and sustainability criteria, as well as roles able to translate between technical, regulatory and commercial languages. In quality-sensitive supply chains, such as that of olive oil, circular initiatives tend to take root when they are transformed into credible operational specifications, defined responsibilities and clear decision-making rules, rather than remaining largely aspirational objectives.

A second implication concerns the coordination of partners. Scaling the CE requires the deliberate development of shared capabilities with supply chain actors possessing complementary assets and knowledge. Managers can facilitate this process by designing collaborative pathways capable of managing uncertainty: structured pilots with explicit evaluation criteria, iterative co-design practices with selected partners, and governance structures capable of balancing collaboration and accountability. At the operational level, boundary objects — shared metrics, templates, standards, traceability artefacts and performance indicators — can help reduce ambiguity and make trade-offs the subject of discussion and governance, allowing a variety of actors to coordinate without requiring full alignment of motivations or priorities.

Finally, for Benefit Corporations, legal governance commitments represent more than a strategic orientation; they act as a structural enabler for shared dynamic capabilities. By mandating stakeholder accountability, purpose-oriented governance institutionalizes the boundary-spanning practices required to negotiate trade-offs and build trust across the supply chain, provided they are supported by credible shared metrics. Managers should therefore ensure that the purpose is translated into shared objectives, monitoring routines and expectations of partners that are consistent from an incentive perspective, so that circularity can be incorporated into procurement criteria, supplier evaluation systems, operational routines and reporting mechanisms. When these elements are effectively in place, circular initiatives are more likely to withstand organisational turnover and network variability and to evolve into scalable practices, rather than remaining one-off interventions.

Originality of the paper. This paper is original in three main respects. Conceptually, it proposes interpreting the scaling of the CE within the olive oil supply chain as a process of capability building, rather than simply as the adoption of discrete circular practices or specific business model configurations. By combining the lens of dynamic capabilities with an inter-organisational perspective, the study develops the idea of shared dynamic capabilities, highlighting how sensing, seizing and reconfiguring are often distributed amongst multiple supply chain partners rather than confined within a single firm.

Secondly, the paper identifies boundary spanning as a central micro-foundation capable of linking intra-organisational alignment with inter-organisational orchestration. In this sense, it clarifies how roles, routines and boundary objects — such as shared metrics, standards and evaluation artefacts — can enable the collective framing of the problem, coordinated experimentation and the institutionalisation of circular practices in the presence of constraints typical of food supply chains, such as quality, traceability and compliance.

Empirically, the study provides evidence relating to an Italian Benefit Corporation operating in the olive oil sector, a context in which purpose-oriented governance and accountability to stakeholders can significantly influence coordination choices and the management of trade-offs. The combination of, on the one hand, a form of governance that incorporates objectives of common benefit and, on the other, a supply chain context in which circularity is highly interdependent, offers a distinctive basis for theorising how circular transformations can be made concretely scalable.

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The Micro-Foundations of Humane Entrepreneurship: Individual Configurations and Opportunity Recognition

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Abstract. *This paper explores the micro-foundations of Humane Entrepreneurship building on the idea that entrepreneurial, sustainability, and human orientations may combine into distinct individual configurations. The study investigates whether different profiles of nascent entrepreneurs can be identified through the joint configuration of Individual Entrepreneurial Orientation, Individual Sustainability Orientation, and Individual Human Orientation, and whether such profiles differ in the way they recognize external enablers as sources of entrepreneurial opportunities. The analysis draws on the Italian GUESSS 2023 dataset and focuses on 651 nascent entrepreneurs. A two-step clustering procedure combining hierarchical and k-means analysis was employed. The results identify four distinct profiles: Humane Entrepreneurial Mindset, Humane Mindset, Conservative Mindset, and In Transition Mindset. The findings further show that these profiles differ significantly in opportunity recognition across seven types of external enablers, including technological, demographic, regulatory, sociocultural, crisis-related, and sustainability-related changes. In particular, the Humane Entrepreneurial Mindset profile systematically reports the highest sensitivity to external change as a source of entrepreneurial opportunities. The study contributes to Humane Entrepreneurship research by extending it to the individual level and showing that humane-entrepreneurial configurations shape how nascent entrepreneurs interpret the external environment. It also contributes to opportunity recognition research by highlighting the role of multidimensional value-based profiles in filtering the entrepreneurial relevance of external change.*
Keywords: *humane entrepreneurship; entrepreneurial mindset; opportunity recognition; external enablers; nascent entrepreneurship; GUESSS project*

Framing of the research. Entrepreneurship research has increasingly moved beyond narrow interpretations of entrepreneurial action grounded solely in economic rationality and market logics. Within this broader shift, the Humane Entrepreneurship (HumEnt) perspective has emphasized that entrepreneurship should be understood as a multidimensional orientation integrating entrepreneurial posture, attention to people, and sensitivity to social and environmental concerns (Parente et al., 2018; Kim et al., 2018; Parente et al., 2021; Vesci et al., 2023). While this perspective has enriched entrepreneurship theory by offering a more inclusive and value-based understanding of entrepreneurial behaviour, it has been developed predominantly at the organizational level. As a result, its micro-foundations remain underexplored, especially with regard to nascent entrepreneurs.

This gap is theoretically relevant because entrepreneurial action is ultimately enacted by individuals whose orientations may combine in different ways. Recent research has provided strong support for studying entrepreneurial orientation (EO) at the individual level, showing that it can be meaningfully examined not only as a firm-level strategic posture but also as a multidimensional individual disposition (Bolton & Lane, 2012; Clark et al., 2024). At the same time, sustainability-related and human-centered orientations have also been recognized as relevant for explaining how individuals approach entrepreneurship, particularly when entrepreneurial action unfolds in contexts characterized by broader social and environmental transformation (Kuckertz & Wagner, 2010; Patzelt & Shepherd, 2011). Yet these dimensions have mostly been examined as separate variables. To the best of our knowledge, the HumEnt literature has not yet explored how individual entrepreneurial orientation (IEO), individual sustainability orientation (ISO), and individual human orientation (IHO) combine into distinct configurations through a person-centered approach.

A configurational perspective is especially appropriate in this context because it makes it possible to move beyond the assumption that entrepreneurial, sustainability, and human orientations vary only along isolated linear continua. Instead, individuals may embody different combinations of these orientations, and such combinations may correspond to qualitatively distinct entrepreneurial mindsets. In this sense, examining nascent entrepreneurs through the joint configuration of IEO, ISO, and IHO offers a concrete way to advance the micro-foundations of HumEnt and to capture forms of heterogeneity that variable-centered approaches are less able to detect (Martínez-Martínez & Ventura, 2020; Jebsen et al., 2023).

Once this configurational heterogeneity is acknowledged, a second question becomes relevant: do different HumEnt configurations shape the way nascent entrepreneurs interpret the external environment? Research on sustainability and sustainable entrepreneurship suggests that individual values and sensitivity to societal and environmental challenges

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influence opportunity recognition, particularly in the early stages of venture creation (Kuckertz & Wagner, 2010; Patzelt & Shepherd, 2011). At the same time, the entrepreneurship literature has increasingly clarified that external change should not be treated as "opportunity" in itself. Rather, as Davidsson (2015) argues, it is important to distinguish between external conditions, venture ideas, and actors' subjective assessments. From this perspective, external enablers are actor-independent changes (such as technological developments, climate change, demographic shifts, regulatory change, sociocultural trends, crises, or other major societal developments) that may facilitate entrepreneurial endeavors across multiple possible ventures (Davidsson, 2015; Davidsson et al., 2020; Kimjeon & Davidsson, 2022). Their entrepreneurial relevance, however, is neither automatic nor uniform, but depends on how such changes are interpreted by different actors.

Against this background, the present study argues that advancing HumEnt theory requires not only identifying distinct individual-level configurations of entrepreneurial, sustainability, and human orientations, but also examining whether these configurations are associated with different ways of reading the environment as a source of entrepreneurial opportunity.

Theoretical background. Although HumEnt and Humane Entrepreneurial Orientation (HEO) have been predominantly conceptualized as an organizational-level strategic posture, HumEnt logic implies that such a posture is also rooted in individual values, beliefs, and orientations (Parente et al., 2018; Vesci et al., 2022; Vesci et al., 2026), particularly in the early stages of entrepreneurial action, when the venture is still under construction and largely depends on the founder's and team's personal dispositions. In line with scholarship calling for EO to be considered at the individual level as well (Robinson & Stubberud, 2014; Koe, 2016; Clark et al., 2024), and with increasing attention to individual-level conceptualizations of sustainability (Parente et al., 2020), it becomes theoretically and methodologically relevant to translate HEO's three components into a micro-level framework. In other words, understanding how much and how an individual incorporates entrepreneurial orientation, sustainability, and human-centered principles into their mindset and behavioral tendencies makes it possible to capture the micro-foundations of the HumEnt approach and to observe early signals of humane-oriented strategic postures even before they crystallize into organizational practices and structures. For these reasons, the next section discusses HumEnt's three dimensions at the individual level, Individual Entrepreneurial Orientation (IEO), Individual Sustainability Orientation (ISO), and Individual Human Orientation (IHO), which constitute the conceptual basis for the Individual Humane Entrepreneurial Orientation (IHEO) dimension.

Individual Entrepreneurial Orientation. EO, originally introduced by Miller (1983) and later popularized by Covin and Slevin (1989), is traditionally understood as a firm-level construct composed of innovativeness, proactiveness, and risk-taking. More recent studies, however, have argued that EO can also be meaningfully examined at the individual level (Bolton & Lane, 2012; Robinson & Stubberud, 2014). In this perspective, IEO captures the extent to which individuals display innovative, proactive, and risk-taking tendencies in the process of entrepreneurial action. As a multidimensional disposition, IEO reflects an individual's willingness and capability to engage in entrepreneurship and is particularly relevant in the nascent stage, when personal orientations strongly shape venture development.

Individual Sustainability Orientation. Sustainability Orientation has been developed within the sustainable entrepreneurship literature, although its conceptualization remains fragmented. Existing studies differ in whether they emphasize environmental sustainability alone or include social sustainability as well, and whether SO is interpreted as an attitude, a strategic posture, or a motivation toward action. In line with the HumEnt perspective, this study conceptualizes ISO as an individual-level orientation reflecting commitment to both environmental and social sustainability, encompassing both attitudinal and behavioral aspects. Accordingly, ISO captures the extent to which individuals value and act upon sustainability-related concerns in ways that may inform their entrepreneurial thinking and behavior.

Individual Human Orientation. Within HumEnt, Human Resource Orientation is based on the assumption that respecting and engaging employees is a successful strategy to achieve organizational results (Parente et al. 2022). It refers to the strategic relevance of practices aimed at respecting, involving, and developing people, although its operationalization remains underdeveloped. Translating this logic to the individual level, we define IHO as the extent to which individuals express a human-centered orientation in their interactions with others. Drawing on Kim et al. (2018), IHO is articulated through four core dimensions: (a) empathy as the extent to which an individual shares emotions and information with others; (b) equity as the extent to which an individual treats others in a fair and equal manner; (c) enablement as the extent to which an individual provide others individual what everything they needs to develop their (life) projects to the best of their abilities; and (d) empowerment as the extent to which an individual shares information and resources with another individual in developing a particular task offering him to participate in the decision-making process. Together, these dimensions capture an individual's tendency to relate to others in fair, supportive, and participatory ways, consistently with the human-centered pillar of HumEnt.

Purpose of the paper. The paper aims is to identify and interpret distinct profiles of nascent entrepreneurs based on the joint configuration of IEO, ISO and IHO, and to examine whether these profiles differ in the extent to which they recognize external enablers as sources of entrepreneurial opportunities. More specifically, the paper investigates whether clusters grounded in entrepreneurial, sustainability, and human orientations are associated with systematically different patterns of opportunity recognition with respect to new technologies, climate change and sustainability, demographic

change, regulatory change, sociocultural trends, societal crises, and other major societal developments. In doing so, the study aims to show that opportunity recognition among nascent entrepreneurs is associated with multidimensional value-based profiles rather than with isolated traits alone.

Methodology. The data were drawn from the Italian national GUESSS dataset (October–December 2023 survey wave), coordinated by the GUESSS Board Italy with the support of participating universities. Overall, the survey collected 4,374 questionnaires from 26 Italian universities, involving young people from different disciplinary backgrounds and levels of study. For the purposes of this study, we used a subset of the variables available in the GUESSS Italy dataset, selected because they were consistent with the operationalization of IHEO's three dimensions. In addition, the analysis focused on a subsample of nascent entrepreneurs, defined as individuals who, alone or with others, are actively trying to start a new entrepreneurial initiative, expect to become its owner (or co-owner), and have undertaken concrete start-up activities within the past 12 months (GEM Report, 2023; Reynolds, 2005).

IEO was measured through the 10-item, seven-point Likert scale developed by Bolton and Lane (2012), capturing nascent entrepreneurs' innovativeness, proactiveness, and risk-taking. ISO was operationalized through four items adapted from Muñoz and Dimov (2015), combining both attitudinal and behavioral aspects of sustainability in line with the HumEnt perspective. Specifically, the selected items cover the two core dimensions of sustainability/environmental and social and reflect both sustainability-related orientations and sustainability-oriented actions. All items were adapted from the organizational to the individual level to ensure consistency with the measurement of IEO. Finally, IHO was measured through four items, one for each core HumEnt dimension identified by Kim et al. (2018), empathy, equity, enablement, and empowerment. Since the original scale was developed at the firm level and conceived as a behavioral expression of human resource orientation, the selected items were similarly adapted to the individual level in order to align the measurement of IHO with the individual-level logic of the study. External enablers in opportunity recognition were measured through a seven-item, seven-point Likert scale (1 = strongly disagree; 7 = strongly agree), adapted from Davidsson (2015). Respondents were asked to indicate the extent to which the idea behind their planned business was driven by different sources of external change, namely new technologies, climate change and/or the quest for sustainability, demographic change, changed laws and/or regulations, sociocultural trends, societal crises, and other major societal developments. The psychometric properties of the focal individual-level orientation measures were assessed through exploratory factor analysis (EFA) using Principal Axis Factoring. Given the expected correlations among the dimensions, an oblique Oblimin rotation was adopted. The adequacy of the factor solutions was evaluated through the Kaiser-Meyer-Olkin (KMO) measure and Bartlett's test of sphericity, while item retention was based on the combined assessment of factor loadings, cross-loadings, and communalities. Internal consistency was then assessed through Cronbach's alpha. Based on the retained items, composite scores were computed as the mean of the items for each dimension and were subsequently standardized (z-scores) in order to ensure equal weighting in the clustering procedure.

As a first step in the clustering procedure, a hierarchical cluster analysis was conducted on the standardized composite scores of the four retained dimensions (IEO_1, IEO_2, ISO and IHO). The hierarchical procedure was carried out using Ward's method and squared Euclidean distance, a combination widely adopted in profile-oriented research because it tends to generate relatively homogeneous and well-separated clusters by minimizing within-cluster variance at each aggregation step (Ward, 1963; Murtagh & Legendre, 2014). This combination is also frequently recommended in two-step clustering procedures aimed at identifying a preliminary cluster structure before refinement through non-hierarchical methods (Punj & Stewart, 1983; Ketchen & Shook, 1996). The analysis was based on 651 complete cases with no missing values on the clustering variables. To determine the most plausible number of clusters, the hierarchical solution was examined through the dendrogram and the agglomeration schedule. Particular attention was paid to changes in the agglomeration coefficients across the final stages of the clustering process, as larger jumps indicate that relatively dissimilar clusters are being merged and therefore signal potentially meaningful cluster boundaries.

In the second step, the candidate solutions were refined through k-means cluster analysis. Comparison of the alternative solutions showed that the two-cluster solution performed slightly better in terms of statistical compactness and separation, as indicated by average silhouette width and pseudo-F statistics. However, the four-cluster solution was retained as the main solution because it provided a more fine-grained and theoretically meaningful representation of heterogeneity within the sample, produced groups of adequate size, and allowed the identification of not only extreme but also intermediate and unbalanced profiles. After the cluster solution had been established, the four groups were first described through one-way ANOVA on the clustering dimensions. Additional between-cluster comparisons were then carried out on descriptive variables and on the seven external enablers of opportunity recognition. In the ANOVA analyses, Bonferroni post hoc tests were interpreted when homogeneity of variances was met, whereas Games-Howell post hoc tests were used when Levene's test was significant. Data analysis was conducted in IBM SPSS Statistics.

Results. The analysis identified four distinct profiles. Cluster I, labelled Humane Entrepreneurial Mindset (n = 233), displayed the highest scores across all four dimensions and therefore represented the most integrated profile in the sample. Cluster II, labelled Humane Mindset (n = 186), was characterized by relatively stronger individual human and sustainability orientations than entrepreneurial ones. Cluster III, labelled Conservative Mindset (n = 94), reported the lowest scores across all four dimensions and represented the least developed configuration. Finally, Cluster IV, labelled

In Transition Mindset (n = 138), occupied a more intermediate and mixed position on the overall four dimensions. Between-cluster differences were statistically significant for all four clustering variables.

The second step of the analysis examined whether these profiles differed in the way they interpreted the external environment. Results show that the four clusters differ significantly across all seven external enablers considered in opportunity recognition, with significant F-values. A clear and consistent pattern emerges: Cluster I reports the highest mean score on every external enabler, indicating that nascent entrepreneurs in this profile is the most sensitive to external change as a source of entrepreneurial opportunities. By contrast, the remaining clusters display lower and generally more compressed scores, although the lowest value is not always associated with the same group. More specifically, Cluster III records the lowest mean on new technologies, climate change/sustainability, sociocultural trends, and other major societal developments; Cluster IV shows the lowest score on demographic change and shares the lowest level on changed laws and/or regulations with Cluster III; whereas Cluster II reports the lowest value on societal crises.

The post-hoc tests further clarify this pattern. For climate change/sustainability, demographic change, changed laws and/or regulations, societal crises, and other major societal developments, the significant differences are driven primarily by Cluster I, which scores significantly higher than the other clusters, while Clusters II, III, and IV do not differ significantly from one another. This indicates that Cluster I is not only higher in absolute terms, but also clearly distinct from the rest of the sample in the way it interprets major external changes as opportunity-generating conditions. A partially different pattern emerges for sociocultural trends and new technologies. In the case of sociocultural trends, Cluster I scores significantly higher than Clusters III and IV, but not than Cluster II, suggesting that Cluster II is relatively closer to Cluster I in recognizing sociocultural change as entrepreneurially relevant. For new technologies, the overall differentiation is weaker: the only significant pairwise contrasts are Cluster I vs. Cluster III and Cluster II vs. Cluster III, while the other comparisons are not significant. This suggests that technological change is recognized quite broadly across the sample and is less discriminating among profiles than broader societal and sustainability-related changes. Overall, the results indicate that the most distinctive feature of Cluster I lies in its systematically stronger orientation toward reading the external environment as a source of entrepreneurial opportunities, especially when such opportunities stem from climate-related, demographic, regulatory, crisis-related, and broader societal transformations. Conversely, Clusters II, III, and IV appear more similar to one another and display a comparatively weaker or less differentiated recognition of external enablers.

Research limitations. This study presents some limitations that should be acknowledged. First, its cross-sectional design does not allow causal inferences regarding the relationship between humane entrepreneurship configurations and the recognition of external enablers. The findings show systematic associations between individual configurations and opportunity recognition, but they do not establish whether specific configurations shape the interpretation of external change or whether repeated exposure to certain entrepreneurial contexts contributes to reinforcing those configurations. Second, the empirical setting is limited to nascent entrepreneurs in a university-based context, which reduces the generalizability of the findings beyond the pre-entry stage and calls for caution in extending the results to more experienced entrepreneurial populations. Third, the configurational solution itself should be interpreted with due caution. Although the four-cluster solution was retained because it was theoretically more informative and more consistent with the person-centered aim of the study, alternative solutions also showed acceptable statistical properties. This suggests that the retained solution should be understood as one theoretically meaningful representation of heterogeneity in the sample rather than as a definitive classification. Future research could address these limitations by testing the stability of the configurations through latent profile analysis, replicating the study in other institutional and national contexts, and adopting longitudinal designs to examine whether these configurations are associated with subsequent entrepreneurial behavior.

Managerial implications. The study offers a first contribution to HumEnt theory by shifting attention from the organizational to the individual level. Existing HumEnt scholarship has convincingly argued that entrepreneurial, human, and sustainability dimensions should be integrated, but it has rarely explored how these dimensions combine within individuals. By identifying four distinct profiles, the paper provides a configurational micro-level extension of HumEnt and shows that the theory can be meaningfully mobilized not only to describe firms, but also to understand heterogeneity among nascent entrepreneurs (Kim et al., 2018; Parente et al., 2021; Vesci et al., 2023).

A second contribution concerns the role of external enablers in opportunity recognition. Drawing on Davidsson (2015) and Davidsson et al. (2020), the paper shows that environmental change is not interpreted uniformly across individuals. Instead, its entrepreneurial relevance varies systematically depending on the profile through which it is filtered. In this respect, the study contributes to opportunity recognition research by showing that different humane-entrepreneurial configurations shape different ways of reading the environment. The key point is not merely that some individuals are more opportunity-oriented than others, but that distinct profiles attach different entrepreneurial significance to climate change, regulation, demographic transformation, crises, and broader societal developments. Taken together, these findings suggest that HumEnt is relevant not only as a normative or strategic framework, but also as a cognitive lens that influences how external change becomes salient as a potential source of entrepreneurial action.

From a practical standpoint, the findings suggest that universities, incubators, and entrepreneurship support actors should avoid treating nascent entrepreneurs as a homogeneous category. Individuals with a Humane Entrepreneurial Mindset appear more capable of connecting broad societal and environmental transformations to entrepreneurial ideas

and may therefore be especially suited to advanced programmes focused on impact entrepreneurship, sustainability transitions, and challenge-driven innovation. By contrast, more conservative or in transition profiles may require stronger support in scanning the external environment, interpreting contextual shifts, and translating them into entrepreneurial possibilities. This implies that support programmes should be differentiated not only by venture stage, but also by the underlying orientation profile of the entrepreneur.

Originality of the paper. The paper advances HumEnt theory by adopting an individual-level, configurational perspective. To the best of our knowledge, previous research has not examined HumEnt through configurations of individual entrepreneurial orientation, individual sustainability orientation, and individual human orientation among nascent entrepreneurs. The study therefore offers a novel micro-level extension of HumEnt, showing that its core dimensions can combine into distinct entrepreneurial configurations rather than being treated as isolated traits. A second element of originality lies in demonstrating the relevance of these configurations for opportunity recognition. Rather than stopping at their identification, the paper shows that different HumEnt configurations are associated with different ways of interpreting the external environment. In particular, they vary in the extent to which external enablers are recognized as sources of entrepreneurial opportunities. In doing so, the study connects HumEnt with opportunity recognition research and provides a more nuanced explanation of how external change becomes entrepreneurially meaningful.

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https://www.guesssurvey.org/

Understanding purpose-driven businesses (PDBs): Insights from a systematic literature review

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Abstract. *Research on purpose-driven businesses (PDBs) has grown significantly in recent years, yet the field remains fragmented across multiple labels and research streams. This study addresses such fragmentation through a systematic literature review (PRISMA 2020) that brings together diverse contributions related to purpose-driven approaches within the broader scholarship on corporate purpose. By synthesizing 63 articles, the study develops a multilevel framework that conceptualizes PDBs as configurations emerging from the alignment of three dimensions: internal organizational mechanisms, market-facing dynamics and institutional contexts. In doing so, the study offers a clearer conceptual organization of the field and proposes a research agenda aimed at supporting more cumulative and comparative future research.*
Keywords: *purpose-driven businesses; corporate purpose; systematic literature review*

Framing of the research. *Major global challenges, including climate change, social inequality and growing expectations for responsible business conduct, are reshaping the role of firms in society. Increasingly, companies are expected not only to generate economic value but also to contribute to addressing complex social and environmental problems (Henderson, 2021; Vredenburg et al., 2021; Kapitan et al., 2022; Dhanesh., 2020). Within this evolving landscape, the debate on corporate purpose has gained renewed prominence. Originally interpreted as the firm's raison d'être, corporate purpose is now increasingly conceptualized as a multidimensional construct linking firm identity, strategic direction and broader societal value creation (Brosch, 2023). The growing attention reflects a broader reconsideration of the role of firms in addressing complex societal challenges and contributing to long-term value creation beyond purely economic outcomes (Porter & Kramer, 2011; Quinn & Thakor, 2018; Craig & Snook, 2014).*

As the understanding of corporate purpose has expanded beyond a purely declarative notion, increasing attention has been devoted to firms that integrate purpose directly into their strategic and operational choices (Rey et al., 2019; von Ahsen & Gauch, 2021; Gartenberg, 2022; George et al., 2023). These firms are often described as PDBs. Although the label itself is relatively recent, its intellectual roots can be traced back to earlier reflections on the role of purpose in organizations and leadership (Bartlett & Ghoshal, 1994; Wilson, 2004; Ready & Truelove, 2011; Hollensbe et al., 2014). Despite the increasing scholarly attention, the literature on PDBs remains conceptually fragmented. Studies employ heterogeneous labels, such as purpose-driven, purpose-led or purpose-oriented firms and tend to focus on specific dimensions of the phenomenon, including leadership, governance, branding or institutional dynamics.

While these contributions offer valuable insights, the field still lacks a structured synthesis that connects these fragmented research streams and provides a systematic understanding of the phenomenon. Specifically, existing studies rarely integrate these contributions within a coherent framework capable of explaining how PDBs are configured across different levels of analysis.

Purpose of the paper. *To address this gap, the study aims to conduct a systematic literature review on PDBs, linking this emerging stream of research to the broader scholarship on corporate purpose and organizing scattered contributions within a coherent multilevel analytical architecture. In this work, PDBs are conceptualized as firms in which corporate purpose systematically guides strategic decision-making, shapes managerial practices and informs interactions with stakeholders and broader institutional environments.*

The study clarifies how PDBs have been conceptualized across the literature, structures the field across multiple dimensions and develops a research agenda aimed at supporting more cumulative and comparable future research. In doing so, it proposes a theoretical framework explaining how purpose-driven configurations emerge through the interaction of micro, meso and macro dimensions.

Therefore, the study is guided by the following research questions:

(RQ1). How can the existing literature on PDBs be synthesized and integrated with the broader corporate purpose scholarship to develop a coherent theoretical framework?

(RQ2). What key themes and underexplored areas emerge from the literature and what directions do they suggest for future research?

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Methodology. *Given the heterogeneity of existing contributions, the study draws on a systematic literature review (SLR) grounded in a structured, transparent and replicable research process (Linnenluecke et al. 2019). Data collection, screening and eligibility were conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (Prisma) 2020 statement (Page et al., 2021) and shown in the PRISMA flow diagram (Figure 1).*

Data collection. As a first step we structured a research query to address the terminological and conceptual complexity of the field:

> *"purpose-driven" OR "purpose-led" OR "purpose driven" OR "purpose led" OR "purpose-oriented" OR "purpose oriented" OR "purposeful brand*" OR "purposeful business*" OR "purposeful firm*" OR "purposeful organization*" OR "purposeful corpor*" OR "purposeful compan*" OR "purposeful leadership*" OR "corporate purpose"*

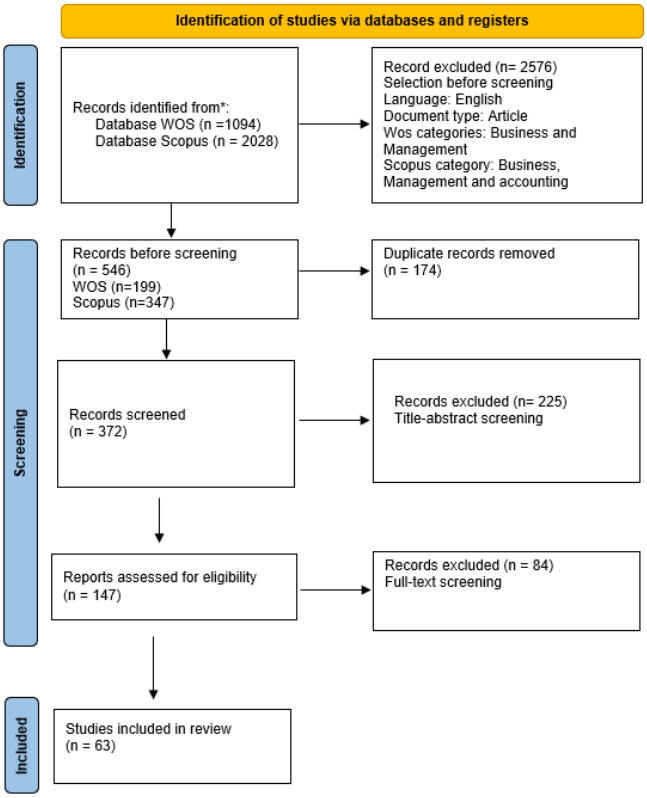
Because the label "purpose-driven business" is conceptually rooted in the broader debate on corporate purpose, the search query was intentionally broadened to include related conceptualizations of corporate purpose and purposeful organizations. This approach allowed us to capture the diverse terminologies through which purpose-oriented business is discussed across management research. In addition, the terms associated with PDBs remain inconsistent across the literature. Many relevant studies discuss corporate purpose, leadership or branding without explicitly adopting the label "purpose-driven business". For this reason, the review adopts a broader analytical lens and considers these streams as complementary perspectives through which purpose-driven configurations can be examined.

In October 2025, the search query was conducted in both the Web of Science and Scopus databases, to avoid overlooking potentially relevant contributions. The search was performed using the TS field in Web of Science and the TITLE-ABS-KEY operator in Scopus. The initial search yielded 3122 documents, 1094 Wos and 2028 from Scopus. For both databases the results were refined by limiting the sample to journal articles published in English and classified within management-related subject areas. This refinement resulted in 546 articles (347 from Scopus and 199 from Wos). Subsequently, 174 duplicates were removed using Bibliometrix (Aria & Cuccurullo, 2017), leading to a consolidated dataset of 372 documents.

Data screening. The 372 documents were screened based on titles and abstracts to assess their conceptual relevance to the research objectives. During this phase, 225 articles were excluded.

Data eligibility. The remaining 147 articles were subjected to full-text assessment. Following the process, a final sample of 63 articles was retained for SLR. The analysis followed an inductive-deductive coding process. Each article was systematically examined to identify its main conceptual focus, level of analysis and the mechanisms through which corporate purpose was conceptualized and operationalized. The coding process was conducted independently by the authors and subsequently discussed to reach a shared interpretation. Through an iterative comparison of the coded studies, recurrent themes and patterns were identified and progressively grouped into higher-order analytical categories, which informed the development of the theoretical framework presented in the results section.

Figure 1. PRISMA statement



Source: authors' elaboration based on Page et al. (2021)

The coding process revealed three broad thematic clusters through which contributions are focused: internal organizational mechanisms, market and ecosystem dynamics and institutional embedding (Table 1).

Table 1 – Main themes emerging from the systematic literature review

Thematic cluster	***Main themes identified in the literature***	***Representative studies***
Internal organizational mechanisms	*Leadership and purpose articulation; governance structures; organizational identity and culture; employee engagement and meaningful work; performance management and accountability systems*	*Gartenberg et al. (2019); Quinn & Thakor (2018); Kempster et al. (2011); Busco et al. (2024); Pratt & Hedden (2023); von Ahsen & Gauch (2021)*
Market and ecosystem dynamics	*Brand purpose and purpose-driven branding; stakeholder communication; certification schemes (e.g., B Corp); purpose ecosystems and stakeholder collaboration; legitimacy and authenticity*	*Lyon et al. (2025); Walter et al. (2024); Baker et al. (2022); Villela et al. (2021)*
Institutional and societal context	*Institutional frameworks and regulation; stakeholder capitalism debate; corporate governance systems; public-private collaboration; societal expectations toward firms*	*Mayer (2021); Patriotta (2021); Aguilera (2023); Mahoney (2023)*

Source: authors' elaboration

Results: Multilevel configurations of PDBs

The thematic clusters correspond to three interrelated levels of analysis - micro, meso and macro - which capture how corporate purpose is internally embedded within firms, articulated in market interactions and shaped by broader institutional contexts.

Taken together, the literature suggests that PDBs do not simply emerge from the presence of a declared corporate purpose. Rather, they arise from the alignment of multiple organizational, market and institutional mechanisms. In this perspective, PDBs reflect a multilevel configuration in which corporate purpose operates both as a guiding compass and as a unifying element across different dimensions of firm activity.

PDBs may be founded with a clearly articulated purpose or develop it progressively over time. They are typically guided by social values, translating this orientation into strategic and operational initiatives that place individuals at the center of firm activities. In many cases, firms pursuing purpose-driven strategies engage in domain-specific initiatives or offerings that address societal challenges while ensuring environmental responsibility, product quality and employee well-being, sometimes supported by certifications or formal standards (Cucino et al.,2025).

Internal organizational mechanisms (Micro-Level). Corporate purpose is increasingly conceptualized as a hybrid objective alongside profit and as a catalyst for broader societal change (Besharov & Mitzinneck, 2023), reflecting firm-specific commitments anchored in values and societal goals that strategists translate into future-oriented strategies and forms of moral leadership (Rindova & Martins, 2023). Its strategic relevance depends on the capacity to balance inside-out and outside-in perspectives (Almandoz, 2023). At the organizational level, the literature highlights how corporate purpose becomes anchored within governance structures, leadership practices and organizational identity, orienting strategic decisions and everyday managerial practices toward long-term value creation.

Several studies advocate a redefinition of corporate purpose (Wilson,2004), embedding it at the core of organizational design. When purpose aligns vision, strategic priorities, brand promise, organizational values and leadership behaviour, it fosters coherence and resilience (Ready & Truelove, 2011). Purpose-driven transformation requires coordinated changes across strategy, structure, culture and capabilities (Carballo, 2023), enabling firms to generate value for stakeholders and the broader systems in which they operate (Glauner, 2019). Research suggests that long-term-oriented ownership reinforces purpose adoption (Gartenberg & Serafeim, 2023) and purpose-oriented entrepreneurship can shape innovation and new technologies implementation (Fernandez, 2025). Purpose-driven leadership becomes operational when leaders clarify their purpose and translate it into concrete strategic and managerial actions (Craig et al., 2014). Its effectiveness also depends on communicating purpose and engaging middle managers in reinforcing it (Quinn & Thakor, 2018). Leadership also functions as a sensemaking process that orients firms toward socially relevant purposes (Kempster et al., 2011). In doing so, leadership can reshape organizational power relations (Fujimoto et al., 2024) and is increasingly expected to be moral (Springett, 2004) and responsible (Enslin et al., 2023).

Governance arrangements influence how corporate purpose is integrated within firms, often involving trade-offs between managerial independence, shareholder control and responsiveness to societal interests (Claassen, 2025), while a strong understanding of purpose among middle managers can enhance organizational performance (Gartenberg et al., 2019). Board characteristics (Collevecchio & Gionfriddo,2023) and dedicated roles such as chief purpose officers (Steller & Björck, 2025) may favor purpose adoption, although governance systems may also foster symbolic decoupling between external claims and internal practices (Westphal, 2023). Overall, strategic corporate governance seeks to ensure long-term stakeholder value creation (Goranova & Ryan, 2022).

Employee engagement is strengthened when leader-member dialogue around purpose is actively cultivated (Durand & Asmar, 2025).

Ultimately, corporate purpose becomes relevant through processes of justification, implementation and evaluation (Durand, 2023). Coherence between declared purpose and organizational practices is critical, as misalignments risk the instrumental use of purpose (Kaplan, 2023).

Evaluation criteria are progressively shifting from legitimacy based on external conformity toward authenticity grounded in internal coherence and alignment (Suddaby et al., 2023). Accountability and measurement systems (Pratt & Hedden, 2023), stakeholder-oriented value frameworks (Jones-Khosla & Gomes, 2023) and performance management systems (Busco et al., 2024) may support this coherence, together with learning processes and market-facing mechanisms that connect internal priorities with stakeholder expectations (Menon, 2022; Blocker et al., 2025).

Market and ecosystem dynamics (Meso-Level). Purpose is externally articulated through market positioning, brand articulation and participation in purpose ecosystems, translating internal commitments into stakeholder-facing practices and legitimacy-building processes.

Purpose implementation is supported by purpose-ecosystems that enable firms to pursue broader sustainability goals (Dahlmann et al., 2020; Stubbs et al., 2022; Lyon et al., 2025) and by institutional mechanisms such as B Corp certification. Certification motivation ranges between intrinsic moral commitments to strategic legitimation (Harjoto et al., 2019). Muñoz et al. (2018) show that ventures follow different developmental paths, depending on purpose breadth, certification timing and feedback sources, while certification may enhance reputation without strengthening internal practices (Villela et al., 2021).

At the market level, PDBs effectiveness depends on stakeholders' consensus and legitimacy. Consumers and investors increasingly value PDBs, making purpose a strategic communication resource (Peters, 2024). Emerging consumer segments, such as hypermodern individuals, are particularly receptive to purpose-oriented strategies that contribute to identity construction and emotional engagement (Dhanesh, 2020). Credible and legitimate metrics for evaluating purpose and preventing washing are essential (Rennollet et al., 2020). The purpose-driven approach also requires a coherent brand identity aligned with organizational values, commonly referred to as brand purpose. Social purpose branding integrates social and environmental concerns into brand identity while promoting stakeholder engagement (Gray et al., 2024). When communicated consistently, purpose can attract public attention, stimulate community engagement and strengthen market positioning (Mirzaei et al., 2021).

Authenticity emerges as a pivotal construct in this literature. Defined as consistency between declared purpose and actual practices, authenticity - together with congruence between cause and brand, brand and consumer and consumer and cause - shapes corporate image and consumer behavior. Evidence suggests that authenticity exerts a stronger direct effect on brand image and identity-based consumer-brand relationships than congruence alone (Fernandes et al., 2024). Stakeholder-perceived credibility is highest under conditions of authenticity and significantly reduced in cases of woke washing (Walter et al.,2024). Authenticity also extends brand activism, a strategy based on a brand's purpose and fundamental values, through which companies publicly communicate their stance on sociopolitical issues (Vredenburg et al., 2020). In B2B context, brand activism can strengthen reputation, reduce perceived customer risk and support stable supply chain relationships (Kapitan et al., 2022).

Finally, some contributions conceptualize purpose as a transformative force capable of reshaping cultural structures and enabling new social practices (Hajdas & Kłeczek., 2021). Within service ecosystems, brand meaning emerges through co-creation processes among multiple actors operating across institutional arrangements (Baker et al., 2022).

Institutional context (Macro-Level). Purpose is institutionally embedded within broader regulatory, legal and cultural environments that enable, constrain and stabilize purpose-driven configurations over time. Mayer (2021;2023) challenges traditional capitalist models, arguing that markets and regulation often fail to ensure that profits derive from solving rather than generating social and environmental problems. In this view, a clear and credible purpose strengthens trust among customers and employees and fosters stronger relationships with communities and suppliers. Achieving shared and sustainable prosperity requires effective public policies and public-private collaborations. Similarly, complex institutional and regulatory environments both enable and constrain corporate action. As business models evolve, inequalities increase, forms of corporate and social involvement evolve and new institutional partnerships emerge, supportive institutional frameworks and public policies are essential to ensure the accountability of purpose (Patriotta,2021). Furthermore, legal personhood can transform firms into durable institutions responsible for stakeholder value creation, supported by governance mechanisms and fiduciary duties (Mahoney, 2023). Finally, the relevance of corporate purpose also varies across institutional and cultural contexts, which shape how firms interpret and operationalize their societal roles (Aguilera, 2023).

PDBs outcomes and tensions.

Beyond the structural dimensions of the framework, the literature also highlights a set of outcomes and tensions associated with the adoption of purpose-driven configurations. These outcomes illustrate how the adoption of a purpose-driven approach may generate multidimensional value while simultaneously creating strategic and organizational tensions.

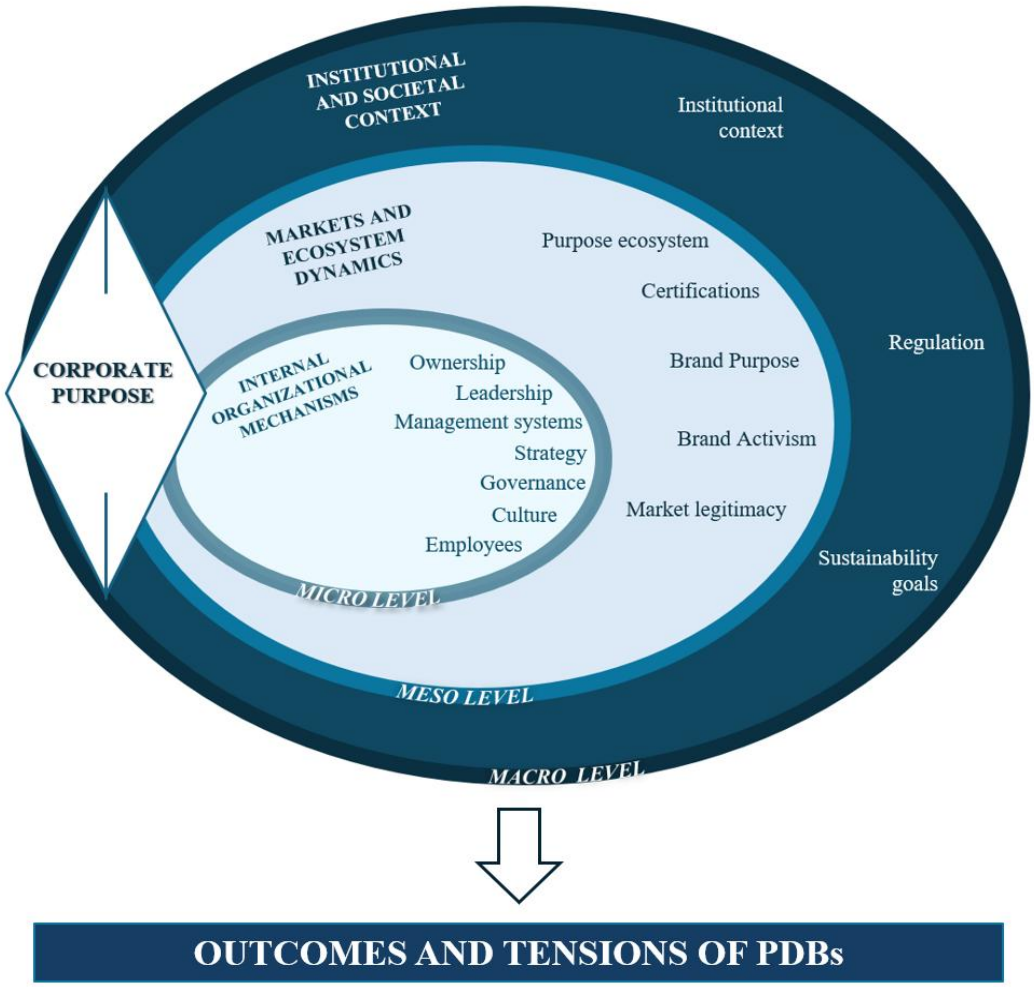
PDBs are often associated with improved financial performance (Wilson, 2004; Von Ahsen & Gauch, 2022). Research on purpose suggests that these effects may be stronger when mid-level employees have a strong understanding of the firm's purpose (Gartenberg et al., 2019) and when within firms there are high levels of intangible capital, innovation and long-term investors (Gartenberg, 2023). Purpose also enhances employee engagement (Bhattacharya et al., 2023; Von Ahsen & Gauch, 2022) and strengthens firms' ability to respond to environmental volatility and uncertainty (Lee et al., 2023). When stakeholders perceive credibility, through transparent communication and collaborative adaptation of

purpose, PDBs may foster stronger customer loyalty (Von Ahsen & Gauch, 2022; Ibn-Mohammed et al., 2024). The integration of the SDGs at normative, strategic and operational levels offers a framework for vision-setting and strategic alignment (Sasaki et al., 2023). Their influence on corporate purpose is stronger when embedded normatively rather than confined to strategic or operational practices (Sasaki et al.,2024). Moreover, a hybrid outside-in and inside-out approach further supports SDGs implementation (Sasaki & Stubbs,2025).

However, these outcomes are linked to significant tensions. PDBs may encounter investor disagreements, internal conflicts and difficulties in measuring performance (Von Ahsen & Gauch, 2022). Moreover, the attractiveness of PDBs may legitimize long work hours (Brosch, 2025) and intensification, obscuring stress and negative emotions. A sustainable purpose is essential to recognize workers as valuable resources (Dupret & Pultz, 2021).

Overall, the defining characteristic of PDBs is not merely the presence of a declared corporate purpose, but the consistency with which purpose is anchored internally, articulated in market-facing practices and institutionally embedded across micro, meso and macro levels. Becoming a PDB therefore requires a deeply integrated configuration in which purpose coherently guides structures, market positioning and institutional engagement. Figure 2 illustrates this multilevel analytical architecture.

Figure 2. Multilevel configuration of PDBs



Source: authors' elaboration.

Research agenda. Building on the multilevel framework developed in this review, future research can further explore how PDBs emerge, evolve and consolidate across different dimensions (table 2).

Table 2. Future research directions

Dimension	***Topics for future research***	***Related literature***
Internal organizational mechanisms (Micro-level)	● *What managerial processes enable firms to embed corporate purpose into strategic decision-making and managerial practices?* ● *How do entrepreneur characteristics and firm features (such as size, ownership structure etc.) shape firms' propensity to adopt a PDB configuration across different industries?* ● *How do PDBs sustain internal alignment as tensions emerge between purpose commitments, performance pressures and accountability demands?*	*Carballo (2023)* *Blocker et al. (2025)* *Von Ahsen et al. (2021)* *Cucino et al. (2025)*
Market and ecosystem dynamics (Meso-level)	● *How do purpose-ecosystems enable firms to transition toward PDBs?* ● *How do purpose-driven initiatives shape brand reputation and consumer perceptions and how do digital communication infrastructures mediate the co-creation of brand meaning, authenticity and legitimacy in PDBs?* ● *How do certification schemes shape accountability and enhance comparability, scalability and credibility of PDBs?*	*Baker et al.(2022)* *Lyon et al. (2025)* *Stubbs et al. (2022)* *Walter et al. (2021)* *Blocker et al. (2025)* *Cucino et al. (2025)*
Institutional context (Macro-level)	● *How do heterogeneous institutional contexts influence the consolidation and stability of PDBs?* ● *Under what conditions do PDBs contribute to public-private governance collaborations within institutional frameworks?* ● *How do institutional and cultural heterogeneity shape legitimacy and long-term sustainability outcomes?*	*Aguilera (2023)* *Jones-Khosla & Gomes (2023)*
Outcomes and tensions	● *Do PDBs exhibit greater resilience in contexts of environmental and market turbulence and through which mechanisms do multidimensional purpose contribute to (or hinder) such resilience?* ● *How do internal conflicts between profitability, stakeholder expectations and operational constraints affect the long-term viability of PDBs?* ● *Under what competitive conditions do PDBs generate distinctive strategic advantages compared to traditional profit-oriented firms?*	*Von Ahsen & Gauch, (2022)* *Ibn-Mohammed et al. (2024)* *Blocker et al. (2025)*

Source: authors' elaboration

Research limitations. *The SLR was limited to peer-reviewed journal articles in management, potentially excluding books, book chapters, institutional reports and grey literature, which have significantly contributed to the broader debate on corporate purpose and the emergence of PDBs. Given the field's terminological fragmentation, relevant studies using alternative labels may not have been captured despite the broad search query.*

Theoretical implications. *The study advances the literature on PDBs by providing a systematic review of existing research. Specifically, by structuring dispersed contributions into three interrelated dimensions, it enhances analytical clarity and offers a common reference framework for future empirical and theoretical investigations. Conceptualizing PDBs as multilevel configurations shifts the focus from isolated purpose-related attributes to the alignment through which corporate purpose becomes internally anchored, externally articulated and institutionally embedded. This perspective contributes to the consolidation of a fragmented field and facilitates more systematic comparisons across empirical contexts and levels of analysis.*

Originality of the paper. *The originality of this study lies in providing an integrative synthesis of the fragmented literature on PDBs. While existing studies have examined specific dimensions of the phenomenon, this review brings together diverse research streams associated with purpose-driven approaches within the broader literature on corporate purpose. By structuring these contributions within a multilevel theoretical framework, the paper highlights the systemic nature of PDBs emerging from the interaction of three main dimensions. The framework highlights how PDBs emerge from the alignment of internal organizational mechanisms, market-facing dynamics and institutional contexts. In doing so, the study provides a more systematic understanding of the phenomenon and offers a foundation for more cumulative and comparable future research.*

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Working with vulnerable populations

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Abstract. *This study explores the factors influencing the job satisfaction of able-bodied employees working alongside colleagues with disabilities. The theoretical framework proposed integrates the construct of empathy, Social Exchange Theory (SET), and the Job Demand–Resources (JD-R) model to explain the factors that able-bodied employees derive from working alongside colleagues with disabilities. Empirical data were quantitatively analyzed; particularly, the hypotheses were tested using a two-stage PLS-SEM approach. Measurement reliability and validity, common method bias, and multicollinearity were first assessed, after which the structural model was estimated using bootstrapping (10,000 resamples). Expecting to support the proposed hypotheses, this short paper contributes to the business and management literature on diversity, equity, and inclusion, with a specific focus on organizational behavior and team diversity, repositioning able-bodied coworkers as active agents in workplace inclusion. By integrating empathy, SET, and the J-D-R model, it conceptualizes inclusion as a cognitive and affective process that generates benefits and shapes job satisfaction. In practice, the study equips managers and policymakers with an actionable roadmap to promote diversity management through a shared-benefit approach to workplace inclusion.*
Keywords: *organizational inclusion management; able-bodied employees; colleagues with disabilities; inclusive workgroups*

Framing of the research. *On the International Labour Organization's (ILO) Business and Persons with Disabilities webpage, Director-General Guy Ryder states: "Employing persons with disabilities is not just a good moral cause, it is also good for business." At the policy level, the Strategy for the Rights of Persons with Disabilities 2021–2030 (European Commission, 2021) highlights the growing policy commitment to enhancing employment opportunities for people with disabilities (PwDs).*

This policy attention is well supported by empirical evidence showing that employment promotes social inclusion and improves the physical and mental health of PwDs (Zappella, 2017). A systematic review by Lindsay et al. (2018) confirms that work enhances quality of life, income, self-confidence, and a sense of belonging to a community. From the firm's side, studies such as Aichner et al. (2024) and Lindsay et al. (2018) show that these outcomes are associated with higher profitability, lower turnover, greater innovation, stronger corporate reputation, and a more positive workplace climate. However, understanding how these benefits emerge requires attention to the conditions that enable successful inclusion, including corporate culture and climate, job characteristics, government support, employer attitudes, and societal attitudes (Ikutegbe et al., 2025). Extending this perspective to a specific scientific area, Dwertmann et al. (2025) in organizational behavior research show, through a large-scale field study and two experiments, that working with colleagues with disabilities enhances creativity. In the hospitality management research area, Chan and McGinley (2024) explore how hotel employees perceive working with colleagues with disabilities. They find that senior managers express positive attitudes but often lack concrete implementation strategies; middle managers show hesitation driven by operational concerns; and line-level staff in midscale hotels appear more open and supportive. From a psychology and education research perspective, Santilli et al. (2023) found that both the type of disability and its presentation influence colleagues' attitudes. Moreover, employees' gender, educational level, and prior experience working with PwDs also shape these attitudes.

Purpose of the paper. *Despite the value of the above contributions, the business and management literature still offers limited awareness into the active agency of able-bodied employees. Therefore, this study adopts a multidimensional view of empathy encompassing cognitive and affective dimensions (Kerem et al., 2001; Smith, 2006; Wieseke et al., 2012) and integrates Social Exchange Theory (SET; Blau, 1964; Homans, 1958) to capture the factors that able-bodied employees derive from working alongside colleagues with disabilities. Furthermore, drawing on the Job Demand–Resource (JD-R) model (Demerouti et al., 2001), this study accounts for the conditions under which these factors translate into job satisfaction. So, these considerations call for addressing the aforementioned shortcomings by investigating the factors influencing the job satisfaction of able-bodied employees working alongside colleagues with disabilities.*

Building on this, several hypotheses are developed to investigate the above aim:

H1a. Perspective-taking positively affects trust toward working alongside colleagues with disabilities

H1b. Empathic concern positively affects trust toward working alongside colleagues with disabilities

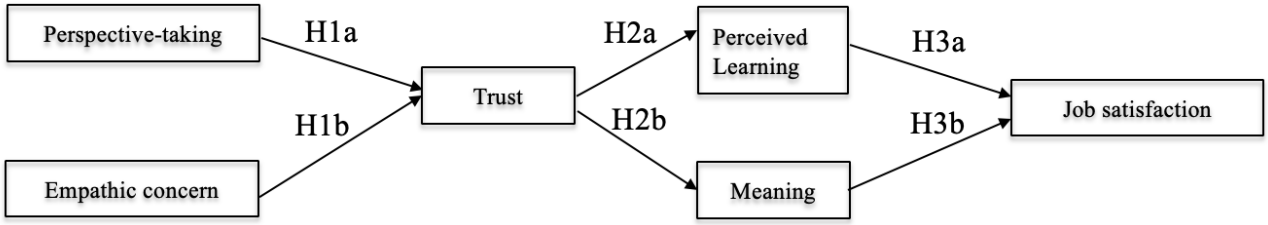
H2a. Trust positively affects perceived learning toward working alongside colleagues with disabilities

H2b. Trust positively affects meaning toward working alongside colleagues with disabilities

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H3a. Perceived learning positively affects job satisfaction working alongside colleagues with disabilities
H3b. Meaning positively affects job satisfaction working alongside colleagues with disabilities
Figure 1 presents the proposed theoretical framework and the relationships between constructs.

Figure 1. Theoretical framework



Source: Authors' own work, excerpted from a full paper in progress

Methodology. *Data will be collected through an online platform, selecting a European employee sample, aged between 18 and 60, and fluent in English. Additionally, only individuals with prior employee interaction experience were included in the sample. Following the methodological recommendations of Hair et al. (2022), a two-stage estimation procedure was applied to test hypotheses 1 to 4. In the first stage, we will evaluate the reliability and validity of the measurement instruments. In particular, we will examine reliability by calculating Cronbach's alpha, composite reliability, and Dijkstra-Henseler's rho_A. For convergent validity, we will evaluate whether the standardized loadings are high (> 0.7) and statistically significant, and whether the average extracted variance (AVE) values are greater than 0.5 for all constructs. Likewise, discriminant validity was checked using criteria widely accepted in the literature, such as the Fornell–Larcker criterion and the HTMT (Heterotrait–Monotrait). To reduce the risk of common method bias, various measures were also implemented following the methodological recommendations found in the literature (e.g., Krosnick, 1999; Kock et al., 2021). First, the questionnaire was pretested. Likewise, the questionnaire was designed to be brief and structured, seeking to reduce possible responses influenced by social desirability. In addition, the instructions provided to participants explicitly emphasized that there were no right or wrong answers. From an analytical perspective, we will also use statistical procedures to detect the presence of common method bias, specifically the latent variable correlation method (Bagozzi et al., 1991) and Harman's single factor test (Podsakoff et al., 2003), which creates a model with a single latent variable (where all the indicators studied are included in an exploratory factor analysis without rotation) to check whether the first factor explains less than 50% of the variance of its indicators. Multicollinearity will also be detected by checking that the variance inflation factors (VIFs) (Hair et al., 2022). In the second stage, we will estimate the structural model described in Figure 1 using a partial least squares structural equation model (PLS-SEM). The choice of PLS-SEM over covariance-based structural equation models (CB-SEM) is justified for several methodological reasons. First, PLS-SEM does not require the assumption of multivariate normality, as it is a nonparametric method, which makes it particularly suitable when data have non-normal distributions or small sample sizes. Second, this approach allows for the modeling of higher-order constructs (whether reflective or formative) and the handling of complex conceptual structures with multiple simultaneous relationships. To assess the statistical significance of the hypothesized relationships, we will use a bootstrapping procedure with 10,000 resamples, which will allow us to obtain robust estimates of the standard errors, confidence intervals, and t-values associated with each coefficient of the structural model. In addition, we will analyze the goodness of fit and the explanatory and predictive power of the model using coefficients of determination (R^2), effect sizes (f^2), and predictive relevance values (Q^2).*

Results. *We expect that the results of the structural model will support the hypothesized relationships in this short paper.*

Research limitations. *Despite the preliminary nature of this short paper, we attempt to identify the study's potential limitations and future research avenues. First, it is necessary to consider that the current short paper is work-in-progress research.*

Second, the analysis will focus exclusively on able-bodied employees. While this choice will be consistent with the study's exploratory aim and contemporary, advanced understanding in an underexplored research area, it will limit comparisons from a disabled employee's perspective. Future research can incorporate the perspectives of employees with disabilities to provide a comparative understanding of inclusive work experiences.

Third, the study will adopt a cross-country European perspective, which, while offering valuable comparative insights, may mask contextual differences at the national or regional level. Future research will therefore focus on specific European countries or regions to better capture institutional, cultural, and organizational variations, and then will proceed to a cross-country comparison. Alternatively, subsequent studies will extend the analysis beyond Europe to assess whether the observed patterns will hold in non-European contexts.

Managerial implications. *Although the empirical results of this study are still under analysis, the proposed theoretical framework and the expected results already suggest several practical implications for organizations seeking to strengthen inclusive workplaces. In particular, the model highlights how everyday interactions between able-bodied employees and colleagues with disabilities may shape trust, learning, and job satisfaction within inclusive teams. First, hypotheses H1a and H1b suggest that perspective-taking and empathic concern may play an important role in fostering trust toward colleagues with disabilities. From a managerial standpoint, this implies that inclusion strategies should extend beyond formal diversity policies and address interpersonal understanding within teams. Organizations may therefore benefit from training programs that promote perspective-taking, empathy development, and inclusive communication practices. Prior research shows that perspective-taking and empathic concern are associated with supportive and cooperative behaviors in workplace relationships (Longmire and Harrison, 2018). In addition, interventions encouraging employees to adopt others' perspectives have been shown to improve attitudes toward dissimilar coworkers and facilitate more positive interactions (Madera et al., 2011). In inclusive work settings, such initiatives may help employees better understand the experiences and challenges of colleagues with disabilities, thereby strengthening trust and cooperation in daily work.*

Second, H2a and H2b propose that trust may function as a relational mechanism enabling positive outcomes in inclusive work settings. If supported empirically, these relationships would suggest that trust toward colleagues with disabilities can create conditions that facilitate learning and enhance the meaning of work. Research in organizational behavior consistently shows that trust plays a central role in promoting cooperation, knowledge sharing, and positive workplace outcomes (Dirks and Ferrin, 2001). Moreover, in team contexts characterized by mutual task dependence, trust has been shown to support collaborative learning processes among coworkers (de Jong et al., 2007). Managers may therefore consider designing collaborative tasks and team structures that encourage mutual reliance and open communication among employees. Strengthening trust within inclusive teams may help create environments in which employees experience their work as more meaningful and developmentally enriching.

Finally, H3a and H3b indicate that inclusive work experiences may generate value not only for employees with disabilities but also for their coworkers. When employees perceive that collaboration with colleagues with disabilities contributes to their own learning or professional development, they may report higher levels of job satisfaction. Likewise, when work is experienced as meaningful within an inclusive environment, employees may feel more positively connected to their roles and to the organization. Recent research suggests that inclusive leadership and supportive team climates can enhance employees' sense of meaningful work by fostering psychological safety and opportunities for learning (Shafaei and Netaji, 2023). For managers, this implies that workplace inclusion should not be framed solely as a social responsibility initiative, but also as an opportunity to strengthen employees' developmental experiences and work meaningfulness.

Originality of the paper. *By investigating how able-bodied employees interpret their work experience alongside colleagues with disabilities and the factors influencing their job satisfaction, our research makes multiple contributions to the business and management literature on diversity, equity, and inclusion, with a specific focus on organizational behavior and team diversity. First, it extends empathy research (Longmire & Harrison, 2018; Madera et al., 2011; Weißhaar & Huber, 2016), by showing that perspective-taking and empathic concern foster trust among able-bodied employees toward colleagues with disabilities.*

Second, this study extends the application of SET to inclusive work environments. While prior research has focused on both vertical and, more recently, horizontal exchanges (Cropanzano & Mitchell, 2005; Eisenberger et al., 2004; Rhoades & Eisenberger, 2002; Elamin et al., 2024; Darke et al., 2024; Zhang et al., 2025), the role of social exchange processes in inclusive work environments—where employees with and without disabilities interact—remains underexplored. Addressing this gap (Ahmad et al., 2023), the study shows that exchanges between able-bodied employees and colleagues with disabilities generate psychological benefits such as perceived learning and meaning, highlighting the importance of non-material outcomes in social exchange processes.

Third, this study contributes to the JD-R model by extending its application to inclusive coworker relationships. Building on prior research on job resources and demands (Bakker et al., 2005; Schaufeli & Bakker, 2004; Maslach et al., 2001; Zeshan et al., 2025), our findings show that perceived learning and meaning—interpreted as psychological benefits arising from empathic and trust-based exchanges—act as relational job resources that foster job satisfaction (Bakker & Demerouti, 2007; Bakker et al., 2005).

Fourth, the study shifts attention from disability as an individual condition to the relational nature of workplace inclusion, conceptualizing inclusion as a social process emerging from everyday interactions and highlighting the active role of able-bodied employees in shaping inclusive workplaces (Chan & McGinley, 2024; Dwertmann et al., 2025; Santilli et al., 2023).

Finally, this study contributes to the "Purpose-driven Businesses" track of the Sinergie-SIMA 2026 conference by showing how workplace inclusion of colleagues with disabilities aligns with a core organizational purpose that extends beyond economic goals. It demonstrates how inclusion-driven values, enacted through everyday interactions among all employees, foster a positive organizational climate. In this way, the study highlights how organizational purpose can also be understood through an inclusive lens, emerging from the collective contribution of all organizational members—

starting from employees, as evidenced in this research—and suggests future research to further explore the broader system of stakeholders involved in shaping such purpose.

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Società Italiana di MANAGEMENT

Short papers

Track:
Retailing & Service Management



A Quantitative Assessment of Consumers' Reactions to "Clean" Labels•

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Abstract. *Across three quantitative studies, this research investigates consumer reaction to "clean" labels, a broad label category identifying products obtained through production processes aimed at minimally affecting consumer health and the natural environment as well as "free from" products, namely products devoid of potentially harmful substances. Study 1 focuses on sales data regarding three European countries (Italy, Spain, and France) and a three-year period (2020-2022). It shows that the sales of clean labelled hedonic products (e.g., snacks) are substantially equivalent to those of products displaying other labels, here referred to as "descriptive". However, with respect to more utilitarian (hereafter, "functional") foods (e.g., cooking ingredients), the sales of clean labeled products are significantly lower than those of products with descriptive labels. Study 2 focuses on an example of functional foods and using an experimental approach confirms that consumers exhibit more favorable reactions to functional products with descriptive rather than clean labels. Study 3 also uses an experimental approach and confirms that employing clean versus descriptive labels does not significantly influence consumers' intentions toward hedonic products. Overall, the results suggest that, compared to clean labels, descriptive labels favorably influence the decision to purchase functional products. However, for hedonic products, descriptive and clean labels exert an equivalent influence on consumers' choices.*
Keywords: *clean labels*; *product sales*; *hedonic food*; *functional food*

"Clean" labels as drivers of food consumption decisions. *Consumers are increasingly attentive to food healthiness because the outbreak of global health problems and the greater availability of health-related information have determined a progressive shift toward preventive nutrition and healthy eating (Mintel, 2025). This trend has led to the rise of negative dispositions toward ultra-processed foods, which, however, offers food manufacturers the opportunity to improve the quality and healthiness of such products, in order to meet consumers' desires for healthy food (Soininen, 2025). In this context, marketing communication plays a crucial role: front-of-package labels, in particular, have become a key information source that helps consumers evaluate food products and make their purchase decisions (De Marchi et al., 2016; Kunz et al., 2021).*

In many cases, food labels incorporate claims concerning relatively unobservable features (e.g., "organic" origin) which may be certified by third-party organizations (e.g., the European Union), by product makers, or food retailers. For this reason, many consumers consider product labels as quality and safety cues and credence attributes that guide their purchasing decisions. However, other consumers question their truthfulness and are unwilling to pay higher prices for certified products (Lee et al., 2020), especially when certifications are ambiguous or when their limited understandability raises skepticism about the real characteristics of food products (Rossi and Rivetti, 2023).

Among the various labels, the so-called "clean" labels (e.g., "no preservatives", "pesticide free") identify products devoid of substances that could harm both consumers or the environment (Lin and Wang, 2023; Sirieix et al., 2012) as well as products obtained through relatively simple production processes that do not involve harmful substances (e.g., artificial dyeing, genetic modification, etc.; Asioli, 2017; Grappe et al., 2022). Clean labels include "free from" labels (e.g., "gluten-free", "sugar-free") which certify that the product does not contain any allergens or chemical substances that could have adverse effects on consumer health. Some studies maintain that consumers generally have favorable opinions about clean labeled products and consider them to be healthier than comparable products (Priven et al., 2015). As a consequence, the perceived healthiness and quality of clean labeled products are the main drivers of consumers' intentions toward such products (Castellini et al., 2023). However, other scholars have noted that these positive effects might be context-specific: for instance, consumers might prefer clean labeled products to comparable products when they aim to avoid some specific health risks (e.g., allergic reactions) or when clean labels are accompanied by information about ingredients or production processes (Liaukonyte et al., 2013).

Purpose of the paper. *Consumer reaction to clean labels might differ significantly from their reaction to other widespread labels – hereafter "descriptive" labels (e.g., "locally sourced", "free range", "rich in Omega 3"). However,*

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still little is known about the impact of clean labels on consumers' attitudes and intentions. Considering that, for food producers and retailers it is important to be aware of such differences in order to effectively market their products, this research aims at: a) exploring said differences by focusing on the sales value of products featuring "clean" and "descriptive" labels; a) understanding how these two label categories influence consumers' purchase decisions. To achieve these objectives, we ran three empirical studies. In Study 1, we analyzed data concerning the sales of products carrying clean and descriptive labels in three European countries (Italy, Spain, and France) sharing some cultural characteristics and consumption habits. The study aimed at establishing whether one of the two label categories is associated with higher sales. Then, to validate Study 1 results, we ran two between subjects online experiments. The first experiment (Study 2) assessed consumer reactions to comparable clean and descriptive labels (i.e., "No Chemicals" versus "100% Natural") focusing on an example of functional food. The second experiment (Study 3) assessed consumer reactions to analogous labels (i.e., "No Chemical Additives" versus "100% Natural Ingredients") applied to hedonic food products.

Study 1: Methods. *We used Euromonitor's Passport sales data (https://www.euromonitor.com/passport) regarding two product categories – snacks and cooking ingredients – as examples of hedonic and functional food products, respectively. Particularly, we analyzed data concerning the sales of products displaying 21 different labels (7 clean labels; 14 descriptive labels) occurred in Italy, Spain, and France over a three-year period (2020-2022). We focused on these countries because they are located in a continuous geographical space and share similarities in terms of food consumption. Two independent coders analyzed the label text in order to distinguish clean labels from other label categories (here referred to as "descriptive"; Tables 1 and 2). Because for each label and for each product category, Euromonitor provides sales and average price data (in USD), we divided the sales data by the corresponding price in order to control for possible effects related to product prices. Hence, for each country and for the two label / product categories, we obtained "sales per price unit" indicators (i.e., sales quantity indicators).*

Study 1: Comparative analysis. *For all countries, we assessed whether sales quantities vary based on the label type by running a series of ANOVA (Table 3). We ran this analysis for both hedonic (i.e., snacks) and functional products (i.e., cooking ingredients). For hedonic products, the results suggest that sales are unrelated to the type of labels as the analysis did not return significant differences. Instead, for functional products, and for Italy and Spain, we found that descriptive labels are associated with significantly higher sales quantities than clean labels.*

Study 1: Moderation analysis. *Based on the results illustrated above, we assessed a possible interaction effect of label type and product category by running a moderation analysis trough Hayes' (2022) PROCESS macro (model 1). Specifically, we ran a linear regression analysis that assessed a possible influence of label type (a variable coded as -1 = Clean label; 1 = Descriptive label), product category (a variable coded as -1 = Hedonic products; 1 = Functional products), and the interaction between these two variables (Label type × Product category) on product sales. For Italy and Spain, the analysis returned significant positive effects of label type on product sales, signaling that descriptive labels are associated with greater sales quantities than clean labels (Table 4). For Italy, the analysis also returned a negative effect of product category, signaling that, compared to hedonic products, functional products are associated with lower sales quantities. Importantly, in all cases, the analysis returned a significant interaction effect of label type and product category. In line with our previous considerations, we found that the conditional effect of label type on product sales is positive and significant for functional products; however, it is non-significant for hedonic products.*

Overall, the results suggest that consumers tend to prefer functional products labelled with descriptive labels, whereas, when it comes to hedonic products, descriptive and clean labels seem to exert an equivalent influence on consumers' purchase decision. Accordingly, in the specific case of Italy and Spain, we found that, for functional products, descriptive labels are associated with significantly greater sales quantities compared to clean labels. This effect does not extend to hedonic products.

Study 2: Methods. *To further investigate whether consumers tend to prefer descriptive labels when their purchase decisions concern functional products, we ran a two-cells between subjects' online experiment with 225 Canadian consumers (mean age = 39; 54% female) recruited through Prolific.com. We presented all participants with a picture of a functional food product (i.e., a package of dried beans). We prepared two versions of this picture: one included a clean label ("No Chemicals"), the other included a descriptive label ("100% Natural"). After checking this picture, participants rated the intentions toward the product using a mono-item scale ("How likely is that you look for further information about that product?"; 1 = Not at all likely, 7 = Very likely). Participants also rated the perceived healthfulness of the product using a mono-item semantic differential scale (1 = Not healthy at all, 7 = Very healthy). Finally, they completed the survey by providing their demographic data.*

Study 2: Results. *Participants' ratings of the perceived healthfulness of the test product did not change across the two experimental conditions ($p = 0.873$; Table 5). However, those participants who were exposed to the picture that featured a descriptive label expressed marginally significant stronger intentions toward the product ($M = 4.80$, $SD = 1.75$) than their counterparts who were exposed to the picture with a clean label ($M = 4.37$, $SD = 1.81$, $F(1, 223) = 3.34$, $p = .069$).*

These findings appear relatively consistent with the results of Study 1 because they indicate that, specifically for functional products, consumers tend to exhibit better reactions to descriptive labels rather than clean labels.

Study 3: Methods. *To assess whether consumers are relatively indifferent to clean and descriptive labels when their purchase decisions concern hedonic products, we ran a two-cells between subjects' online experiment with 384 US consumers (mean age = 47; 61% female) recruited through Prolific.com. We used a mock-up online food store displaying some hedonic food products (biscuits and wafers). The store featured "add to cart" buttons, which allowed participants to simulate an online shopping experience. It was designed to display either a clean label ("No Chemical Additives") or a descriptive label ("100% Natural Ingredients") below each product. Participants accessed the store through a link embedded in an online questionnaire. Half of them saw the version of the store with "clean" labels below the products; the other half saw the version with "descriptive" labels below the same products. After visiting the store, participants completed the questionnaire used a mono-item scale (1 = Not healthy at all, 7 = Very healthy) to rate the perceived healthfulness of the products available in the store and provided their demographic data.*

Study 3. Results. *Participants' ratings of the perceived healthfulness of the products available in the store did not change across the two experimental conditions (p = 0.180; Table 6). Similarly, both their overall expenditure (p = 0.976) and the number of products that they added to their carts (p = 0.450) did not change across the two conditions. These findings confirm that, specifically for hedonic products, the adoption of clean versus descriptive labels does not affect consumers' perceptions and behavioral intentions.*

Research limitations. *While a strength of this research is the adoption of a mixed method combining archival and experimental data, it is important to acknowledge that our research did not assess the factors underlying consumers' decision to purchase (or not) products featuring clean labels. Therefore, to fully understand why the influence of such labels on consumers' decisions varies across different product categories, future studies should investigate potential factors responsible for such differences: for example, consumers might find descriptive labels more understandable than clean labels. Furthermore, although we observed the purchase behavior of consumers living in different countries, it is important to acknowledge that the preference for clean or descriptive labels may significantly vary within each national consumer group. Future research is, therefore, recommended to investigate characteristics such as a consumer age and cultural factors because they might significantly influence consumers' reaction to clean and descriptive labels.*

Managerial implications. *The studies illustrated above yield two main results that are relevant to food producers and retailers: a) clean labels are less effective than descriptive labels when they are applied to functional products; b) clean labels are as effective as descriptive labels when they are applied to hedonic products. Managerially, these results advise manufactures and retailers to use clean labels only for hedonic products because the application of these labels to functional products may lead to sub-optimal economic results. Instead, they could use descriptive labels for functional products. Such conclusions likely apply to the other forms of communication (e.g., website information, etc.). Therefore, marketers should maintain information consistency across different communication channels.*

Originality of the paper. *The food market is characterized by a growing use of labels which compete to attract consumers' attention and influence their purchasing decisions. As a meaningful category of labels that reassure consumers about the absence of potentially harmful substances, clean labels have progressively captured the interest of food marketing scholars (e.g., Asioli et al., 2017; Grappe et al., 2022). However, it is still unclear whether their ability to influence consumers' decisions significantly varies across consumption contexts. The present research addresses this gap and establishes that functional products do not benefit from the adoption of these labels. The results also indicate that cultural factors may affect consumer reaction to these labels as we detected the same results in countries that share similarities in their food consumption patterns (Italy and Spain). Thus, from a global perspective, the findings of this study suggest that consumer responses to clean labels vary across product categories and are further shaped by the specific characteristics of the target market.*

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Tables

Table 1. Study 1: Number of items for each label type and product category in three European countries

	Italy		*Spain*		*France*	
	n	*%*	*n*	*%*	*n*	*%*
Clean (free-from) labels:						
Cruelty free		0.0	9	0.6	6	0.3
No chemical additives	28	1.1	3	0.2	26	1.5
No dye	220	8.8	111	7.6	199	11.1
No GMO	192	7.7	124	8.4	131	7.3
No herbicide	6	0.2	3	0.2		
No palm oil	211	8.5	154	10.5	200	11.2
No pesticides	45	1.8	17	1.2	48	2.7
Total:	702	28	421	29	610	34
Descriptive labels:						
Biodegradable	29	1.2	3	0.2	3	0.2
Can be recycled	492	19.8	145	9.9	260	14.6
Carbon neutral/Reduced carbon	4	0.2				
Climate pledge friendly	11	0.4	3	0.2	5	0.3
Compostable	38	1.5	2	0.1	16	0.9
Environmentally friendly	232	9.3	263	17.9	244	13.7
Fair for life					5	0.3
Fairtrade	38	1.5	20	1.4	46	2.6
Free range	56	2.2	40	2.7	27	1.5
From sustainable sources	393	15.8	121	8.24	143	8
Locally sourced	38	1.5	35	2.4	42	2.4
Natural	421	16.9	411	28	384	21.5
Responsible marine sourcing	6	0.2				
Responsible forestry	31	1.2	5	0.3	1	0.1
Total:	1789	72	1048	71	1176	66
General total:	2491	100	1469	100	1786	100

Table 2. Study 1: Number of hedonic and functional products with "Clean" and "Descriptive" labels for the selected European countries

	Italy		*Spain*		*France*	
	Clean labels	*Descriptive labels*	*Clean labels*	*Descriptive labels*	*Clean labels*	*Descriptive labels*
Hedonic products	553	1168	285	572	410	679
Functional products	149	621	136	476	200	497
Total	702	1789	421	1048	610	1176

Note: *N*(Italy) = 2491; *N*(Spain) = 1469; *N*(France) = 1786.

Table 3. Study 1: Average sales quantities of clean and descriptive labels in the selected European countries

	Clean labels		*Descriptive labels*				
	Mean	*SD*	Mean	*SD*	*F*	*df*	Sig.
Italy:							
Hedonic products	4.18	11.98	3.77	10.24	0.53	1, 1719	0.468
Functional products	*0.96*	*1.94*	*4.87*	*8.42*	*31.84*	*1, 768*	*< 0.001*
Spain:							
Hedonic products	0.64	1.67	0.77	1.39	1.43	1, 855	0.232
Functional products	*0.57*	*1.42*	*1.40*	*3.20*	*8.59*	*1, 610*	*0.003*
France:							
Hedonic products	2.52	7.75	2.04	5.39	1.45	1, 1090	0.229
Functional products	2.89	5.02	4.18	11.36	2.39	1, 692	0.122

Note: *N*(Italy) = 2491; *N*(Spain) = 1469; *N*(France) = 1786.

Table 4. Study 1: Interaction effect of label type and product category on product sales

	b	SE	*t*	Sig.	LLCI	ULCI
Italy:						
Constant	3.44	.26	13.21	<.001	2.933	3.956
Label type	*.88*	*.26*	*3.37*	*.001*	*.367*	*1.390*
Product category	*-.53*	*.26*	*-2.03*	*.043*	*-1.039*	*-0.017*
Label type × Product category	*1.08*	*.26*	*4.15*	*<.001*	*.570*	*1.593*
Conditional effect of Label type on product sales:						
Hedonic products	-.20	.26	-.79	.429	-707	.301
Functional products	*1.96*	*.45*	*4.32*	*<.001*	*1.070*	*2.850*
Spain:						
Constant	.84	.07	12.72	<.001	.715	.975
Label type	*.24*	*.07*	*3.59*	*<.001*	*.109*	*.369*
Product category	*.14*	*.07*	*2.15*	*.031*	*.013*	*.273*
Label type × Product category	*.17*	*.07*	*2.63*	*.009*	*.044*	*.305*
Conditional effect of Label type on product sales:						
Hedonic products	.06	.08	.81	.417	-.091	.220
Functional products	*.41*	*.11*	*3.88*	*<.001*	*.205*	*.622*
France:						
Constant	2.91	.21	13.97	<.001	2.49	3.32
Label type	.20	.21	.98	.329	-.205	.611
Product category	.63	.21	3.01	.003	.218	1.035
Label type × Product category	*.44*	*.21*	*2.13*	*.033*	*.035*	*.851*
Conditional effect of Label type on product sales:						
Hedonic products	-.24	.25	-.96	.335	-.728	.248
Functional products	*.65*	*.33*	*1.94*	*.053*	*-.009*	*1.301*

Note: Label type was coded as -1 = *Clean* label; 1 = *Descriptive* label; Product category was coded as -1 = *Functional*; 1 = *Hedonic*; *N*(Italy) = 2491; *N*(Spain) = 1469; *N*(France) = 1785.

Table 5. Study 2: Participants' reactions to a functional product displaying either a clean or a descriptive label

	Clean Label		*Descriptive label*			
Variables	Mean	SD	Mean	SD	*F*	Sig.
Behavioral intentions	4.37	1.81	4.80	1.75	3.345	.069
Perceived healthiness	4.33	1.59	4.36	1.47	.026	.873

Note: *N* = 225; [a]: "No Chemicals"; [b]: "100% Natural".

Table 6. Study 3: Participants' reactions to hedonic products displaying either clean or descriptive labels

	Clean Label		*Descriptive label*			
Variables	Mean	SD	Mean	SD	*F*	Sig.
Self-reported measures:						
Perceived product healthiness	4.05	1.49	4.25	1.44	1.81	.180
Tracking data:						
Overall expenditure	5.18	4.85	5.19	3.47	9.430×10^{-4}	.976
Number of purchased products	3.68	1.73	3.82	1.74	.57	.450

Note: *N* = 384; [a]: "No Chemical additives"; [b]: "100% Natural Ingredients".

Breaking the shelf blindness: how dynamic social norms-based communication increases visual attention toward high-fiber breakfast products

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Abstract. *Questo studio indaga il ruolo delle norme sociali descrittive dinamiche come strumento di Nutrition Shopper Marketing per promuovere l'acquisto di prodotti dal miglior indice nutrizionale. Nonostante l'efficacia delle norme sociali sia nota, la letteratura riporta risultati contrastanti; secondo gli studi precedenti, una delle principali ragioni di insuccesso potrebbe essere la scarsa visibilità delle iniziative stesse da parte dei consumatori. Al fine di comprendere questo aspetto, è stato condotto un esperimento sfruttando la tecnologia dell'eye-tracking in due punti vendita della Grande Distribuzione italiana su un campione di 52 partecipanti. Nel punto vendita sperimentale è stata installata una comunicazione basata su norme dinamiche applicata a cereali, biscotti e merendine per la promozione dei prodotti che offrissero un maggior apporto di fibre. L'utilizzo dell'eye-tracking ha permesso di misurare i processi di scelta. I risultati evidenziano come la comunicazione abbia aumentato significativamente il numero di fissazioni e il dwell time sui prodotti target, specialmente per biscotti e merendine. Inoltre, solo nel punto vendita sperimentale sono state osservate una maggiore facilità di ricerca e una superiore soddisfazione per l'esperienza d'acquisto, oltre che scelte più corrette dei partecipanti rispetto al gruppo di controllo. La ricerca dimostra come il ricorso a una strategia di comunicazione basata sulle norme sociali abbia migliorato la visibilità dei prodotti ricchi in fibre e orientato i consumatori nella scelta dei prodotti.*

Keywords: *norme sociali dinamiche; marketing nutrizionale; in-store communication; eye-tracking; fibre; prima colazione*

Framing of the research. *Il panorama epidemiologico attuale è fortemente condizionato dall'aumento delle malattie croniche non trasmissibili legate all'alimentazione. Infatti, l'eccessiva disponibilità di alimenti ad alta densità energetica ha contribuito alla diffusione del fenomeno dell'obesità, un disturbo multifattoriale che provoca l'insorgenza di gravi comorbilità, come malattie del sistema circolatorio e metabolico e che può portare allo sviluppo di diverse forme tumorali (Mahony, 2025; WHO, 2022). In particolare, la letteratura evidenzia come l'abuso di sodio, grassi trans e bevande zuccherate, unito a un consumo insufficiente di fibre, frutta e vegetali freschi, rappresentino i principali fattori di rischio per lo sviluppo di una condizione di obesità e delle relative comorbilità (Afshin, 2019).*

É importante notare come l'obesità sia provocata da una combinazione di variabili, tra cui emerge con forza il ruolo determinante dell'ambiente. Nello specifico, le strategie di marketing attuate dalle imprese industriali e distributive rappresentano un fattore rilevante nell'influenzare le preferenze e i pattern di acquisto e consumo della popolazione rinforzando le abitudini alimentari e comportamentali che non promuovono l'equilibrio energetico positivo (Farzand et al., 2025). L'architettura delle scelte nei punti vendita può influenzare profondamente le decisioni d'acquisto. Spesso, infatti, i prodotti ricchi di zuccheri, grassi saturi e sale vengono valorizzati all'interno dei punti vendita grocery attraverso strategie di posizionamento, l'aumento dell'ampiezza e della profondità assortimentale e l'uso di comunicazioni aggressive (Thorndike et al., 2020). Tuttavia, i distributori hanno l'opportunità di agire come attori del cambiamento, attraverso l'applicazione di strategie di "Nutrition Shopper Marketing" per influenzare positivamente le abitudini di acquisto (Grandi & Cardinali, 2021). Infatti, secondo l'approccio del Nutrition Shopper Marketing, il punto vendita non rappresenta un luogo in cui avvengono scelte puramente razionali. In quest'ottica, le leve del marketing in-store possono essere declinate strategicamente per incoraggiare l'acquisto di referenze dal miglior profilo nutrizionale (Grandi & Cardinali, 2021). Nonostante l'ampia letteratura sui driver che incoraggerebbero l'adozione di regimi alimentari orientati alla salute, il contributo strategico dei retailer nella promozione di scelte sane, rimangono molte domande senza risposta sulle migliori pratiche per l'implementazione di interventi efficaci nei punti vendita (Karpin et al., 2020). Inoltre, gran parte degli approcci esistenti tende a sovrastimare la componente razionale del consumatore e attribuisce scarsa rilevanza alle strategie di condizionamento ambientale e ai messaggi basati sulle norme sociali, in grado di attivare euristiche che permettono di modellare i comportamenti (Slapø et al., 2021; Glanz et al., 2012).

Le norme sociali possono essere intese come l'insieme di regole implicite, non scritte e legate al contesto che guidano e vincolano il comportamento umano (Gelfand et al., 2024). Coerentemente con la Focus Theory of Normative Conduct (Cialdini et al., 1990) è possibile distinguere tra norme descrittive (descrivono il comportamento altrui all'interno di uno specifico gruppo di riferimento) e norme ingiuntive (prescrivono ciò che è considerato appropriato dal gruppo di riferimento). Si parla di "social norm nudges" per descrivere l'esplicitazione delle norme sociali attraverso l'utilizzo di

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comunicazione testuale (Wolfswinkel et al., 2025). L'efficacia di interventi volti a incoraggiare l'acquisto o il consumo di prodotti dal miglior contenuto nutrizionale attraverso il ricorso alla comunicazione basata sulle norme sociali descrittive è stata ampiamente riconosciuta in letteratura (Melnyk et al., 2022; De Groot, 2022; Sharps & Robinson, 2016; McGrath, 2023; Guichard et al., 2021; Higgs et al., 2019). È importante notare come le norme sociali non siano statiche ma, piuttosto, evolvano continuamente. Nuovi comportamenti possono affermarsi grazie ad una maggiore consapevolezza su costi e benefici legati alle vecchie abitudini o all'influenza degli atteggiamenti e delle convinzioni che caratterizzano il proprio gruppo di riferimento. Inoltre, l'allineamento con le tendenze sociali più ampie può favorire l'adozione di nuove norme. Infatti, le persone sono più propense a cambiare i propri comportamenti se percepiscono il cambiamento in linea con una tendenza generale. Questo avviene perché le norme dinamiche possono far credere che il cambiamento personale sia possibile, importante per gli altri e/o coerente con la propria identità sociale (Gelfand et al., 2024). Nonostante alcuni studi abbiano evidenziato come le norme sociali descrittive dinamiche siano più efficaci di quelle statiche nella promozione di comportamenti prosociali tra cui quelli alimentari (Edwards et al., 2026; Sparkman & Walton, 2017; Sparkman et al., 2020; Carfora et al., 2022); altri hanno mostrato come la comunicazione non abbia prodotto alcun effetto o generato addirittura effetti controproducenti (si parla a tal proposito di "effetto boomerang"). Spesso gli autori suggeriscono che il fallimento degli interventi normativi rivolti a modificare i comportamenti alimentari possa essere dovuto ad abitudini fortemente consolidate. Infatti, spesso i messaggi contenenti norme sociali descrittive dinamiche sono stati utilizzati non tanto per promuovere comportamenti alimentari orientati alla salute ma alla sostenibilità ambientale e, nello specifico, la riduzione del consumo di carne a fronte di un aumento del consumo di alimenti a base vegetale (Aldoh et al., 2021; Çoker et al., 2022). Inoltre, alcuni esperimenti condotti in ambiente reale (nei ristoranti, nelle mense o all'interno dei punti vendita grocery) potrebbero non aver prodotto gli effetti desiderati a causa del forte rumore visivo legato alla presenza di molteplici stimoli (Patel et al., 2024; Çoker et al., 2022). Infatti, affinché un'iniziativa di comunicazione in-store possa funzionare, è necessario che le persone la notino e la comprendono davvero (Bartels et al., 2018). Diversi studi (Jacoby et al., 1977; Mazis & Staelin, 1982; McGuire, 1976) dimostrano che, tra leggere un'informazione e cambiare il proprio comportamento, ci sono diversi "ostacoli" da superare: bisogna esporsi al messaggio, prestargli attenzione, capirlo e, infine, ricordarlo. Se uno di questi passaggi fallisce, l'informazione diventa sterile. Inoltre, i consumatori sono esposti a un sovraccarico informativo che eccede le loro capacità di elaborazione (es. Jacoby et al., 1977; Bartels et al., 2018). Di conseguenza, l'individuo adotta dei meccanismi di attenzione selettiva, filtrando gli stimoli e concentrandosi solo su una porzione ridotta dei dati disponibili (Jacoby et al., 1977). Per questa ragione, al fine di arricchire la comprensione di come i consumatori percepiscono ed elaborano le informazioni durante l'esperienza di spesa, questa ricerca si propone di misurare l'efficacia di un'iniziativa di comunicazione in-store attraverso il ricorso allo strumento dell'eye-tracking.

Purpose of the paper. *Spesso i consumatori sfruttano euristiche per dedurre la qualità nutrizionale dei prodotti e la loro attenzione è limitata e catturata da elementi visivi salienti (Bartels et al., 2018). Di conseguenza, semplificare le informazioni relative al contenuto di fibre dei prodotti attraverso la comunicazione puntuale su reglettes e stopper potrebbe renderle più fruibili.*

Methodology. *Al fine di testare l'efficacia della comunicazione in-store basata sulle norme sociali dinamiche, è stato condotto un esperimento in ambiente reale in due punti vendita (uno sperimentale e uno di controllo) appartenenti a una catena della Grande Distribuzione italiana. L'iniziativa ha riguardato i prodotti ricchi in fibre della prima colazione, in particolare cereali, merendine e biscotti, sia della Marca del Distributore (MDD) che dell'Industria di Marca (IDM). Nel punto vendita sperimentale, è stata installata un'iniziativa di comunicazione attraverso crowner, banner, stopper, reglettes e calpestabili, che recitavano il seguente messaggio:*

"SCELGO + FIBRE. Sempre più consumatori [Retailer] scelgono prodotti ricchi di fibre. E TU COSA SCEGLI?"
"Prenditi cura del tuo benessere. Scopri i prodotti per la prima colazione con maggiore apporto di fibre."

Poiché il consumo di fibre non rappresenta ancora un'abitudine diffusa, nonostante mostri una tendenza in crescita (Tao et al., 2023; GS1 Italy, 2022; 2024; AIRC - Fondazione per la Ricerca sul Cancro, 2021), l'uso di una norma descrittiva statica rischierebbe di demotivare i destinatari, evidenziando come tale comportamento sia adottato solo dalla minoranza. Per superare questo limite, si è scelto di ricorrere a una norma descrittiva dinamica. Al fine di testare l'efficacia di tale iniziativa è stato condotto uno studio di eye-tracking con gli occhiali Tobii Glasses 3 nel punto vendita oggetto dell'esperimento e nel punto vendita di controllo. Lo strumento dell'eye-tracking permette infatti di analizzare i processi percettivi, cognitivi e decisionali (Rayner, 1998; Radach et al., 2003). Durante l'atto d'acquisto, consente di monitorare i movimenti oculari come indicatori dell'acquisizione informativa e dei meccanismi subconsci di elaborazione (Bartels et al., 2018). Nello specifico, permette di mappare la sequenza, la collocazione e la persistenza dello sguardo su determinati stimoli, identificando quali sono gli elementi che vengono effettivamente rilevati dal consumatore. Sebbene l'atto percettivo non implichi necessariamente la decodifica o l'utilizzo del dato che il consumatore raccoglie, questo rimane sempre una condizione preliminare indispensabile per la successiva comprensione e applicazione dell'informazione raccolta (Becker et al., 2015). Inoltre, l'utilizzo degli occhiali come strumento di eye-tracking ha consentito di acquisire i dati delle fissazioni e delle saccadi in condizioni ecologiche, lasciando al partecipante la totale libertà di movimento.

Prima dell'inizio della sessione, a ciascun partecipante è stato assegnato un codice per consentirne l'anonimato ed è stato sottoposto a una procedura di calibrazione standard a un punto. I dati grezzi registrati dagli occhiali sono stati

successivamente importati e analizzati tramite il software Tobii Pro Lab, che è stato utilizzato per l'analisi delle Aree di Interesse (AOI) e la realizzazione delle heatmap. Inoltre, è stato misurato il tempo che il partecipante impiegava nel trovare i prodotti ricchi di fibre ed è stato annotato se il prodotto selezionato era effettivamente ricco di fibre o meno.

A ciascun partecipante è stata fornita una lista della spesa fittizia come shopping mission, che prevedeva l'acquisto di una confezione di cereali ricchi in fibre, una confezione di biscotti ricchi in fibre e una confezione di merendine ricche in fibre. Ai partecipanti non è stato dato alcun vincolo di tempo, di ordine o di percorso. Al termine della simulazione, sono state poste loro delle domande attraverso un breve questionario. In particolare, sono state misurate la facilità di ricerca dei prodotti all'interno dello scaffale (Seiders et al., 2005; α =.961), la valorizzazione percepita dei prodotti ricchi in fibre all'interno dello scaffale e la soddisfazione dell'esperienza di acquisto simulata (Van Ittersum et al., 2013; α =.978). Inoltre, ai partecipanti è stato chiesto come hanno fatto a identificare e riconoscere il prodotto ricco in fibre.

Il campione dello studio consta di 52 partecipanti, 27 partecipanti per il punto vendita sperimentale e 25 per il punto vendita di controllo, così suddiviso:

Tabella 1. Composizione del campione

Punto vendita sperimentale		***Punto vendita di controllo***		***Totale***	
Genere					
Donne	*59%*	***Donne***	*52%*	***Donne***	*56%*
Uomini	*41%*	***Uomini***	*48%*	***Uomini***	*44%*
Età					
18-24	*-*	***18-24***	*20%*	***18-24***	*10%*
25-34	*22%*	***25-34***	*20%*	***25-34***	*21%*
35-44	*30%*	***35-44***	*12%*	***35-44***	*21%*
45-54	*19%*	***45-54***	*16%*	***45-54***	*17%*
55-64	*19%*	***55-64***	*24%*	***55-64***	*21%*
65 +	*11%*	***65 +***	*8%*	***65 +***	*10%*
Tipo di cliente					
Abituale	*68%*	***Abituale***	*28%*	***Abituale***	*52%*
Occasionale	*33%*	***Occasionale***	*72%*	***Occasionale***	*48%*

Results. *Per quanto riguarda il punto vendita sperimentale, dal dichiarato dei partecipanti è emerso che il 48% aveva notato la comunicazione e, di questi, il 77% ha dichiarato che è risultata utile nella ricerca dei prodotti ricchi di fibre. Ai partecipanti è stato chiesto come hanno fatto a indentificare e riconoscere il prodotto ricco in fibre (Tabella 2). Il confronto tra i due punti vendita evidenzia come l'introduzione della comunicazione a scaffale nel punto sperimentale abbia parzialmente sostituito l'affidamento ad altri elementi visivi, come il packaging, le immagini e i colori del packaging. Si osserva inoltre una maggiore incidenza del fattore marca nel campione sperimentale, che potrebbe suggerire una ricerca più mirata e "programmata" rispetto al gruppo di controllo.*

Tabella 2. Driver di ricerca dei prodotti

Affermazione	***sperimentale***	***controllo***
Ho letto le informazioni presenti sul pack	*41%*	*48%*
Mi sono fatto guidare dall'immagine presente sul pack	*7%*	*21%*
Mi sono fatto guidare dal colore del pack	*12%*	*15%*
Conoscevo già il prodotto e l'ho cercato a scaffale	*11%*	*10%*
Mi sono fatto guidare dalla marca	*16%*	*6%*
Mi sono fatto guidare dalla comunicazione a scaffale	*13%*	*-*

Nel punto vendita sperimentale, il 33% del campione ha selezionato correttamente tutti i prodotti ricchi di fibre, il 56% ne ha selezionato uno errato, il 7% ne ha selezionati due errati e solo un partecipante ha sbagliato a selezionare tutti e tre i prodotti. Nel punto vendita di controllo, invece, solo il 29% del campione ha selezionato correttamente tutti i prodotti ricchi di fibre, il 48% ne ha selezionato uno errato, il 15% ne ha selezionati due errati e l'8% ha sbagliato a selezionare tutti e tre i prodotti. Attraverso un t-test a campioni indipendenti, è stata calcolato il numero di scelte corrette in entrambi i punti vendita ed è risultato che nel punto vendita con la comunicazione i partecipanti hanno effettuato più scelte corrette (Ms = 2.19, Mc = 1.76; p = .042).

Sia nel punto vendita sperimentale che di controllo, la categoria di prodotti dove i consumatori hanno riscontrato più difficoltà, ovvero dove hanno commesso più errori, è quella delle merendine, mentre quella risultata più semplice da trovare è quella dei cereali.

Attraverso l'ausilio degli occhiali eye-tracking, è stato cronometrato il tempo impiegato nell'esperienza di spesa simulata in entrambi i punti vendita (Tabella 3). Tuttavia, eseguendo un t-test a campioni indipendenti, è emerso che i tempi di spesa per ciascuna categoria di prodotto (ad eccezione dei cereali) sono inferiori nel punto vendita sperimentale, anche se non in modo significativo (p>.05).

Tabella 3. Tempo impiegato nella ricerca dei prodotti

Punto vendita	*Tempo impiegato (in secondi)*			
	Biscotti	*Cereali*	*Merendine*	*Spesa totale*
sperimentale	*69,57*	*53,14*	*42,52*	*165,23*
controllo	*57,26*	*62,84*	*43,89*	*172,08*

Per quanto riguarda i cereali, i risultati potrebbero risentire del diverso spazio espositivo; infatti, i metri lineari assegnati alla categoria nel punto vendita di controllo sono ridotti rispetto a quelli del punto vendita sperimentale. L'assenza di significatività tra le due condizioni potrebbe essere dovuta anche al modo in cui i partecipanti hanno ricercato i prodotti ricchi in fibre. Infatti, in entrambi i punti vendita, i partecipanti si sono fatti guidare in gran parte dalle informazioni presenti sul packaging (48% nel punto vendita di controllo, 41% nel punto vendita sperimentale). Questo risultato non sorprende dal momento che il packaging rappresenta spesso l'ultimo e più rilevante strumento di comunicazione capace di raggiungere il consumatore nel momento della scelta (Butkevičienė et al., 2008). Tuttavia, la facilità di ricerca nello scaffale è risultata più alta nel punto vendita con la comunicazione (Ms = 5.64, Mc = 3.86; p < .001), così come la soddisfazione dell'esperienza di acquisto (Ms = 5.50, Mc = 4.52; p =.004). Ai partecipanti è stato chiesto anche quanto, secondo loro, i prodotti ricchi in fibre fossero valorizzati a scaffale ed è risultato che nel punto vendita sperimentale la valorizzazione risulta maggiore rispetto a quello di controllo (Ms = 4.88; Mc = 3.56; p < .001).
Successivamente, è stato calcolato un t-test sulle fissazioni e il dwell time, ponendo come AOI i prodotti ricchi in fibre in entrambi i punti vendita. Dai risultati si può evincere che nel punto vendita sperimentale vi è un incremento significativo nelle fissazioni per le categorie dei biscotti (Ms = 33.37, Mc = 8.96; p = .001) e delle merendine (Ms = 22.85, Mc = 6.96; p = .004), mentre non significativo per i cereali (Ms = 42.28, Mc = 43.63; p > .05). Anche il dwell time è aumentato in modo significativo sia per i biscotti (Ms = 12.05, Mc = 3.66; p = .003) che per le merendine (Ms = 8.45, Mc = 2.83; p = .019) e in modo non significativo per i cereali (Ms = 16.39, Mc = 16.44; p > .05).
Infatti, mentre nel punto vendita di controllo i consumatori tendevano a ignorare i prodotti ricchi di fibre o a cercarli basandosi principalmente sul packaging, nel punto vendita sperimentale la comunicazione ha aiutato nella ricerca del prodotto. Questo spiega anche perché i partecipanti nel punto vendita sperimentale abbiano poi effettuato un numero significativamente maggiore di scelte corrette.
Inoltre, attraverso il software Tobii Pro Lab, sono state generate delle mappe che permettono di approfondire meglio la comprensione dei meccanismi di attenzione selettiva attivati dalla comunicazione in-store. Le heatmap evidenziano come gli stimoli abbiano guidato lo sguardo dei partecipanti verso elementi specifici della comunicazione, favorendo la decodifica del messaggio sulle norme sociali dinamiche.
Le heatmap relative ai calpestabili (Figure 1-2-3) mostrano una concentrazione di fissazioni prevalentemente sulla parte superiore, in corrispondenza del claim "SCELGO + FIBRE". In particolare, nel calpestabile dei biscotti si osserva una maggiore intensità di sguardo sul testo, che sembrerebbe aver dunque svolto una funzione di anchor visivo. La dispersione minore di fissazioni sugli altri elementi decorativi conferma che il messaggio centrale è stato il principale driver dell'attenzione. Per quanto riguarda le heatmap dei crowner (Figure 5-6-7), quello delle merendine presenta la maggiore densità di fissazioni, con attenzione sia sul messaggio testuale superiore che sulla call-to-action centrale. Nel crowner dei biscotti, la presenza di fissazioni sul volto e sul prodotto che tiene in mano il soggetto può suggerire che l'elemento umano abbia contribuito a rendere la norma sociale più tangibile e identificabile, favorendo il processo di allineamento alle tendenze del gruppo di riferimento. Infatti, la visione di individui che mangiano cibi con espressioni edoniche, rispetto a espressioni neutre, aumenta le risposte positive verso i cibi sani e può avere un impatto sulla salienza del messaggio (Samson e Buijzen, 2020). Nel crowner dei cereali non sono presenti fissazioni, probabilmente dovuto al fatto che era posizionato in un punto in cui i partecipanti transitavano solo al termine della loro esperienza di spesa. I crowner delle merendine e dei biscotti erano invece disposti all'inizio, in modo quasi speculare.



Figura 1. *Calpestabili cereali*



Figura 2. *Calpestabili biscotti*



Figura 3. *Calpestabili merendine*



Figura 4. *Crowner cereali*

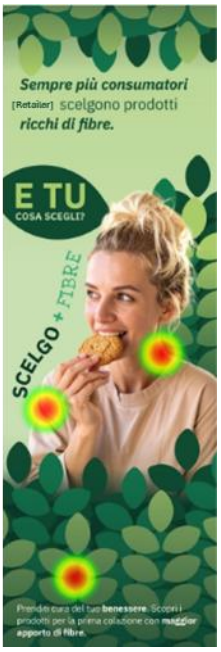


Figura 5. *Crowner biscotti*



Figura 6. *Crowner merendine*

Attraverso gli scan path (Figure 7-8) è invece possibile evincere le differenze nel percorso di scelta che i consumatori hanno adottato. Nel punto vendita di controllo, i partecipanti attuano un'esplorazione "bottom-up": lo scan path risulta fortemente guidato dalle caratteristiche visive dei packaging e da una scansione a "Z". Il percorso è caratterizzato da saccadi lunghe e frequenti incroci, segno di un processo di ricerca per tentativi ed errori in cui il consumatore deve processare singolarmente numerosi stimoli prima di identificare il prodotto target. Lo scan path nel punto vendita sperimentale mostra invece un percorso di ricerca più lineare. Lo sguardo viene "catturato" dalle reglettes e dagli stopper. Una volta agganciato il messaggio normativo, lo sguardo si muove successivamente verso i prodotti adiacenti. Le fissazioni sono più concentrate e ravvicinate, a dimostrazione del fatto che la comunicazione ha ridotto l'area di ricerca visiva, guidando il partecipante direttamente verso i prodotti corretti.



Figura 7. *Scanpath pv sperimentale*



Figura 8. *Scanpath pv controllo*

Research limitations. *Le limitazioni di questo studio risiedono innanzitutto nella numerosità campionaria di 52 partecipanti che, pur essendo adeguata a uno studio sperimentale con eye-tracking in ambiente reale, circoscrive la generalizzabilità dei risultati. Inoltre, l'utilizzo di una shopping mission simulata potrebbe aver parzialmente alterato i naturali processi decisionali, attenuando l'influenza delle abitudini di acquisto consolidate che solitamente guidano il*

consumatore nel punto vendita. Un ulteriore vincolo è rappresentato dalle differenze strutturali intrinseche dei punti vendita coinvolti; in particolare, la diversa dotazione di metri lineari nella categoria cereali potrebbe aver influenzato la visibilità dei prodotti e i tempi di ricerca indipendentemente dall'efficacia dell'intervento comunicativo. Lo studio si è inoltre focalizzato esclusivamente sui prodotti per la prima colazione e sul contenuto di fibre, non permettendo di estendere le conclusioni ad altri nutrienti o categorie merceologiche caratterizzate da driver d'acquisto differenti.

Managerial implications. *I risultati di questo studio possono offrire punti di riflessione per i retailer e i player industriali interessati a promuovere abitudini di acquisto più salutari attraverso strategie di Nutrition Shopper Marketing. In primo luogo, i risultati dimostrano che l'implementazione di iniziative di comunicazione basate su norme sociali dinamiche può essere una strategia efficace per rompere la shelf blindness e incrementare l'attenzione visiva verso prodotti dal miglior profilo nutrizionale. L'implementazione di queste strategie potrebbe migliorare la soddisfazione complessiva dell'esperienza di acquisto e la percezione di facilità nella ricerca. Inoltre, la riduzione degli errori di scelta osservata nel punto vendita sperimentale suggerisce che tali interventi semplificano il processo decisionale del consumatore, agendo come euristiche che riducono il sovraccarico informativo e contrastano l'affidamento esclusivo a elementi meno accurati come i colori o le immagini del packaging. Dal punto di vista strategico, l'utilizzo delle norme dinamiche permette di promuovere comportamenti ancora minoritari senza demotivare il consumatore, rendendo il cambiamento percepito come una tendenza socialmente approvata e in crescita.*

Originality of the paper. *Mentre numerosi studi hanno analizzato l'impatto delle norme sociali in contesti controllati o online, questa ricerca si distingue per l'applicazione di un esperimento in ambiente reale che integra la teoria delle norme dinamiche con l'analisi dei processi di scelta tramite la tecnologia dell'eye-tracking. Inoltre, a differenza di precedenti ricerche focalizzate prevalentemente sulla sostenibilità o sulla riduzione del consumo di carne, questo studio applica il framing normativo alla promozione di un nutriente specifico, la fibra, in categorie di prodotti spesso percepite come edonistiche (biscotti e merendine), offrendo nuove prospettive sulla capacità dei retailer di agire come agenti di promozione della salute delle persone. Infine, l'approccio integrato che combina dati di fissazione, performance di scelta corretta e metriche di soddisfazione del cliente fornisce una visione più completa dell'efficacia del nudge normativo.*

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Can Product Aggregation Facilitate the Identification of Healthy Options? An Eye-Tracking Field Experiment on Visual Attention and Search Efficiency

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Abstract. *L'incremento delle malattie croniche legato a regimi alimentari non salutari richiede un'urgente attenzione da parte di tutti gli attori della filiera alimentare. In particolare, il contributo dei retailers risulta prezioso, dato che la maggior parte delle decisioni d'acquisto viene presa in punto vendita. Tuttavia, l'efficacia degli interventi in store di marketing nutrizionale è spesso ostacolata dall'information overload, che compromette la capacità decisionale del consumatore davanti allo scaffale. Questo studio mira a valutare se l'aggregazione dei prodotti salutistici possa mitigare il sovraccarico informativo e facilitare la ricerca degli stessi. Attraverso un field experiment condotto in due punti vendita della Grande Distribuzione italiana, è stata testata l'efficacia dello space management e dell'in-store communication su un paniere di prodotti per la prima colazione a Marchio del Distributore (MDD). In particolare, in un punto vendita tutti i prodotti selezionati sono stati aggregati ed è stata installata un'iniziativa di comunicazione basata sul beneficio del gusto, mentre nell'altro punto vendita la stessa iniziativa di comunicazione è stata installata sui singoli prodotti, mantenuti disaggregati sul piano espositivo. La metodologia ha previsto l'impiego della tecnologia eye-tracking su un campione di 85 partecipanti per mappare i processi visivi e decisionali in condizioni ecologiche. I risultati indicano che l'aggregazione dei prodotti non solo aumenta significativamente la visibilità e l'efficacia percepita dell'iniziativa di comunicazione, ma riduce anche i tempi complessivi di ricerca e di scelta. Inoltre, l'aggregazione raddoppia l'attenzione visiva dedicata agli stimoli comunicativi e migliora sia la percezione di salubrità dello scaffale sia la soddisfazione complessiva dell'esperienza d'acquisto. Lo studio contribuisce al dibattito accademico sulla manovra delle leve di in-store nell'ambito del Nutrition Shopper Marketing, fornendo indicazioni manageriali utili per ottimizzare lo spazio di vendita in chiave salutistica, dimostrando come l'organizzazione dei prodotti possa agire da facilitatore cognitivo per il benessere del consumatore.*

Key words: *space management; nutrition marketing; in store communication; UTI; eye-tracking; field experiment.*

Framing of the research. *L'incremento delle malattie croniche osservato negli ultimi anni costituisce un tema di crescente gravità e rilevanza (GBD, 2018), alimentato in larga misura da regimi alimentari insalubri e stili di vita sedentari (GBD, 2019). Diventa dunque imprescindibile l'adozione di strategie preventive volte al miglioramento del benessere collettivo, attraverso degli interventi sull'alimentazione degli individui e sul comportamento degli stessi. Coerentemente con questa necessità, i retailer hanno adottato negli anni un ruolo attivo, implementando diverse strategie di marketing nutrizionale come, ad esempio, attraverso l'ampliamento dell'assortimento con nuove linee di MDD salutistiche o manovrando le leve di in-store marketing. Tuttavia, la comprensione dei messaggi legati alla salute che sono comunicati in punti vendita è spesso ostacolata dall'eccessiva esposizione informativa a cui è sottoposto il consumatore. Il cosiddetto "information overload" può infatti compromettere il processo decisionale (Toffler, 1970), poiché una sovrabbondanza di stimoli riduce la capacità di analisi razionale dell'individuo (es. Toffler, 1970). La letteratura evidenzia, infatti, come l'aumento delle opzioni di scelta possa generare confusione e decisioni meno soddisfacenti e subottimali (Jacoby et al., 1974; Jacoby, 1977; Iyengar & Lepper, 2000). Quando un consumatore valuta la scelta di un prodotto, deve elaborare molteplici variabili, compiendo un compito che richiede non solo tempo per il reperimento delle informazioni, ma anche uno sforzo cognitivo per sintetizzarli in un giudizio di valore (es. Russo, 1981). A tal proposito, data la scarsità di risorse temporali e cognitive durante la spesa (es. Hoyer, 1984), l'organizzazione dei prodotti a scaffale diventa essenziale nel guidare l'elaborazione delle informazioni (Lamberton & Diehl, 2013). Lo space management si configura dunque come una leva strategica (Kim & Moon, 2021) per orientare le preferenze (Pechey et al., 2020; Arno & Thomas, 2016) e stimolare gli acquisti non pianificati (Sorensen, 2003).*

Diversi autori (es. Dulsrud & Jacobsen, 2009; Chandon et al., 2009; Stilley et al., 2010) concordano sul fatto che la visibilità - intesa come quantità e qualità dello spazio espositivo assegnata ai prodotti - sia un driver fondamentale dell'acquisto (Bayley & Nancarrow, 1998; Inman et al., 2009; Muruganantham & Bhakat, 2013; Wilson et al., 2016; Cadario & Chandon, 2017). Tuttavia, l'analisi dell'efficacia delle diverse tecniche di space management nel contesto del marketing nutrizionale ha riportato risultati contrastanti. Ad esempio, sebbene Liu et al. (2018) abbiano osservato un aumento delle vendite di prodotti sani nelle testate di gondola, tale effetto svaniva se nelle vicinanze venivano collocati prodotti meno salutari. Analogamente, Young et al. (2020) non hanno riscontrato variazioni significative nelle vendite posizionando i prodotti salutari ad altezza occhi. Altri studi, come quello di Adam et al. (2017) o di de Wijk et al. (2016), hanno mostrato impatti limitati o nulli sulle vendite complessive della categoria, nonostante le manipolazioni volte a

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migliorare la visibilità dei prodotti. Al contrario, sono emersi risultati positivi posizionando, ad esempio, le bevande più salutari nelle testate di gondola (Nakamura et al., 2014) o rimuovendo gli snack dolci dalle avancasse (Baird et al., 2018). Trude et al. (2018) hanno inoltre dimostrato che l'aumento dello spazio per gli snack e le bibite senza zucchero, supportato dalla sinergia di altre leve, come la comunicazione e le promozioni, può favorire la scelta di prodotti meno calorici. La letteratura suggerisce quindi che, nella promozione della corretta alimentazione in punto vendita, sia più efficace integrare diverse leve di in-store marketing in modo sinergico (es. Graziano et al., 2025). Nonostante la letteratura esistente concordi sull'importanza della leva dello space management, rimangono inesplorati i meccanismi cognitivi che guidano le scelte salutari del consumatore davanti allo scaffale. Gli studi precedenti si sono focalizzati prevalentemente sulle performance di vendita, pur riportando risultati spesso divergenti (Liu et al., 2018; Young et al., 2020). Mancano dunque delle evidenze su come il "blocking" a scaffale dei prodotti salutari possa mitigare il sovraccarico informativo e facilitare attivamente la ricerca visiva.

Per tali ragioni, questo studio intende valutare l'effetto combinato della manovra della leva dello space management e della comunicazione in store. Per farlo, è stato implementato un esperimento in ambiente reale - ancora in corso - in due ipermercati appartenenti alla stessa insegna. In un punto vendita (PV1) i prodotti MDD salutistici sono stati aggregati sul piano espositivo, mentre nell'altro (PV2) sono stati mantenuti disaggregati. In entrambi gli ipermercati è stata implementata un'iniziativa di in-store communication basata sul beneficio del gusto. Si è deciso di comunicare il beneficio del gusto perché, nelle decisioni che riguardano i prodotti alimentari, le aspettative sensoriali giocano un ruolo determinante ai fini della scelta del prodotto (Saba et al., 2019; Roininen et al., 1999). È noto, infatti, che i consumatori spesso associno il concetto di "salutare" a una minore palatabilità, secondo l'"Unhealthy = Tasty Intuition" (UTI) (Mai & Hoffmann, 2015; Raghunathan et al., 2006; Erhard et al., 2024; Piqueras-Fiszman & Spence, 2015; Saba et al., 2019; Teisl & Levy, 1997). Tuttavia, è possibile modificare tale percezione attraverso messaggi che stimolino aspettative positive sul sapore (Wansink, 2017; Steptoe et al., 1995).

Alla luce di quanto riportato sopra, si ipotizza che:

H1: *L'aggregazione dei prodotti rende più visibile l'iniziativa di comunicazione.*
H2: *L'aggregazione dei prodotti migliora l'efficacia percepita dell'iniziativa di comunicazione.*
H3*: La soddisfazione dell'esperienza di spesa è maggiore nel punto vendita con l'aggregazione.*
H4: *L'aggregazione dei prodotti genera una maggiore attenzione visiva rispetto alla disaggregazione.*
H5: *L'aggregazione dei prodotti aumenta la percezione di salubrità dello scaffale.*
H6: *L'aggregazione dei prodotti riduce i tempi di ricerca dei prodotti salutari per la prima colazione.*
H7: *L'aggregazione dei prodotti facilita la ricerca dei prodotti salutari per la prima colazione.*

Purpose of the paper. *Lo scopo di questa ricerca è quello di valutare l'impatto della gestione strategica dello spazio espositivo, in combinazione con l'iniziativa di comunicazione in-store, sull'orientamento dei consumatori verso scelte alimentari più salutari. In particolare, lo studio mira a verificare se l'aggregazione dei prodotti a scaffale sia in grado non solo di massimizzare l'efficacia della comunicazione in-store, ma anche di aumentare la visibilità dell'iniziativa stessa. Inoltre, la ricerca si propone di verificare se l'aggregazione dei prodotti salutari sia in grado di elevare la percezione di salubrità dello scaffale, di facilitare la ricerca dei prodotti salutari e di diminuire i tempi di ricerca. Questo studio intende mappare i processi visivi e decisionali dei consumatori attraverso l'impiego della tecnologia di eye-tracking, fornendo ai retailer insights per gestire lo spazio nei punti vendita in chiave di marketing nutrizionale.*

Methodology. *In due punti vendita appartenenti a una grande catena della distribuzione italiana, è stata implementata un'iniziativa di comunicazione in store basata sul gusto che ha coinvolto un paniere di prodotti salutari della prima colazione della MDD, in particolare cereali, biscotti e merendine, scelti in base ai loro valori nutrizionali. In un punto vendita (PV1) i prodotti sono stati aggregati, mentre nell'altro (PV2) sono stati mantenuti disaggregati. L'iniziativa di comunicazione ha impiegato diversi supporti di comunicazione, quali crowner, calpestabili, reglette e stopper.*

Al fine di testare l'efficacia dell'iniziativa, è stato condotto uno studio di eye-tracking con gli occhialini Tobii Pro Glasses 3. Questo strumento permette infatti di monitorare i movimenti oculari, che sono indicatori dell'acquisizione informativa e dei meccanismi di elaborazione subconscia (Bartels et al., 2018). Mappando la sequenza e la persistenza dello sguardo, è possibile infatti identificare gli stimoli effettivamente rilevati, che sono il presupposto necessario affinché l'individuo possa elaborare l'informazione (Becker et al., 2015). L'utilizzo degli occhialini ha inoltre garantito la raccolta delle fissazioni e delle saccadi in condizioni ecologiche, preservando quindi la naturalezza del comportamento d'acquisto.

A ciascun partecipante è stata data la stessa shopping mission, ovvero l'acquisto (fittizio) di: "un pacco di cereali MDD sani e gustosi", "un pacco di merendine MDD sane e gustose" e "un pacco di biscotti MDD sani e gustosi". Il campione consta di 85 partecipanti (43 nel PV1 e 42 nel PV2) ed è composto come indicato nella Tabella 1.

Al termine della simulazione di spesa, ai partecipanti è stato somministrato un breve questionario, misurando attraverso scale Likert a 7 punti la salubrità percepita dello scaffale (Van Kleef et al., 2012; $\alpha = .727$), la facilità di ricerca nello scaffale (Bauer et al., 2012 $\alpha = .879$), l'efficacia percepita della comunicazione (Kim & Lakshmanan, 2015; Lehnert et al., 2014; $\alpha = .801$) e la soddisfazione dell'esperienza d'acquisto simulata (Van Ittersum et al., 2013; dove 1 = "per niente soddisfatto" e 7 = "molto soddisfatto").

Tabella 1. Composizione del campione

Sociodemografiche							
Complessivo							
Genere		***Età***					
Donne	*54%*	***18 - 24***	*17%*	***35 - 44***	*10%*	***55 - 64***	*19%*
Uomini	*46%*	***25 - 34***	*21%*	***45 - 54***	*19%*	***65+***	*13%*
PV1							
Genere		***Età***					
Donne	*60%*	***18 - 24***	*16%*	***35 - 44***	*12%*	***55 - 64***	*19%*
Uomini	*40%*	***25 - 34***	*14%*	***45 - 54***	*26%*	***65+***	*14%*
PV2							
Genere		***Età***					
Donne	*48%*	***18 - 24***	*17%*	***35 - 44***	*9%*	***55 - 64***	*20%*
Uomini	*52%*	***25 - 34***	*28%*	***45 - 54***	*13%*	***65+***	*13%*

Results. *I dati raccolti attraverso l'eye-tracker e il questionario post esperimento sono stati elaborati attraverso il software Tobii Pro Lab e IBM SPSS. Per testare H1, è stato chiesto ai partecipanti se avessero notato l'iniziativa di comunicazione durante la loro esperienza di spesa simulata. Conducendo un t-test a campioni indipendenti, è risultato che l'iniziativa di comunicazione non solo è stata notata maggiormente nel punto vendita con l'aggregazione (Magg = .70; Mdis = .24; p < .001), ma anche l'efficacia percepita dell'iniziativa è risultata maggiore (Magg = 6.00; Mdis = 4.80; p < .001). Sia H1 che H2 sono dunque confermate. Inoltre, seppure i partecipanti abbiano riportato un alto grado di soddisfazione per l'esperienza d'acquisto in entrambi i punti vendita, nel punto vendita con l'aggregazione è stata significativamente maggiore (Magg = 6.91, Mdis = 6.48; p = .001). H3 è quindi confermata. Per testare H4, è stato condotto un t-test a campioni indipendenti sulle fissazioni, ovvero il numero totale di volte che l'occhio si è fermato su un'area specifica (in questo caso sulla comunicazione), e sul dwell time, ovvero la somma totale del tempo passato a guardare quell'area. Attraverso le fissazioni è infatti possibile misurare il coinvolgimento e la salienza visiva del partecipante verso lo stimolo (es. Pomaranski et al., 2021), mentre attraverso il dwell time è possibile misurare l'interesse e l'elaborazione cognitiva (es. Isomoto et al., 2023). Sia per quanto riguarda il numero medio di fissazioni (Magg = 571.67, Mdis = 250.64; p = .003), sia per il dwell time medio (Magg = 179.30 Mdis = 73.86; p<.001), i valori nel punto vendita con l'aggregazione significativamente sono più alti rispetto al disaggregato. Di conseguenza, possiamo accettare H4. Per quanto riguarda H5, la percezione di salubrità dello scaffale è risultata significativamente maggiore nel punto vendita con l'aggregazione (Magg = 5.75, Mdis = 4,82; p = .002). H5 è quindi confermata. Per testare H6, è stato cronometrato, attraverso l'ausilio degli occhiali eyetracking, il tempo impiegato (in secondi) dai partecipanti dall'inizio alla fine della simulazione d'acquisto. Eseguendo un t-test a campioni indipendenti, è risultato che nel punto vendita con l'aggregazione i partecipanti hanno complessivamente speso meno tempo rispetto al punto vendita disaggregato, sia considerando il tempo speso per la scelta nelle singole categorie di prodotto, sia per il tempo complessivo. Tuttavia, a livello statistico è risultata significativa la differenza solo nel tempo complessivo (Magg = 157, 74; Mdis = 193, 01; p = .014). H6 è dunque confermata. È stato anche chiesto ai partecipanti un parere sulla facilità di ricerca dei prodotti salutari per la prima colazione nello scaffale, che è risultata maggiore nel punto vendita con l'aggregazione (Magg = 6.22, Mdis = 5,17; p <.001). Possiamo dunque accettare H7.*

Sono state anche generate delle heatmap sui materiali di comunicazione in entrambi i punti vendita (Figure 1a-6c).



Figura 1a. *Bandiera cereali*



Figura 1b. *Bandiera biscotti*



Figura 1c. *Bandiera merendine*



Figura 2a. *Calpestabile cereali*



Figura 2b. *Calpestabile biscotti*



Figura 2c. *Calpestabile merendine*



Figura 3a. *Crowner cereali*



Figura 3b. *Crowner biscotti*



Figura 3c. *Crowner merendine*



Figura 4a. *Aggregazione cereali*



Figura 4b. *Aggregazione cereali*



Figura 4c. *Aggregazione cereali*



Figura 5a. *Aggregazione biscotti*



Figura 5b. *Aggregazione biscotti*



Figura 5c. *Aggregazione biscotti*



Figura 6a. *Aggregazione merendine*



Figura 6b. *Aggregazione merendine*



Figura 6c. *Aggregazione merendine*

Nel punto vendita dove i prodotti sono disaggregati, le heatmap dei calpestabili (Figure 2a-c) mostrano una forte concentrazione visiva sull'elemento testuale centrale e sul claim legato al gusto. In particolare, l'area rossa si focalizza sulla promessa del gusto. Nei crowner (3a-c) l'attenzione è più articolata: oltre al testo, vi sono delle fissazioni sulle immagini edonistiche dei prodotti. Le heatmap relative allo scaffale aggregato (Figure 4a-c, 5a-c, 6a-c) mostrano invece un pattern di esplorazione visiva differente. Mentre per la disaggregazione l'attenzione è più focalizzata in determinati punti, nell'aggregazione l'attenzione è più distribuita.

Attraverso gli scan path della disaggregazione (Figure 8a-c) e dell'aggregazione (Figure 9a-c), è possibile notare la differenza nei percorsi di ricerca che i partecipanti hanno attuato.



Figura 8a. *Scan path cereali (disaggrezione)*



Figura 8b. *Scan path biscotti (disaggrezione)*



Figura 8c. *Scan path merendine (disaggrezione)*



Figura 9a. *Scan path biscotti (aggregazione)*



Figura 9b. *Scan path merendine (aggregazione)*



Figura 9c. *Scan path cereali (aggregazione)*

Gli scan path relativi alla disaggregazione appaiono estremamente densi, con un numero elevato di fissazioni distribuite su un'area molto vasta. Questo indica che il consumatore è costretto a un'analisi prodotto per prodotto. L'occhio deve quindi processare ogni singolo stimolo per discriminare tra prodotti sani e non sani. L'elevata numerosità delle saccadi e i frequenti cambiamenti di direzione dello sguardo indicano invece un alto sforzo visivo. Al contrario, gli scan path dell'aggregazione appaiono più lineari. La minore densità di fissazioni indica una maggiore efficienza nella ricerca: questo perché, una volta identificato la sezione dedicata ai prodotti salutari, l'area di ricerca si restringe immediatamente.

Research limitations. *Questa ricerca presenta alcune limitazioni che aprono interessanti prospettive per ricerche future. In primo luogo, la ricerca si è concentrata sui prodotti per la prima colazione (cereali, biscotti e merendine). Sarebbe dunque interessante testare la strategia di aggregazione in altre categorie merceologiche per verificarne la trasversalità. Un ulteriore spunto di indagine riguarda l'approfondimento dell'impatto emotivo e dei livelli di stress: alcuni fattori, come la presenza di altri acquirenti, potrebbero infatti alterare i processi decisionali osservati in condizioni sperimentali. Inoltre, seppur la numerica del campione raccolto sia in linea con gli studi di eye-tracking, la dimensione dello stesso limita la generalizzabilità dei risultati; studi futuri potrebbero ampliare il numero di partecipanti al fine di fornire una maggiore solidità statistica. Un altro limite risiede nel fatto che questa ricerca si è concentrata esclusivamente sui prodotti MDD; pertanto, sarebbe opportuno testare la strategia di aggregazione includendo brand industriali. Infine, la natura della "shopping mission" fittizia potrebbe aver indotto i partecipanti a una ricerca più razionale rispetto a una spesa quotidiana. I prossimi step di questo studio consisteranno nel replicare lo studio in un punto vendita di controllo, al fine di approfondire l'efficacia della comunicazione in forma disaggregata che, seppur si sia dimostrata meno efficace rispetto alla sinergia della stessa con la leva dello spazio, è possibile che risulti comunque più utile nel guidare le scelte rispetto a una condizione che non preveda alcun facilitatore di scelta.*

Managerial implications. *Le implicazioni manageriali emerse dallo studio suggeriscono che i retailer e i player dell'industria alimentare dovrebbero implementare una gestione strategica dello spazio espositivo come leva cardine del marketing nutrizionale per orientare i consumatori verso scelte alimentari più sane. L'aggregazione dei prodotti salutistici si configura come una strategia efficace per semplificare il processo di ricerca e ridurre lo sforzo cognitivo richiesto durante l'acquisto, mitigando così gli effetti negativi del sovraccarico informativo, che spesso caratterizza il punto vendita. La ricerca dimostra inoltre come la sinergia tra la manovra dello space management e la comunicazione in-store aumenti la salienza visiva e l'interesse verso l'iniziativa. Tale approccio non solo eleva la percezione di salubrità dell'intero scaffale e facilita l'identificazione delle opzioni più sane, ma ottimizza anche l'efficienza decisionale, riducendo i tempi di ricerca e incrementando la soddisfazione complessiva dell'esperienza di spesa. Dato che la maggior parte delle scelte avviene ancora all'interno del punto vendita, la manovra strategica di queste leve offre dunque ai retailer l'opportunità di assumere un ruolo attivo nella prevenzione delle malattie croniche legate a regimi alimentari insalubri. Facilitando acquisti nutrizionalmente più consapevoli, infatti, i retailer possono agire come un agente di cambiamento, migliorando il benessere dei consumatori e facilitando l'accesso a stili di vita più salutari.*

Originality of the paper. *L'originalità di questa ricerca risiede nell'approccio che integra lo space management e la comunicazione in store focalizzata sul gusto, in chiave di marketing nutrizionale. Sebbene sia noto come l'eccesso di stimoli nel punto vendita possa generare un sovraccarico informativo in grado di compromettere la capacità decisionale del consumatore (Toffler, 1970; Jacoby et al., 1974), meno indagato è il ruolo che la gestione dello spazio può avere nell'influenzare le scelte di prodotti salutari in punto vendita. Testando l'efficacia dell'aggregazione espositiva dei prodotti per la prima colazione a valenza salutistica, questo studio contribuisce al dibattito accademico, oggi caratterizzato da risultati contrastanti tra chi rileva un aumento delle vendite di prodotti sani grazie al posizionamento dei prodotti (es. Nakamura et al., 2014) e chi non riscontra impatti significativi (es. Young et al., 2020). Attraverso l'impiego dell'eye-tracking, la ricerca analizza se tale strategia, unita a una comunicazione che prova a sfidare il pregiudizio dell'UTI (Raghunathan et al., 2006; Mai & Hoffmann, 2015), possa facilitare l'identificazione dei prodotti e migliorarne la percezione di salubrità. L'impiego di questa tecnologia ha permesso di affermare che l'aggregazione riduce la complessità della ricerca dei prodotti, non solo riducendo i tempi medi dell'esperienza di spesa, ma anche raddoppiando l'attenzione visiva (fissazioni e Dwell Time) dedicata agli stimoli. Inoltre, a differenza degli studi condotti in laboratorio, questa ricerca offre un contributo attraverso un esperimento in ambiente reale, in condizioni ecologiche, dimostrando che una gestione strategica della leva dello spazio, in sinergia con la comunicazione in-store, può migliorare la soddisfazione dell'esperienza di spesa e la facilità di scelta di prodotti salutari.*

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Do shopping behaviors change the importance of store attributes? Evidence from the French grocery market.

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Abstract. *This research examines whether behavioral shopping repertoires shape the importance that consumers assign to grocery store attributes. We propose that shopping behavior — defined by primary format destination and repertoire breadth — predicts attribute importance profiles more strongly than socio-demographic variables. The analysis draws on survey data from 725 grocery shoppers in the Alpes-Maritimes department (French Riviera). Exploratory factor analysis of 13 store attributes yields four dimensions: 'Store Experience and Service,' 'Product Quality and Assortment,' 'Convenience and Proximity,' and 'Price and Promotion Sensitivity.' Six behavioral consumer segments are identified from primary format destination and format variety. Multivariate analysis of variance confirms significant differences across all four attribute dimensions between segments, with the price-sensitivity gradient producing the largest and most consistent effect. A particularly notable finding concerns Premium Destination Shoppers, who record the lowest convenience and proximity score of all segments — a pattern that persists in the multinomial logistic regression after controlling for actual travel distance and socio-demographic variables, suggesting that reduced accessibility sensitivity in this segment reflects a structural evaluative difference rather than geographic adaptation. Overall, the results indicate that behavioral repertoire provides stronger discriminatory power over attribute importance than demographics alone.*
Keywords: *grocery retailing; store attributes; behavioral segmentation; retail format choice; multi-format markets; consumer typology; store attribute importance*

Framing of the research. One of the most prominent paradigms in understanding the decision to choose a grocery store has been based on a standard research methodology in which respondents rate the importance of store attributes when deciding where to go shopping. Woodside and Trappey (1992) point out that consumers are likely to choose a store or brand by linking the store to some attributes, while Carpenter and Moore (2006) provided the benchmark for store attribute ratings in the US by conducting a survey among 454 grocery shoppers across five different store formats. They identified cleanliness, product selection, price competitiveness, and courtesy of personnel as the attributes that were most consistently linked to store format, while socio-demographic variables were linked positively to shopping in supercenters. Pan and Zinkhan (2006) furthered the research in an international context across different decades by conducting a meta-analysis of 45 studies. They found that assortment size and quality, price, service, store atmosphere, and convenient location were the primary determinants of store patronage in different contexts. They further found that demographic variables had only a modest impact on store choice. In the European context, Nilsson et al. (2015a) conducted a survey among 1,575 Swedish consumers. They used principal component analysis on an extensive range of store attributes. They distinguished between attractiveness and accessibility attributes. They found that car accessibility was the most important attribute overall, contradicting the findings in the US that emphasized product and service dimensions, showing us that the importance of attribute categories depends also on the market context.

However, these contributions have a structural limitation in common that has not received sufficient attention. They all treat attribute importance ratings as population means or via socio-demographic groups, averaging over respondents in a way that masks the variety of consumer motivations. Such an aggregation assumption may have been justifiable in a grocery retail environment where only a limited number of competing models existed; however, in the contemporary European environment where hard discounters, regular supermarkets/hypermarkets, organic and specialty stores, open-air markets, and convenience stores all compete at the same time with strongly differing value propositions, the notion of averaging over consumer segments in terms of attribute importance starts to become problematic, especially when the grocery market is segmented along several store choice dimensions. A systematic review of the subsequent empirical literature on format competition by Bonfrer et al. (2022) reinforces this idea, finding that the drivers of format choice extend across price, location, and assortment dimensions in ways that aggregate measurement frameworks struggle to capture.

A parallel research stream has approached consumer heterogeneity from the behavioral side, constructing typologies based on where and how consumers shop. Since the foundational work of Stone (1954) we found that there exist different types of shoppers defined along social dimensions and behaviors. Fox et al. (2004) proved that the volume of consumer spending in different formats is more responsive to differences in assortment and promotional activity than to price differences. Moreover, the influence of demographic factors on the heterogeneity of spending in different formats is limited. This again emphasizes the need to consider behavioral factors to explain the differences in the spending patterns of various consumers on different formats. In the same vein, Sinha and Banerjee (2004) found that store selection behavior is a result of complex motivational factors that cannot be explained through the help of demographic factors in a changing marketplace.

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Reutterer and Teller (2009) showed that the type of trip indeed moderates the preference for the format, such that major shopping trips generate higher consumer utility for discount stores and hypermarkets, while supermarkets perform better in the case of fill-in trips. Moreover, the study by Luceri and Latusi (2012) supported the notion that repertoire breadth indeed represents a significant behavioral variable, which is mainly determined by the market structure in terms of the number of formats available and consumers' general perception of the shopping activity. Finally, Nilsson et al. (2015b), using the combination of format and trip types in the Swedish data, identified a typology of five segments: Planning Suburbans, Pedestrians, Social Shoppers, City Dwellers, and Flexibles; and showed that behavioral segments differ in socio-demographic variables. The above studies suggest that a more differentiated behavioral typology, which considers primary format orientation in more than two categories and repertoire breadth as a continuous criterion, would reveal profiles of attribute importance that remain undetected by the existing aggregate measures and by studying simply the socio-demographic characteristics of the consumers.

Purpose of the paper. What is left unexplored and what this current study address is the development of behavioral consumer typology and then an evaluation of whether these types vary in terms of their structure along a multi-dimensional attribute importance dimension. Nilsson et al. (2015a, 2015b) recognized this as an issue to be explored and proposed that research should investigate if the behavioral format orientation changes the attribute importance ratings of consumers; however, their own attempt at this issue, with a focus on a binary format taxonomy distinguishing between supermarkets and convenience stores, is not sufficient to capture the full range of formats present in modern European retail markets. So, following Nilsson et al. (2015a), our research question is the following:

RQ. Do store attribute importance ratings differ systematically across consumers who primarily shop in different grocery store formats?

A further question concerns the robustness of these differences to socio-demographic controls. Attribute importance profiles may simply reflect the demographic composition of each behavioral segment rather than representing an independent dimension of consumer heterogeneity. To address this, a multinomial logistic regression estimates the contribution of each attribute dimension to segment membership after controlling for age, income, education, household type, travel distance, and shopping time. This allows us to assess whether behavioral format orientation and attribute orientation carry independent explanatory power, or whether their observed association is fully mediated by underlying demographic variables.

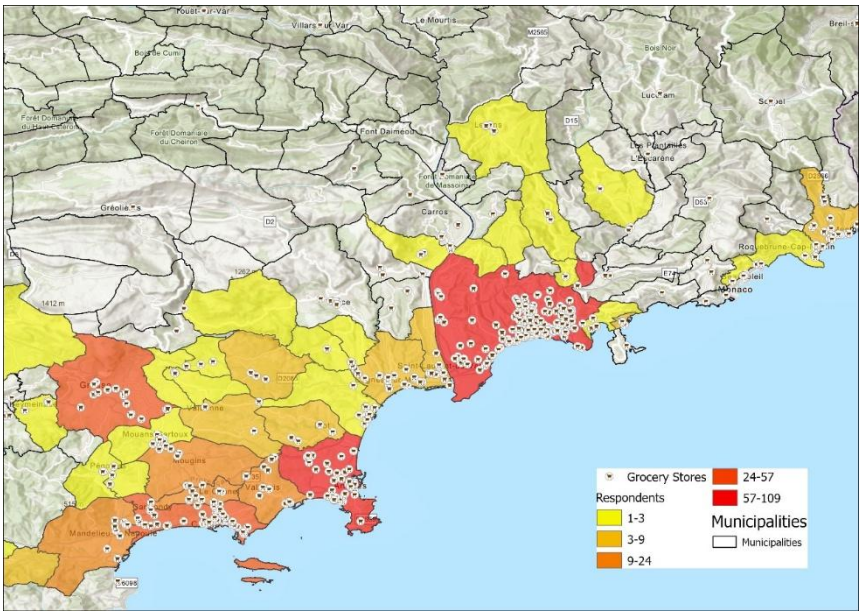
Methodology. Data were collected through a structured questionnaire given to grocery shoppers in the Alpes-Maritimes department (French Riviera) from October 2025 to January 2026. The final sample included 725 respondents from 60 municipalities, collected through a combination of offline and online panels. The department can be conceived of as an ecologically valid setting for this study, with an exceptional diversity of retail formats.

The range of formats includes all the large mainstream supermarkets and hypermarkets of France (Carrefour, Casino, Leclerc, and Intermarché), hard-discount retailers (Aldi, Lidl, and Netto), specialty stores, traditional delicatessens and daily open-air markets. The heterogeneity of formats ensures that the behavioral segmentation dimensions used in this study, namely, primary format destination and repertoire breadth, will display substantial discriminatory power.

The sample used in this study is generally representative of the population of the department but slightly overrepresents the younger and better-educated population than the departmental census. More than 47% of the sample was 35 years old or younger, and 69% held a university-level educational degree. The questionnaire used for data collection consisted of three substantive sections. The first section of the questionnaire collected sociodemographic data, including nationality, age, educational level (four categories: lower than high school, high school, bachelor's degree, and master's degree or higher), household income (six income categories), household type, employment status, and car availability. The second module of the questionnaire focused on behavioral shopping habit data. Here, respondents indicated the categories of store formats and brands they normally frequent. The number of distinct store locations visited within a week was also recorded. The logistics of shopping trips, including the initiation point of the shopping trip (respondents could select multiple options; home on foot, 43%; home by car, 63%; directly from work, 19%; via Internet with home delivery, 7%; via Internet with drive-through collection, 10%), distance traveled to the store (categories for walking and driving), and time spent in the store (ranging from 0 to over 45 minutes), were also recorded.

The third module involved evaluating the relative importance of 13 attributes of stores using five-point Likert scales, with 1 indicating ‘not at all important’ and 5 indicating ‘extremely important.’ The attributes were based on benchmarks of Carpenter & Moore (2006) and Nilsson et al. (2015), which were then refined in collaboration with a leading grocery retailer to validate their business importance. The attributes include price competitiveness, promotional offers, quality of products, variety of products, private label products, proximity to home or work, hours of operation, cleanliness, helpfulness of staff, parking facilities, atmosphere of the store, speed of checkout, and convenience of the store. The relative importance of these attributes was analyzed using principal component factor analysis with orthogonal rotation (varimax) (n = 722 after listwise deletion of missing responses). The Kaiser-Meyer-Olkin measure of sampling adequacy was .81, and Bartlett’s test of sphericity was significant, indicating factorability of the data. Four factors were extracted based on the Kaiser criterion, retaining factors with eigenvalues of 1 or higher (4.73, 1.60, 1.14, 1.03), supported by inspection of the scree plot. The factors accounted for a cumulative percentage of 65.4 of the total variances.

Figure 1 - Map of Alpes Maritimes with Respondents and Store Locations



Subsequently, six segments of behavioral consumers were developed by combining two behavioral variables: variety of formats (the quantity and variety of visited stores during the week) and primary format destination. Segments were created in descending order of premium orientation, with one additional segment for online shoppers: (1) Premium Destination Shoppers (PDS): primary store is a specialty or organic store; (2) Premium Cross-Format Explorers (PCFE): primary store is not a specialty, but at least one premium format is present in repertoire, with variety of formats ≥2; (3) Supermarket Loyalists (SL): primary store is a mainstream supermarket or hypermarket, no premium formats, variety of formats =1; (4) Mainstream Value Mix (MVM): primary store is mainstream, no premium formats, variety of formats ≥2; (5) Discount-Led Value Seekers (DLVS): primary store is a hard discount; (6) Online Lovers (OL): primary shopping channel is online. Multivariate analysis of variance (MANOVA) was conducted to examine differences among segments for the four attribute factors. Subsequently, univariate ANOVAs and Bonferroni post hoc tests were conducted. Finally, a multinomial logistic regression (baseline category: Supermarket Loyalists) predicted segment membership from the four factor scores together with age, income, education, household type, travel distance, and typical shopping time, to assess the independent contribution of attribute orientation to format behavior after demographic controls.

Results. The exploratory factor analysis yields four clear and interpretable dimensions (Table 1). The first factor, Store Experience & Service, captures in-store service quality and operational efficiency, including atmosphere, staff helpfulness, checkout speed, store quickness, cleanliness, and parking facilities. Notably, parking loads within this factor rather than within accessibility, suggesting that in the local market it is perceived as a service facility rather than a pure location attribute. The second factor, Product Quality & Assortment, reflects the breadth and perceived quality of the product offering, including product variety, product quality, and private-label range. The third factor, Convenience & Proximity, captures traditional spatial and temporal accessibility attributes, primarily proximity to home/work and opening hours. Finally, the fourth factor, Price & Promotion Sensitivity, groups price competitiveness and promotional offers as a distinct dimension of store evaluation. Overall, the factor structure closely aligns with prior research on grocery store attributes while cleanly separating experiential, assortment, convenience, and price-related dimensions.

Table 1. Factor structure: rotated loadings and variance explained (varimax rotation, n = 722)

Attribute item	F1 Experience	F2 Quality	F3 Convenience	F4 Price
Store atmosphere	.78			
Staff helpfulness	.76			
Checkout speed	.72			
Store quickness	.67			
Cleanliness	.65			
Parking facilities	.61			
Product variety		.75		

Product quality		.71		
Private-label range		.64		
Proximity to home/work			.82	
Opening hours			.77	
Promotional offers				.88
Price competitiveness				.87
Variance explained (%)	**24.5**	**14.4**	**13.5**	**13.1**
Cumulative (%)	**24.5**	**38.8**	**52.3**	**65.4**

Note. Loadings < .50 hidden for clarity. Total variance explained = 65.4%. KMO = .81; Bartlett $\chi^2(78) = 3291.26$, $p < .001$.

Then, six behavioral segments are built from the behavior-based classification (Table 2). The two largest groups are Premium Cross-Format Explorers (35.3%) and Mainstream Value Mix shoppers (25.1%), together accounting for over 60% of the sample and highlighting the prevalence of multi-format grocery shopping in the Alpes-Maritimes market. Supermarket Loyalists (21.8%) represent the traditional single-format grocery shopper anchored in mainstream supermarkets. Two smaller segments occupy the extremes of the price–experience spectrum: Discount-Led Value Seekers (7.7%), strongly oriented toward price, and Premium Destination Shoppers (6.1%), whose primary destinations are specialty or organic stores. Finally, Online Lovers (4.0%) form the smallest group and rely primarily on digital grocery channels.

Socio-demographic differences across segments are generally modest. Age shows the strongest association, with Premium Destination Shoppers skewing older, while discount-oriented segments tend to be overrepresented among lower-income households. Overall, however, demographic variables explain only limited variation, reinforcing the idea that behavioral repertoires capture dimensions of consumer heterogeneity not fully reflected by demographics alone.

Table 2. Behavioral consumer segments: size, construction criteria, and key behavioral features

Segment	n (%)	Construction criteria	Key behavioral features
Premium Destination Shoppers (PDS)	44 (6.1%)	Primary: specialty/organic store	High scores in F1 (Experience) & F2 (Quality). Low scores in F3 (Convenience) & F4 (Price)
Premium Cross-Format Explorers (PCFE)	256 (35.3%)	Primary: non-specialty; ≥1 premium format in repertoire; ≥2 formats	High score in F2 (Quality). Low score in F4 (Price)
Supermarket Loyalists (SL)	158 (21.8%)	Primary: mainstream; no premium formats; 1 format only	Low Score in F2 (Quality)
Mainstream Value Mix (MVM)	182 (25.1%)	Primary: mainstream; no premium formats; ≥2 formats	Low scores in F1 (Experience) & F2 (Quality). High scores in F3 (Convenience) & F4 (Price)
Discount-Led Value Seekers (DLVS)	56 (7.7%)	Primary: discount store	Low scores in F1 (Experience) & F2 (Quality). High scores in F4 (Price)
Online Lovers (OL)	29 (4.0%)	Primary: online channel	High scores in F1 (Experience)

Note. Segment construction based on primary format destination, presence of premium formats in repertoire, and format variety (distinct format count). Chi-square tests: age $\chi^2(30) = 130.15$, $p < .001$; income $\chi^2(30) = 67.70$, $p < .001$; education $\chi^2(15) = 23.78$, $p = .069$ (ns).

The MANOVA test confirms that the six behavioral segments differ significantly across the four attribute dimensions. Univariate ANOVAs indicate significant between-group differences for all factors: Store Experience & Service, Product Quality & Assortment, Convenience & Proximity, and Price & Promotion Sensitivity. Effect sizes are modest to moderate, which is consistent with the exploratory nature of the segmentation and the expected heterogeneity within behavioral groups. Mean standardized factor scores by segment are reported in Table 3.

Price & Promotion Sensitivity (F4) follows the behavioral gradient most clearly. Premium Destination Shoppers (PDS) display the lowest price orientation, followed by Premium Cross-Format Explorers (PCFE), Supermarket Loyalists (SL), while Discount-Led Value Seekers (DLVS) and Mainstream Value Mix (MVM) shoppers show the highest score. Post-hoc comparisons confirm that PDS differ significantly from all other segments, while PCFE also differ significantly from the more price-oriented MVM and DLVS groups. This strong alignment between primary store format and price sensitivity provides a clear validation of the behavioral segmentation: price orientation emerges as the main dimension distinguishing premium-oriented shoppers from discount-driven consumers.

Store Experience & Service (F1) and Product Quality & Assortment (F2) show a largely inverse pattern. PDS record the highest scores on both dimensions, followed by PCFE, while MVM exhibit the lowest evaluations of both experience and assortment attributes. Post-hoc tests indicate that PDS differ significantly from MVM on experience and from both SL and MVM on quality, while PCFE also score significantly higher than mainstream segments on product quality. The Online Lovers (OL) segment displays a relatively high experience score, comparable to PDS; however, given the small size of this group (n = 29, 4.0% of the sample), this result should be interpreted with caution and no strong conclusions are drawn from it.

The Convenience & Proximity (F3) dimension reveals the most theoretically intriguing pattern. Premium Destination Shoppers record the lowest convenience score of all six segments (M = −0.51), significantly below Mainstream Value Mix (p = .002), Supermarket Loyalists (p = .044), and Premium Cross-Format Explorers (p = .035). This result is notable because PDS consumers have by construction selected specialty or organic stores as their primary destination — formats that typically require greater travel effort in the Alpes-Maritimes market than mainstream supermarkets. Yet they are the segment least concerned with proximity and opening hours. Distance data confirm that this is not a simple adaptation to longer travel: average travel distances for PDS (M = 3.50) are comparable to those of other segments, including Discount-Led Value Seekers (M = 3.54). The pattern suggests that for this segment, spatial and temporal accessibility are not central evaluative criteria when selecting a primary store, irrespective of the actual distance involved.

Table 3. Mean factor scores by behavioral segment (standardized, M = 0, SD = 1) and ANOVA results

Segment	F1 Experience	F2 Quality	F3 Convenience	F4 Price
PDS (n=44)	+0.36	+0.37	−0.51	−0.78
PCFE (n=256)	+0.06	+0.18	−0.01	−0.16
SL (n=158)	−0.01	−0.16	0.00	−0.02
MVM (n=182)	−0.18	−0.18	+0.13	+0.24
DLVS (n=56)	−0.13	−0.12	−0.02	+0.59
OL (n=29)	+0.31	+0.06	+0.09	+0.06
F(5,716)	3.24	5.15	2.98	13.72
p	.007	<.001	.011	<.001

Note. Bonferroni post-hoc significant pairs: F4: PDS vs all others (p ≤ .004); PCFE vs MVM (p < .001); PCFE vs DLVS (p < .001); SL vs DLVS (p < .001). F3: PDS vs MVM (p = .002); PDS vs SL (p = .044); PDS vs PCFE (p = .035). F2: PDS vs SL (p = .029); PDS vs MVM (p = .015); PCFE vs SL (p = .011); PCFE vs MVM (p = .002). F1: PDS vs MVM (p = .020).

To test whether the attribute importance differences observed in the MANOVA reflect independent consumer orientations or merely the demographic composition of each segment, a multinomial logistic regression was estimated with Supermarket Loyalists as the baseline category. The four factor scores were entered alongside age, income, education, household type, travel distance, and typical shopping time as predictors.

Product Quality & Assortment (F2) is the strongest and most consistent attribute predictor across premium-oriented segments. It positively and significantly predicts membership in Premium Destination Shoppers (β = .775, p < .01) and Premium Cross-Format Explorers (β = .394, p < .01) relative to Supermarket Loyalists, while it does not significantly predict membership in either of the two more price-oriented segments. Price & Promotion Sensitivity (F4) produces the mirror image: it is a strong positive predictor of Discount-Led Value Seekers membership (β = .649, p < .01) and a significant negative predictor of Premium Destination Shoppers membership (β = −.699, p < .01). Expressed as average marginal effects, a one-standard-deviation increase in F2 raises the predicted probability of PDS membership by 2.6 percentage points and of PCFE membership by 5.2 percentage points, while a one-standard-deviation increase in F4 reduces PDS probability by 3.1 percentage points and raises DLVS probability by 4.2 percentage points. Together, these two dimensions account for the primary discrimination between premium and discount segments independently of demographic controls.

The Convenience & Proximity dimension (F3) provides the most diagnostically important result from a segmentation standpoint. It is a significant negative predictor of Premium Destination Shoppers membership (β = −.426, p < .05), even after all demographic and locational controls are included. Expressed as an average marginal effect, a one-standard-deviation increase in F3 reduces the predicted probability of PDS membership by 2.0 percentage points (p = .014). Crucially, the actual travel distance variable is non-significant not only for PDS (β = .028, p = .829) but across all segments in the model, confirming that the convenience sensitivity differences observed are not a function of objective spatial constraints. This dissociation — lower stated importance assigned to convenience attributes in the absence of any difference in actual travel distances — indicates that differential accessibility sensitivity among PDS consumers is not an artifact of geographic adaptation. It reflects a structural difference in the evaluative role of spatial and temporal accessibility for this segment, independent of actual travel behavior.

Importantly, demographic variables provide limited explanatory power once attribute preferences are included in the model. Income and education do not reach conventional significance levels, while age remains the only consistent

predictor of premium-format membership, with older consumers more likely to belong to these segments. This pattern is broadly consistent with Kohijoki and Marjanen's (2013) finding that ageing consumers show a heightened preference for stores offering a complete and high-quality assortment, a dimension that maps directly onto our F2 factor. Overall, these findings suggest that store attribute factors and shopping behaviors provide stronger insights into consumer heterogeneity than traditional socio-demographic characteristics alone.

Research limitations. Three limitations should be acknowledged. First, the sampling approach over-represents younger and more educated respondents relative to the Alpes-Maritimes population, which may compress income variance and potentially understate price sensitivity among older consumers. A probability sample stratified by age and income would strengthen external validity. Second, the study relies on explorative cross-sectional data and therefore cannot track how behavioral segments and attribute priorities evolve over time as new retail formats enter the market. Longitudinal research would help assess the stability of behavioral repertoires and the dynamics of format competition. Third, the Alpes-Maritimes market is characterized by high format diversity and cross-border retail proximity. While this limits direct generalizability to other grocery markets, the underlying mechanisms linking behavioral repertoires and attribute priorities are likely to extend to other multi-format retail environments.

Managerial implications. The findings provide several practical insights for grocery retailers. First, the limited explanatory power of socio-demographic variables compared with behavioral indicators reinforces the value of transaction-based segmentation. This result aligns with the argument of Baltas and Papastathopoulou (2003) that combining behavioral and store-choice criteria yields more actionable segments than relying on demographics alone.

Second, the differential convenience sensitivity identified among Premium Destination Shoppers has direct implications for location and investment decisions. For this segment, improvements in accessibility — such as extended opening hours or additional parking capacity — are unlikely to significantly influence patronage, since convenience does not function as a primary evaluative criterion for store choice. Instead, product quality, assortment distinctiveness, and in-store experience are the dimensions most likely to drive destination choice in this segment. By contrast, for Supermarket Loyalists and Mainstream Value Mix consumers, convenience remains a central decision criterion, making location optimization and operating hours key competitive levers. Treating accessibility sensitivity as uniform across consumers may therefore lead to inefficient allocation of retail investment.

Third, the dominance of F2 (Product Quality & Assortment) as a predictor of both PDS and PCFE membership in the multinomial logit points to assortment differentiation as the primary competitive tool for premium and specialty formats. In a market where mainstream supermarkets are widening their organic and premium private-label ranges, specialty retailers cannot compete on breadth. The segment most likely to respond to a quality assortment positioning strategy, PCFE, is also the largest segment (35.3%) and the one with the widest format repertoire, making it the most contestable by mainstream operators attempting to upgrade their offer. For specialty retailers, the strategic imperative is curation, provenance, and the experiential dimensions of F1, dimensions that mainstream formats find hardest to replicate.

Originality of the paper. This study makes two main original contributions to the body of knowledge in retail marketing. First, it offers direct empirical support for the claim that behavioral shopping repertoires can be used as predictors of attribute importance profiles in a multi-dimensional factor structure in a market that is more complex than the binary format of most segmentation studies. While Nilsson et al. (2015) suggested in their study that future research should investigate drivers of satisfaction with stores across different segments of shoppers—implying attribute importance as a mediator—our study offers direct investigation. Our study uses a six-segment model of behavioral typology, acknowledging the complexities of European multi-format grocery competition. Our findings support the theoretical proposition that behavioral criteria hold discriminatory power over demographics in forecasting how consumers rate grocery stores.

Second, this study provides direct empirical evidence of differential convenience sensitivity across behaviorally defined consumer segments in a European multi-format grocery market. Prior research has established that proximity and accessibility are among the most consistent predictors of store patronage in aggregate studies (Pan and Zinkhan, 2006; Nilsson et al., 2015a). Our results show that this relationship is highly segment-specific: while mainstream and discount-oriented consumers assign moderate-to-high importance to Price Sensibility and Convenience & Proximity, Premium Destination Shoppers assign systematically lower importance to these dimensions, and this difference persists in the multinomial logistic regression after controlling for travel distance and all socio-demographic variables. The dissociation between actual travel behavior and convenience importance ratings is a novel empirical finding that challenges the assumption that accessibility is a universal driver of grocery store choice. The combined findings suggest that behavioral repertoire should be treated as a first-order segmentation variable in grocery retail research, with demographics playing an enrichment role and attribute importance profiles serving as the outcome variable through which the link between behavior and competitive format positioning is most clearly understood.

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Mind the fit: A Framework for Virtual Reality Integration in the Online Customer Journey

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Abstract. Virtual Reality (VR) offers the opportunity to reimagine digital marketing activities by extending traditional internet usage. Despite extensive efforts to identify the drivers and barriers to adoption, market perspectives on VR have fluctuated, leaving it unclear how consumers effectively integrate such tools into their online shopping journeys. As part of a broader research project investigating VR's role in consumer decision-making, the present study proposes a behavioural framework grounded in Task-Technology Fit (TTF) theory to explain the intention to use VR solutions when shopping online. Data were collected via a cross-sectional survey (N = 206) and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). Results indicate a significant effect of technological characteristics (interactivity and vividness) on TTF, alongside an unexpected negative moderation effect of Personal Need for Structure (PNS) on usage intention. From a theoretical standpoint, this research represents an initial application of the TTF lens to VR effectiveness in online retailing while testing the moderating impact of PNS. Such findings contribute to the literature on VR as a decision-support service and provide strategic guidelines for practitioners seeking to integrate VR solutions into e-commerce journeys.
Keywords: *virtual reality; online shopping; task-technology fit; personal need for structure; PLS-SEM*

Framing of the research. Three-dimensional representations present an opportunity for digital marketing to extend how online purchasing processes happen. A significant impetus in this direction was provided by the development of Virtual Reality (VR). The B2C VR market is expected to reach revenues of over $25 billion by the end of 2030 (Statista 2025), underlining its contribution to digital innovation in the interaction between brands, retailers, and consumers.

VR applications exist along a continuum of immersion (Yildiz et al., 2024), allowing them to be utilised either through screen-based devices (i.e., smartphones) or via dedicated equipment, like head-mounted displays (HMD). On the one hand, VR environments can be entirely synthetic, requiring technical expertise in "*digital product creation*" (see Hanson, 2025). On the other hand, spaces can be "*tridimensionalised*" through the spatial rendering of objects and areas; these become explorable as 360° virtual tours, the development of which has become increasingly accessible.

Concurrently, literature has shown that interacting with VR content is particularly effective in stimulating positive consumer outcomes. In destination marketing, significant results have emerged regarding its ability to induce the intention to visit places experienced virtually (Chekembayeva and Garaus, 2024). Furthermore, virtual visits to production centres in the food sector have highlighted these positive effects, encouraging both visits and product purchase intention (Peruzzini et al., 2023).

However, the development of VR-based interactions has slowed over the years, contrary to initial growth expectations (Vanian, 2026). Regarding immersive use, HMD adoption levels have remained low (Osservatori.net, 2026), suggesting that such implementations remain unattractive for direct remote consumption and are confined to "*in-place*" experiences. Therefore, from a consumer-oriented e-commerce perspective, the most significant implementation prospects remain low-immersion VR applications (e.g. screen-based virtual tours), representing a customer service component during online shopping.

Purpose of the paper. The remaining question is when screen-based VR solutions can effectively and efficiently find a place within consumer purchasing processes to convey their value proposition. Although previous studies have sought to clarify the drivers behind such solutions, this field remains underexplored, requiring further investigation into their implementation as an online service (Lee et al., 2025).

While three-dimensional visualisation has demonstrated its ability to yield better outcomes than static, two-dimensional images (Wang et al. 2019), providing benefits in terms of both micro and macro consumer conversions (Zhu and Chao, 2023), evidence also suggests that these solutions can appear of limited utility. Specifically, they may impose an excessive cognitive load during the purchasing process (e.g., Fici et al., 2024). In this context, the level of involvement emerges as a variable explaining when the utility of product virtualisation effectively surfaces; this is particularly evident in the immersive utilisation of VR (Cowan and Ketron, 2019; Zhang et al., 2024), but remains unclear regarding non-immersive solutions.

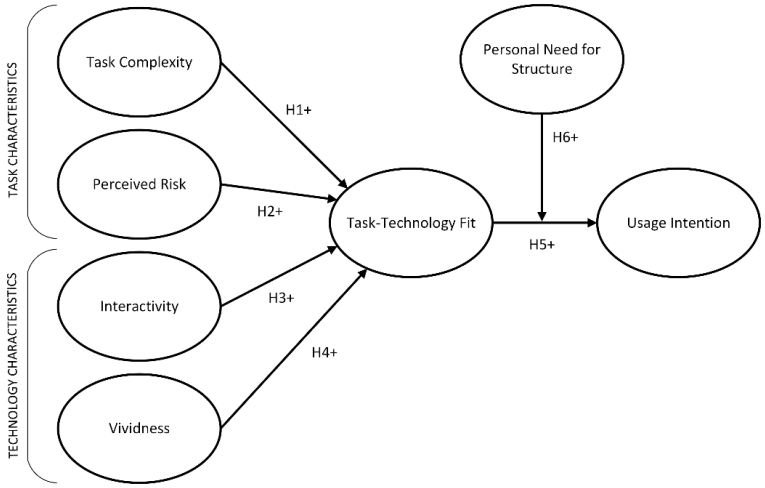
This study is part of an ongoing research project aimed at understanding how VR applications can be effectively integrated into online customer journeys, with a particular focus on their role as decision-support tools. In light of this literature gap, the study aims to provide a framework delineating how and when VR systems can enrich online retailing services, addressing the following research question: "*RQ: What is the behavioural process that drives consumers to use VR solutions during their online purchasing journey?*".

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To achieve the study's objectives, a theoretical model is proposed based on Task-Technology Fit (TTF; Goodhue and Thompson, 1995). TTF has been applied across various fields, undergoing significant evolution over time. For instance, it was designed within Information Systems literature to move beyond the narrow focus on "*utilisation*" and "*fit*" found in earlier theories. The model rests on three propositions: first, a user's evaluation of fit is determined by both task and technology characteristics; second, system utilisation depends on this perceived fit; and finally, a positive fit evaluation not only predicts utilisation but also positively influences perceived performance (Goodhue and Thompson, 1995). Empirical evidence has confirmed the robustness of the model and its extensions across several digital contexts, such as e-commerce, online courses and mobile banking (see Marikyan and Papagiannidis 2023).

In this study, task and technology characteristics are treated as groups of variables to capture the multidimensional nature of the purchasing process, whilst the TTF construct is considered unidimensional. This approach is consistent with the "*fit-as-match*" perspective identified by Marikyan and Papagiannidis (2023) as a common practice in recent literature. Figure 1 illustrates the proposed theoretical model, with the hypotheses presented below:

Figure 1 – Proposed model



Task characteristics comprise task complexity and perceived risk. Task complexity is defined as "*the number of attributes each product has to be evaluated*" (Tang, 2020, p. 180). In online shopping environments where task complexity is high, information demands may exceed the consumer's limited working memory capacity, generating cognitive overload (Gaillard, 2000; Mikolon et al., 2015). Consequently, a mentally fatigued user tends to reduce effort by relying on simplified, less accurate decision heuristics (Hadjimarcou and Hu, 1999). According to Resource-Matching Theory (Anand and Sternthal, 1988), decision quality is maximised only when available cognitive resources match those required by the task. In this sense, a support service can act as a decision aid, potentially reducing the cognitive resources needed to filter and process information within a complex process. However, if the task is inherently simple, the same service may provide excess resources; this mismatch can induce cognitive laziness or distraction, paradoxically leading to a decline in performance (Tang, 2020). Therefore, it is hypothesised that VR generates an optimal fit only when task complexity is high, as this triggers the need for (and justifies) the advanced cognitive support provided by the technology, thereby improving decision quality.

Perceived risk is defined as "*the consumer's perception of the uncertainty and adverse consequences of buying products or services*" (Dowling and Staelin, 1994, p. 114). In online shopping, the inability to physically examine or test goods prior to a transaction intrinsically generates high perceived risk, linked to uncertainty and the possibility that the product may not meet expectations (Ariffin et al., 2018). When the risk associated with a specific choice exceeds a consumer's "*acceptable risk*" threshold, individuals actively undertake risk-handling strategies and problem-solving activities to mitigate their sense of insecurity (Dowling and Staelin, 1994). Accordingly, high-risk decision-making necessitates solutions capable of overcoming information barriers; VR services could address this need by providing simulations that emulate the physical experience. Consequently, as the uncertainty intrinsic to the choice process increases, consumers will feel a greater need for reassurance and will thus perceive a higher degree of fit for VR to resolve their decision-making task.

In light of this evidence regarding task characteristics, the following hypotheses are postulated:

H1: Task complexity positively influences TTF for VR solutions during the online purchasing process.
H2: Perceived risk positively influences TTF for VR solutions during the online purchasing process.

Technology characteristics comprise two dimensions identified as fundamental in VR literature (Steuer, 1992; Kim et al., 2021): interactivity and vividness. Vividness refers to the representational richness of the virtual environment, defined by its sensory breadth and the depth (or resolution) of the information provided (Steuer, 1992). Interactivity, meanwhile,

represents "*the extent to which users can participate in modifying the form and content of a mediated environment in real time*" (Steuer 1992, p. 14).

Vividness and interactivity are hypothesised to act as direct antecedents of TTF, as they align the capabilities of the technological system with the user's decision-making and evaluative needs (Chen et al., 2023). Specifically, interactivity supports the analytical and cognitive processing of the task: by providing functional and visual control (e.g., rotate, zoom or manipulate product properties), it allows buyers to actively explore products based on their preferences and focus on the details where they feel the greatest uncertainty (Chen et al., 2023). Simultaneously, vividness enriches the experiential aspect by offering realistic, high-resolution product visualisations within a natural three-dimensional space (Kim et al., 2021).

The synergy of these two technological stimuli maximises perceived diagnosticity, defined as the extent to which the virtual environment proves useful for accurately understanding and judging product characteristics (Chen et al., 2023). Furthermore, the integration of vivid images and realistic interactions produces a sense of telepresence (the psychological sensation of "*being there*") which increases the system's perceived utility for positive shopping outcomes (e.g., Kim et al., 2021). Since these characteristics provide consumers with the essential tools to overcome online limitations and achieve effective evaluative outcomes, it is postulated that they determine the adequacy of the technology to the task. In light of this theoretical background, the following hypotheses are formulated:

H3: Interactivity positively influences TTF for VR solutions during the online purchasing process.
H4: Vividness positively influences TTF for VR solutions during the online purchasing process.

Within information systems literature, the relationship between TTF and use intention has been a well-established principle since its original conceptualisation, although it has often produced stronger predictive outcomes when extended with other technology acceptance theories (Marikyan and Papagiannidis, 2023).

In its original form, the theory posits that regardless of a user's general attitude or curiosity towards an innovation, they are unlikely to adopt it if its functionality fails to address the practical requirements of the task (Marikyan and Papagiannidis, 2023). For example, regarding other retail technologies, a high degree of alignment between the tool and the purchasing task exerts a direct impact on consumers' usage intention (Khashan et al., 2023).

In interactive shopping environments, such as those enhanced by VR solutions that effectively support product exploration and evaluation, adoption may be stimulated by lowering psychological barriers to tools capable of better performing the shopping mission. Accordingly, it is reasonable to expect that congruence between the shopping task and the VR simulation will directly motivate users to employ the system. Consequently, the following hypothesis is proposed:

H5: TTF positively influences the behavioural intention to use VR solutions in the online shopping process.

Finally, this study examines the moderating role of Personal Need for Structure (PNS), defined as "*a chronic aversion to ill-structured situations and a longing for certainty and predictability*" (Rietzschel et al., 2007, p. 856). Previous studies have considered the influence of PNS within the decision-making process; for instance, Cutright (2012) showed that high-PNS individuals seek "*structured consumption*", manifesting in a preference for closed product forms and well-delimited environments to manage attentional overload, particularly when personal control is low.

In online shopping, where the absence of physical products leads to fewer decisional cues, VR can provide "*perimeters*" that help delimit the decision-making process through increased focus. Since high-PNS users require structured knowledge to resolve ambiguity (Thompson et al., 2001), VR may facilitate this desired cognitive state by providing clear mental starting and stopping points. Accordingly, a higher PNS will amplify the positive effects of TTF on usage intention, due to the technology's ability to provide predictability and satisfy the user's need for certainty during product evaluation.

Furthermore, recent scholarship has underscored the importance of investigating psychological variables such as PNS as moderators between consumer perceptions of new technology and the resulting outcomes (Jayawardhena et al., 2026). Hence, we propose:

H6: PNS positively moderates the relationship between the TTF and the behavioural intention to use VR solutions in the online shopping process.

Methodology. To test the proposed model and its hypotheses, and thus address the research question, this study conducted a quantitative investigation through a cross-sectional survey. The rental market for students and professionals was selected as the focal context due to three primary characteristics. First, it presents a high probability of information asymmetry, as potential tenants often face the necessity of securing a property without a prior physical viewing. Second, the search process is typically conducted exclusively through online channels (Rently, 2026). Third, the level of purchase involvement is predictably high, necessitating a rigorous evaluation of alternatives and informed decision-making. Future stages of this research will expand upon the present study by examining low-involvement purchasing contexts.

The survey was designed on the EUSurvey platform for online distribution. The access link was shared across international social media groups and pages dedicated to housing searches, facilitating a purposive sampling approach. A filter question identified respondents who had actively searched for a rental apartment for study or work purposes within

the last 24 months. Regarding the measurement of variables, task complexity was assessed using a 4-item scale (Li et al., 2011), while perceived risk was measured with a 3-item scale adapted from Laroche et al. (2004). Vividness and interactivity were measured using an 8-item scale (Babin and Burns, 1998) and a 5-item scale (Peruzzini et al., 2023), respectively. Finally, TTF was assessed with a 5-item scale adapted from Howard and Rose (2019), PNS with a 4-item scale adapted from Thompson et al. (2001), and usage intention with a 3-item scale adapted from Ramos-de-Luna et al. (2016).

To mitigate common method bias and prevent issues such as response sets, primacy and recency effects that could distort validity, the order of questions was randomised and respondents were guaranteed full anonymity (Krebs and Bachner, 2018).

During the survey, respondents were instructed to use a link to take a virtual tour of an apartment, allowing them to experience the tool first-hand and evaluate its characteristics and spaces in a simulated choice process. To ensure validity and confirm that the tour was completed, an attention-check question was included (asking for the number of windows in the bathroom). Additionally, following Hericher and Bridoux (2023), respondents with excessively short or long completion times were excluded. This criterion removed profiles characterised by potential lack of attention or interruptions, ensuring the reliability of the collected data. Table 1 presents the sample characteristics.

Table 1 – Sample characteristics

Variable	Category	Frequency (n=206)	Percentage (%)
Gender	Woman	138	67%
	Man	68	33%
Age Range	18 – 24	75	36%
	25 – 35	82	40%
	35 – 44	13	6%
	45 – 54	17	8%
	> 55	19	9%
Education	Middle School	4	2%
	High School	53	26%
	Bachelor's	53	26%
	Master's Degree	87	42%
	Doctorate	9	4%
Occupation	Student	69	34%
	Working Student	13	6%
	Employed	104	50%
	Unemployed	7	3%
	Other	13	6%

Table 2 – Means, standard deviations, internal reliability, convergent validity, and discriminant validity

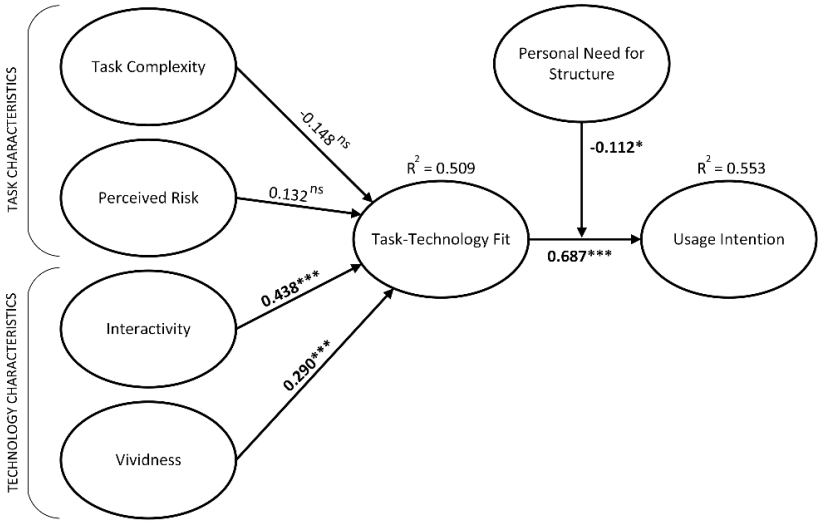
	Mean	S.D.	α	rho_A	AVE	CPX	RISK	INT	VIV	TTF	NFCC
CPX	5.19	1.30	0.719	0.889	0.769						
RISK	5.40	1.30	0.876	0.891	0.889	0.698					
INT	5.67	1.21	0.907	0.907	0.729	0.166	0.070				
VIV	5.81	1.09	0.930	0.934	0.672	0.095	0.069	0.811			
TTF	5.85	1.11	0.934	0.935	0.792	0.044	0.054	0.716	0.658		
NFCC	5.06	1.32	0.762	0.928	0.531	0.316	0.110	0.154	0.092	0.169	
USE	6.01	1.20	0.925	0.932	0.869	0.145	0.092	0.540	0.492	0.785	0.126

Following the data collection, the measurement model was evaluated according to established protocols (Sarstedt et al., 2022) to ensure the reliability and validity of the constructs (Table 2). Internal consistency reliability was supported by Cronbach's alpha and rho_A coefficients, which were all above the 0.70 target. Furthermore, convergent validity was established, with Average Variance Extracted (AVE) values exceeding the 0.50 benchmark. The Heterotrait-Monotrait ratio (HTMT) criterion showed values below the 0.85 threshold, confirming discriminant validity. Additionally, the Variance Inflation Factor (VIF) values ranged from 1.05 to 2.466, well below the threshold of 3.3, indicating that common method bias was not a concern in this study.

Results. For the data analysis, this study employs the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach, using the SEMinR library in R (version 4.5.3) to test the hypotheses within the model (Hair et al., 2021). The selection of this methodology is motivated by the particular suitability of PLS-SEM for managing complex structural models, as well as its prediction-oriented approach (Sarstedt et al., 2022).

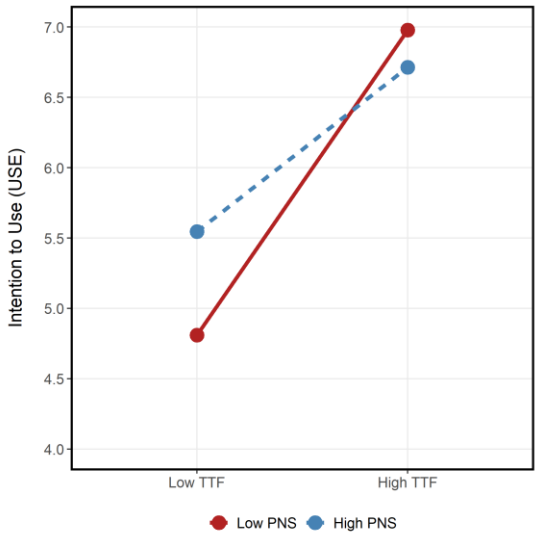
To test the hypothesised relationships, a bootstrapping procedure was performed with 10,000 subsamples and a 95% bias-corrected and accelerated confidence interval. Path analysis evaluated the structural coefficients and their significance levels, while age and service frequency were used as control variables. The final structural model, including path coefficients and the moderation effect, is illustrated in Figure 2.

Figure 2 – PLS-SEM results



Note(s): ***: p-value < 0.001; *: p-value < 0.05; ns: not significant

Figure 3 - Moderation plot



The findings indicate that interactivity is positively associated with TTF (β = 0.438, p < 0.001) and vividness also shows a significant positive effect on TTF (β = 0.290, p < 0.001), supporting H3 and H4. In contrast, task complexity (β = -0.148, p = 0.140) and perceived risk (β = 0.132, p = 0.144) did not significantly affect TTF. Therefore, H1 and H2 were not supported. These variables explain 50.9% of the variance in TTF ($R^2 = 0.509$). Furthermore, the analysis revealed a strong positive relationship between TTF and usage intention (β = 0.687, p < 0.001), supporting H5. Overall, 55.3% of the variance in usage intention is explained ($R^2 = 0.553$).

Surprisingly, the moderation of PNS resulted in a significant but negative effect (β = -0.112, p = 0.014), thus not supporting H6 but suggesting its role in attenuating the impact of TTF on use. As illustrated in Figure 3, the positive influence of TTF on usage intention is more pronounced for individuals with low PNS, whereas high-PNS users appear less sensitive to improvements in TTF.

Research limitations. This study is not without limitations. The specific focus on the rental market and the use of purposive sampling may limit the generalisability of the findings to other categories. In different contexts, VR usage might be driven by a strong hedonic component, a factor not measured in this study. Future research could therefore integrate variables such as perceived enjoyment and aesthetics to examine how hedonic value interacts with TTF. Nevertheless, the present results provide a robust preliminary assessment of the proposed model. Our objective was to establish its initial validity before extending its applicability through a comparative analysis with low-involvement contexts and diverse industries, such as fast-moving consumer goods. This will allow for a deeper exploration of how the role of VR as a decision-support tool varies across heterogeneous customer journeys.

Secondly, a significant limitation lies in the focus on positive fit, without empirically exploring the dynamics of mismatch. As suggested by Resource-Matching Theory, adopting advanced technologies for excessively simple tasks can generate a cognitive mismatch; future research should therefore investigate the thresholds beyond which VR complexity becomes an obstacle rather than a support. Moreover, adopting a longitudinal approach to examine how the perception of fit evolves as user familiarity with the tool increases could significantly enrich the evidence from this cross-sectional design.

Finally, participants may have viewed the virtual tour on diverse devices, such as smartphones, tablets or computers. This heterogeneity in hardware could have influenced the perception of the virtual environment. Future studies could control for this factor by requiring the use of a specific device or by analysing the potential impact of the hardware utilised.

Managerial implications. From a managerial perspective, the initial results of this study offer valuable insights for digital marketers. Contrary to expectations, the model suggests that task complexity and perceived risk do not alone determine where VR functions as a value-driven service. This suggests that non-immersive VR solutions may possess a broader applicability than previously assumed, potentially fitting product categories that do not necessarily require high consumer involvement. While this aspect can be further clarified in the next stages of this research, managers should already prioritise the strategic optimisation of the service's functional attributes. Ensuring that interactivity and sensory vividness act as indispensable tools for product diagnosticity will enable consumers to effectively evaluate items and successfully fulfil their shopping missions.

Finally, this study confirms the potential of PNS as a segmentation variable, although its impact appears more complex than previously assumed. The results suggest that structure-oriented consumers may remain cautious or resistant even when the technology is functionally adequate for the task. Marketers should, therefore, utilise this variable to personalise service offerings, recognising that high-PNS users may perceive a technology that radically alters task procedures as a source of ambiguity. Accordingly, VR services should not only ensure maximum clarity and explicit navigation paths but also reshape the online shopping journey with caution. Technical or design frictions (e.g., slow rendering times, pop-up windows, loss of primary informational references) can be perceived as threats. For high-PNS users, such disruptions can transform the VR experience into a chaotic one, acting as a significant barrier to adoption even when the system is deemed adequate for the task.

Originality of the paper. This study offers three main contributions to the literature on VR adoption in online retailing.

First, by employing a TTF lens, the research shifts the focus from general technology acceptance to the alignment between technological capabilities and the cognitive requirements of the purchasing task. This provides a clearer understanding of how VR integrates into the consumer's online journey.

Second, the current research helps clarify the boundary conditions of VR effectiveness, providing evidence for a field where the literature remains fragmented. Contrary to expectations, the findings suggest that technological "*fit*" is driven primarily by the tool's intrinsic functional attributes rather than task complexity or risk. Such results help define the applicability of non-immersive VR in online shopping by demonstrating its potential value across a broader range of product categories, regardless of the consumer's level of involvement. Building on these insights, the next stage of the study will further validate the model by extending the investigation to low-involvement purchasing contexts.

Thirdly, a further innovative element is the integration of PNS as a key individual-level moderator. Although the findings did not support the initial hypothesis, they offer significant theoretical insights by showing that individuals with high PNS levels may rely on heuristic processing to reach a decision (Rietzschel et al., 2007). In this respect, the density of information and complex interactions inherent in VR can trigger cognitive overload, acting as a barrier that leads these users to prefer faster, more familiar, or traditional decision-making processes. Overall, such an inclusion provides an original perspective on how this personality trait influences the intention to use VR solutions throughout the customer journey, illustrating how psychological alignment can ultimately enrich the service experience and facilitate conversions.

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What Drives Theatre Attendance? Audiences Who Plan, Attend More Work in progress

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Abstract. *This paper presents preliminary results from a survey-based study aimed at exploring relevant elements related to the choice of attending theatre performances. Drawing on data collected from a representative sample of participants in the United Kingdom, the analyses focus on time preferences, wellbeing indicators, and socio-demographic variables as the primary variables of interest. In particular, although the survey instrument captured multiple dimensions of theatre participation, we relate attendance frequency to the future orientation of the respondents and to their perception of the effects of attendance on their wellbeing. Results show that attendance frequency is positively and significantly related to respondents' future-orientation, as captured through their willingness to purchase a discounted seasonal subscription. We also find some evidence of the role of gender, age and education in explaining attendance frequency. In addition, a positive relationship appears between frequency of attendance and individual wellbeing, particularly when it is framed through on a health-related definition. These findings suggest that performing arts organizations may benefit from targeting forward-looking audience segments and from communicating theatre attendance as part of a healthy lifestyle. We discuss the implications of these preliminary findings and outline directions for further research.*
Key words: *performing arts; survey; future orientation; wellbeing.*

Framing of the research. *The study of the performing arts from an economic perspective is commonly traced back to the seminal work of Baumol and Bowen (1965, 1966), who focused on the issue of rising costs against essentially stagnant productivity levels, recognized as the root cause of the financial problems that often characterize the organizations active in this field.*

Although the first framework of analysis employed this supply-side perspective, the study of theatre production cannot be disentangled from its relationship with the audience, for both financial (as a source of revenues) and social reasons, since theatrical organizations' efforts, historically, have been oriented towards achieving the mission of meeting the public ("The theatre is meant to be full, not empty", in Giuseppe Verdi's opinion; Triola, 2013, p.207). In this context, we can place the broad strand of literature that adopts a demand-side perspective. Some studies focus on aggregated demand analysis, with the aim of estimating key indicators such as price and income elasticities (see, for instance, Zieba, 2009 or Laamanen, 2013). Other studies assess attendance choices at individual level, in relation to prices or personal characteristics such socio-demographic factors and education (e.g. Borgonovi, 2004). It is relevant to recall the perspective of authors highlighting the role of audience motivation, which indeed can show some degree of relationship with socio-economic factors, but is also related with the development of attendance experience, both in terms of past events and planning for future events (Swanson et al., 2008; Tröndle et al., 2025). This is consistent with the nature of the performing arts product that, as an experience, even if not customized, is perceived in a unique way by each user (Pine and Gilmore, 1998), and its impact is as well unique and audience-dependent (Walmsley, 2013).

In addition, other studies highlight patterns related to the effects of cultural consumption over time, such as habit formation, learning-by-consumption, and (rational) addiction (see, for instance, Borgonovi, 2004; Castiglione and Infante, 2016; Throsby et al., 2024; Turrini, 2006). In particular, Castiglione and Infante (2016) characterizes theatre attendance as a beneficial "habit-forming activity" in which consumers engage in a learning-by-doing process, one through which past participation in theatre increases their appreciation and desire for it in the present and future. These findings may suggest a process of taste acquisition for the arts through repeated exposure.

Cultural attendance can be then explored from a forward-looking perspective. In this sense, individual time preferences, and in particular the degree to which individuals are oriented towards the future, may play a relevant role in shaping attendance choices. Future-oriented individuals are more likely to plan cultural activities in advance, to commit to subscription schemes, and to perceive the benefits of repeated attendance as worthwhile investments in long-term personal enrichment. This perspective connects the study of arts and culture demand to the broader literature on intertemporal decision-making (Frederick et al., 2002; Loewenstein and Prelec, 1992), suggesting that the willingness to engage with theatre is not only shaped by past experience but also by individual attitudes towards future consumption and its perceived benefits.

Such future-oriented behaviour is also likely to be shaped by the perceived personal benefits of attendance, among which wellbeing plays a particularly relevant role. Relatedly, Meeks et al. (2018) discuss how theatre involvement is related to psychological benefits; in addition, Meeks et al. (2020) find evidence of positive effects for over 60 attenders. Alsop et al. (2025) document the impact of concerts on attendees' wellbeing with respect to the emotional, social, and cultural dimensions.

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In this context, it emerges that theatre attendance involves individual choices that consider a set of element behind the traditional (although relevant) demand determinants, such as price, income or socio-demographical factors. These benefits, which unfold over time, naturally connect attendance choices to individual future orientation and perceive wellbeing, the two dimensions at the core of the present study.

Purpose of the paper. *This paper presents the preliminary results of a work in progress research that relies on a survey-based approach to explore relevant elements related to the demand of theatre performances, with a focus on two under-explored dimensions: individual future orientation and perceived wellbeing. To capture the role of time preferences, we proxied intertemporal orientation through respondents' willingness to commit to a discounted seasonal subscription, treating this as a behavioral indicator of their propensity to plan and invest in future cultural experiences. We further examine how individual future orientation relates to attendance decisions, alongside respondents' perceptions of the effects of theatre-going on their wellbeing, which we assess across multiple dimensions. We also consider the role of socio-demographic characteristics. By integrating these perspectives within a single empirical framework, the paper aims to contribute to a more comprehensive understanding of the drivers of theatre demand, while offering actionable insights for managers of performing arts organizations.*

Methodology. *The research protocol and planned analyses were specified in advance in an AsPredicted preregistration document. Participants were recruited via the Prolific online research platform, targeting a minimum of 300 completed responses from representative samples in the United Kingdom. No experimental manipulation or random assignment to conditions was implemented; however, two survey versions were administered: a full version for individuals with varying levels of theatre attendance and a shortened version for non-theatregoers to enable between-group comparisons. To this end, the primary dependent variable—attendance frequency—was measured using a six-level ordinal scale: non-attendee, sporadic (≤1/year), occasional (2-3/year), regular (4-6/year), frequent (7-10/year), and very frequent (>10/year) attendee. The first two categories were classified as non-theatregoers, whereas the remaining four were classified as theatregoers. A pilot test assessed the survey for language-related and technical issues prior to full deployment. Informed consent was obtained from all participants.*

Data were collected using a structured, self-administered questionnaire implemented in LimeSurvey. After reviewing the informed consent document, theatregoers completed questions on theatre attendance, well-being and emotional experiences, cultural and social engagement, and time preferences. In addition to our primary dependent variable, other indicators of engagement included years of theatre attendance, possession and continuity of theatre subscriptions, anticipated future attendance, and ticket-purchasing behavior. As for non-theatregoers, we asked them to identify barriers to theatre attendance and completed the time preference items administered to the theatregoer group. For both groups, educational attainment was also measured. Additional demographic data (age and gender) were instead obtained via Prolific. Although 300 participants completed the survey, 2 were excluded for failing the attention checks, resulting in a final sample of 298 participants.

In line with the aims of the present paper, although the survey instrument captured multiple dimensions of theatre participation, the analyses reported here focus on theatre attendance and socio-demographics, time preference, and well-being indicators as the primary variables of interest. Time preference was mainly assessed through participants' willingness to purchase a discounted seasonal subscription for their preferred type of event. Specifically, all participants were asked to: "Imagine you can purchase a discounted seasonal subscription for your preferred type of event today. How likely are you to accept this offer compared to buying individual tickets for events as they occur? Please rate your likelihood on a scale from 1 to 10, where 1 means "not at all likely" and 10 means "very likely" (please assume that you have the financial means and that season subscriptions/tickets do not sell out quickly)." This item reflects future orientation through engagement with a commitment device: accepting a subscription requires planning ahead and forgoing flexibility in exchange for deferred rewards—behaviours consistent with a future-oriented time preference. Although this format differs from standard monetary delay-discounting tasks (e.g., choosing between receiving 100€ today or 120€ in one month; Frederick et al., 2002), such items would have been contextually incongruous in a survey focused on theatre participation and may have reduced engagement or introduced demand effects. By embedding the intertemporal trade-off within a domain-relevant consumption decision, we preserved contextual coherence while still capturing individual differences in future orientation[1].

Moreover, to better identify whether subscription willingness genuinely reflects future orientation rather than other considerations, conditional follow-up items were employed to capture the qualitatively distinct reasons underlying low versus high subscription willingness. Participants who reported lower likelihood scores (1–5) were asked to select one reason from the following forced-choice options (with an additional open-ended "Other" option): preference for making decisions closer to the event date rather than months in advance; concern about committing to events too far in advance; difficulty predicting future schedule and availability; and concern about wasting money if unable to attend some subscription events. Participants who reported higher likelihood scores (6–10) were instead presented with a different set of forced-choice options (again including an open-ended "Other" option): enjoyment of planning cultural activities

[1] *While the survey instrument included an additional proxy of time preferences, the analyses reported in this paper concentrate on a single measure: the willingness to purchase a discounted seasonal subscription for the preferred type of event. As this research is still in progress, the role of this additional measure will be explored in subsequent stages of the work.*

well in advance and having events to look forward to; appreciation of a fixed schedule that motivates continued cultural engagement; valuing having cultural events planned and scheduled throughout the year; preference for guaranteeing access to all events to avoid missing performances. While several of these options explicitly relate to intertemporal orientation (e.g., preference for advance planning or reluctance to commit far ahead), others capture conceptually distinct considerations, such concerns about wasting money. By including both time-related and non-time-related motivations, along with the "Other" option, we aimed to untie future orientation from alternative drivers of subscription willingness, such as uncertainty about future availability or concerns about financial loss. The conditional follow-up items were included in the original survey instrument.

As for well-being measures, the variables included were: belief that theatre attendance enhances individual well-being (10-point scale); satisfaction with most recent theatre experience (10-point scale), and perceived impact of attendance interruptions on physical/psychological health (10-point scale). Data was analyzed by using Stata 16.1.

Results. *The first point our analysis focuses on is the level of theatre attendance, intended as the yearly frequence of participation to professional theatrical performances. Responses have been converted on a 6-points scale. Our first target is to investigate the determinants of the attendance level, with special focus on time preferences, assessed through the described question on the willingness to purchase a discounted seasonal subscription, and demographics variables. This analysis considers the whole sample, i.e., including both theatregoers and non-theatregoers. Average values for the whole sample are reported in table 1.*

The sample is almost evenly distributed between non-theatergoers (levels 1 and 2 of Attendance scale) and theatregoers (levels 3 to 6). Given the low numerosity of frequent and very frequent attendees, levels 5 and 6 will be merged into a single group henceforth. It is interesting to note that the mean values of the variable wtp_subscr (willingness to purchase a discounted seasonal subscription immediately) and of the demographic variables tend to increase, on average, as the level of attendance increases. In particular, female is a dummy variable that assumes value of one when the respondents are classified as female by Prolific. The variable age, as well, is reported in years by the platform. Tertiary_edu is a dummy variable equal to one if the respondent declares owning a tertiary education title.

Table 1. Attendance, time preferences and demographics, average values – whole sample. Source: our elaboration

Attendance scale	*Obs*	*wtp_subscr (scale) Average*	*female (dummy) Average*	*age (years) Average*	*tertiary_edu (dummy) Average*
1 (non-attendee)	*48*	*4,729*	*0,396*	*44,813*	*0,5*
2 (sporadic)	*99*	*5,21*	*0,404*	*47,23*	*0,7*
3 (occasional)	*88*	*6*	*0,614*	*46,4*	*0,704*
4 (regular)	*49*	*6,76*	*0,653*	*47,55*	*0,735*
5 (frequent)	*10*	*7,9*	*0,6*	*53,7*	*1*
6 (very frequent)	*4*	*5*	*1*	*57*	*0,75*

Table 2 provides models evaluating the role of willingness to purchase the subscription and of demographics as determinants of theatre attendance. The first column of coefficients refers to an ordered logistic regression run using Attendance_scale (5 levels) as dependent variable; the second column of coefficients refers to a binary logistic regression aimed at distinguishing theatregoers from non-theatregoers (by aggregating the levels of Attendance_scale as described above). We notice that, although the pseudo-R2 are not very high, in both the models the independent variables are jointly significant in explaining the response variable. All the considered variables show a positive and significant effect in explaining the level of attendance in the ordered logit, implying that female and older respondents, as well as more educated respondents attend theatre performance more frequently. In addition, and more interestingly in terms of the focus of our study, more future-oriented respondents also state significantly higher frequency, i.e. individuals who express higher willingness to purchase a subscription show a higher demand for theater performances. This result is confirmed in the binary logistic regression, as well as the role of gender, while age and education do not longer show significant coefficients.

Table 2. Ordered logit and logit models – whole sample. Source: our elaboriation

VARIABLES	*ordered logit attendance_scale*	*logit teatregoers*
wtp_subscr	*0.214****	*0.208****
	(0.0445)	*(0.0506)*
female	*0.738****	*0.927****
	(0.217)	*(0.248)*
age	*0.0147***	*0.00886*
	(0.00689)	*(0.00795)*
tertiary_edu	*0.561***	*0.385*
	(0.232)	*(0.268)*
/cut1	*0.831**	
	(0.479)	
/cut2	*2.642****	
	(0.498)	
/cut3	*4.138****	
	(0.527)	
/cut4	*5.930****	
	(0.594)	
Constant		*-2.323****
		(0.572)
Pseudo-R2	*0.0557*	*0.0915*
LRchi2 (4)	*48.52*	*37.80*
Prob>chi2	*0.0000*	*0.000*
Observations	*298*	*298*

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

At this point, it is relevant to deepen the nature of the relationship between frequency of attendance and future orientation by investigating the motivation underlying the willingness (or unwillingness) to purchase a discounted subscription for the preferred time of event, as described by the conditional follow-up items which, as noted earlier, were employed to capture the qualitatively distinct reasons underlying low versus high subscription willingness.
First (as expected, given the results of the logistic regressions), on average, respondents with high willingness to purchase a discounted subscription (n=172) tend to be more frequent attendees than respondents with low willingness to purchase (n=126), with an average of 2.84 vs 2.28 points, as resulting from the last row of Table 3. A Wilcoxon-Mann-Whitney test confirms that the distribution of the variable Attendance_scale significantly differs between the two groups (p-value < 0.0001). Notice, however, that not all the reasons for low or high willingness to subscribe are related to future orientation: reason identified as 4H is more related to security reasons (fear of missing out performances), while reason 4L is more related to loss aversion. These motivations, however, do not collect the majority of responses in either of the two groups. Therefore, we repeat the test by including only respondents with high or low willingness to subscribe due to time-related motivation (i.e. respondents reporting motivations 1H, 2H, 3H versus respondent reporting motivations 1L, 2L, 3L; motivations not related to future-orientation and the residual categories "other" are thus excluded).
In this case, we get an average value of Attendance_scale of 2.92 for the group with high willingness to purchase a subscription, vs an average of 2.28, for the other group, with a difference even more evident than considering the whole sample (these last average values are not displayed in the table). The distribution of Attendance_scale differs between the two groups, as confirmed by a p-value, also in this case, smaller than 0.001 for the Wilcoxon-Mann-Whitney test.

Table 3. Reasons for high and low willingness to purchase a subscription and attendance frequency

High wtp_subscr (6-10 points)	*Obs*	*Average Attendance_scale*	*Low wtp_subscr (1-5 points)*	*Obs*	*Average Attendance_scale*
I enjoy planning my cultural activities well in advance and having events to look forward to (1H)	*58*	*2.88*	*I prefer making decisions when the event is close rather than months in advance (1L)*	*30*	*2.17*
I appreciate having a set schedule of events that motivates me to maintain my cultural engagement (2H)	*36*	*2.78*	*I worry about committing to events too far in advance (2L)*	*16*	*2.25*
I value having my cultural events planned and scheduled throughout the year (3H)	*34*	*3.15*	*It's difficult to predict my schedule and availability months in advance (3L)*	*21*	*2.47*
I like to guarantee my access to all events and ensure I won't miss out on any performances (4H)	*35*	*2.57*	*I worry about wasting money if I can't attend some of the events in a subscription (4L)*	*50*	*2.22*
Other (5H)	*9*	*2.78*	*Other (5L)*	*9*	*2.56*
Total	*172*	*2.84*		*126*	*2.28*

Source: our elaboration

Let us, now, restrict our analysis to the theatergoers subsample, in order to verify the relationship between attendance and well-being indicators (which have been collected only for the theatregoers group).
For this part of the analysis, therefore, we exclude non-attendee and sporadic attendees (n=147). Without going deeper in the analysis of non-theatregoers behavior, we just would like to notice that the main reason for non-attendance is related to the fact that theatre is considered too expensive (72 responses).
We maintain, thus, the subsample of theatregoers (151 observations). For this subsample, table 4 reports the average level of the well-being indicators, all expressed over a 10-point scale, declined for the remaining levels of Attendance_scale (notice that the number of observations is reduced for the last well-being indicator since 34 respondents state having not interrupted their attendance, except during the Covid-19 pandemics).
It is possible to notice a positive association between the average levels of the well-being indicators and the frequency of attendance. This relation is more evident for the perceived impact of interruption, although for this indicator the respondents have systematically assigned a lower score on the 10-point scale than for the other two indicators.

Table 4. Attendance levels and well-being indicators. Source: our elaboration

Well-being indicator	*Attendance_scale*	*3*	*4*	*5*
Belief that theatre attendance enhances individual well-being	*Obs*	*88*	*49*	*14*
	Average	*8.43*	*8.33*	*9.29*
Satisfaction with most recent theatre experience	*Obs*	*88*	*49*	*14*
	Average	*8.22*	*8.18*	*8.29*
Perceived impact of attendance interruptions on physical/psychological health	*Obs*	*70*	*34*	*13*
	Average	*3.37*	*4.65*	*5.15*

Table 5 deepens this analysis by reporting the correlation coefficients computed among the attendance variable and the well-being indicators. The variable willingness to purchase a subscription is also included.
As expected, the frequency of attendance shows a positive and significant correlation with the willingness to subscribe. The correlation of Attendance_scale with the belief that attendance increases well-being and with satisfaction with the last theatre experience are positive, but very small in magnitude and not significant. However, the correlation of Attendance_scale with the perceived impact of interruption on health is positive and significant. Therefore, the considered well-being determinants are likely to capture different well-being concepts, and the one more related to health seems to have a direct connection with the frequency of attendance. It is interesting, however, to notice that the belief that attendance enhances individual wellbeing show a significant positive correlation with the willingness to subscribe, i.e. is correlated with forward-looking behavior. The same holds, with a weak significance level, for the health-related indicator. Finally, the level of satisfaction with the last performance is not significantly correlated either with frequency of attendance or with the willingness to purchase a subscription. However, the correlation is positive, relatively strong and highly significant with the belief that attendance increases wellbeing, highlighting a reasonable link between perceived wellbeing and satisfaction.

Table 5. Correlation among attendance, future-orientation and wellbeing measures. Source: our elaboration

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Attendance scale (1)	*1*				
Willingness to purchase a subscription (2)	*0.1835***	*1*			
Belief that theatre attendance enhances individual well-being (3)	*0.1089*	*0.2616****	*1*		
Satisfaction with most recent theatre experience (4)	*0.0046*	*0.0963*	*0.5198****	*1*	
Perceived impact of attendance interruptions on physical/psychological health (5)	*0.2884****	*0.1738**	*-0.0764*	*-0.1269*	*1*

Research limitations. *This paper, as a work in progress, reports preliminary results of broader research that will also allow to include the role of emotion and of the individual and social benefits associated with theatre attendance. At this step of analysis, therefore, we can rely only on a partial framework for explaining individual attendance choices.*

In addition, a few methodological limitations should be acknowledged. First, the reliance on self-reported data may lead to overreporting of both attendance frequency and wellbeing effects, as theatre-going is a socially valued activity and respondents may be inclined to present themselves as more culturally engaged or to overstate the personal benefits of attendance. Second, the subscription willingness item, while contextually coherent, remains an indirect proxy for future orientation, and may not fully capture the complexity of individual time preferences. A more standard monetary measure of time preferences was also included in the survey but, being less contextually embedded in the cultural framework, its integration with the present findings will require careful interpretation and then will be explored in subsequent stages of the research.

As for future research directions, subsequent stages will explore the role of the additional time preference measure, develop the between-group comparison between theatregoers and non-theatregoers, and incorporate emotional and social dimensions of theatre attendance into the analytical framework. Extending the analysis to other national contexts beyond the UK sample would also represent a valuable step forward.

Managerial implications. *The findings of this paper carry several theoretical implications for the literature on cultural economics and the demand for performing arts. First, the positive relationship between future orientation and attendance frequency supports the need to increasingly incorporate behavioral dimensions, and in particular individual time preferences, into theoretical frameworks of cultural demand. By connecting attendance choices to future orientation, the paper contributes to bridging the performing arts literature with the broader literature on intertemporal decision-making, opening up a promising theoretical avenue for understanding cultural consumption as a forward-looking behavior, rather than merely a response to current prices and income levels. Moreover, the finding that the health-related dimension of wellbeing shows a stronger and more significant association with attendance frequency than other wellbeing dimensions contributes to the growing literature on cultural participation and individual wellbeing. It suggests that different definitions of wellbeing may capture distinct aspects of the theatre-going experience. Finally, the results are consistent with a theoretical view on performing arts as experience goods, where value accumulates over time through repeated consumption. Although this paper does not directly test this mechanism, the positive relationship between future orientation and attendance frequency, as well as the association between attendance and health-related wellbeing, suggest that individuals may perceive theatre-going as an investment in a long-term experiential and personal benefit, rather than a one-off consumption act. This interpretation is consistent with the concepts of habit formation and learning-by-consumption mentioned in the framing section, and points to a promising direction for future theoretical and empirical work.*

Beyond their theoretical relevance, these findings also suggest practical implications for managers of performing arts organizations. First, since future orientation is positively related to attendance frequency, forward-looking attenders represent a crucial target to consolidate a relationship with, for instance through early presentations of future programming, the creation of ancillary events anticipating the shows or the implementation of early bird discount policies. Second, a correlation emerges between attendance and the health-related definition of wellbeing. This suggests that the way that cultural organizations communicate their activity should not focus only on the aesthetic experience or on the role of cultural products in individual development, but also on the opportunity of their integration in a healthy lifestyle. Finally, the quality of the performance is crucial to be maintained, given the significant correlation with the perception of enhancement of individual wellbeing.

Originality of the paper. *This paper analyses the demand of theatre performance by adopting an original perspective that additional and novel behavioral and motivational factors that may influence individuals' participation in theatre activities. Particularly, on top of considering socio-demographics characteristics, it investigates the role of consumers' attitude towards time, with special focus on their future orientation. In addition, it focuses on motivational factors that may be medium or long-term, such as the impact on personal wellbeing.*

From a methodological standpoint, the study also contributes to research transparency and replicability in the performing arts field through its preregistration. Finally, the two-group survey design — administering different survey

versions to theatregoers and non-theatregoers — will enable more structured between-group comparisons in subsequent stages of the research.

Overall, the study offers new insights into the behavioral drivers of cultural participation and contributes to a better understanding of audience behavior in the performing arts sector.

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Società Italiana di MANAGEMENT

Short papers

Track:
Small & Family Business



B Corps: Do they signal their status? Family vs. Non-Family Owned Behaviour

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Abstract. *This short paper describes where we are with our work in progress of our long-term investment in a research project that investigates how certified B Corporations communicate their B Corp status and sustainability commitments, and whether these communication strategies differ across ownership structures. Building on Signalling Theory and Identity Theory, we examine whether certification functions primarily as an instrumental market signal or as an expression of deeply embedded organizational identity.*
Our exploratory findings reveal significant ownership-based differences in both symbolic signalling and substantive sustainability framing.
By moving beyond a binary view of certification and examining heterogeneity within the certified population, this study aims at contributing to the literature on sustainability communication, ownership structure, and third-party certification. It offers first empirical evidence to our intuition that B Corp status is not enacted uniformly but is shaped by governance and identity dynamics, offering new insights into how organizational form influences the meaning and strategic deployment of sustainability credentials.
Keywords: *sustainability, B Corps, Signaling Theory, Identity Theory*

Framing of the research.
The current marketplace is rife with certifications and insignias; some are product- or industry-specific, such as GOTS; others certify the process, such as FSC or Green Seal; each signals to the consumer that the firm or product meets specific criteria. The B Corp certification is widely recognized and highly valued by both consumers and industry actors, in part because it is accessible to firms regardless of country of origin, size, or industry. Moreover, the certification process is generally regarded as stringent and demanding, thereby enhancing the credibility and signaling strength of the certification toward end consumers This work situates itself within Signaling Theory and Identity Theory. According to Spence (1973), a signal represents and transmits reliable information about an unobservable quality to an actor in a state of information asymmetry. This signal, to be reliable and well-received, must be costly and difficult to imitate, thus increasing receivers' trust in the signal. From a signaling perspective, B Corp certification can be understood as a strategic communication device aimed at reducing uncertainty and enhancing legitimacy among stakeholders. However, Signaling Theory also suggests that firms may differ substantially in how they deploy such signals. Some firms may adopt certification instrumentally, using it selectively or cautiously to avoid potential scrutiny or accusations of greenwashing, while others may amplify the signal through more visible and integrated communication strategies (Carlos & Lewis, 2018). Achievement of certification alone does not fully capture its strategic meaning; the *intensity and visibility* of its communication are central to understanding how the signal is used. We believe this to be significant and important as understanding this relationship could provide further insights into why some firms choose not to advertise their costly certifications, moving past issues raised by Gehman & Grimes (2017), (distinctiveness) and Carlos & Lewis (2018) (hypocrisy and reputational concerns). Furthermore, to our knowledge, few papers exist within family firm scholarship that seek to combine core identity values of a firm with the use (or lack thereof) of a costly, observable, and highly recognizable signal, as well as comparing their behaviour to other forms of ownership.
On the other hand, Identity Theory describes those core beliefs that exist within an organization, that are accepted by all members and considered as enduring, central, and distinctive (Albert & Whetten, 1985). In short, they describe the "*who we are"* and "*why we act"* of an organization. Identity Work considers the ongoing actions and processes that are undertaken by individuals or entities in order to construct, evolve and revise their identities (Burke & Stets, 2009). It encompasses the cognitive and behavioural efforts required for the creation and evolution of a sense of self (Bettinelli et al., 2022).
However, identity *work* does not translate directly into identity *communication*. The outward signaling of internal toil and identity construction is not always a clear or conscious path; in the organizational context, this translates into the adoption of symbols, practices, procedures, and certificates that are used to clearly communicate identity through explicit declaration and visible value-alignment. As pointed out by Bettinelli et al. (2022), there is a significant gap in family business literature on identity work.
Further evidence that certification can serve as an indicator of identity work is pointed out by Richards et al. (2017), as they find that the act of certification is not a passive moment, but that it leads firms through a process of questioning and managing their own legitimacy in the chosen arena. In this view, the B Corp certification, grounded in increasing social purpose and boosting responsibility, becomes instrumental in shifting organizational identity and expectations to further align them with the B Lab credo.

Purpose. With this exploratory study, we seek to deepen understanding of the relationship between a costly and observable signal, such as B Corp certification, and the underlying identity beliefs that motivate organizations to pursue and enact such certification. Specifically, we investigate whether B Corp status functions primarily as an instrumental market signal or as an authentic expression of organizational identity, and whether this distinction varies systematically across ownership structures, namely family firms, founder-controlled firms, and non-family firms.

Drawing on Signalling Theory and Identity Theory, we develop a dual theoretical lens through which certification is conceptualized not merely as a reputational device, but as an observable outcome of identity-building work. From a signaling perspective, B Corp certification represents a costly, third-party verified credential that reduces information asymmetry and communicates quality and commitment to external stakeholders. From an identity perspective, however, certification may also serve as a mechanism through which firms consolidate, formalize, and publicly affirm deeply embedded values and beliefs. In this sense, certification becomes part of the firm's identity narrative rather than a purely symbolic or market-oriented signal.

Considering these aspects, we began to notice an interesting trend: many firms we know to be B Corp certified do not "shout it from the rooftops", providing little or no visual communication of their certification. We chose to question why, after a lengthy and costly process, some firms would choose a very low-profile communication strategy. This work seeks to set the floor for a better understanding of the behavior firms exhibit towards communicating their belonging to a specific subgroup; we thus ask: *How do certified B Corps communicate their B Corp status and sustainability commitments in their mission statements, and how do these communication strategies differ between family and non-family firms?*

As we are studying a sustainability certification, this work is also adjacent to the greater topic of nonfinancial reporting and performance in family firms. Brunelli et al. (2024) show that current literature has focused heavily on how family influence can moderate nonfinancial reporting and performance. Other literature reviews such as Buchetti et al., (2025), Van Gils et al., (2014) have also focused primarily on ESG and CSR metrics, relating them to family firm performance and heterogeneity, showing that the realm of certifications, especially sustainability certifications, is as yet underrepresented in family firm scholarship.

Through this project, we aim to contribute to the family business literature by linking ownership structure to the strategic and symbolic use of sustainability certification, offering a more nuanced understanding of how identity and governance dynamics influence the meaning and enactment of third-party credentials.

Our work in progress potentially aims at making some contributions to the family business and sustainability literatures. Firstly, we move beyond a binary view of sustainability certification by considering whether the B Corp status varies meaningfully in its communicative enactment across ownership types. Secondly, by integrating Signaling Theory with Identity Theory, we explain why the same certification can function either as an instrumental market signal or as an expression of organizational identity.

Methodology. This study refers to a work in progress employing a mixed-method approach to explore how Italian certified B Corporations communicate sustainability, with particular attention to differences across ownership structures. The analysis integrates secondary data with qualitative and content-based examination of corporate communications, using established criteria to group firms into broad ownership categories.

To preserve the originality and integrity of the ongoing research, detailed specifications of the research design, data construction, and analytical procedures will be fully articulated at the end of the research process.

Preliminary findings from a sample of Italian B Corporations indicate observable variation in both sustainability framing and symbolic communication across ownership categories. Initial evidence suggests that firms tend to emphasize multiple sustainability dimensions, with indications that certain ownership types are associated with broader sustainability narratives and comparatively stronger visibility of certification-related signals. Statistical testing points to meaningful differences across groups, and supplementary analyses provide consistent directional support for these patterns. As this is an ongoing study, the results presented here should be interpreted as provisional.

Research limitations. Since we have not completed the project and are presenting the progress of our work in order to receive constructive feedback on its evolution, detailed statistical outputs, model specifications, and robustness procedures are not available at this stage. Furthermore, as this is a work in progress, our preliminary findings would benefit from ulterior quantitative testing focusing eventually on non-parametric tests, in the future we would consider widening the definition of "family firm" to be less stringent on ownership share as well as on family involvement in governance; this widening would allow for the inclusion of various firms and would therefore, we hypothesize, render the family ownership variable significant in in explaining "Pride score" and "mission emphasis". Also, while a strength of this work is the strong commitment to check the qualitative nature of mission statements, beyond mere word counts, even more could be disclosed about the reasons for such communication strategies with qualitative in-depth interviews with decision makers to reflect nuances in family and firm identity.

Managerial implications. This work-in-progress seeks to contribute to the literature on sustainability signaling by examining why some firms choose not to actively communicate certifications like the B Corp one and how this behavior may relate to ownership structure and stated organizational purpose. A suggestion from preliminary findings is that different ownership types may be associated with whether certification is seen as a tool to signal a company's identity or not.

Given the ongoing nature of the project, these interpretations should be considered provisional. A full articulation of theoretical implications, managerial contributions, and supporting evidence will be disclosed once the research project is completed.

Originality of the paper. This work-in-progress explores the intersection of ownership structure, sustainability communication, and certification. It represents a first step towards a more nuanced understanding of differences among certified B Corps. The work tentatively contributes by suggesting an approach that moves beyond distinguishing between certified and non-certified companies and by considering the communication strategies of certified companies.

The study also introduces an initial communication-based methodological approach combining visual and textual analysis as proxies for organizational positioning. As the research is ongoing, these contributions are provisional.

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Dual-Speed Transformation After Succession: Why Family Business Groups Change while Staying the Same

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Abstract. *Generational succession is central in family-controlled firms, but post-succession is often framed as producing either strategic renewal or strategic continuity. Conversely, this paper develops a theory of "dual-speed" strategic transformation in large family-controlled business groups by integrating insights from family business research, business group scholarship, and organisation theory, using the South Korean chaebols context as an extreme illustrative setting for mechanism elaboration. Drawing on socioemotional wealth theory, the attention-based view, and institutional complexity, we argue that succession triggers a successor legitimacy calculus: incoming leaders must signal competence and future orientation to external audiences while preserving family control, socioemotional wealth, and internal coalition stability. This tension leads to selective change across domains. Continuity is expected in control-critical domains, such as governance, ownership, and core affiliates, where change is politically costly. Renewal is more likely in growth-critical domains, such as technology, capability development, and international expansion, where visible change offers greater legitimacy benefits with lower risks to the control core. The paper also identifies boundary conditions that intensify this pattern, including institutional scrutiny, ownership-control complexity, predecessor imprinting, and resource slack.*
Keywords: *Generational succession, Socioemotional wealth (SEW), Strategic change, Family-controlled business groups, Chaebols, Corporate governance.*

Framing of the research. *Generational succession is widely recognised as one of the most consequential events in family-controlled firms, shaping strategic orientation, governance arrangements, and long-term survival (Gómez-Mejía et al., 2007; Miller et al., 2008). Family business research typically frames succession as a pivotal juncture that yields either strategic continuity or strategic renewal (De Massis et al., 2016), thereby polarising existing perspectives on succession. The first stream links succession to strategic inertia, grounded in families' motivations to preserve control, identity, and socioemotional wealth (SEW) and to avoid decisions that might intensify conflict or jeopardise authority (Gómez-Mejía et al., 2007; Miller & Breton-Miller, 2014; Berrone et al., 2012). The other stream positions succession as an opening for renewal, enabling next-generation leaders to pursue innovation, redirect growth, and realign the organisation with changing competitive and institutional environments (Chirico & Salvato, 2016; Kellermanns et al., 2012). Both accounts are plausible and share an implicit assumption that post-succession responses are organisation-wide and internally coherent.*

*However, emerging works suggest that succession involves multiple processes and uneven effects across strategic arenas: intergenerational dynamics redirect attention in complex ways (Magrelli et al., 2022), successor imprinting and willingness to lead can constrain some choices while enabling others (Marques et al., 2022), and transgenerational control intentions may both encourage experimentation and generate inhibiting uncertainty depending on the domain (Dorsch et al., 2023). Business-group evidence further shows that successor effects depend not only on the successor's "outsiderness" at the affiliate level, but also on embeddedness in the group's internal labour market, which shapes the capacity to override inherited commitments and networks (Kim et al., 2022). Moreover, the canonical change-versus-inertia framing is complicated by the evidence that leadership transitions can remain "shadowed" by the continued influence of departing executives, thereby narrowing successors' discretion and suppressing strategic change even after formal succession has occurred (Kim et al., 2022). Th*ese insights are *particularly salient in the chaebol domain, where research has expanded rapidly but remains fragmented and disproportionately centred on ownership and governance structures, leaving limited cumulative theorising on how dynastic transitions translate into patterned post-succession strategy within complex business groups (Tomeczek, 2025).*

While family business research still tends to treat strategic change as relatively homogeneous, organisation and strategy theory has long argued that firms respond to leadership transitions and institutional pressures through selective adaptation, preserving stability in some arenas while changing in others (Ocasio, 1997; Greenwood et al., 2011). The chaebol context amplifies the plausibility of such selectivity. Historically shifting governance-CEO models, from hierarchical owner-chairman coordination to post-1997 "global standard" reforms and later internal-market governance mechanisms, create differentiated pressures across domains, making uniform transformation unlikely (Shin & Kim, 2025). In addition, the "shadow" mechanism suggests that stability can be an outcome of inherited relational

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and governance constraints, not merely a family preference, and that these constraints may operate unevenly across arenas (Kim et al., 2022).

Chaebols are a distinctive and analytically rich form of family-controlled business organisation. As large, diversified business groups, they coordinate portfolios of legally independent affiliates under a shared strategic and governance umbrella, while control is centralised through pyramidal ownership chains and cross-shareholding ties (Chang, 2003; Khanna & Yafeh, 2007). Although they differ from the archetypal small and medium-sized family firms often studied in the family business literature, chaebols embody core family-enterprise attributes: concentrated family control, transgenerational intent, and the persistent intertwining of family and business goals (Carney, 2005; Morck et al., 2005). Their theoretical importance lies less in size than in the institutionalised architecture of control, which allows controlling families to sustain stable rule despite limited direct equity. This makes protecting control a uniquely salient strategic objective (Park, 2025; Dessì & Kim, 2026).

In chaebols, dynastic control coexists with ownership complexity, professionalised management, and intense scrutiny from regulators, the media, and capital markets, making governance and control a central battleground for legitimacy (Park, 2025; Korea Fair Trade Commission, 2023). A The defining feature of chaebols is the pronounced separation between ownership and control (Park, 2025) and effective control with relatively small direct equity stakes (Chang & Hong, 2000). This wedge enables disproportionate influence over strategy with limited capital commitment, but it also creates governance vulnerabilities, coordination costs, and exposure to regulatory intervention. Succession often intensifies these pressures by inheritance-related financing and control-preserving transactions that occur under heightened scrutiny, making governance and ownership decisions politically and reputationally "high stakes" for successors (Park, 2025). From an SEW perspective, these features amplify the preservation of control as a core dimension of family value, pushing governance arrangements into a control-critical arena across generations (Berrone et al., 2012; Gómez-Mejía et al., 2007).

Historically, research on chaebol and business groups has examined succession-adjacent issues through governance and agency lenses, including tunnelling and minority shareholder expropriation in group-based control settings (Bae et al., 2002; Bertrand et al., 2002), and links to firm value and crisis-era outcomes that highlight how institutional shifts shape strategic constraints (Baek et al., 2004; Campbell II & Keys, 2002). Arguably, succession in chaebols is not merely a leadership change but a system-level reconfiguration of authority, legitimacy, and control in which business-group dynamics further complicate it by reshaping discretion. While this scholarship clarifies the "control core" aspects, it offers more limited theorisation of how successors' strategic actions are patterned across domains inside the group. Recent works show why such patterning should be expected by demonstrating that control, legitimacy, and information dynamics are tightly coupled. More broadly, governance scholarship argues that group governance and the group-level CEO/owner-chairperson role are "virtually inseparable," with real governance dynamics partly decoupled from formal charts, limiting the feasibility of rapid change in control-critical domains (Shin & Kim, 2025). At the same time, other strands indicate why renewal may be more feasible in growth-critical arenas. Yet CEO- and succession-centred mechanisms remain relatively under-integrated, leaving open the question of why post-succession change should unfold asymmetrically rather than uniformly (Tomeczek, 2025).

Purpose of the paper. *This paper aims to develop a conceptual theory of dual-speed post-succession strategic transformation in family-controlled business groups, explaining why succession generates continuity in control-critical domains and renewal in growth-critical domains. We develop a theoretical model of dual-speed strategic transformation, arguing that successors face a legitimacy calculus: they must demonstrate strategic competence and a future-oriented stance to external audiences while preserving family control and cohesion. This tension reallocates strategic attention asymmetrically. Inertia is expected to dominate control-critical domains (governance structures, ownership arrangements, control architectures, core assets), where disruption is politically costly and prone to cascades. Instead, renewal should focus on growth-critical domains (technology upgrading, new investments, emerging markets, international expansion), where visible change can build legitimacy while posing a comparatively lower threat to the control core. This persistent theoretical tension in succession research affects the design logic of this work. Rather than treating this divergence as an inconsistency to be resolved via additional contingencies, it is leveraged as a productive site for theory development. Following arguments that contradictions can generate stronger theory (Poole & Van de Ven, 1989), the article proposes a higher-order explanation in which renewal and inertia systematically coexist but are distributed across strategic domains. The rationale of the research is underpinned by several considerations.*

First, family business research offers some building blocks for a domain-differentiated view. Families evaluate strategic moves selectively, depending on whether actions threaten control, identity, or relational wealth, a pattern observed in decisions such as IPOs and acquisitions (Calabrò et al., 2024; Carbone et al., 2024). Dominant-coalition lens emphasises that control is sustained through both equity and relational coalitions, implying that successors must manage formal and informal power simultaneously (Ben-Shahar et al., 2023). These insights converge on a central problem in complex family enterprises: successors must signal capability and future orientation while operating within fragile control architectures in which destabilising moves are costly, especially when discretion is narrowed by the predecessor's "shadow" conditions and inherited networks (Kim et al., 2022; Park, 2025).

Second, succession research has long regarded leadership transitions as critical turning points that alter risk preferences and the balance between economic and non-economic goals (Berrone et al., 2012; Gómez-Mejía et al., 2007). SEW helps explain inertia when change threatens control or identity (Gómez-Mejía et al., 2007; Miller & Breton-Miller,

2014), yet recent contributions clarify that SEW is multi-dimensional, helping explain selective acceptance of change across arenas (Carbone et al., 2024). In parallel, renewal perspectives argue that successors may pursue innovation to build a distinctive legacy (Chirico & Salvato, 2016; Kellermanns et al., 2012), with successor imprinting and willingness to lead shaping behaviour unevenly (Marques et al., 2022), and pre-succession uncertainty influencing innovation incentives (Dorsch et al., 2023). However, what remains under-theorised is the structure of post-succession change in internally differentiated organisations. Outcomes are often treated as a single firm-level trajectory despite the likelihood that constraints and discretion vary across domains and layers (Kim et al., 2022).

Third, business group theory makes heterogeneity unavoidable. In family-controlled groups, these theoretical tensions intensify because dynastic power rests on control-preserving structures with limited cash-flow rights (Carney, 2005; Morck et al., 2005). Korean evidence reinforces this: governance outcomes vary with proximity to the control core and the magnitude of the wedge (Ahn et al., 2025; Kim et al., 2025), while succession effects depend on group-outsider status and the predecessor shadow, with crisis conditions moderating change (Kim et al., 2022).

These strands remain suggestive but fragmented, motivating an integrating logic of where, when, and why renewal and inertia coexist within the same group. Two broader lenses can help to clarify why such integration is needed. Institutional complexity implies competing demands that invite selective accommodation rather than a single, coherent strategy (Greenwood et al., 2011). The attention-based view depicts organisations as attention-constrained systems where leadership transitions reallocate attention and intensify selective engagement (Ocasio, 1997). Together, these perspectives imply that successors in chaebols will likely pursue visible renewal that builds legitimacy and growth, while preserving stability when change threatens control, cohesion, and the governance architecture underpinning dynastic authority. This is the theoretical space a dual-speed framework addresses, bridging SEW (Gómez-Mejía et al., 2007; Carbone et al., 2024), attention-based reasoning (Ocasio, 1997), and institutional complexity (Greenwood et al., 2011) to explain patterned, domain-differentiated post-succession transformation, and to motivate propositions and boundary conditions (e.g., ownership/control complexity, predecessor shadow, institutional scrutiny, resource slack) for future empirical research.

Methodology. *This paper adopts a conceptual research design focused on theory building rather than theory testing. The goal is to develop a parsimonious yet generative explanation that specifies focal constructs, clarifies their relationships, and delineates the boundary conditions under which the theory should apply (Whetten, 1989). Consistent with foundational views in organisation studies, theory is treated as an explanatory system that clarifies why relationships emerge, how they unfold, and under what conditions they hold, rather than as a mere catalogue of variables or empirical regularities (Sutton & Staw, 1995; Weick, 1989). To avoid ungrounded abstraction, recent empirical findings on Korean business groups are used as stylised facts that anchor theorising, such as evidence that post-transition strategic change can be selective and shaped by group-level constraints and legacy effects, and that succession dynamics may shift risk-taking incentives even before formal transfer (Kim et al., 2022; Lee et al., 2023). These findings are not retested; instead, they serve as empirical signals motivating the conceptual model.*

The theory-building design is an integrative synthesis: established perspectives are recombined to produce an explanation that no single body of literature can yield on its own (Jaakkola, 2020). In line with Weick's notion of disciplined imagination, novelty is recognised as theoretically valuable only insofar as it remains coherent and plausible (Weick, 1989). Three bodies of work are integrated: (1) SEW and family succession research, (2) attention-based and strategic change theories, and (3) business group scholarship. To sharpen microfoundations of why some arenas resist change, the model also draws on dominant-coalition theorising that links hard power (equity) and soft power (relational ties) (Ben-Shahar et al., 2023). On this basis, the contribution lies in offering an original and useful explanation, one that can redirect future research and clarify theoretical and practical implications (Corley & Gioia, 2011; Whetten, 1989). In our study, chaebols are used as an extreme, illustrative context to clarify mechanisms and boundary conditions. This aligns with the logic of extreme-case design in theorising; the setting aims to shed light on constructs and processes rather than to achieve statistical representativeness (Eisenhardt, 1989; Eisenhardt & Graebner, 2007; Siggelkow, 2007). Moreover, the Korean context amplifies the preservation–renewal tension through high ownership–control wedges, professionalised CEO models, and shifting governance expectations (Park, 2025; Shin & Kim, 2025). The aim is to analytically generalise to other complex family-controlled enterprises under close scrutiny.

Construct development proceeds iteratively. The framework specifies the successor legitimacy calculus as the central mechanism, distinguishes between control-critical and growth-critical domains, and predicts a dual-speed transformation as the post-succession pattern. Boundary conditions (e.g. institutional scrutiny, ownership/control complexity, predecessor imprinting, resource slack) are defined to avoid overgeneralisation (Corley & Gioia, 2011; Whetten, 1989), and propositions are deductively derived to guide future empirical work, especially process and longitudinal designs attentive to temporality and selective change (Langley, 1999).

Results. *In developing a dual-speed theory of post-succession strategic transformation in family-controlled business groups, this study starts from the premise that generational succession is not merely a discrete managerial turnover, but a legitimacy-challenging turning point that reconfigures strategic attention and priorities. Succession activates a successor legitimacy calculus: incoming leaders must reconcile two competing imperatives, demonstrating strategic competence and future orientation in the eyes of external audiences while simultaneously preserving family control and*

SEW. This calculus helps explain why successors are pulled toward both continuity and change immediately after succession rather than moving in a single strategic direction.

This mechanism aligns with emerging family business research that emphasises succession as historically and relationally situated, shaped by how successors negotiate inherited values and what Magrelli et al. (2022) describe as the "wisdom of the past" as they launch new initiatives. It is also consistent with Marques et al.'s (2022) research on family imprinting and successor willingness, which shows that successors' motivations and perceived fit are endogenously shaped through family influence, generating both commonalities and differences in succession-related orientations. In business groups, moreover, legitimacy-building may be proactively engineered through governance pathways: controlling families can use board appointments strategically to position next-generation members within the group's governance structure, thereby enhancing their visibility and legitimacy as potential successors (Jeong et al., 2022). Dominant-coalition perspectives further suggest that legitimacy pressures are filtered through political considerations, as coalitions interpret performance feedback not solely through efficiency criteria but also through a control calculus oriented toward preserving dominance (Lee et al., 2025). Taken together, these insights imply that the successor legitimacy calculus is not purely external but simultaneously shaped by family history, internal coalitions, and broader institutional audiences.

Crucially, this legitimacy calculus does not produce a uniform organisational response. Instead, it implies the selective deployment of change efforts across domains, depending on two dimensions: the visibility of actions to external audiences and the perceived risk they pose to family control and internal cohesion. Because succession reopens tensions between past and future while exposing successors to multiple evaluative audiences, a single coherent package of change is unlikely to emerge. This logic is consistent with institutional complexity arguments: when organisations face heterogeneous, partly incompatible demands, they often respond by adopting differentiated, compartmentalised adaptations across domains rather than a uniform shift (Greenwood et al., 2011).

This differentiated response becomes more analytically tractable when the theory distinguishes between control-critical and growth-critical domains. In the first domain, changes in governance structures, ownership and control architectures, and the core affiliates that underpin family authority are politically costly and can provoke cascading contestation; successors therefore prioritise stability, and, when change is inevitable, they tend to adopt incremental adjustments to safeguard coalition stability. The latter domain, which includes outward-facing, future-driven fields such as technological investment, capability development, and international expansion, poses less threat to the control core and, at the same time, provides greater legitimacy because visible renewal can convincingly signal competence and modernity.

Several contextual forces intensify this dual-speed logic. Institutional scrutiny from regulators, media, and capital markets operates as a dual force: it increases incentives for visible renewal in growth domains while raising the political and legal risks of altering governance and ownership arrangements, reinforcing stability in the control core. Ownership and control complexity further magnifies these dynamics by increasing coordination costs and cascading risk; in settings characterised by pyramids and cross-shareholdings, disturbances to the control architecture can produce unintended ripple effects across affiliates, making control-critical change especially hazardous. Discretion is also shaped by predecessor imprinting and internal elites: longstanding routines and elite coalitions socialised under predecessors may persist after succession, constraining what successors can credibly change and encouraging them to redirect renewal toward safer arenas. Finally, slack expands the feasible set for successors, enabling more intensive experimentation and investment in growth-facing domains while maintaining stability in areas tied to family authority; such slack can be financial, but it may also be political, reflecting the coalition's capacity to act despite constraining performance signals (Lee et al., 2025).

Research limitations. *As a conceptual article, the framework aims to generate explanatory clarity and guide empirical inquiry rather than to directly test hypotheses. This presents some limitations.*

First, the dual-speed logic is developed from a revelatory context (South Korean chaebols) in which ownership-control wedges, coalition dynamics, and external scrutiny are especially pronounced. Although this extreme-case context improves mechanism explanation, future research should assess its applicability across other forms of family capitalism and business groups, including European family firms, Latin American conglomerates, and other Asian business groups, where ownership complexity, institutional scrutiny, and coalition structures may differ in both intensity and form (Barkema et al., 2015; Khanna & Palepu, 2000).

A second limitation concerns micro-foundations. The framework would benefit from a richer empirical understanding of how successors interpret competing audiences, negotiate internal elite constraints, and identify which domains are perceived as safe arenas for renewal rather than anchors of continuity. Qualitative and mixed-method studies would be especially valuable in clarifying how legitimacy is constructed over time and how it interacts with imprinting, successor willingness, and dominant-coalition dynamics (Ben-Shahar et al., 2023; Magrelli et al., 2022; Marques et al., 2022).

Third, the theory calls for longitudinal evidence. Tracking strategic actions across domains before and after succession would allow researchers to observe not only whether dual-speed transformation emerges, but also how it evolves as successors consolidate authority and as boundary conditions shift (e.g., scrutiny levels, ownership complexity, predecessor "shadow," resource slack) (Kim et al., 2022; Lee et al., 2023).

Finally, the framework does not yet fully specify the role of exogenous shocks and major discontinuities. Legal sanctions, crises, technological disruptions, and major governance events may interact with succession in ways that alter

the relative feasibility and attractiveness of control-critical versus growth-critical change, thereby intensifying, attenuating, or reconfiguring the dual-speed pattern.

Managerial implications. *For successors, controlling families, boards, and advisors, the framework highlights why attempting to "change everything at once" is often neither feasible nor strategically optimal in complex family-controlled groups. A first practical implication is to explicitly separate domains: treat control-critical arenas as spaces where continuity and careful sequencing protect coalition stability, while positioning growth-critical arenas as domains where renewal is both safer and more effective for demonstrating competence and future orientation.*

Second, governance stability should not automatically be interpreted as rigidity. In the dual-speed view, preserving the control core can serve as a strategic buffer, creating political and organisational slack for experimentation elsewhere, particularly when external audiences expect visible modernisation. In this sense, stability and renewal can complement each other when intentionally allocated across domains.

Third, advisors and policymakers should anticipate selectivity in change. Governance interventions that overlook the domain-specific calculus of control and legitimacy may trigger resistance or unintended ripple effects, especially in tightly coupled ownership structures. A more effective approach is to recognise that change is often shaped by where it is introduced: outward-facing initiatives may build legitimacy and expand the successor's room for manoeuvre before more politically sensitive adjustments to the control core become feasible.

Originality of the paper. *The paper's originality lies in reframing post-succession outcomes away from a binary "renewal versus continuity" logic toward a domain-differentiated theory of dual-speed transformation in family-controlled business groups. Rather than treating stable governance indicators as evidence of organisational stagnation, the framework explains how governance stability can coexist with substantial strategic renewal in growth-critical domains (e.g., technology, international expansion, capability development). This challenges interpretations that infer "no change" from unchanged ownership or board structures, redirecting attention to where change occurs within groups. A second original contribution is conceptual. Institutional scrutiny is theorised as a dual force rather than a uniformly disciplining mechanism. Scrutiny can simultaneously intensify outward-facing renewal (because visible initiatives yield legitimacy returns) and reinforce conservatism in governance-related arenas (because control moves become more observable, contestable, and cascade-prone) (Greenwood et al., 2011). This opens a pathway for governance scholarship to theorise selective and compartmentalised adaptation, rather than expecting comprehensive governance reform following succession. Third, the dual-speed lens encourages more fine-grained research designs by highlighting intra-group heterogeneity across affiliates and organisational roles within business groups (Chang & Hong, 2000; Khanna & Yafeh, 2007).*

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Energy Transition as an Ecosystem enabler of growth in Italian MSMEs: Preliminary evidence from a national survey

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Abstract. *The energy transition represents one of the most significant structural transformations affecting contemporary business ecosystems. While large corporations have been widely investigated in relation to sustainability strategies and decarbonization pathways, far less attention has been paid to micro, small, and medium enterprises (MSMEs), particularly within national contexts characterized by structural fragmentation and financial constraints. This study explores how energy transition strategies function as enabling or constraining mechanisms of ecosystem-based growth among Italian MSMEs. Drawing on preliminary evidence from a national survey carried out by Universitas Mercatorum and Federterziaio as components of Lamp Observatory involving 139 firms with fewer than 50 employees, the paper analyzes patterns in energy awareness, strategic behavior toward energy procurement, adoption of efficiency and renewable energy investments, and access to public financing. The findings reveal a structural divide between proactive and passive firms, a significant energy literacy gap among microenterprises, and strong size-based asymmetries in financial access and strategic adaptability. While a majority of firms have undertaken some form of energy-related intervention, many initiatives remain incremental and self-financed, limiting systemic impact. The study proposes a conceptual interpretation in which energy transition acts simultaneously as a capability filter and as an ecosystem growth enabler. By integrating sustainability transition dynamics into ecosystem-based growth models for MSMEs, the paper contributes preliminary empirical evidence to debates on sustainable competitiveness and institutional support mechanisms.*

Keywords: *energy transition; MSMEs; ecosystem growth; sustainable competitiveness; renewable energy adoption; Italy*

Framing of the research. *The energy transition is increasingly recognized as a structural transformation reshaping economic systems, industrial organization, and competitive dynamics (Newell, 2019). Decarbonization pressures, volatility in energy markets, technological innovation in renewable sources, and evolving regulatory frameworks are redefining the strategic landscape within which firms operate (Laurie & Serrano-Archimi, 2025; Üstgörül et al., 2024). In this evolving context, energy transition becomes intertwined with growth trajectories, cost structures, reputational positioning, and ecosystem participation (Thomas et al., 2024).*

While much of the academic and policy discourse has focused on large corporations and energy-intensive industries, micro, small, and medium enterprises (MSMEs) represent the structural backbone of many European economies, including Italy (Faggioni & Rossi, 2025a; 2025b; Sestino et al., 2025). Italian MSMEs are characterized by high fragmentation, strong territorial embeddedness, prevalence of family ownership, and limited financial and managerial slack (Palazzo et al., 2017; Rossi et al., 2026). These structural features influence their capacity for innovation and their ability to engage in sustainability-oriented transformation processes (Basile et al., 2025).

Ecosystem theory has emphasized the importance of inter-organizational networks, institutional support, and resource complementarities in enabling firm growth and innovation (Vrontis et al., 2020). From this perspective, growth is not solely an internal process but emerges through relational and systemic dynamics (Sánchez-García et al., 2023). Business ecosystems are conceptualized as loosely coupled yet interdependent constellations of actors, firms, institutions, financial intermediaries, and knowledge providers, whose coordinated interactions generate collective value and enable capability development beyond firm-level boundaries (Tani et al., 2025). However, the integration of energy transition into ecosystem-based growth models remains underdeveloped, particularly for microenterprises (Chatzinikolaou & Vlados, 2025). Energy-related strategic decisions, such as switching suppliers, investing in renewable energy systems, or accessing public incentives, may signal broader capabilities related to strategic adaptability, financial planning, and institutional embeddedness (Prashar, 2019; Fresner et al., 2017).

In this sense, energy transition can also be understood as a dynamic capability test within the ecosystem (Pouw & Mosink, 2024). Firms capable of monitoring energy consumption, renegotiating contracts, leveraging public incentives, and integrating renewable technologies demonstrate higher levels of absorptive capacity, strategic reflexivity, and ecosystem connectivity (Dong et al., 2022). Conversely, firms displaying inertia in these domains may experience cumulative competitive disadvantages (Munguia et al., 2018).

Recent fluctuations in energy prices across Europe, including significant increases in wholesale electricity costs, have further exposed vulnerabilities within smaller firms (Martin-Valmayor et al., 2023). Energy procurement, once

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considered a purely operational issue, has become a strategic variable affecting margins, investment decisions, and long-term competitiveness (Petrovich & Kubli, 2023). In such a context, the capacity to understand energy consumption patterns, evaluate contractual alternatives, and implement efficiency measures can be considered an indicator of organizational maturity (Britel & Cherkaoui, 2022).

Within Italy, the MSME sector faces additional structural constraints, including bureaucratic complexity, limited access to external capital, and uneven participation in formal networking and institutional support mechanisms (Pascucci et al., 2022). These factors may amplify asymmetries in the adoption of energy transition strategies; consequently, energy transition provides a valuable analytical lens through which to observe broader ecosystem-based growth dynamics (Thomas et al., 2024).

While recent studies have increasingly explored sustainability transitions and ecosystem dynamics, the intersection between energy transition and MSME ecosystem-based growth remains only partially developed. In particular, prior contributions have predominantly focused either on firm-level sustainability adoption or on macro-level ecosystem configurations, without explicitly conceptualizing energy-related strategic behavior as a diagnostic lens of underlying capability structures. By positioning energy transition as both a capability filter and an ecosystem enabler, this study contributes to advancing current debates by bridging sustainability transitions with capability-based and ecosystem-oriented perspectives in the specific context of MSMEs.

Considering this scenario, this study positions energy transition as a potential ecosystem enabler of growth in Italian MSMEs. Rather than treating sustainability as an isolated policy domain, the paper interprets energy-related strategic behavior as a proxy for organizational capabilities development, institutional engagement, and growth orientation. The preliminary quantitative evidence presented here aims to stimulate discussion on how energy transition interacts with structural characteristics of the Italian MSME ecosystem.

By embedding energy transition within a conceptual ecosystem-growth framework, the study contributes to emerging debates on sustainable competitiveness, arguing that energy-related strategic behavior reflects deeper patterns of resource orchestration, institutional embeddedness, and long-term strategic positioning.

Purpose of the paper. *The purpose of this study is to explore how energy transition strategies function as enabling or constraining mechanisms within ecosystem-based growth trajectories of Italian micro, small, and medium enterprises.*

Specifically, the study seeks to:

1. *Examine the level of energy awareness among Italian MSMEs and its relationship with organizational size.*
2. *Analyze strategic behaviors in energy procurement and contract management.*
3. *Investigate the adoption of energy efficiency measures and renewable energy investments.*
4. *Assess the extent to which firms access public financial support for energy-related initiatives.*
5. *Conceptually interpret these findings within an ecosystem-based growth framework.*

Rather than testing causal hypotheses, this preliminary investigation aims to identify structural patterns and asymmetries that may inform the development of an integrated conceptual framework linking energy transition and MSME growth dynamics. The study contributes early empirical evidence to ongoing discussions regarding sustainable competitiveness and institutional support systems for small firms.

Methodology. *This study adopts an exploratory empirical approach based on preliminary evidence from a national quantitative survey of Italian micro, small, and medium enterprises. The survey collected 139 valid responses from firms with fewer than 50 employees, the majority of which qualify as microenterprises.*

The participating firms are predominantly active in services, commerce, and manufacturing sectors. A significant proportion operate as family-owned businesses and exhibit entrepreneur-centered governance structures. Most firms reported having been established without public incentives and relying primarily on personal capital at start-up.

The questionnaire included sections addressing firm profile, strategic orientation, networking behavior, and energy-related practices. The firm profile section gathered detailed information on organizational characteristics including firm size, sector, age, ownership structure, and market orientation, providing essential contextual data for interpreting subsequent responses. The strategic orientation section explored managerial priorities, competitive strategies, and tendencies toward innovation, with particular attention to how firms align their long-term objectives with operational decision-making. The networking behavior section examined the extent and nature of inter-firm relationships, partnerships, and institutional linkages, capturing networking capabilities, knowledge exchange, and external support mechanisms contribute to business development and adaptation. The energy-related practices section assessed operational approaches to energy management, including monitoring systems, efficiency measures, and investment planning, offering insights into how firms balance short and long-termism approach. The energy transition component of the survey focused on four main dimensions: (i) awareness of annual energy consumption linked to specific products or services; (ii) changes in energy supply contracts within the past five years; (iii) adoption of energy efficiency and renewable energy interventions; (iv) access to public funding for energy-related investments.

Data was analyzed using descriptive statistics to identify distributional patterns and structural asymmetries, particularly in relation to firm size categories. Given the exploratory nature of this study, the analysis aims to identify trends and emerging patterns rather than establish statistical causality. Different survey items referred to partially overlapping biennial periods (2023-2024 and 2024-2025), depending on the specific intervention considered.

As this paper presents preliminary findings, the results should be interpreted as indicative of structural dynamics rather than definitive conclusions.

Results. *The analysis reveals four interconnected themes that illuminate how energy transition interacts with ecosystem-based growth dynamics among Italian MSMEs, providing a comprehensive framework for understanding the strategic, organizational, and relational mechanisms that underpin sustainable business development. These themes collectively demonstrate that energy transition is not a linear or isolated process, but rather a multidimensional transformation shaped by internal capabilities, external pressures, and network-based interactions. They capture how firms interpret environmental challenges, mobilize resources, and embed sustainability practices within their broader growth trajectories. Furthermore, the interconnections among the four themes highlight the cumulative and reinforcing nature of energy-related strategies, whereby progress in one domain facilitates advancements in others. This dynamic interplay underscores the importance of coherence between managerial awareness, operational adjustments, institutional engagement, and ecosystem participation. By revealing these linkages, the analysis provides deeper insight into how Italian MSMEs navigate structural constraints and opportunities, leverage ecosystem support, and translate energy transition initiatives into competitive advantage, organizational learning, and potential long-term resilience that is still not fully considered by the analyzed firms (see Table 1).*

Table 1. Summary of key results

Theme	***Key Findings***	***Ecosystem Interpretation***
Energy Awareness Divide	*27% lack energy-output awareness; 32% among micro firms*	*Knowledge asymmetry; limited absorptive capacity*
Strategic Inertia	*57% did not change contract in 5 years*	*Adaptive rigidity; weak institutional engagement*
Financial Asymmetry	*25% accessed public funds; lower among micro firms*	*Capability filter effect; institutional access divide*
Asset-Based Transition	*29% renewable systems; 16% EV charging*	*Strategic signaling; ecosystem embeddedness strengthening*

Source: Authors' elaboration

The four dimensions identified are not independent but can be interpreted as part of a cumulative and reinforcing process. Limited energy awareness may constrain firms' ability to actively manage energy procurement, leading to forms of strategic inertia. This, in turn, may reduce the likelihood of engaging with institutional support mechanisms, particularly in accessing public funding. The resulting financial constraints can limit the scale and scope of energy-related investments, ultimately reinforcing capability divides within the ecosystem. From this perspective, energy transition dynamics reveal a sequential and path-dependent process through which initial capability gaps translate into broader structural asymmetries.

***Energy Awareness Divide**. A significant proportion of firms exhibit limited awareness of their energy consumption in relation to specific products or services. Approximately 27% of surveyed firms report a lack of clarity regarding the relationship between energy use and output, with this percentage rising to around 32% among firms with five or fewer employees.*

This finding suggests an energy literacy gap within the microenterprise segment. From a growth perspective, the inability to monitor and analyze energy consumption may constrain strategic decision-making and limit firms' capacity to implement a systematic efficiency improvements. Energy awareness thus emerges as a foundational capability within the transition process that needs of a networking capability useful in knowledge exchanges, financial support and advisory systems that typically highlights a sustainable territorial ecosystem capable to diffuse best practices related to efficiency management producing relevant impacts on specific places.

***Strategic Inertia in Energy Procurement**. Energy contract management reveals patterns of strategic inertia. Over 40% of firms report never having changed their energy supplier, and 57% have not modified their contract within the past five years. Given the volatility of energy prices over recent years, this behavior may signal limited strategic reactivity or insufficient information-processing capacity.*

Such inertia can be interpreted as an indicator of constrained managerial bandwidth or risk aversion. From an ecosystem perspective, firms that do not actively monitor and renegotiate energy contracts may also display weaker engagement with institutional support systems and advisory networks. Strategic inertia in energy procurement therefore, becomes not only a cost-management issue, but a marker of limited adaptive capacity within turbulent institutional environments.

***Partial Activation with Limited Financial Leverage**. Despite these limitations, a substantial majority (77%) of firms report having undertaken at least one intervention to reduce energy consumption during the 2023–2024 period. When excluding minor lighting upgrades, approximately 71% still report implementing efficiency or renewable-related measures.*

However, only about 25% of firms that invested in efficiency or renewable energy accessed public funding. Among microenterprises, access rates are even lower. This rate indicates that energy transition efforts are frequently self-financed, potentially limiting scale and scope.

These findings highlight strong size-based asymmetries in access and increasing relationships with institutional financial support. Larger firms appear better positioned to navigate funding mechanisms, reinforcing structural capability divides within the MSME ecosystem. The energy transition thus operates as a capability filter, rewarding firms with stronger administrative, financial, and institutional competencies while reinforcing vulnerabilities among structurally weaker actors.

***Asset-Based Energy Transition and Ecosystem Positioning**. Approximately 29% of firms installed renewable energy systems during the 2024–2025 period, often in combination with heat pump installations or building efficiency improvements. Additionally, 16% implemented electric vehicle charging infrastructure.*

These investments reflect not only cost-saving strategies with short-term impacts but also reputational positioning and ecosystem integration dynamics. Renewable installations and charging infrastructure can expand customer bases, enhance sustainability signaling, and create new revenue streams.

From an ecosystem growth perspective, asset-based energy investments may function as anchoring mechanisms that strengthen firms' embeddedness within local sustainable value chains. Such investments can enhance relational capital, attract environmentally conscious stakeholders, and signal long-term commitment to sustainable transformation and impacts.

Research limitations. *This study presents preliminary evidence based on 139 survey responses and relies on self-reported data. As such, the findings are subject to potential response biases and may not fully capture sector-specific heterogeneity. The findings are limited to the Italian institutional and regulatory context and cannot be directly generalized to other national settings. Given the nature of the data collection process, the sample should not be considered statistically representative of the overall population of Italian MSMEs. The survey relies on voluntary participation and self-reported information, which may introduce response bias and limit generalizability. However, the dataset provides a valuable first empirical insight into underexplored dynamics, particularly at the microenterprise level.*

The cross-sectional design prevents analysis of longitudinal dynamics or causal relationships between energy transition strategies and growth outcomes. Moreover, the descriptive statistical approach does not allow for inferential generalization to the broader population of Italian MSMEs.

Future research should incorporate longitudinal designs, comparative regional analyses, and multivariate modelling to test relationships between energy transition adoption, ecosystem engagement, and firm performance indicators. Further studies may also explore how ecosystem orchestration mechanisms, such as institutional convenors, regional innovation clusters, and financial intermediaries, moderate the relationship between energy transition and growth trajectories.

Managerial implications. *The findings suggest that the energy transition should be considered a strategic dimension of firm development within broader business ecosystems, not merely a regulatory or cost-related issue. For many micro and small enterprises, the first step is not technological investment, but awareness. A clearer understanding of how energy consumption relates to specific products or services represents a foundational managerial capability, enabling more informed decisions on pricing, cost structures, and long-term competitiveness and reputational performances.*

Energy procurement practices also deserve greater strategic attention. In contexts characterized by price volatility, regularly reviewing contracts and supplier conditions can reduce exposure to external shocks and enhance managerial responsiveness. Even operational choices in energy procurement may reflect broader patterns of strategic adaptability.

Access to public fundings emerges as another critical dimension. The data suggests that many firms, particularly microenterprises, rely primarily on self-financing when implementing energy-related investments. This condition may limit the scale and transformative potential of their initiatives. Strengthening advisory support and simplifying access to incentives could therefore play a pivotal role in enhancing the systemic impact of energy transition strategies.

Having said that, investments in renewable energy systems and charging infrastructure carry implications beyond immediate cost savings. Such initiatives can reinforce firms' reputational positioning, strengthen relational capabilities with stakeholders, and increase embeddedness within emerging sustainable value chains. From this perspective, energy transition becomes part of a broader strategic narrative that connects operational efficiency with long-term sustainable ecosystem positioning. Ultimately, this suggests the need for more targeted and differentiated policy instruments, particularly aimed at supporting microenterprises through simplified procedures and ecosystem-based advisory mechanisms.

Originality of the paper. *This paper contributes to the literature by integrating energy transition dynamics into ecosystem-based growth models for Italian MSMEs. Rather than treating sustainability adoption as an isolated phenomenon, the study interprets energy-related strategic behavior as a proxy for broader relational capabilities within a sustainable ecosystem view. In doing so, it positions energy transition not merely as a compliance-driven or cost-centered decision, but as a strategic process embedded within firms' learning, innovation, and relational activities. This perspective enables a more nuanced understanding of how MSMEs develop adaptive capacities, mobilize internal and*

external resources, and align environmental objectives with short and long-term competitive and growth-oriented strategies.

By embedding energy-related practices within an ecosystem framework, the study highlights the interconnected roles of institutional support, policy incentives, market pressures, and network relationships in shaping firm-level transitions. This approach captures the dynamic interactions between MSMEs and their surrounding business environments, emphasizing how co-operative relations, knowledge exchange, and access to funding mechanisms jointly influence sustainability trajectories and performance outcomes. Consequently, the paper extends existing ecosystem-based growth models by demonstrating that energy transition strategies can serve as indicators of organizational maturity, strategic alignment, and long-term resilience, thereby offering both theoretical advancement and practical insights for policymakers and practitioners concerned with sustainable MSME development.

By providing preliminary empirical evidence from a national survey, the paper advances understanding of how structural asymmetries, energy awareness gaps, and financial access constraints shape sustainable growth trajectories within fragmented MSME ecosystems.

The proposed interpretation of energy transition as both a capability filter and an ecosystem growth enabler offers a novel analytical lens for future research on sustainable competitiveness in small-firm contexts. In particular, the study suggests that energy transition operates as a diagnostic lens through which underlying ecosystem capabilities and structural fragilities visible, thereby enriching theoretical debates on sustainable competitiveness, institutional embeddedness, and small-firm resilience.

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Next-Generation Digital Leadership in Family-Owned SMEs: An Integrative Review and Research Agenda—Ongoing Study

VERA AMPADU

Abstract. *Family-owned small and medium-sized enterprises (SMEs) operate at the critical intersection of intergenerational renewal and pervasive digitalization. Contrary to the assumption that "familiness" obstructs change, recent evidence indicates that family-specific attributes condition digital transformation (DT) through unique configurations of ownership goals, governance structures, and resource trade-offs. This study provides an integrative systematic synthesis of literature published between 2016 and 2026, exploring the entry of Generation Z—digital natives with distinct value systems—into the family SME landscape. The synthesis reveals that while "familiness" (e.g., long-term orientation and emotional bonds) can catalyze digital adoption, it can also constrain openness to external knowledge. Gen Z leaders introduce digital fluency and entrepreneurial agility that align with firm longevity; however, their demand for tech-enabled, purpose-driven cultures often disrupts traditional Socioemotional Wealth (SEW) frameworks. Drawing on SEW and Upper Echelons Theory, we identify digital leadership—specifically digital innovativeness and transformational styles—as the primary mechanism for harmonizing Gen Z's potential with family legacies. We highlight inherent tensions: while strong family control ensures stability, multigenerational top management teams may inadvertently dampen risk-taking in digital initiatives. This study contributes a holistic framework for understanding how next-generation leaders navigate the "willingness/ability" paradox. We conclude with a research agenda that addresses gaps in Gen Z's role in digital succession and offers managerial recommendations to foster a digital-first organizational culture.*
Keywords: *family-owned SMEs; next generation; digital leadership; digital transformation; succession; integrative review*

Framing of the research. *Globally, family-owned SMEs (FOSMEs) contribute to both the domestic and international economies by serving as catalysts for job opportunities, continuity, local production systems, and long-term wealth creation. Compared with non-family-owned SMEs, they have distinctive organizational forms in which ownership, governance, identity, and strategic intent are deeply embedded in family influence and continuity aspirations, generating long-term commitment and orientation, as well as a traditional paradox (De Massis et al., 2016; Chirico & Nordqvist, 2010). Therefore, providing suitable settings for analyzing firms' digital transformation pathways built on existing norms and systems.*

Embracing continuous, multidimensional restructuring of organizational structures, with reliance on digital tools, has become a distinctive context for small- and medium-scale enterprises, especially family-owned ones, that must adapt to remain relevant in the market across all sectors (Bouncken et al., 2025; Ricciardi, 2024). This process, known as digital transformation, is a shift from just acquiring digital hardware to a definitive blend of business goals nurtured in a family's socioemotional wealth (SEW). With a prioritization of legacy and control over aggressive innovation and path dependencies that can hinder adaptation (Ceipek et al., 2021; Ano & Bent, 2022; De Massis et al., 2014; Soluk & Kammerlander, 2021; Teece, 2007).

FOSMEs are characterized by resource constraints and risk aversion, a common barrier to digitalization, generational issues loom large: succession dynamics and the blending of family and business systems create both barriers and catalysts for innovation. In practice, family firms' digitalization is often more reactive than that of larger organizations that place greater emphasis on maximizing shareholder dividends (Żukowska et al., 2025). In the current work environment, the incoming Gen Z cohort—digital natives born in the mid-1990s to the early 2010s—plays a transformative role (Urme et al., 2025). They bring distinct values, digital fluency, and work expectations that promote greater flexibility in the workplace and the labor market (Stevanovski et al., 2024). An avenue not fully explored by these FOSMEs due to the assumption that Gen Z's perspectives are wholly different from the existing organizational cultures.

With the growing trend in family firm research, many scholars have addressed generational succession, DT, and Gen Z's impact in the workplace. However, few studies integrate Gen Z, digital leadership, and family SMEs. Daskalopoulos and Machek's (2023) systematic review found only 30 relevant studies on family firms' digitalization (2019–2023), underscoring a very young literature. Also, the bibliometric study on family firm digital transformation shows a rapid increase in publications in China and Europe in 2023, highlighting a clear gap that warrants urgent attention (Atienza-Barba et al., 2025). With the existing growing parallel research on Gen Z, which largely appears in human resources or consulting outlets, not explicitly in family business journals, there is a clear gap: we need to understand "next-generation digital leadership"—how younger family members (and nonfamily Gen Z employees) can drive or impede digital change. In this context, emphasizing digital leadership (DL) goes beyond technical expertise or digital literacy. It can be defined as the know-how to interpret technological opportunities, mobilize support for digital change, shape strategic priorities, and align transformation with the firm's long-term direction (The Future of Digital Leadership, 2026). In the current digital age, amid significant uncertainties, traditional leadership approaches (Kane et al., 2019) are insufficient to fully explore and exploit untapped resources (Contreras et al., 2020; Tigre et al., 2024).

In the convergence of these trends, we pose the following research questions:
RQ1: *How are Generation Z characteristics and digital leadership competencies influencing digital transformation in family SMEs?*
RQ2: *What organizational factors moderate the relationship between Gen Z leadership and digital innovation?*
Drawing on the theoretical lenses of socioemotional wealth (SEW), which explains resistance to change in family firms, and upper echelon theory, highlighting how leadership traits shape strategic direction.
Our review addresses the following: What leadership dynamics emerge when Gen Z enters family SMEs, and how do these dynamics affect digital transformation outcomes? An analytical opportunity, not to reduce the discussion to a narrow cohort label, but to build an underdeveloped, coherent explanation of how next-generation actors exercise digital leadership in family-owned SMEs. How that leadership shapes the direction, pace, and depth of digital transformation.

Purpose of the paper. *This paper aims to synthesize empirical and conceptual research (2016–2026) on Generation Z's impact on family-owned SMEs undergoing digital transformation.*
More specifically, the paper seeks to

1. *Examine how the literature conceptualizes the role of the next generation in digital transformation within family-owned SMEs.*
2. *Identify the main mechanisms through which next-generation actors enable, constrain, or redirect digital change.*
3. *synthesize the principal themes linking succession, governance, digital leadership, and organizational capability;*
4. *Develop an integrative framework and research agenda for future scholarship.*

The paper contributes in three ways. First, it integrates two research domains that have often evolved in parallel: family business succession and SME digital transformation. Second, it reframes the next generation not merely as a succession outcome but as an active source of digital leadership and strategic renewal. Third, it develops a research agenda that supports more precise theorization and stronger future empirical inquiry.

Methodology. *This paper adopts an integrative review design. Such an approach is particularly well-suited because the literature on next-generation digital leadership in family-owned SMEs is conceptually dispersed and methodologically heterogeneous. Relevant evidence is spread across family business studies, entrepreneurship, strategic management, SME digitalization, innovation, and information systems research. Moreover, the direct literature on younger generations and digital transformation in family firms is still emerging, making a narrowly aggregative or meta-analytic approach less appropriate (Torraco, 2016; Whittemore & Knafl, 2005). The review was guided by two main search streams. The first focused on family firms and generational transition, using terms such as "family business," "family firm," "family-owned SME," "succession," "next generation," "generational involvement," and "intergenerational transition." The second focused on digital transformation, using terms such as "digital transformation," "digitalization," "digital innovation," "digital leadership," "technology adoption," "dynamic capabilities," and "Industry 4.0." Searches were conducted through Scopus, Web of Science, and Google Scholar, which were selected because they provide broad coverage of business and management scholarship and were also identified as core databases for your search strategy.*
Because the direct "Generation Z + family-owned SMEs + digital transformation" literature remains limited, the review deliberately included proxy concepts such as next-generation involvement, successor influence, generational dispersion, leader digital innovativeness, and intergenerational digitalization. This widened the retrieval logic without diluting the conceptual focus. Studies were retained if they directly examined digital transformation in family firms, succession-related digital change, or the role of younger family actors in strategic renewal. Where possible, we relied on evidence-based findings (e.g., statistical results) and theoretical arguments from the sources. Conflicting evidence or open issues were highlighted as research gaps. We excluded studies of SMEs that were not family-involved and work on broader generational cohorts (e.g., "Millennials") unless Gen Z-specific content was present. We applied these across titles, abstracts, and keywords. From the initial hits (140 records), we removed duplicates. Inclusion criteria were studies of family-owned SMEs (or broader family firms) that explicitly addressed digital or technological change and involved issues related to younger-generation leadership or workforce. We excluded papers on large corporations, purely technical digital systems without human factors, or non-English publications. Abstracts were assessed for alignment with our focus; about 45 articles passed this screening. We then retrieved the full texts of each and verified their relevance, narrowing to 30 core sources (including empirical studies, reviews, and theoretical pieces). Bibliographies of key papers were also hand-searched to identify any missing sources (backward snowballing). Analyses were descriptive and thematic. We charted publication counts by year and geography, identified dominant authors or clusters (e.g., family business centers or regions), and extracted recurring themes (e.g., SEW impact, innovation pathways). Any divergences or notable methodological issues (e.g., use of qualitative vs. quantitative data) were recorded. This transparent process ensures reproducibility.

Results.
Trends. *Our review confirms a recent surge in interest at the intersection of Gen Z, family firms, and digitalization. Few relevant papers appeared before 2020; interest picked up after 2021. Before the identified peak period, most papers generally focused on family firms or SMEs, whereas later pieces explicitly mentioned generational or leadership factors*

(Araya-Castillo et al., 2021). These studies originate from diverse economies, including Asia, Europe, the Middle East, and Latin America (Atienza-Barba et al., 2025). The different geographic representations underscore global recognition that family firms face similar digitalization imperatives and generational transitions.
The integrative review reveals that the impact of Generation Z on digital transformation in family-owned SMEs is shaped by interconnected organizational and socio-cultural mechanisms, not solely by generational presence. Across the literature, five recurring themes emerge: renewal, legitimacy, identity, leadership, and capabilities. These themes set the ground for explaining how next-generation actors influence digital transformation and why their impact varies significantly across family firms.

Renewal. *A major recurring theme is the next generation as a catalyst for organizational renewal, given their characteristic digital fluency, collaboration, and adaptability from formative immersion in digital environments. Across the reviews, the next generation is consistently associated with stronger digital awareness, openness to experimentation, and a greater willingness to modernize existing traditional business models. This influence often extends beyond technology adoption to broader strategic initiatives, such as process digitalization, platform-based business models, customer-oriented innovation, and data-driven decision-making (Ano & Bent, 2022; Maseda et al., 2025). Gen Z makes their digital influence felt before formal succession through project-based involvement, advisory roles, or informal participation in strategic discussions. A clear indication that digital leadership within family firms should be understood as a continuous intergenerational process rather than a single succession event (Ricciardi, 2024; Mihotić & Pfajfar, 2026). Similar observations can be identified in broader family-business research, which portrays the growing role of next-generation actors as internal entrepreneurs who introduce new capabilities and strategic directions (De Massis et al., 2013; Nordqvist & Melin, 2010). With a broader perspective, next-generation actors have greater potential for capability expansion and strategic direction (Del Vecchio et al., 2024), but effective, sustainable outcomes rely heavily on organizational acceptance and decision-making authority (Schroth, 2019; Deloitte, 2023).*

Legitimacy. *From the review, even formal succession alone doesn't grant the next generation the autonomy they need to have their influence felt. Perceived credibility largely rests with incumbents, who often retain strong informal authority even after younger family members assume visible roles (Appleton et al., 2025; Ko et al., 2025). Mostly resulting in tension and slow digital transformation across units, as senior family members typically control strategic decision-making and resource allocation. Digital transformation initiatives regularly depend on incumbents' willingness to grant younger family members decision-making rights and strategic autonomy. In situations where senior leaders support experimentation and gradually transfer authority, digital initiatives are more likely to evolve into sustainable, substantive, and entire organizational changes. Compared with when the founder's authority remains centralized or ambiguous, digital initiatives typically remain symbolic or limited to low-risk activities (Ricciardi, 2024; Ano & Bent, 2022). With older generations placing much emphasis on stability, tradition, and hierarchical decision-making, whereas younger members prioritize adaptability, digital tools, and collaborative innovation, this creates complications in the digital transition process in family-owned firms (Subhani et al., 2026). Generational involvement has both negative and positive effects: Othman (2025) finds that the active participation of younger family members increases digital tool adoption by 26.5% in Jordanian family firms, compared with 10.8% in non-family businesses. Similarly, Ko et al. (2025) show that the presence of multiple next-generation leaders can reduce resistance to digital transformation by dispersing authority and legitimizing innovation initiatives. Other studies indicate that multigenerational leadership teams may sometimes weaken the impact of proactive strategic initiatives due to conflicting perspectives and coordination challenges (Maseda et al., 2025).*

Identity. *One significant trait of family-owned SMEs is that they do not approach digitalization purely as a technical or economic process; instead, they make strategic decisions deeply rooted in family identity, reputation, and aspirations for continuity (De Massis et al., 2016; Ceipek et al., 2021). Thereby, striking a balance between continuity and modernization, as change agents must simultaneously demonstrate respect for the firm's legacy and values to maintain legitimacy within the family system. As a result, successful digital leadership in family firms rarely frames digital transformation as a radical break with the past. The concept of familiness, one of the pillars of family-owned firms, can support innovation through strong commitment and patient capital; it can also create resistance to disruptive change when family members prioritize stability and socioemotional wealth over experimentation (Berrone et al., 2012; Costa et al., 2023).*

Leadership. *Leadership functions as a central mechanism connecting generational change to digital transformation outcomes. Digital leadership is often identified as a fundamental enabler, enabling family firms to convert generational digital competencies into enhanced innovation performance. Empirical studies show that leadership that supports digital innovation and is open to experimentation positively influences digital innovation when complementary resources, such as IT infrastructure, employee training, and digital-oriented organizational cultures, are available (Żukowska et al., 2025). Urme et al. (2025) argue that leadership traits such as agility, digital fluency, and synergistic empowerment closely align with Gen Z's preferences, which value autonomy, authenticity, and flexible work structures. Consequently, adopting digital leadership practices may enhance innovation performance and improve the retention and motivation of*

younger employees. Again, the effectiveness of leadership depends on the broader governance and whether the firm operates in a centralized or decentralized system.

Capabilities. *Achieving a sustainable, digitally transformed, family-owned firm can't be done solely through tech-driven Gen Zs; it requires organizational capabilities that enable absorption and implementation. Studies in dynamic capability theory shed light on the value of absorptive capacity, IT infrastructure, employees' digital skills, and the sustaining of digital cultures in facilitating transformation (Soluk & Kammerlander, 2021; Żukowska et al., 2025). In the absence of these capabilities, the efforts of digital natives are limited to incremental improvements, such as digital marketing tools or basic internal communication technologies. With these capabilities, next-generation leaders can drive deeper organizational transformation through business model innovation, data-driven decision-making, and platform-based strategies (Maseda et al., 2025; Mihotić & Pfajfar, 2026). A clear indication that next-generation digital leadership should not be viewed as a direct cause of transformation, but rather as a catalyst whose effectiveness depends on the wider institutional ecosystem.*

Discussion. *This review probably challenges the common belief that "familiness" always blocks organizational change. Instead, it finds a more complex "ability-willingness" paradox (Chrisman et al., 2014), which is becoming more important as Generation Z joins family businesses. Traditional Socioemotional Wealth (SEW) frameworks focus on stability and identity (Gomez-Mejia et al., 2007), but Generation Z is driving digital renewal. For them, digitalization is key to keeping the family business strong over time, not just a threat to tradition.*
Gen Z's digital skills are not enough if they do not also have real authority within the company. The study indicates that the "next-gen effect" is constrained by a "legitimacy gap," in which older leaders retain informal control over key resources even after stepping down from their roles. This aligns with Upper Echelons Theory, which holds that a company's digital path depends on its most powerful people—right now, that means both cautious founders and tech-savvy successors.
Upgrading from small digital initiatives to large business innovation depends on building dynamic capabilities (Teece, 2014). Without these skills and an open digital culture, Generation Z's impact stays mostly on the surface. Digital leadership can help by connecting Generation Z's push for agility with the family's desire for stability, helping family SMEs shift from reacting to change to leading it.
While the current literature identifies the "what" and "who" of digital transformation in family SMEs, it remains thin on the "how" regarding the specific behavioral mechanisms of Gen Z. To advance the field, we propose the following four research directions: psychological ownership and digital change, the role of non-family Gen Z, longitudinal crisis adaptation, and intergenerational knowledge integration.

Research limitations. *This paper is an integrative review and therefore shares the strengths and limitations of that approach. The strength lies in its ability to consolidate a fragmented body of literature and to generate conceptual advancement. Its limitation is that the literature on next-generation digital leadership is still emergent and uneven. Papers focused on Generation Z, in particular, remain limited, stressing the need to include adjacent studies that use proxy concepts such as next-generation involvement, generational dispersion, or successor influence. Secondly, the review integrates studies that use diverse methods, operate in diverse contexts, and define digital transformation in different ways. While this is appropriate for an emerging field, it also means that conclusions should be understood as interpretive rather than statistically generalizable. Additional research could strengthen the field through longitudinal, mixed-method, and comparative designs.*

Managerial implications. *This study finds that for family-owned SMEs, bringing Gen Z into the business is less about technical onboarding and more about making structural and psychological adjustments. From the evidence, we recommend three key actions for managers:*

Understanding Psychological Ownership and Digital Responsibility. *Managers need to distinguish between Gen Z's digital projects that benefit the company as a whole and those that primarily serve personal career goals. In many family SMEs, younger members propose digital changes to develop their own areas of expertise, separate from the founder. If these projects are treated as personal rather than as part of the company's main strategy, they can become isolated and fail to support the firm's long-term socioemotional wealth (SEW). Managers should focus on connecting digital changes to the family's legacy so that the next generation's desire for recognition strengthens the company's identity rather than divides it (Pierce et al., 2001; Ceipek et al., 2021).*

Using Non-Family Gen Z Employees as Cultural Connectors. *Family firms often focus on their heirs and overlook the important role non-family Gen Z employees can play. These employees are usually just as skilled with digital tools as family members, but they do not have the family ties that can complicate decisions. Managers should see these employees as neutral connectors or cultural bridges. By involving non-family Gen Z workers in digital decision-making groups, companies can reduce emotional conflicts in multigenerational leadership teams (Maseda et al., 2025). This helps create a more objective, data-driven approach to digital change that is less affected by old family habits.*

Building Lasting Resilience Instead of Only Reacting to Change. *Recent evidence indicates that many digital changes in family SMEs occur in response to external events rather than as part of a planned strategy (Jalilvand et al., 2024). To improve, leaders need to make ongoing crisis adaptation part of the company's routine. This means moving from quick fixes to building lasting skills. For family managers, it involves working with Gen Z employees to create a cycle of continuous improvement in which digital tools are regularly updated. This helps keep the business strong through economic ups and downs and across generational changes (Soluk et al., 2021; Mihotić & Pfajfar, 2026).*

Originality of the paper. *This paper proposes a novel perspective on the next generation in family-owned small and medium-sized enterprises (SMEs). Rather than considering younger family members solely as future leaders or a demographic cohort, it positions them as central actors in digital leadership who influence both the direction and pace of organizational change. By integrating research on family business succession and SME digital transformation, the paper clarifies the connections among governance, legitimacy, digital orientation, and the cultivation of new competencies. This framework provides a more actionable and strategic lens for understanding how family-owned SMEs prepare for digital transformation.*

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Productivity patterns of family *vs* non-family firms under stability and crisis

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Abstract. *This study examines the effect of family and non-family ownership on the productivity of listed Italian firms during periods of economic crisis and stability. Using Total Factor Productivity (TFP) as a comprehensive measure of firm performance and applying unconditional quantile regression, we expect that, during periods of economic growth or stability, family firms at the higher tail of the productivity distribution perform worse than non-family firms, whereas those at the lower tail outperform their non-family counterparts. During crisis periods, however, this pattern may reverse. The findings may be interpreted in light of the property rights theory, which emphasize how the exercise of use, appropriation, and transfer rights by family owners shapes the production process and productivity outcomes. Overall, the study aims to shed light on the longstanding debate over the comparative superiority of family versus non-family firms by revealing how family firms' attitudes toward the productive use of their resources change contingently on their relative performance position and on the hardships caused by economic crises.*
Keywords: *family firms; non-family firms; productivity; property right theory; quantile regression*

Framing of the research. *Family firms represent the dominant form of business organization worldwide and are key economic players (Masulis, Pham, and Zein, 2011). In Italy, they account for approximately 85% of all companies (AIDAF, 2025), making their performance central to explaining the evolution of the national economy. Over the past two decades, Italy has recorded disappointing productivity dynamics, with an average annual productivity growth of -0.3%, compared to an OECD average of +0.3% (OECD, 2023). The weak aggregate total factor productivity (TFP) growth and subdued capital accumulation are widely regarded as principal explanations for the underperformance of the Italian economy (Giordano and Zollino, 2021), and the prevalence of family ownership is often cited among the structural factors contributing to low firm productivity (Baltrunaite et al., 2022, Andretta,Brunetti, and Rosso, 2021).*

Firm productivity is shaped by both external and internal drivers. At the system level, productivity depends on the quality of institutions, the efficiency of the legal system, the degree of market competition, and the quality of infrastructure and human capital. At the firm level, governance and ownership structures (Shleifer and Vishny, 1997) and management quality (Bartelsman and Doms, 2000) play critical roles. Within this context, the theoretical literature has long debated the relative superiority of family versus non-family firms in terms of performance. Creemers et al. (2023) offer a reconciling perspective on the contrasting arguments by employing a quantile-based regression to show that the sign of the relationship between family ownership and labor productivity changes across the productivity distribution. Aguilera et al. (2024) further enrich this picture by demonstrating that family-owned businesses tend to prioritize labor over capital in their production processes, and this distinctive decision lead to consistently lower levels of productivity compared to non-family firms; in addition, when family firms share ownership and control with non-family members, they become less labor intensive, invest more in capital, and achieve higher productivity, suggesting that specific governance configurations can mitigate the productivity gap.

This literature generally concentrates on the family-productivity nexus without considering the potential moderating effect of the economic cycle. Thus, the question remains as to whether the advent of an external crisis alters the balance between economic and non-economic goals, and whether this effect is contingent on a firm's position in the productivity distribution.

More generally, the literature examining family versus non-family ownership during systemic crises presents a nuanced and context-dependent picture of resilience, productivity, and financial performance. While family ownership has long been associated with distinctive governance features, such as concentrated ownership, long-term orientation, and socioemotional wealth considerations, the extent to which these characteristics enhance or hinder performance during economic downturns remains debated.

A comprehensive meta-analysis by Hansen, Block, and Neuenkirch (2020) provides the broadest cross-country evidence on this issue. Analyzing 155 primary studies across 35 countries, they find that family firms in developed markets exhibit a statistically significant but economically negligible outperformance relative to nonfamily firms in general. The work of Hansen et al. (2020) shows that, although family firms may perform slightly better on average, their relative advantage diminishes during downturns; they also identify substantial regional heterogeneity, with procyclical effects in Anglo-American countries and emerging markets, but no strong crisis sensitivity in Continental Europe.

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The Hansen et al. (2020) review synthesizes conflicting crisis-era findings. During the Asian financial crisis, studies such as Baek et al. (2004) and Lemmon and Lins (2003) report that concentrated family control and separation of control from cash-flow rights amplified performance declines. Similarly, Lins, Volpin, and Wagner (2013) show that family-controlled firms reduced investments more aggressively during the global financial crisis and underperformed in stock returns. In contrast, other European studies (e.g., van Essen et al., 2015; Minichilli, Brogi, and Calabrò, 2016) find that family firms exhibited stronger profitability during crisis periods. Thus, the meta-analytic conclusion is that family ownership does not universally confer crisis resilience; its effect depends on institutional and governance context.

More recent evidence from the Covid-19 pandemic provides additional insights. Amore, Pelucco, and Quarato (2022), focusing on Italian listed firms, find that family firms outperformed nonfamily firms in both stock market performance and operating profitability during the pandemic. This outperformance was stronger in firms without large minority investors and in firms with multiple family shareholders, suggesting that cohesive and concentrated family control enhanced crisis responsiveness. Mechanism analyses reveal that family firms experienced smaller revenue declines and more efficient labor utilization. The authors frame these results against competing theoretical expectations: on one hand, long-term orientation and stakeholder relationships may enhance resilience; on the other hand, entrenchment and labor rigidity may reduce adaptability. Thus, in the Italian context, the resilience channel appears to dominate.

Similarly, Jarchow, Kaserer, and Keppler (2023) document significant outperformance of German family firms during the 2008–2010 crisis period in terms of return on assets, and to a lesser extent, Tobin's. Notably, this crisis resilience becomes stronger as family equity ownership increases. The authors identify leverage reduction during the crisis as a key channel, while also showing that this financial conservatism did not come at the expense of long-term investment or employment. These findings stand in contrast to the international evidence of Lins et al. (2013), who attribute crisis underperformance to investment cuts. The German evidence suggests that prior financial conservatism and lower leverage may have created buffers that enhanced resilience rather than constrained growth.

Complementing firm-level financial analyses, Valentino, Diaz Matajira, and Szymanska (2025) examine crisis responses across 2,344 family firms around the world during Covid-19. Their results indicate that crisis outcomes depend not only on family involvement but also on leadership configuration. Specifically, directive leadership reduces revenue and employment losses, whereas high family involvement without directive leadership exacerbates negative outcomes. These findings underscore that familiness alone does not guarantee resilience; governance structure and crisis leadership style moderate performance outcomes.

Overall, the prior literature suggests that family ownership does not exert a uniform effect on performance, but rather that its impact varies with macroeconomic conditions, institutional context, and governance structure, with evidence of modest outperformance in stable periods and heterogeneous effects in crises. In particular, studies documenting procyclical patterns (Hansen et al., 2020) and crisis underperformance in certain settings (e.g., Lins et al., 2013) imply that family control may weaken when firms face heightened vulnerability, especially if risk aversion and resource extraction dominate strategic responses. Conversely, evidence of crisis resilience in coordinated market economies such as Germany and Italy (Jarchow et al., 2023; Amore et al., 2022) indicates that under specific structural conditions—such as strong ownership concentration or financial conservatism—family firms can leverage control rights to stabilize performance and preserve productivity. These contrasting findings align with the property rights perspective (Aguilera et al., 2024; Schulze and Zellweger, 2021), which emphasizes that the benefits and hazards of family control—relating to the use, appropriation, and transfer of resources—depend on contextual incentives and constraints.

Purpose of the paper. *This paper focuses on family and non-family ownership as an internal driver of productivity and its role in explaining between-firm differences in performance during periods of systemic crisis or, conversely, stability. Specifically, we address two research questions: to what extent do differences in firm ownership explain the differentials in firm productivity during periods of stability? How do family firms perform, in terms of productivity and with respect to non-family firms, during an economic crisis?*

Building on the above framing, our hypotheses propose that both macroeconomic conditions (critical versus non-critical times) and the firm's productivity position condition whether family ownership mitigates or exacerbates vulnerability.

We formulate four testable hypotheses. First, we predict that in non-critical times and for low levels of productivity, family firms outperform non-family firms (H1a). The rationale is that at low level of productivity, i.e. when the firm appears as more vulnerable, family leaders are prompted to prioritize preventing economic imbalance. Second, in non-critical times and for high level of productivity, family firms are expected to underperform non-family firms (H1b), as family leaders might perceive the business as secure and shift toward rent extraction.

Regarding the crisis, we hypothesize that in critical times and at the low level of productivity, family firms underperform non-family firms (H2a). The rationale is that in critical times, already vulnerable family firms are more likely to prioritize short-term private benefits over long-term firm growth. Conversely, in critical times and at the high level of productivity, family firms are expected to outperform non-family firms (H2b), since high-performing family firms are expected to respond to crises with proactive, long-term-oriented strategies.

These predictions are informed by the property rights perspective (Aguilera et al., 2024; Schulze and Zellweger, 2021), which emphasizes how the exercise of control rights by family owners and the associated hazards of use, appropriation, and transfer of firm resources shape the production process and productivity outcomes. We extend this

logic by arguing that macroeconomic conditions and the firm's competitive position may amplify or attenuate these hazards.

The purpose of this study is therefore to empirically test these four hypotheses using TFP as a comprehensive performance measure, applying unconditional quantile regression to capture the heterogeneous effects of family ownership across the entire productivity distribution, and explicitly incorporating the crisis as a moderating variable.

Methodology. *We adopt a two-stage empirical strategy. In the first stage, we estimate a Cobb-Douglas production function to derive firm-level TFP. We employ the Levinsohn and Petrin (2003) semiparametric estimator, which addresses the simultaneity bias arising from the correlation between input choices and the unobserved, time-varying productivity component. This approach uses intermediate inputs as a proxy for the unobserved productivity and is widely regarded as producing consistent and unbiased estimates of the production function parameters.*

In the second stage, we use the estimated TFP values as the dependent variable in an unconditional quantile regression model (Firpo, Fortin, and Lemieux, 2009). This allows us to estimate the effect of family ownership on TFP at different points of the unconditional productivity distribution, a feature that is essential for testing our hypotheses, which posit heterogeneous effects across the distribution. The empirical model includes as key explanatory variables a FAMILY dummy (equal to 1 if the firm is family-owned or family managed), a CRISIS dummy (equal to 1 for the year 2020), and their interaction term FAMILY × CRISIS. The FAMILY coefficient captures the family-nonfamily productivity differential during stable periods, thereby testing H1a and H1b. The interaction term captures the moderating effect of the crisis on this relationship, allowing us to test H2a and H2b. We adopt different definitions of family to build alternative measure of the variable FAMILY, according to the percentage of voting rights in the family's hands and the family members' involvement in the firm management.

We control for firm size, investment intensity, geographical location (Italian North-West, North-East, Centre, South) and industry at two-digit level. To address selection bias, a concern frequently highlighted in family business research (Zhang, Fang, and Chrisman, 2022), we follow the two-step Heckman (1979) procedure. We estimate a probit model for the probability of being a family firm and derive an inverse Mills ratio (IMR), which is included as an additional regressor in the quantile regression.

The empirical analysis is based on a dataset of 250 listed Italian firms observed continuously from 2015 to 2024, yielding 2,500 firm-year observations. As a robustness check, we run the same analysis on 205 non-listed Italian firms observed from 2001 to 2011 (a period of time including the 2007-2009 financial crisis), of which approximately 58% correspond to family firms and 42% to non-family firms. The economic data are drawn from the AIDA Bureau Van Dijk database, while the governance and ownership data are retrieved from NRG metrics. All monetary variables are deflated to 2024 (2010 for the non-listed sample used in the robustness check) values using appropriate industry-level deflators.

Results. *During non-crisis periods, family firms are expected to adopt strategies that preserve long-term value, allowing them to maintain or even enhance performance relative to non-family firms, particularly among firms located at the lower tail of the productivity distribution. In this range, family firms may be motivated to strive more than their non-family counterparts due to their embedded long-term stance. Conversely, at higher levels of productivity during non-crisis periods, family firms may engage more in the extraction of private benefits of control, which can result in a relative performance lag compared to non-family firms.*

During crisis periods, adverse conditions are likely to push family firms—especially those operating at low levels of productivity—toward short-term and opportunistic decisions, limiting their ability to sustain performance and potentially widening the gap with non-family firms. In contrast, highly productive family firms during crises are expected to adopt stronger defensive strategies to preserve their productivity and safeguard long-term objectives, thereby enabling them to outperform non-family firms.

Research limitations. *While our study provides robust evidence on the heterogeneous impact of family ownership on productivity across the distribution and over the economic cycle, several limitations must be acknowledged. First, our analysis is limited to Italian firms, which constrains the generalizability of the findings to other institutional contexts. Italy's concentrated ownership structure, its specific legal framework, and its deep spatial disparities in productivity may not be fully representative of other European or global settings. The cross-country evidence in Aguilera et al. (2024) suggests that the family-productivity gap varies across national contexts, with larger differences in Germany and Italy and smaller differences in the United Kingdom. Future research could extend the quantile regression approach to multi-country samples to assess whether the distributional patterns we identify hold across diverse institutional environments.*

Secondly, although we sampled to whole population of Italian listed firms to address potential selection bias (and controlled for it through methodological refinements), the sample size (250 firms and 2,500 observations) is relatively small compared to the large-scale datasets used in other studies.

Finally, we do not observe specific characteristics of family members, such as their educational profiles or managerial competence, which Aguilera et al. (2024) identify as potentially important determinants of productivity outcomes.

Managerial implications. *The findings of this study potentially carry important implications for family firm leaders, corporate governance practitioners, and policymakers. The fact that family firms may underperform non-family peers at*

the high productivity level in stable times, and at the low level of the productivity distribution during crises, underscores the need for robust governance structures that can counterbalance agency-driven behaviours emerging under both prosperity and adversity. Family leaders should be particularly vigilant about the risk of shifting toward rent extraction and self-serving behaviour, since this shift progressively erodes the competitive position relative to non-family peers especially as the firm's performance improves in stable times.

In light of the property rights perspective, an actionable strategy for family firms is to share a degree of ownership and control with non-family members. For policymakers, results might suggest that policies incentivizing families to adopt governance structures that balance family control with external accountability could generate significant productivity gains. Given that family firms represent the overwhelming majority of Italian companies, even marginal improvements in their productivity could have substantial aggregate effects on national economic growth.

From a practical standpoint, family firms should separate family and business priorities, particularly in good times when the temptation to extract private benefits is strongest, and establish clear governance mechanisms, such as independent boards, professional management, and external shareholders, that maintain discipline and strategic focus throughout the economic cycle.

Originality of the paper. *This study contributes to the longstanding debate on the relative performance of family and non-family firms in several ways. First, it bridges the mixed evidence on family versus non-family firm performance with the macroeconomic context, an intersection that has received limited attention in the literature. While Creemers et al. (2023) demonstrate the distributional heterogeneity of the family-productivity relationship, they do not consider the moderating role of the economic cycle. We extend their framework by investigating how the potential family firms' advantage (possibly observed at the lower tail of the productivity distribution in stable periods) may vanish during crises and argue that crisis support mechanisms can be tailored to account for the heterogeneous vulnerabilities of family firms across different productivity levels.*

Second, the study provides a real-side corroboration to the financial evidence documented by Attig et al. (2016), who find that family firms are more likely to decrease or omit dividends during the global financial crisis. By shifting the lens from financial outcomes to the full distribution of productivity, we expect that the crisis introduces heterogeneity in the property rights-driven behaviours in family firms, producing productivity shortfalls that are not visible in aggregate accounting metrics. This helps reinterpret the apparent resilience of family firms during crises documented by Minichilli et al. (2016): resilience in aggregate financial measures can coexist with productivity underperformance once the firm's position along the productivity spectrum is considered.

Third, methodologically, the application of TFP, rather than to single-factor productivity measures or accounting ratios, represents an advancement. TFP captures the efficiency with which all inputs are combined in the production process and provides a more comprehensive assessment of firm performance. The Levinsohn and Petrin (2003) semiparametric approach ensures that simultaneity bias in production function estimation is rigorously addressed. Furthermore, the suggested empirical model, and the subsequent findings, are compatible with potential changes in ownership structures and governance arrangements, that have been suggested as possible corrective mechanisms. Specifically, our analysis relies on unconditional quantile regression, which does not condition the estimated effects on a predetermined ownership or governance configuration.

Finally, by focusing on the Italian context, a country where family firms are overwhelmingly dominant yet national productivity growth has been stagnant, the study offers policy-relevant evidence on a question of macroeconomic significance: whether the prevalence of family ownership is a structural constraint on productivity, and under what conditions family firms can close the productivity gap with their non-family counterparts.

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Sustainability Disclosure Strategies in Family Firms: A Systematic Literature Review

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Abstract. *Environmental, Social, and Governance (ESG) issues have become central in both research and corporate practice, as firms face growing pressure from investors, regulators, and society to demonstrate accountability for their environmental and social impact. Sustainability reporting and ESG disclosures are key mechanisms for communicating responsible business conduct (Dhaliwal et al., 2010; Plumlee et al., 2010). Family firms offer a particularly insightful context, given their distinctive governance structures and strategic priorities shaped by family ownership and involvement.*

Family-controlled firms often exhibit long-term orientation, strong community ties, and a desire to preserve family reputation and legacy (Campopiano & De Massis, 2015). Socioemotional wealth (SEW) theory suggests that family owners prioritize non-economic goals such as identity, control, and transgenerational continuity alongside financial performance (Gomez-Mejia et al., 2007). These motivations can encourage socially responsible behavior and environmental stewardship yet concerns about privacy and control may limit public disclosure.

Empirical evidence on CSR and ESG disclosure in family firms is mixed. Some studies show stronger environmental performance and sustainability commitment compared with non-family firms (Battisti et al., 2023; Berrone et al., 2010), while others find reduced disclosure due to discretion and reluctance to expose internal practices (Arduino et al., 2024; Biswas et al., 2018; Venturelli et al., 2021). This paradox highlights the complexity of ESG communication in family-controlled organizations.

This embryonal study systematically reviews 93 peer-reviewed articles to address: What do we currently know about CSR and ESG disclosure strategies in family firms, and what factors shape these practices? Our thematic analysis identifies six key research streams and our initial findings reveal that disclosure strategies reflect interactions between family motivations, governance structures, and institutional environments. We find that governance features often mediate the link between family ownership and sustainability communication (Arayssi et al., 2019; Ghaleb et al., 2024; Ghinizzini et al., 2025).

Key gaps remain: most studies focus on publicly listed firms and formal reports, overlooking private firms and informal channels, and few examine the alignment between disclosure and actual ESG performance. Addressing these gaps advances understanding of how family firms balance socioemotional wealth, governance, and stakeholder expectations in sustainability communication, providing insights for both research and practice amid evolving regulatory frameworks such as the European Corporate Sustainability Reporting Directive.

Keywords: *family firms; CSR disclosure; ESG reporting; nonfinancial reporting; socioemotional wealth*

Framing of the research. The increasing importance of environmental, social, and governance (ESG) issues has profoundly transformed the contemporary business landscape. Firms are facing growing expectations from investors, regulators, and civil society to demonstrate responsible behavior and to communicate transparently about their social and environmental impact (Dhaliwal et al., 2010). Consequently, sustainability reporting and nonfinancial disclosure have become key instruments through which organizations signal accountability and commitment to responsible business practices.

Within this broader context, family firms represent a particularly relevant organizational form for studying sustainability engagement and communication. Family businesses account for a significant proportion of firms worldwide and play a central role in many national economies. Compared to non-family firms, family-controlled organizations often exhibit distinctive governance structures, characterized by concentrated ownership, strong family involvement in management, and long-term strategic orientation (Campopiano & De Massis, 2015).

Previous literature reviews have focused on highlighting and explaining why family firms tend to me more adept and involved in social issues compared to non-family firms, long-term orientation, stewardship values and reputational concerns all lead to increased interest in social issues (Van Gils et al., 2014). Brunelli et al., (2024) consider how family businesses with strong family involvement can drive nonfinancial reporting and further study various factors influencing the relationship, including individual, relational, business and contextual factors moderate this relationship. There is a great deal of heterogeneity in results due to the different interactions of the aforementioned factors. Generally scholars find that agency theory leads to lower disclosure levels as type one agency problem and information asymmetries are lower by the very nature of being a family firm. On the other hand, SEW perspective suggests that family firms seeking to gain long term benefits and reputational strength will engage in greater and higher quality financial disclosures (Häußler & Ulrich, 2024). In his perspective article, Caccialanza (2024), calls for greater attention to be placed both the "how" and the "why" family firms disclose CSR/ESG information, providing important insight into the implicit transparency-control trade-off that family firms face. This trade-off shapes strategic choices and actions, therefore a more nuanced, qualitative understanding is fundamental to explain the deep heterogeneity that characterizes this field of study. A recent review

considers corporate governance characteristics specifically, finding that in general board independence, female directors, institutional investors, some CEO specificities and sustainability committees are all tied to great ESG outcomes, with family ownership sometimes weaking this relationship due to concerns about privacy and control (Buchetti et al., 2025). Notwithstanding these important reviews, there remains a large gap in the literature firstly in the conceptualization of sustainability disclosures and how to measure them, secondly there is very little attention placed on the generational differences in reporting practices and how these delicate moments shape future strategic choices. Lastly, as of yet, there is insufficient research focusing on the owning family's values, TMT (top management team) characteristics and firm lifecycle phase.

Our review seeks to systematize current research into thematic groups, firstly to provide a concise representation of what has been studied so far and what are the main trends in results. Secondly, we seek to place greater emphasis on the communication aspect of these nonfinancial actions and aspects. Few studies have focused on determinants of the *level* or *amount* of nonfinancial communication by family firms, and even fewer still have considered communication vs. action in a singular firm.

These mixed findings indicate that the relationship between family ownership and sustainability communication is complex, influenced by governance structures, leadership characteristics, institutional contexts, and stakeholder expectations. Despite growing research, the literature remains fragmented and heterogeneous, using diverse theories, methods, and contexts, which makes it difficult to draw clear conclusions about ESG disclosure determinants and outcomes. A systematic literature review is therefore needed to synthesize existing knowledge, identify patterns, and highlight gaps, providing a clearer understanding of the factors shaping sustainability communication in family-controlled firms.

Purpose of the paper. The purpose of this study is to synthesize and organize the existing academic literature examining CSR and ESG disclosure strategies in family firms. Specifically, the paper seeks to address the following research question:

What do we currently know about sustainability disclosure strategies in family firms, and what factors shape these communication practices?

The study aims to achieve three main objectives.

First, it seeks to provide a comprehensive overview of the academic literature examining sustainability reporting and nonfinancial disclosure in family-controlled firms. By mapping the main research streams and theoretical perspectives employed in the literature, the study aims to clarify how scholars have approached the topic and which explanatory variables have been most frequently investigated.

Second, the study aims to identify the key determinants influencing ESG disclosure practices in family firms. These determinants include family-related characteristics such as ownership concentration and socioemotional wealth priorities, governance mechanisms such as board independence and leadership characteristics, and contextual factors such as institutional environments and regulatory frameworks.

Third, the study seeks to identify gaps and inconsistencies in the existing literature and to propose directions for future research. Understanding how family firms approach sustainability communication is increasingly important in light of evolving regulatory frameworks and stakeholder expectations regarding transparency and responsible business practices.

Methodology. This study adopts a systematic literature review (SLR) methodology in order to synthesize and organize the fragmented body of research examining CSR and ESG disclosure strategies in family firms. Systematic literature reviews are particularly suitable for consolidating dispersed knowledge, identifying research patterns, and highlighting gaps that may guide future scholarly inquiry (Denyer & Tranfield, 2009; Tranfield et al., 2003). Compared to traditional narrative reviews, the SLR approach follows a transparent and replicable process that enhances the rigor and reliability of the analysis.

The literature search was conducted primarily through the Web of Science database, which provides access to a wide range of peer-reviewed academic journals in management, accounting, and business studies. Following the approach adopted in prior sustainability reporting reviews (Brunelli et al., 2024; Mariani et al., 2021), the search strategy combined two groups of keywords. The first group included terms related to family firms (e.g., "family business," "family firm," "family ownership," and "family-controlled firms"), while the second group included terms related to sustainability reporting and nonfinancial disclosure (e.g., "CSR disclosure," "ESG reporting," "sustainability reporting," and "nonfinancial reporting").

The initial search yielded 414 articles. These articles were then screened through a multi-stage selection process. First, the sample was filtered according to journal quality, prioritizing journals ranked above level two in the Chartered Association of Business Schools' Academic Journal Guide (Franco-Santos & Otley, 2018). Special consideration was given to journals specializing in family business research, such as *Family Business Review* and *Journal of Family Business Strategy*, as well as interdisciplinary journals focusing on sustainability and corporate governance.

Second, the abstracts of all remaining papers were carefully examined in order to determine their relevance to the research topic. Articles that did not directly address sustainability practices, ESG reporting, or CSR disclosures within family firms were excluded from the sample. Duplicate entries resulting from the use of multiple keyword combinations were also removed.

Following this screening process, the final dataset consisted of 93 peer-reviewed articles published in academic journals. These studies were subsequently analyzed using thematic analysis, a widely used method for identifying patterns and recurring themes within qualitative datasets (Braun & Clarke, 2006; Jones et al., 2011). Through iterative coding and classification, the reviewed studies were organized into several thematic clusters representing the main areas of research on CSR and ESG disclosure in family firms. We aim to increase our database by repeating the aforementioned process in the Scopus database, thus avoiding selection bias.

In addition to thematic categorization, we briefly describe the sample according to the methodological and geographical distribution of the studies. This descriptive analysis revealed a strong predominance of quantitative research designs, with 69 studies employing quantitative methods, compared to a relatively small number of qualitative, mixed-method, or experimental studies. The geographical distribution of the studies also revealed a concentration of research in Europe, North America, and parts of Asia, with limited representation of firms operating in Africa and Latin America.

Results. The thematic analysis of the literature reveals several key research streams examining CSR and ESG disclosure strategies in family firms.

Ownership structure and disclosure incentives. A substantial body of research investigates how family ownership influences CSR and ESG disclosures. Many studies compare family and non-family firms, highlighting the dual role of socioemotional wealth (SEW) motivations: while long-term orientation and community embeddedness may encourage responsible practices, concerns about privacy, control, and reputation can limit transparency (Arduino et al., 2024; Battisti et al., 2023; Berrone et al., 2010; Biswas et al., 2018; Campopiano & De Massis, 2015; Maggi et al., 2023). Empirical evidence is mixed: some studies find stronger ESG performance but lower disclosure in family firms, while others suggest family ownership may enhance disclosure when reputational concerns are salient (Ardianto et al., 2024; Discua Cruz, 2020; Gavana et al., 2016; Marques et al., 2014; Venturelli et al., 2021). Moderators such as audit committees, non-family shareholders, explicit family firm identity, and institutional context help explain this heterogeneity (Biswas et al., 2018; Cabeza-García et al., 2017; Fuadah et al., 2022; Gavana et al., 2016; Gupta et al., 2025). Lifecycle dynamics also shape strategies, with younger firms often relying more on CSR communication to build legitimacy (Arena & Michelon, 2018; Madden et al., 2020; Manzi et al., 2024).

Governance mechanisms and sustainability disclosure. Governance structures affect strategic priorities, monitoring, and stakeholder engagement, thereby shaping disclosure (Arduino et al., 2024). CEO characteristics such as duality, tenure, and ownership influence ESG reporting, with family ownership often moderating these effects (AL-Duais et al., 2021; Arayssi et al., 2019; Cabral & Sasidharan, 2021; Farooq et al., 2023; Ghinizzini et al., 2025; Seow, 2025). Board size, independence, and diversity also play key roles, generally promoting transparency and higher disclosure levels, though family ownership may strengthen or weaken these relationships (Al Amosh, 2024; Arayssi et al., 2019; Butt et al., 2025; Cuadrado-Ballesteros et al., 2015; Ghaleb et al., 2024; Hunjra et al., 2025; Moisello et al., 2026; Oware et al., 2021; Padungsaksawasdi & Treepongkaruna, 2024; Rubino & Napoli, 2020; Sanad, 2025; Tran & Hamelin, 2025)

Symbolic versus substantive sustainability strategies. Research also examines whether disclosures reflect substantive ESG performance or symbolic signaling (Caccialanza, 2024; Van Gils et al., 2014). Family firms may display smaller gaps between disclosure and performance due to SEW considerations, though outcomes depend on strategic objectives, governance, and generational stage (Bergmann et al., 2025; Chi et al., 2025; Combs et al., 2023; Parra-Domínguez et al., 2021).

Credibility, signaling, and economic implications. Disclosures often function as signals to reduce information asymmetry, yet their effectiveness depends on credibility and stakeholder perceptions (Dhaliwal et al., 2010; Plumlee et al., 2010). Family ownership can provide a credibility advantage or can help reduce skepticism, this effect is especially robust when moderated by assurance mechanisms and board characteristics described in the previous section (Ananzeh, 2022; Elaigwu et al., 2024; Fawad et al., 2025; Ghaleb et al., 2024; Hsueh, 2018; Jaufenthaler et al., 2024; Latif et al., 2023; Martinez-Ferrero et al., 2017; Melati et al., 2023; Stutz et al., 2022). Sustainability disclosure has also been linked to economic consequences, including reduced cost of capital, improved investment efficiency, and stronger market reactions for family firms, though effects vary across contexts (Akhter & Hassan, 2024; Arayssi et al., 2019; Borralho et al., 2022; Cordeiro et al., 2021; Erawati et al., 2021; Gjergji et al., 2021; Natour et al., 2022; Nekhili et al., 2017; Orellana et al., 2025; Sari et al., 2024; Sekerci et al., 2022).

Institutional context. Institutional and regulatory frameworks strongly shape ESG disclosure, influencing the incentives and legitimacy strategies adopted by family firms (Aureli et al., 2020; Brunelli et al., 2024; Coluccia et al., 2018; Sani Khamisu & Ratna Achuta, 2025). Engagement with policymakers can sometimes reduce environmental commitments or result in symbolic compliance (Brumana et al., 2024; Diez-Busto et al., 2021; Fernández-Gago et al., 2024).

Despite substantial progress, three key gaps remain in the literature:

1. The temporal aspect, we see promising results in explaining the heterogeneity present within the field when we account for lifecycle phases of the firm.

2. The alignment between symbolic and substantive strategies requires further study, particularly regarding governance and generational influences.
3. The role of institutional context in moderating disclosure behavior needs more investigation, as most studies focus on specific regions, limiting generalizability. Addressing these gaps can clarify how family firms balance socioemotional wealth preservation, governance, and stakeholder expectations in ESG disclosure.

Research limitations. Despite its contributions, this work in progress review has several limitations. It relies mainly on Web of Science publications and peer-reviewed journals, potentially excluding relevant studies from other databases, practitioner outlets, or grey literature. Most empirical studies use quantitative methods and secondary data, such as ESG databases and sustainability reports, which may not fully capture the complexity of family firms' practices. Qualitative research is needed to explore the motivations and contextual factors behind ESG strategies.

Geographically, the literature is concentrated in Europe, North America, and parts of Asia, leaving Africa, Latin America, and Oceania underrepresented and limiting generalizability.

Future research should expand beyond publicly listed companies to include privately held firms and SMEs, explore alternative forms of sustainability communication (e.g., social media, stakeholder engagement, community initiatives), and examine the alignment between disclosures and actual sustainability practices. Investigating family firm heterogeneity and institutional contexts through cross-country and qualitative studies can provide deeper insights into how family values, governance, and regulatory environments shape ESG communication strategies.

Managerial implications. The initial findings of this review offer several important implications for managers and policymakers involved in family-controlled organizations.

First, the results highlight the importance of aligning **s**ustainability practices with effective communication strategies. Many family firms actively engage in environmental and social initiatives but may not communicate these efforts extensively. Developing structured ESG communication strategies could enable family firms to enhance stakeholder trust, strengthen reputation, and fully capture the strategic benefits associated with sustainability engagement.

Second, our preliminary findings emphasize the role of corporate governance structures in shaping sustainability disclosure practices. Family firms seeking to improve the credibility and transparency of their ESG reporting may benefit from incorporating independent directors, promoting gender diversity within boards, and establishing dedicated sustainability committees.

Finally, policymakers designing sustainability reporting frameworks should recognize the unique characteristics of family firms, particularly SMEs. Providing simplified reporting guidelines and support mechanisms may encourage broader participation in sustainability disclosure while accommodating the specific governance structures of family-controlled firms.

Originality of the paper. This potential study contributes to the literature by providing a systematic synthesis of research examining CSR and ESG disclosure strategies in family firms, an area that has received increasing scholarly attention but remains fragmented across multiple disciplines.

By organizing the existing literature into coherent thematic clusters, the embryonal study clarifies the key determinants of sustainability communication in family firms and highlights the role of family-related motivations, governance structures, and institutional contexts in shaping ESG disclosure strategies.

Furthermore, this work in progress identifies several important gaps in the literature, including the limited focus on privately held family firms, the reliance on formal disclosure data, and the lack of research examining the relationship between sustainability actions and communication practices. Addressing these gaps represents an important opportunity for future research aimed at developing a more comprehensive understanding of sustainability communication in family-controlled organizations.

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When Marriage Breaks, Firms Shake: Marital Instability as a Hidden Governance Risk in Family Firms

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Abstract. *Family firms are widely recognized for their long-term orientation, strong relational embeddedness, and commitment to preserving socioemotional wealth (SEW). Yet the same relational foundations that sustain these organizations may also expose them to specific vulnerabilities. One such vulnerability—largely overlooked in the family business literature—concerns the potential relational pressures generated by the strong financial and organizational interdependence between family and firm. In contexts where ownership structures, family relationships, and business governance are deeply intertwined, the concentration of family wealth within the firm may increase the economic and emotional stakes associated with marital relationships, potentially amplifying the consequences of marital instability for both the family and the organization. Rather than treating divorce solely as an exogenous shock to family firm governance, this study explores how the financial and governance arrangements typical of family firms may interact with marital dynamics within business families. Drawing on the Socioemotional Wealth perspective (Gómez-Mejía et al., 2007), the Family Stress Model (Conger et al., 1994), and the Vulnerability–Stress–Adaptation framework (Karney & Bradbury, 1995), the research examines how the financial and governance structures typical of family firms may contribute to relational strain within families involved in the ownership and management of family firms. A central contribution of the study is the introduction of the Wealth Exposure Index (WEI), which captures the degree to which family wealth and firm assets are financially intertwined. The index reflects governance and financing patterns frequently observed in family-controlled firms, such as ownership concentration, reliance on internal family capital, and the use of personal guarantees in corporate financing. Preliminary empirical evidence suggests that family firms characterized by higher levels of wealth exposure may face increased vulnerability to marital instability. By examining how the financial architecture of family firms may shape marital risk within business families, this study contributes to family business research and offers three insights into the relational foundations of organizational stability in family-controlled firms. First, the study highlights how the strong financial interdependence between family wealth and firm assets may represent a structural source of relational pressure within business families, suggesting that governance arrangements designed to protect socioemotional wealth may also carry unintended relational consequences. Second, the study shows how governance and financing choices typical of family firms—such as asset concentration, personal guarantees, and resistance to external equity—may unintentionally increase relational stress within the business family, revealing a potential "paradox of protection" in the preservation of socioemotional wealth. Third, the research integrates insights from family sociology and management studies, demonstrating that changes in family structures and marital stability may have important organizational implications for family-controlled firms, particularly when family wealth and firm resources are tightly interconnected.*

Keywords: *Divorce risk; Wealth exposure; Socioemotional wealth (SEW); Entrepreneurship; Family business governance*

Framing of the research. *Family firms operate through governance structures in which family relationships, ownership arrangements, and business management are deeply intertwined. Unlike widely held corporations, decision-making processes in family firms are frequently embedded in relational dynamics that extend beyond formal organizational boundaries. The classic three-circle model illustrates how the interaction between family, ownership, and business subsystems creates a governance configuration in which personal relationships and economic interests become closely interconnected (Tagiuri & Davis, 1996; Gersick et al., 1997). Within this configuration, family ties often shape strategic choices, leadership transitions, and ownership arrangements. The family business literature has long emphasized that this relational embeddedness represents both a source of advantage and a potential source of tension. On the one hand, strong family ties may foster trust, long-term orientation, and commitment to the continuity of the firm across generations (Miller & Le Breton-Miller, 2005; Zellweger, 2017). On the other hand, the same relational proximity may also generate conflicts that affect governance processes and managerial decision-making (Chrisman, Chua, & Sharma, 2005; De Massis, Kotlar, Chua, & Chrisman, 2014). Consequently, scholars have devoted considerable attention to relational conflicts within business families. Research has extensively explored issues such as succession disputes, intergenerational disagreements, sibling rivalry, and role ambiguity among family members involved in ownership and management (Handler, 1994; Sharma, Chrisman, & Chua, 2003; Jaskiewicz, Combs, & Rau, 2015). These studies highlight how tensions within the family system may influence governance structures, leadership succession, and strategic decision-making in family-controlled firms. More recently, the Socioemotional Wealth (SEW) perspective has provided a powerful framework for understanding why family relationships play such a central role in family firm governance. According to this perspective, family-controlled firms pursue not only financial goals but also non-economic objectives related to the preservation of family control, identity, and dynastic continuity (Gómez-Mejía et al., 2007; Berrone, Cruz, & Gómez-Mejía, 2012). The desire to protect socioemotional wealth often encourages family owners to maintain ownership*

concentration and avoid external equity participation in order to preserve family influence over the firm (Chrisman et al., 2012; Miller & Le Breton-Miller, 2014). While this body of research has significantly advanced our understanding of governance dynamics in family firms, it has primarily focused on conflicts that emerge within the formal governance structure of the firm, particularly those related to succession processes and internal power dynamics among family members. In contrast, relatively little attention has been devoted to relational disruptions that originate within the broader family system but outside the formal governance structure of the firm, despite their potential implications for ownership structures and governance stability. One such disruption is marital dissolution. Divorce has traditionally been examined within sociology, demography, and family studies as a private life event associated with changing household structures and individual life trajectories (Cherlin, 2004; Amato, 2010). However, within business families, marriage may also play an implicit institutional role that extends beyond the private sphere. Marital relationships frequently contribute to the stabilization of relational ties among members of the business family and may support the consolidation of wealth and alliances within the family system. In many cases, marriage indirectly sustains governance arrangements by reinforcing predictable expectations regarding inheritance, ownership continuity, and succession within the firm (Zellweger, 2017; Miller & Le Breton-Miller, 2021). At the same time, contemporary societies have experienced profound transformations in family structures and intimate relationships. Over the past decades, divorce rates have increased across most advanced economies as part of broader demographic changes associated with the Second Demographic Transition (Lesthaeghe, 2010; van de Kaa, 1987). These transformations reflect a broader shift toward individual autonomy, self-realization, and the diversification of family arrangements. Scholars have interpreted these developments as part of a broader transformation in the nature of intimate relationships. Giddens (1992) describes the emergence of "pure relationships," which persist only as long as they provide mutual satisfaction for both partners. Similarly, Beck and Beck-Gernsheim (1995) argue that processes of individualization have transformed romantic relationships into increasingly contingent and fluid arrangements. These changes suggest that marital relationships—once considered relatively stable institutional foundations—have become more uncertain in contemporary societies. For family firms, this transformation raises an important but largely unexplored question: how do changes in marital relationships affect governance structures in family-controlled firms? More specifically, how might the financial and governance arrangements typical of family firms interact with marital dynamics within business families? This question becomes particularly relevant when considering the financial and governance arrangements typical of family firms. Business families often rely on mechanisms that strongly intertwine family wealth and firm resources. Entrepreneurs frequently provide personal guarantees for corporate loans, pledge family assets as collateral, and concentrate a significant portion of their wealth within the firm itself. These governance choices are often motivated by the desire to preserve family control and protect socioemotional wealth (Gómez-Mejía et al., 2007; Chrisman et al., 2012). However, these strategies may also increase the degree of financial and relational interdependence between the family and the firm. Insights from the Family Stress Model suggest that economic pressure can generate relational strain within households, potentially affecting marital stability over time (Conger et al., 1994; Masarik & Conger, 2017). Similarly, the Vulnerability–Stress–Adaptation framework explains marital outcomes as the result of the interaction between enduring vulnerabilities, external stressors, and adaptive processes within couples (Karney & Bradbury, 1995; Randall & Bodenmann, 2017). Taken together, these perspectives suggest that financial pressures associated with business activities may spill over into family relationships, potentially increasing the likelihood of marital instability within business families. Despite these theoretical insights, the potential organizational implications of marital dissolution remain largely unexplored in the family business literature. While prior research has extensively investigated governance conflicts within family firms, limited attention has been devoted to how divorce may reshape ownership structures, alter governance dynamics, and introduce new sources of managerial complexity in family-controlled organizations. Accordingly, this study addresses this gap by examining how the financial architecture of family firms may interact with marital dynamics within business families and how marital instability, when it occurs, may generate organizational consequences for ownership structures and governance processes. By linking wealth concentration, relational stress, and marital outcomes, the study provides an initial step toward understanding divorce as a phenomenon with both relational and organizational implications in family-controlled firms.

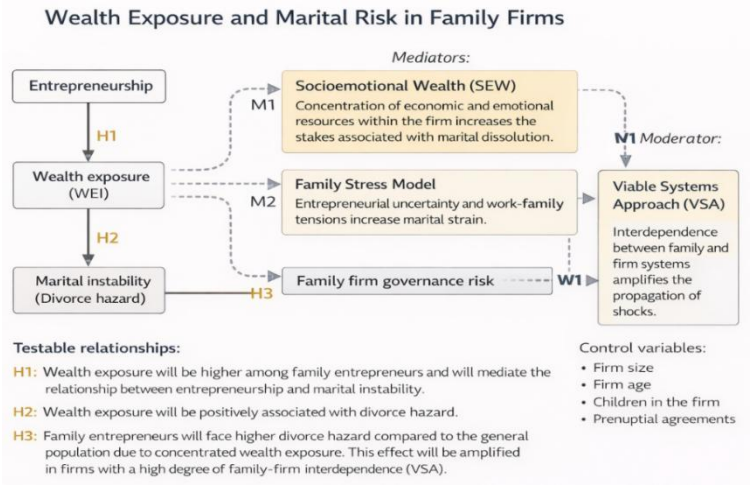
Purpose of the paper. *Against this backdrop, this study examines how the financial architecture of family firms may interact with marital stability within business families and potentially influence governance dynamics in family-controlled firms. While prior research has primarily focused on conflicts related to succession and intergenerational relationships, limited attention has been devoted to how divorce may affect ownership arrangements and managerial decision-making.*

Drawing on the SEW perspective and insights from family stress research, the paper examines how the strong financial and relational interdependence characteristic of family firms may shape marital stability and, in turn, generate potential organizational consequences for ownership structures and managerial processes. By doing so, the study explores how governance and financing arrangements typical of family firms—such as the concentration of family wealth within the firm—may indirectly shape marital dynamics within business families, and how marital instability, when it occurs, may have implications for ownership arrangements and governance processes in family-controlled firms.

Methodology. *To investigate the relationship between marital instability and governance structures in family firms, this study adopts a quantitative exploratory research design that combines demographic data on marital dissolution with indicators capturing the financial interdependence between family wealth and firm resources. The objective is not to*

establish causal relationships at this stage but rather to provide an initial empirical exploration of how specific structural characteristics of family firms may be associated with different levels of marital instability within business families and how such relational dynamics may carry potential implications for governance structures in family-controlled firms.

The analysis is grounded in the concept of wealth exposure, defined as the degree to which family wealth is financially intertwined with the assets and financial obligations of the firm. In family-controlled businesses, the boundaries between family assets and corporate resources are often blurred. Business owners frequently rely on mechanisms such as personal guarantees for bank loans, collateralization of family property, reinvestment of family savings into the firm, and high ownership concentration. These practices are widely documented in the family business literature and are often associated with governance choices aimed at preserving family control and protecting socioemotional wealth (Gómez-Mejía et al., 2007; Chrisman et al., 2012; Miller & Le Breton-Miller, 2014). However, these governance strategies may also increase the degree of financial interdependence between the family system and the business system. When family wealth becomes highly concentrated within the firm, economic shocks affecting the business may simultaneously affect the financial stability of the household. Prior research suggests that financial strain and economic uncertainty can generate relational tensions within families and increase the likelihood of marital conflict (Conger et al., 1994; Dew, 2011; Masarik & Conger, 2017). To capture this structural interdependence, the study introduces a composite indicator called the Wealth Exposure Index (WEI). The WEI measures the extent to which family wealth and firm assets are financially interconnected and therefore jointly exposed to economic risk. The index integrates several structural dimensions commonly observed in family firms, including ownership concentration, the use of family guarantees in corporate financing, and the reliance on internal family capital as a primary funding source. These dimensions reflect governance patterns that are frequently adopted by family-controlled firms seeking to maintain control over strategic decisions and limit external interference (Chrisman et al., 2005; Miller & Le Breton-Miller, 2005; Zellweger, 2017). The empirical analysis is conducted using a comparative macro-level dataset combining demographic statistics on divorce with economic indicators related to entrepreneurial activity and family firm ownership structures. The analysis focuses primarily on Italy, where family-controlled firms represent a dominant organizational form, but it also incorporates a comparative perspective including France, Germany, and the United Kingdom. Cross-national comparison allows the study to account for institutional differences in family policies, welfare regimes, and divorce legislation, which may influence marital instability patterns (Esping-Andersen, 2009; Lesthaeghe, 2010). Data on divorce rates and marital transitions are drawn from national statistical agencies and harmonized demographic datasets that provide information on marital dissolution across population groups. Economic indicators related to entrepreneurial activity and family firm ownership structures are integrated into the dataset in order to distinguish families associated with business ownership from other household categories. To analyze the relationship between wealth exposure and marital instability, the study employs a hazard ratio modelling approach, a technique commonly used in demographic and sociological research to estimate the probability that a specific event—such as divorce—occurs within a given time interval (Allison, 2014; Blossfeld et al., 2007). Hazard models allow researchers to estimate how structural characteristics influence the timing and likelihood of marital dissolution. The modelling process involves two main steps. First, the WEI is estimated for different categories of business families based on the structural characteristics described above. Second, hazard ratios associated with marital dissolution are estimated by comparing groups characterized by different levels of wealth exposure with baseline household categories that do not display the same degree of financial interdependence between family and business assets. Finally, to account for cross-country institutional differences, the model incorporates a national adjustment parameter that controls for variations in legal frameworks, welfare systems, and divorce regulations across the four countries considered. This adjustment allows the analysis to identify structural patterns in the relationship between wealth exposure and marital instability while reducing the influence of country-specific institutional factors. While the methodological approach remains exploratory, it provides an initial empirical framework for examining how the financial structures typical of family firms may interact with relational dynamics within business families and potentially influence the likelihood of marital dissolution as well as the broader governance environment of family-controlled firms.



Results. *This section presents the preliminary empirical results of the study.*

Wealth Exposure in Family Firms. A first key result concerns the level of wealth exposure associated with entrepreneurial activity. The construction of the WEI, which measures the proportion of personal wealth concentrated in the firm, reveals substantial differences between family and non-family entrepreneurs. The analysis indicates that family entrepreneurs display significantly higher levels of wealth exposure compared to non-family entrepreneurs. Specifically, the estimated exposure index reaches approximately 0.66 for family entrepreneurs, compared to 0.39 for non-family entrepreneurs, producing a relative exposure ratio of about 1.7. This finding is consistent with the theoretical expectation derived from the SEW perspective, according to which family firms tend to concentrate both economic and emotional resources within the business. Because the firm often represents not only a financial asset but also a repository of family identity and legacy, family entrepreneurs tend to allocate a larger share of their wealth to the firm. From a marital perspective, this concentration of wealth increases the potential economic stakes associated with marital dissolution. In the event of divorce, the division of assets may directly affect the ownership structure and control of the firm, thereby increasing the economic and relational stakes associated with marital instability within business families.

Divorce Hazard and Entrepreneurial Exposure. A second result concerns the relationship between wealth exposure and the probability of divorce. Using hazard ratio modelling, the analysis estimates the relative risk of marital dissolution across different occupational categories. The results indicate that entrepreneurs display a higher divorce hazard compared to the general population. The calibrated hazard ratio for non-family entrepreneurs is estimated at approximately 1.25, indicating a 25% higher probability of divorce relative to the baseline population. However, the effect becomes even more pronounced in the case of family entrepreneurs. The estimated hazard ratio for this group reaches approximately 1.43, corresponding to a 43% higher divorce risk compared to the general population. These findings suggest that entrepreneurial activity itself is associated with increased marital strain, a result that aligns with the Family Stress Model, which highlights how economic pressures and work–family tensions can affect marital stability. However, the significantly higher hazard ratio observed among family entrepreneurs indicates that additional mechanisms may be at play beyond the general stress associated with entrepreneurship and may be related to the specific financial and relational interdependence typical of family-controlled firms.

Decomposing the Excess Divorce Risk. To better understand this difference, the analysis decomposes the excess divorce risk observed among family entrepreneurs into two main components. The results suggest that approximately 62% of the excess risk can be attributed to the baseline risks associated with entrepreneurial activity, including long working hours, financial uncertainty, and role conflicts between work and family life. The remaining 38% of the excess risk, however, appears to be associated with the higher level of wealth exposure characteristic of family firms. Because family entrepreneurs typically allocate a substantial portion of their wealth to the firm, marital dissolution may entail particularly complex negotiations over asset division and ownership rights. This result challenges the idea that divorce risk among entrepreneurs can be explained solely by occupational stress or adverse selection mechanisms. Instead, it suggests that the structural characteristics of family ownership—particularly the concentration of family wealth within the firm—may play an important role in shaping marital outcomes.

Preliminary Interpretation: Wealth Exposure and Family Firm Vulnerability. Findings point to a structural tension within family firms. On the one hand, family ownership structures are often designed to protect family wealth and ensure continuity across generations. On the other hand, the concentration of financial and emotional resources within the firm may inadvertently increase the stakes associated with marital disruption. From the perspective of the Viable Systems Approach (VSA), this dynamic can be interpreted as a form of systemic vulnerability. Because the family and the firm are deeply interconnected, disruptions in one subsystem—such as marital breakdown—can potentially propagate across the broader organizational system. These preliminary results therefore suggest that divorce may have implications that extend beyond the private sphere and potentially affect governance arrangements in family firms. Marital instability may affect ownership structures, decision-making processes, and the firm's strategic continuity, particularly in contexts characterized by high levels of wealth exposure and strong family–firm interdependence. While these findings remain exploratory, they provide initial empirical support for the idea that wealth exposure and family embeddedness jointly shape the relationship between entrepreneurship and marital stability and may indirectly influence the governance environment of family-controlled firms.

Research limitations. *Despite the contributions of this study, several limitations should be acknowledged.*

First, the empirical analysis relies on a preliminary dataset and the results should therefore be interpreted with caution. Although the statistical models provide initial evidence of the relationship between wealth exposure and marital instability among entrepreneurs, further analyses using larger and more diverse samples are needed to confirm the robustness and generalizability of the findings. Second, the study focuses primarily on the economic dimension of divorce exposure, operationalized through the Wealth Exposure Index (WEI). While this measure captures the concentration of personal wealth within the firm, it does not fully account for other important dimensions of marital dynamics, such as emotional conflict, relational quality, or family communication patterns. Future research could complement the current

quantitative approach with qualitative or mixed-method designs in order to better capture the relational mechanisms underlying marital instability within business families. Third, the analysis does not explicitly consider institutional and legal differences across contexts. Divorce regulations, property regimes, and family law frameworks vary significantly across countries and may influence both wealth exposure and divorce outcomes. As a result, the mechanisms identified in this study may operate differently in alternative institutional environments. Comparative cross-country analyses could therefore provide valuable insights into how legal and cultural factors shape the relationship between entrepreneurship, wealth concentration, and marital risk. Fourth, although the study highlights the potential organizational implications of marital instability for family firms, the current analysis does not directly observe firm-level outcomes following marital disruption. Future research could examine how divorce events affect ownership structures, succession processes, strategic decision-making, and firm performance over time. Finally, the conceptual framework integrates insights from socioemotional wealth theory, the Family Stress Model, and the Viable Systems Approach. While this interdisciplinary perspective helps illuminate the mechanisms linking entrepreneurship, wealth exposure, and marital instability, the empirical models test only part of these theoretical dynamics. Additional studies could further explore how emotional attachment to the firm, governance structures, and family–business boundaries interact with marital processes and how these dynamics may influence the stability of family firm governance systems.

Managerial implications. *The findings of this study offer several implications for family business owners, advisors, and governance bodies involved in the management and continuity of family firms. First, the results highlight how marital instability may generate organizational implications in family firms. Because business families often concentrate a substantial share of their wealth in the firm, marital dissolution may have significant implications for ownership structures, control rights, and strategic decision-making. Family business leaders should therefore consider marital stability as part of the broader relational and financial landscape affecting the firm. Second, the findings suggest that wealth concentration within the firm can amplify the economic stakes of marital disruption. For family entrepreneurs, this implies the need to adopt governance mechanisms that can mitigate potential conflicts in the event of divorce. Instruments such as shareholder agreements, prenuptial arrangements, or clear ownership transfer rules may help reduce uncertainty and protect the continuity of the business. Third, the results underline the importance of formal governance structures in family firms. When family relationships and business ownership are deeply intertwined, unexpected personal events—such as marital breakdown—may easily spill over into the organizational domain. Establishing clearer boundaries between family and business roles can help firms maintain stability even when family dynamics change. Fourth, the study suggests that family business advisors—including lawyers, financial planners, and family business consultants—should pay greater attention to the interaction between family dynamics and ownership structures. Integrating marital risk considerations into long-term governance planning may help families anticipate potential conflicts and design more resilient ownership arrangements. Finally, the results point to the broader need for preventive governance strategies in family firms. Rather than addressing marital disruptions only when they occur, family firms may benefit from proactively developing governance frameworks that anticipate potential changes in family relationships. Such an approach can help preserve both family harmony and organizational stability over time and reduce the potential organizational disruptions associated with marital dissolution in business families.*

Originality of the paper. *This study contributes to the family business literature by expanding current understanding of how family dynamics interact with governance structures in family-controlled firms. While prior research has extensively examined governance conflicts related to succession, intergenerational relationships, and role ambiguity among family members involved in ownership and management (Handler, 1994; Sharma, Chrisman, & Chua, 2003; Chrisman, Chua, & Sharma, 2005; Jaskiewicz, Combs, & Rau, 2015; De Massis, Kotlar, Chua, & Chrisman, 2014), comparatively limited attention has been devoted to relational disruptions originating outside the formal governance structure of the firm. In particular, the potential implications of marital instability for family firm governance remain largely unexplored. The originality of this study lies in shifting attention toward the structural conditions within family firms that may shape marital instability within business families. Rather than conceptualizing divorce solely as an exogenous family event, the paper examines how the financial architecture of family firms—particularly the concentration of family wealth within the business—may increase the economic and relational stakes associated with marital disruption. In doing so, the study extends the family business governance literature by highlighting how relational dynamics within the family system may interact with ownership structures and influence the stability of governance arrangements in family-controlled firms.*

A second contribution concerns extending the SEW perspective (Gómez-Mejía et al., 2007; Berrone, Cruz, & Gómez-Mejía, 2012). Prior studies have shown that family owners often prioritize the preservation of family control, identity, and dynastic continuity, leading them to concentrate ownership and avoid external equity participation (Chrisman et al., 2012; Miller & Le Breton-Miller, 2014). This study argues that governance and financing choices aimed at preserving SEW may also have unintended relational consequences. Specifically, the concentration of family wealth within the firm may increase the family system's economic exposure, thereby intensifying the potential consequences of marital instability.

Third, the study contributes by connecting family business research with theories of family stress and marital instability developed in sociology and family studies. The conceptual framework integrates the Family Stress Model (Conger et al., 1994; Masarik & Conger, 2017) and the Vulnerability–Stress–Adaptation framework (Karney &

Bradbury, 1995; Randall & Bodenmann, 2017), suggesting that economic pressures associated with entrepreneurial activity and wealth concentration may spill over into family relationships. By bridging these literatures, the paper highlights how economic structures and relational dynamics jointly shape marital outcomes within business families.

A fourth contribution is methodological. The study introduces the WEI, a composite indicator designed to capture the degree to which family wealth is financially intertwined with firm assets and liabilities. By operationalizing wealth concentration in family firms, the WEI provides a novel empirical mechanism for examining how economic exposure may influence marital risk among entrepreneurs. This approach offers a new analytical tool for investigating the intersection between family wealth structures, entrepreneurial activity, and family stability.

Finally, the study provides preliminary quantitative evidence that family entrepreneurs face a higher divorce hazard compared to both the general population and non-family entrepreneurs. By identifying wealth exposure as a potential mechanism linking entrepreneurship and marital instability, the findings open new avenues for research on how family relationships and governance structures co-evolve in family-controlled firms. More broadly, the study suggests that changes in family relationships may have implications that extend beyond the private sphere, potentially influencing the stability and continuity of family firm governance systems.

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Società Italiana di MANAGEMENT

Short papers

Track: Strategic Communication



Antecedenti, evoluzione ed esiti dell'autenticità d'impresa: una revisione critica della letteratura

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Abstract. *Un* leitmotiv *nella letteratura di* strategic management *è che l'autenticità d'impresa rappresenti una risorsa intangibile in grado di supportare l'emergere e la sostenibilità del vantaggio competitivo. Questa consapevolezza ha stimolato un'ampia produzione scientifica sul tema. Se, da un lato, la copiosità della letteratura ha consentito di investigare molteplici e importanti sfaccettature inerenti alla genesi, all'affermazione e al dissolvimento dell'autenticità d'impresa, la ricerca su questo tema rimane teoricamente frammentata. Gli studi esistenti tendono generalmente a esaminare fasi temporalmente distinte connesse all'autenticità d'impresa; pertanto, la letteratura non offre una ricostruzione coerente delle dinamiche temporali che collegano le suddette fasi e, quindi, non spiega compiutamente l'evoluzione dell'autenticità d'impresa. Il presente paper rappresenta il disegno di ricerca di uno studio ancora* in fieri*. La ricerca mira a sintetizzare e reinterpretare l'autenticità d'impresa attraverso una lente interpretativa temporale. La ricerca dovrà proporre un framework concettuale che spieghi come l'autenticità si trasforma nel tempo. In particolare, dall'analisi della letteratura noi abbiamo già identificato le condizioni di field e di categoria, le condizioni di ancoraggio dell'impresa e le condizioni relative alle dotazioni di connessione come antecedenti dell'autenticità d'impresa. Inoltre, lo studio della letteratura esistente consente di mettere in luce come l'autenticità d'impresa evolva sia attraverso sforzi manageriali intenzionali (*i.e., authenticity work*), sia mediante mutamenti non intenzionali. Gli esiti di tali trasformazioni sono rappresentati da nuove condizioni di field e di categoria, nuove condizioni di ancoraggio dell'impresa e nuove condizioni relative alle dotazioni di connessione. Il framework proposto può supportare l'individuazione di nuove direzioni di ricerca e l'identificazione di implicazioni manageriali.*
Keywords: *autenticità d'impresa, authenticity work, temporalità, conformità, coerenza, connessione*

Framing della ricerca. *Negli ultimi due decenni, l'autenticità è divenuta vieppiù centrale nel dibattito di* strategic management*. Le imprese sono sempre più chiamate ad essere percepite come autentiche per ottenere legittimazione, per differenziarsi dai* competitor *e per conseguire il vantaggio competitivo (Kovács et al., 2014; O'Connor et al., 2017). L'autenticità segnala l'appartenenza credibile dell'impresa ad una categoria, la coerenza tra l'identità, i valori dichiarati e le pratiche effettive, o connessioni simboliche con luoghi, persone e tempi (Lehman et al., 2019).*

La letteratura sull'autenticità si è mossa lungo tre principali direttrici. La prima riguarda la questione ontologica stessa dell'autenticità. Per esempio, Wang (1999) ha distinto l'autenticità oggettiva (interpretando l'autenticità come attributo verificabile), dall'autenticità costruita (quindi, l'autenticità come risultato di una costruzione sociale) ed esistenziale (in tal caso, l'autenticità è intesa come potenziale stato esistenziale dell'essere).

La seconda direttrice si è concentrata sulle prospettive interpretative dell'autenticità. Nello specifico, una prima prospettiva denominata audience–based *si concentra su "chi valuta" l'autenticità (Carroll & Kovács, 2021). Una seconda prospettiva denominata* referent–based*, invece, analizza "a che cosa" l'autenticità viene riferita, ossia a quali criteri socialmente condivisi (ad esempio, categorie, identità, valori, tempi, persone, luoghi) l'audience fa riferimento come base valutativa (Lehman et al., 2019).*

La terza direttrice di ricerca che ha caratterizzato il dibattito sull'autenticità è l'analisi dei processi mediante cui le imprese costruiscono l'autenticità (Peterson, 2005), evidenziando tensioni tra parole e azioni (Cording et al., 2014), mutamenti categoriali (Negro et al., 2011; Pozner et al., 2022) e reinterpretazioni di connessioni spazio-temporali (Cappelen & Pedersen, 2021).

Benché l'abbondante letteratura abbia approfondito molteplici dimensioni relative alla genesi, all'affermazione e al dissolvimento dell'autenticità d'impresa, il dibattito scientifico appare ancora caratterizzato da una marcata frammentazione teorica. L'autenticità è usualmente analizzata in momenti discreti o con riferimento a significati isolati (conformità, coerenza, connessione), senza una visione integrata delle dinamiche temporali che collegano gli antecedenti dell'autenticità, la trasformazione dell'autenticità e gli esiti di tali trasformazioni. De facto*, la temporalità, intesa come relazione tra passato, presente e futuro (Schultz & Hernes, 2013), rimane una dimensione limitatamente teorizzata. Tale condizione inibisce la comprensione del perché alcune imprese riescono a trasformare la propria autenticità nel tempo, mentre altre imprese rimangono vincolate agli antecedenti dell'autenticità. Inoltre, da un'analisi della letteratura, noi osserviamo che rimane ambiguo se e come l'autenticità possa simultaneamente abilitare e limitare l'azione strategica delle imprese.*

Scopo del paper. *La presente ricerca – ancora in una fase embrionale – si propone di sviluppare una review della letteratura sull'autenticità d'impresa, reinterpretandola mediante una lente temporale. Il risultato atteso della ricerca*

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dovrà essere un framework concettuale che colleghi antecedenti dell'autenticità d'impresa, modalità evolutive dell'autenticità ed esiti della trasformazione dell'autenticità nel tempo.

Metodologia. *Questa ricerca adotta un approccio di revisione teorica estensiva della letteratura. La raccolta degli articoli è stata condotta attraverso Web of Science e Scopus (1990–2026) utilizzando il termine "*authentic*" combinato con l'operatore booleano "*AND" "organisation*", "*organization*", "*firm*", "*business*", o "*compan*". Le parole chiave sono state ricercate nel titolo, abstract, parole chiave e sono stati inclusi solo articoli pubblicati in inglese nell'ambito del business e management.*

Per affinare il campione abbiamo applicato un filtro di qualità delle riviste. Sono stati inclusi articoli e review pubblicati in riviste classificate 3, 4 e 4 nell' U.K. Association of Business Schools Academic Journal Guide 2024 all'interno dei seguenti ambiti: entrepreneurship and small business management; ethics, CSR, and management; innovation; international business; marketing; operations & technology; organization & management science; organization studies; strategy. Dopo la rimozione dei duplicati, il dataset comprendeva 700 articoli.*

Coerentemente con l'obiettivo dello studio, l'inclusione di riviste appartenenti ai domini sopra menzionati non implica l'inclusione di tutti i filoni di ricerca che essi comprendono. Ad esempio, sono stati considerati selettivamente gli studi di marketing includendoli soltanto quando i contributi concettualizzano i mercati come sistemi sociali organizzati e istituzionalizzati, piuttosto che come arene di consumo individuale. Di conseguenza, abbiamo escluso gli articoli focalizzati principalmente sulla brand authenticity *(ad es., Fritz et al., 2017; Dwivedi & McDonald, 2018). Sebbene questo filone di ricerca offra importanti contributi in merito alle valutazioni dell'autenticità da parte dei consumatori, la nostra analisi si concentra sui referenti valutativi dell'autenticità dell'impresa. Analogamente, abbiamo considerato in modo selettivo la ricerca nel dominio di Operations & Technology, escludendo ad esempio gli studi centrati sull'autenticità del prodotto focalizzati sugli aspetti tecnologici della blockchain (Pun et al., 2021).*

Inoltre, abbiamo escluso gli articoli che analizzano l'autenticità ad un micro–livello di analisi, come gli studi sui leader (Fladerer et al., 2020), imprenditori (Lewis, 2013), dipendenti (Jean–Baptiste et al., 2025) o altri individui (Lee & Chung, 2025), poiché l'inclusione di tali studi avrebbe introdotto eterogeneità teorica in termini di livelli di analisi, diluendo il focus sull'autenticità come processo collettivo e radicato organizzativamente.

Inoltre, abbiamo integrato il dataset con due articoli che non sono emersi dalla ricerca sopra descritta, ma che sono stati inclusi in virtù della loro particolare rilevanza nella letteratura sull'autenticità. Nello specifico, abbiamo aggiunto Peterson (2005), un contributo fondamentale sui processi di autenticazione, che non era stato incluso nel database originario poiché si concentra più ampiamente sulla costruzione sociale dell'autenticità piuttosto che su come le imprese gestiscono la propria autenticità. Allo stesso modo, abbiamo incluso Lehman et al. (2019), che non era presente nel database iniziale poiché si concentra sui significati dell'autenticità adottando una prospettiva basata sui referenti e, nell'abstract, fa riferimento in modo generale alle "entità" in senso astratto, piuttosto che alle imprese o alle organizzazioni.

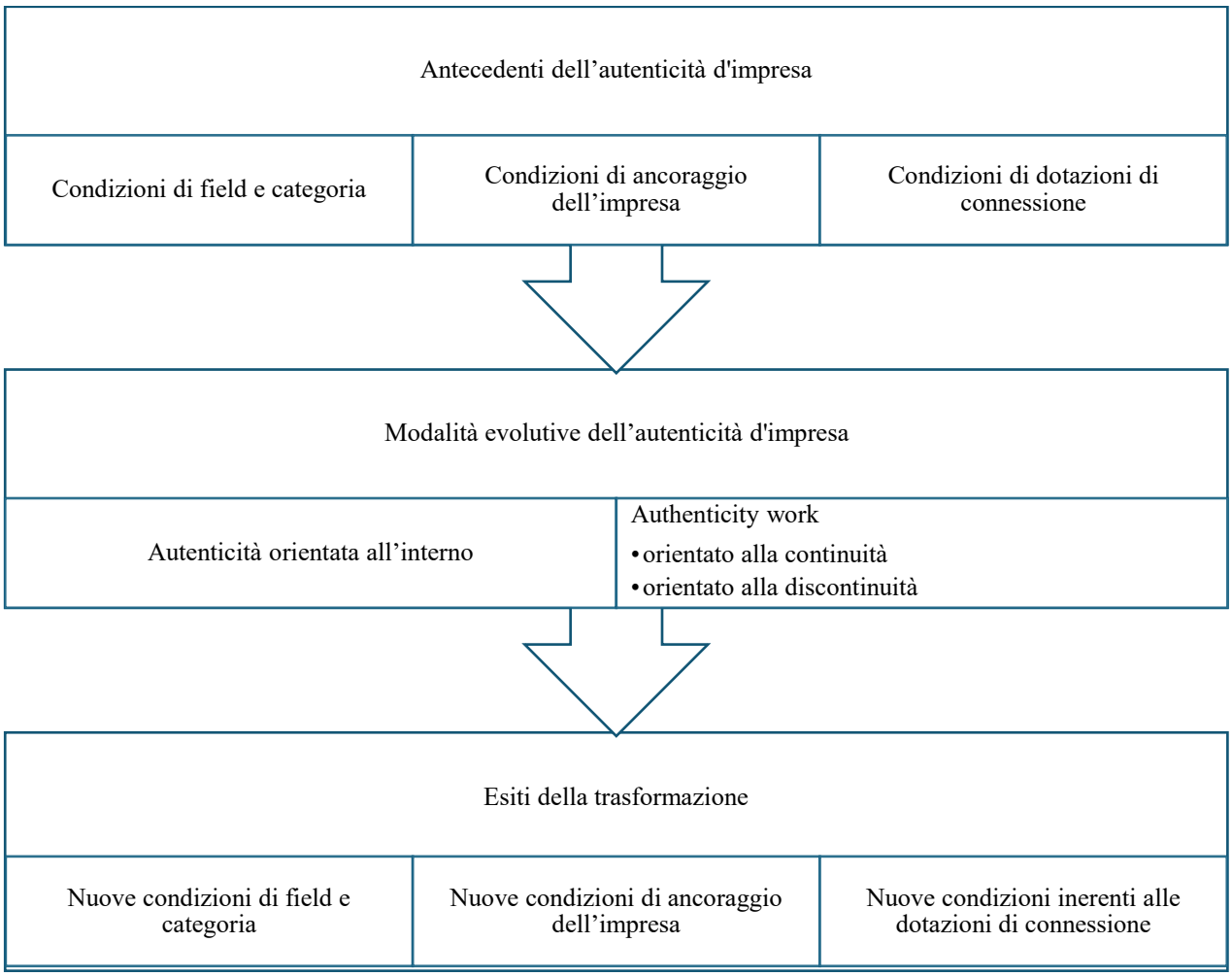
A seguito del processo di screening, il campione finale conterrà almeno 100 articoli, che sono stati codificati in base a: (a) prospettiva(e) teorica(e) adottata(e); (b) metodologia; (c) contesto empirico; (d) implicazioni teoriche; ed (e) implicazioni manageriali. Inoltre, seguendo Lehman et al. (2019) secondo cui l'autenticità può avere tre significati, sono state analizzate: (f1) la conformità al field *e alla categoria, che coglie l'aderenza categoriale a norme istituzionalizzate; (f2) la coerenza dell'impresa, che riflette l'allineamento tra l'entità stessa (ossia identità e valori dell'impresa) e le sue espressioni; e (f3) la connessione, fondata sui legami percepiti con luoghi, tempi e persone. Giova osservare che, così facendo, richiamiamo l'attenzione sui referenti valutativi che orientano il modo con cui l'audience valuta le rivendicazioni di autenticità. Un processo iterativo di confronto tra autori ha permesso di identificare antecedenti dell'autenticità, modalità evolutive dell'autenticità ed esiti della trasformazione.*

Figura 1. La selezione della letteratura

Database	Scopus	Web of Science
Arco temporale	Gennaio 1990–Febbraio 2026	Gennaio 1993–Febbraio 2026
Risultati della query di ricerca	3,228 articoli	2,804 articoli
Selezione delle riviste	460 articoli	630 articoli
Articoli aggiunti	2 articoli	
Dataset iniziale	702 articoli	
Criteri di esclusione	Abbiamo escluso quei filoni di ricerca che collocano l'autenticità prevalentemente a livello di tratti individuali, caratteristiche del brand o meccanismi tecnologici di verifica degli attributi del prodotto.	

Risultati. *L'analisi della letteratura fin qui condotta ha consentito di descrivere l'autenticità d'impresa come esito di un processo evolutivo nel tempo. In particolare, identifichiamo tre elementi centrali del processo di evoluzione dell'autenticità d'impresa, segnatamente: (i) gli antecedenti dell'autenticità d'impresa, (ii) le modalità evolutive dell'autenticità d'impresa, e (iii) gli esiti della trasformazione. Il framework concettuale permette di comprendere come l'autenticità venga costantemente trasformata nell'interazione tra passato, presente e futuro.*

Figura 2. Framework concettuale



Fonte: Elaborazione nostra

Di seguito, si analizzano i singoli blocchi che costituiscono il framework proposto in Figura 2.

(i) Antecedenti dell'autenticità d'impresa. *L'autenticità d'impresa non è riconducibile ad un singolo elemento (e.g., coerenza tra espressioni esterne e valori d'impresa o appartenenza ad una categoria), bensì emerge dall'interazione tra condizioni di* field *e di categoria, condizioni di ancoraggio dell'impresa e condizioni di dotazioni di connessione. Le condizioni di* field *e categoria definiscono ciò che è percepito come autentico in un determinato contesto istituzionale. I codici categoriali, le logiche istituzionali e le aspettative dominanti dell'audience forniscono uno "schema" attraverso cui l'audience valuta l'autenticità delle imprese (Lehman et al., 2019). Tuttavia, tali schemi non sono statici. Infatti, la letteratura mostra come mutamenti nella composizione dell'*audience*, nella struttura del mercato o nelle tecnologie possano ridefinire i criteri di autenticità (Negro et al., 2011; Pozner et al., 2022). Ne consegue la natura dinamica dell'autenticità con riferimento alle condizioni di* field *e categoria.*

Il secondo elemento riguarda le condizioni di ancoraggio dell'impresa. Le imprese formulano rivendicazioni su "chi sono", che funzionano da punto di riferimento per le decisioni strategiche (Baron, 2004). La coerenza tra identità, valori dichiarati e pratiche effettive rafforza le percezioni di autenticità (Cording et al., 2014), mentre incongruenze persistenti generano erosione di credibilità.

Il terzo elemento è costituito dalle condizioni di dotazioni di connessione, ossia i legami simbolici che intercorrono tra l'impresa e persone, luoghi e tempi. Ad esempio, connessioni temporali, connessioni con figure fondative e Heritage possono generare rendite simboliche significative (Pecot et al., 2018).

Questi tre elementi, considerati congiuntamente, definiscono gli antecedenti dell'autenticità d'impresa, e costituiscono il punto di partenza per ogni successiva trasformazione.

(ii) Modalità evolutive dell'autenticità d'impresa. *La nostra analisi della letteratura converge su due macro–pattern attraverso cui l'autenticità evolve: autenticità orientata all'interno e* authenticity work*.*

1. **Autenticità orientata all'interno.** *Nel caso dell'autenticità orientata all'interno, l'impresa non "lavora" intenzionalmente per apparire autentica, bensì coltiva coerenza interna e allineamento valoriale (Auster & Freeman, 2013). In questa prospettiva, l'autenticità emerge come risultato di pratiche quotidiane coerenti, piuttosto che operazioni comunicative. Tuttavia, anche in assenza di sforzi intenzionali orientati verso l'esterno, l'autenticità può trasformarsi. Infatti, i mutamenti nelle categorie di mercato, nell'ambiente istituzionale e nei valori sociali possono ridefinire ciò che viene considerato autentico. Alla luce di quanto precede, l'autenticità dell'impresa può essere percepita diversamente anche in assenza di una modifica delle proprie pratiche.*
2. **Authenticity work.** *L'impresa può attivare deliberatamente strategie di* authenticity work *(Peterson, 2005; Voronov et al., 2023), ponendo in essere uno sforzo attivo orientato verso l'esterno per costruire la propria autenticità. L'*authenticity work *può assumere modalità di trasformazione distinte:*
   - **2.1. Authenticity work orientato alla continuità.** *Nell'*authenticity work *orientato alla continuità, l'autenticità dell'impresa evolve integrando elementi innovativi e al contempo preservando la riconoscibilità. Si tratta di un processo di adattamento, in cui la continuità con le categorie, l'identità, i valori e le connessioni iniziali vengono enfatizzate per rendere il cambiamento intellegibile. Ciò avviene enfatizzando l'appartenenza alla categoria (Mathias et al., 2020), allineando la strategia con l'identità e i valori dell'impresa (De Keyser & Langley, 2025) e mobilitando le connessioni con il passato, i luoghi e le persone (Hahl, 2016; Hatch & Schultz, 2017). In questo modo, gli antecedenti dell'autenticità d'impresa funzionano come bussola che orienta il cambiamento.*
   - **2.2. Authenticity work orientato alla discontinuità.** *Nell'*authenticity work *orientato alla discontinuità, invece, l'impresa trasforma in modo più radicale la propria autenticità. Ciò può avvenire attraverso l'estensione e ibridazione tra categorie (Wheaton & Carroll, 2017; Schifeling & Demetry, 2021), il (ri)allineamento tra identità e valori dell'impresa (McKendrick & Hannan, 2014) e la reinterpretazione di connessioni con il passato, i luoghi e le persone (Cappelen & Pedersen, 2021). Anche nel pattern orientato alla discontinuità, la trasformazione dell'autenticità deve apparire chiara all'audience, poiché una rottura dirompente con gli antecedenti dell'autenticità d'impresa rischia di essere percepita come inautentica.*

(iii) Esiti della trasformazione. *Sebbene l'autenticità abbia origine negli antecedenti identificati, essa viene continuamente trasformata nel tempo. In primo luogo, l'autenticità può trasformarsi anche in assenza di sforzi deliberati orientati verso l'esterno da parte dell'impresa (Auster & Freeman, 2014), come nel caso di mutamenti emergenti delle categorie (ossia cambiamenti nelle logiche istituzionali, nei codici delle categorie, o nelle aspettative dominanti dell'audience), di riallineamenti endogeni dei valori (quando mutano i valori sociali precedentemente condivisi), oppure di sedimentazione delle dotazioni di connessione (quando connessioni territoriali diventano date per scontate e non generano più valore aggiunto). Tali dinamiche contribuiscono a trasformare l'autenticità nel corso del tempo.*

*In secondo luogo, la trasformazione dell'autenticità può avvenire attraverso l'*authenticity work *orientato alla continuità o orientato alla discontinuità. L'autenticità dell'impresa non riguarda meramente "essere", bensì "divenire". In un processo radicato nella temporalità, gli antecedenti dell'autenticità d'impresa (passato) vengono trasformati attraverso le modalità evolutive dell'autenticità (presente), e a sua volta conducono verso nuove condizioni di field e categoria, nuove condizioni di ancoraggio dell'impresa e nuove condizioni inerenti alle dotazioni di connessione (futuro). Da un lato, l'*authenticity work *orientato alla continuità può essere mobilitato per abilitare il cambiamento preservando un orientamento stabile verso "chi è l'impresa" (De Keyser & Langley, 2025). In questa prospettiva, l'*authenticity work *orientato alla continuità può attenuare gli effetti vincolanti dell'autenticità e amplificarne la funzione di empowerment. Ad esempio, l'*authenticity work *orientato alla continuità consente di utilizzare valori e identità del passato come punti di riferimento e bussola per orientare la trasformazione, piuttosto che meri limiti al cambiamento. Dall'altro lato, l'*authenticity work *orientato alla discontinuità implica la rottura selettiva e deliberata rispetto agli antecedenti dell'autenticità d'impresa, cercando di mantenere credibilità presso l'audience di riferimento (Younkin & Kashkooli, 2020). In entrambi i casi, le imprese si confrontano con una sfida strategica cruciale: sfruttare l'autenticità come empowerment, limitandone al contempo gli effetti vincolanti.*

Limitazioni della ricerca. *Il disegno della ricerca proposto in questo contributo non è scevro di limitazioni. In primo luogo, il framework concettuale privilegia una prospettiva* referent–based*, concentrandosi sui criteri valutativi attraverso cui l'autenticità viene trasformata nel tempo. Tale scelta analitica lascia in secondo piano l'evoluzione dell'audience. Riconosciamo, dunque, la necessità di adottare una prospettiva complementare che potrebbe indagare come e perché le valutazioni di autenticità cambiano nel tempo, ad esempio in funzione di mutamenti nella composizione dell'audience.*

In secondo luogo, la review adotta una delimitazione precisa del campo di indagine, escludendo contributi focalizzati su brand authenticity*,* product authenticity *e autenticità a livello micro (e.g., leader, imprenditori, dipendenti). Questa scelta è coerente con l'obiettivo di analizzare l'autenticità come processo collettivo e organizzativo, ma comporta l'esclusione di dinamiche individuali e di consumo che potrebbero interagire con gli antecedenti dell'autenticità*

d'impresa. L'integrazione tra livello organizzativo e livello micro rappresenta pertanto una possibile area di sviluppo futuro.

Infine, la maggioranza degli studi analizzati si concentra su contesti organizzativi e imprenditoriali tradizionali e poco esplora la digital authenticity *(Pedersen & Ritter, 2024) e l'impatto delle tecnologie emergenti nella genesi e affermazione dell'autenticità d'impresa. La crescente centralità di ambienti digitali e sistemi basati sull'intelligenza artificiale potrebbe modificare in modo significativo le modalità attraverso cui l'autenticità viene valutata e costruita, dischiudendo nuove linee di ricerca e richiedendo una distinzione analitica tra contesti organizzativi tradizionali e digitali.*

Implicazioni manageriali. *Il framework concettuale proposto offre indicazioni rilevanti per i manager chiamati a gestire l'autenticità d'impresa in contesti caratterizzati da crescente esposizione pubblica e mutamento istituzionale. In primo luogo, la ricerca che stiamo portando avanti indica che l'autenticità può evolvere anche in assenza di interventi deliberati da parte dell'impresa. Ciò implica che i manager non possano considerare l'autenticità come un elemento statico. Giacché la percezione dell'autenticità dell'impresa dipende dai codici categoriali e i valori sociali, che sono in continuo mutamento, le imprese devono monitorare costantemente l'evoluzione degli stessi.*

*In secondo luogo, sottolineiamo che i referenti interni all'impresa (e.g., l'identità dell'impresa) possono evolvere. Tale evoluzione comporta una tensione delicata tra continuità e cambiamento. I manager devono gestire questa tensione evitando che trasformazioni strategiche vengano percepite come rotture incoerenti rispetto alla storia, l'identità e i valori dell'impresa. Nello specifico, l'*authenticity work *orientato alla continuità può consentire il bilanciamento tra il cambiamento e il mantenimento della riconoscibilità, preservando un orientamento stabile rispetto all'identità dell'impresa mentre si introducono elementi nuovi.*

Nel loro insieme, queste implicazioni indicano che la gestione dell'autenticità richiede una combinazione di sensibilità temporale, capacità interpretativa dei cambiamenti e abilità di bilanciare continuità e trasformazione.

Originalità del paper. *Il presente contributo apporta tre principali elementi di originalità teorica. In primo luogo, il disegno della ricerca descritto propone una rilettura della letteratura sull'autenticità d'impresa attraverso una lente esplicitamente temporale. Mentre gran parte degli studi esistenti analizza l'autenticità in momenti discreti o in relazione a specifici significati (e.g., conformità categoriale, coerenza tra identità, valori ed espressioni esterne, connessioni con tempo, luoghi e persone), la presente ricerca integra tali prospettive all'interno di un processo dinamico che collega antecedenti, modalità evolutive ed esiti della trasformazione dell'autenticità d'impresa nel tempo. In tal modo, l'autenticità viene concettualizzata non come un attributo statico, bensì come protagonista di un processo di trasformazione.*

*In secondo luogo, il contributo sviluppa un framework concettuale che mette in relazione tre elementi: condizioni di field e categoria, condizioni di ancoraggio dell'impresa e condizioni di dotazioni di connessione, che insieme formano gli antecedenti dell'autenticità. Tali antecedenti strutturano le possibilità di azione futura dell'impresa attraverso l'autenticità orientata all'interno e attraverso l'*authenticity work*, orientato alla continuità e/o alla discontinuità. Il framework concettuale proposto supera la frammentazione teorica della letteratura e consente di spiegare come differenti antecedenti dell'autenticità d'impresa possano dare origine a modalità evolutive differenti.*

Complessivamente, contribuiamo al dibattito sull'autenticità d'impresa offrendo una prospettiva temporale che integra elementi precedentemente trattati in modo frammentato, fornendo una base per ulteriori sviluppi futuri empirici e concettuali.

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Do Packaging Claims Drive Product Performance? Evidence from the Biscuit Category in the Italian FMCG Market

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Abstract. *This study investigates the role of packaging claims in explaining product performance in the biscuit category, a context in which front-of-pack messages may be relevant but not universally effective. Building on the idea that packaging claims act as visible and synthetic market signals, the paper examines whether they operate as independent performance drivers or as positioning signals embedded within broader brand identity strategies. The empirical analysis is based on a structured dataset of packaged biscuits in the Italian fast-moving consumer goods market, integrating product-level market performance indicators, brand identity, weighted distribution coverage, and front-of-pack claim categories. Product performance is measured through EURO per point of weighted distribution (EURO PP) and through its year-on-year variation, in order to capture both static performance efficiency and performance dynamics. A stepwise regression approach is adopted to isolate the role of packaging claims from the effects of brand identity and distribution coverage, and to test whether claim effectiveness varies across brands. The results show that some claim categories are associated with product performance when considered in isolation, but their explanatory role decreases substantially once brand effects are introduced. Interaction effects further reveal that claim effectiveness is heterogeneous across brands, while no systematic associations emerge with performance growth over time. Overall, the findings suggest that packaging claims should be interpreted less as universal drivers of market performance and more as brand-contingent positioning signals within an indulgence-oriented food category.*
Keywords: *packaging claims; front-of-pack communication; brand positioning; product performance; biscuit category; FMCG*

Framing of the research. *In fast-moving consumer goods markets, packaging represents a critical communication interface between brands and consumers (Wang et al., 2025), especially at the point of sale, where many decisions are made quickly and under limited cognitive effort (van Ooijen et al., 2017; Steenis et al., 2017; Mehta et al., 2024). In food retail contexts, front-of-pack elements are particularly relevant because they provide highly visible cues that support rapid product evaluation and shape consumers' first inferences about the offer (Steenis et al., 2017). Literature shows that packaging design and front-of-pack communication contribute to consumers' perceptions of quality, healthiness, sustainability, and value. Therefore, packaging functions not merely as a container but as a strategic communication device that helps consumers interpret product meanings in competitive shelf environments (Schifferstein et al., 2021; Spence and Van Doorn, 2022; Mehta et al., 2024).*

Within this communication architecture, packaging claims deserve specific attention because they condense complex product attributes into simple, visible, and immediately accessible signals (Steenis et al., 2017; Schifferstein et al., 2021; Hallez et al., 2023; Zerbini et al., 2023). Nutrition, health, taste, environmental, and origin-related claims may reduce information asymmetry by making otherwise less observable product characteristics more salient to consumers (Hallez et al., 2023; Shahid et al., 2024;). At the same time, prior research suggests that the effects of front-of-pack messages are not always straightforward (Bix et al., 2015). For example, front-of-pack messages have been shown to influence consumers' perceptions of a product, but not necessarily their willingness to buy in a direct way, with nutrition-related messages often proving more effective than environmental or hedonic ones in shaping product evaluations (Biondi and Camanzi, 2020; Tavares et al., 2026). More broadly, prior research as wells as a meta-analysis on front-of-pack labels shows that such cues are generally effective in improving healthier choices and perceptions, but their effects vary depending on context, label format, and outcome considered (Cabrera et al., 2017; Ikonen et al., 2020). Therefore, while many studies show that claims affect perceived healthiness and overall product perception, their impact on willingness to buy or actual purchase behavior is often weaker, context-dependent, or mediated by other factors (Hallez et al., 2023; Zerbini et al., 2023). This gap between perceptual and behavioral effects is particularly important for understanding the marketing role of packaging claims.

A further point emerging from the literature is that claims are interpreted together with other packaging cues rather than in isolation and their effectiveness depends on the broader interpretive context in which claims are embedded (Schifferstein et al., 2021; Hallez et al., 2023; Wang et al., 2025). Specifically, packaging design, wording, image use, and stylistic features may all alter how information is understood and whether it is perceived as credible or misleading (Schifferstein et al., 2021). In particular, short front-of-pack claims can function as heuristics in decision-making, encouraging consumers to generalize from a single positive attribute to broader product evaluations, sometimes

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producing halo effects in healthiness perception (Hallez et al., 2023). This is especially relevant because food packages are often processed under low-involvement conditions, where consumers rely on salient and easily interpretable cues rather than on deeper analytical evaluation (Mehta et al., 2024). Since, in realistic shopping environments, consumers do not simply react to claims in isolation, but interpret them in relation to product category expectations, other package cues, and the meaning of the offer as a whole, recent contributions call for studies based on authentic packages, real or quasi-real shopping settings, and actual behavior rather than only self-reported preferences.

The literature also suggests that the effectiveness of claims depends on the broader product category and on the fit between the message and the product's expected meaning (Steinhauser et al., 2019; Hallez et al., 2023). Research comparing different food categories has shown that claim effectiveness is not uniform and varies depending on the perceived healthiness of the product category: nutrition-oriented claims tend to perform better in categories perceived as healthier, whereas hedonic or taste-oriented claims may be more persuasive in indulgence-oriented categories (Steinhauser et al., 2019; Hallez et al., 2023). For instance, Steinhauser et al. (2019) showed how orange juice was bought more often when associated with a nutrition claim, whereas milk chocolate performed better when paired with a taste claim. The same study also shows that, for less healthy or more hedonic products, nutrition and health claims may trigger skepticism, distrust, or a perceived trade-off between health and taste (Steinhauser et al., 2019).

This category-contingent logic is particularly important for the biscuit market. Biscuits are traditionally associated with taste, indulgence, routine consumption, and convenience, yet they are increasingly characterized by the presence of front-of-pack messages related to health, wholegrain content, free-from properties, sustainability, country-origin, and authenticity (McIntyre and Schwanke, 2010; Tarrega et al., 2017). In such a hybrid category, claims are unlikely to work as universally positive cues. Rather, they may act as positioning signals whose meaning depends on whether they fit category expectations and whether they are perceived as coherent with the symbolic and functional associations of the brand. This interpretation is consistent with previous work showing that the persuasive effect of front-of-pack claims depends not only on the claim itself, but also on consumer goals, the broader package design, and the interaction between informational and visual cues (Biondi and Camanzi, 2020; Schifferstein et al., 2021).

This logic is even more relevant in the case of sustainability-related claims. While consumers may value environmentally friendly attributes, the literature also shows that green claims are especially sensitive to trust and skepticism (de Sio et al., 2022; Nugraha et al., 2024). Trust in green claims plays a key mediating role and positively affects intention to buy green food, whereas green advertising skepticism reduces purchase intention indirectly by undermining trust in those claims (de Sio et al., 2022). Similarly, recent reviews on greenwashing in the food industry highlight that sustainability communication can easily become ambiguous, symbolic, or misleading when claims are vague or insufficiently substantiated (Nugraha et al., 2024). Therefore, sustainability claims should not be assumed to generate positive outcomes automatically; rather, their effectiveness depends on perceived credibility and on whether consumers interpret them as trustworthy signals or as symbolic, misleading, or superficial communication devices.

Despite the growing body of research on packaging claims, especially for healthy claims (Xiaotong et al., 2024), an important gap remains in the literature. Existing studies have largely focused on single claim types, perception-based outcomes, or experimental settings (Biondi and Camanzi, 2020; Ikonen et al., 2020; Hallez et al., 2023), whereas less attention has been devoted to the comparative role of multiple packaging claim strategies within real-market product performance data. This gap is particularly relevant in indulgence-oriented food categories, where the effectiveness of claims may depend less on the intrinsic persuasiveness of the message and more on the brand identity within which the claim is embedded (Hallez et al., 2023). In line with this perspective, the present study investigates whether packaging claims explain product performance in the biscuit category independently, or whether they function primarily as positioning signals whose effectiveness is contingent on brand identity and distribution context.

Purpose of the paper. *This study investigates the role of packaging claims in explaining product performance in the biscuit category, a context in which front-of-pack messages may be relevant but not universally effective. More specifically, treating packaging claims as visible and synthetic market signals, the paper examines whether they act as independent performance drivers or as positioning signals embedded within broader brand identity strategies, once distribution coverage is taken into account. The empirical analysis is based on a structured dataset including product-level market performance indicators, brand identity, weighted distribution coverage, and on-pack communication variables for packaged biscuits in the Italian fast-moving consumer goods market.*

Methodology. *The empirical analysis is based on a structured dataset of packaged biscuits in the Italian fast-moving consumer goods market, integrating product-level performance indicators, brand identity, weighted distribution coverage, and front-of-pack packaging claims. In the original dataset, packaging claims were coded as binary variables indicating the presence or absence of specific claims on each product. Since individual products may display multiple claims simultaneously, the dataset was reshaped into a product–claim structure, so that each observation corresponds to a product–claim combination. As a result, products may appear multiple times when more than one claim is displayed on the package. This transformation made it possible to analyse packaging claims systematically as explanatory variables associated with product performance. Claims were then grouped into macro-categories reflecting the main communication strategies observed in the category, namely free-from, wholegrain, health, environment, social, indulgence, Italian origin, and authenticity.*

Two complementary performance indicators were used. Static product performance was measured through EURO per point of weighted distribution, a standardized indicator capturing the efficiency of shelf presence by relating sales value to distribution coverage. This measure makes it possible to compare products with different levels of market availability and therefore provides a more informative indicator than absolute sales values alone. In addition, a dynamic performance indicator was computed as the year-on-year variation in EURO per point of weighted distribution, in order to capture changes in performance over time and not only cross-sectional differences across products.

The empirical strategy follows a stepwise regression approach designed to isolate the role of packaging claims from the effects of brand identity and distribution coverage. In the first step, regression models were estimated using claim categories as the only explanatory variables. This initial specification makes it possible to assess whether packaging claims are associated with systematic differences in product performance when considered independently of brand-related effects. In the second step, brand identifiers were introduced as categorical predictors in order to control for brand-level heterogeneity and brand positioning. This specification allows evaluating whether the explanatory role of packaging claims remains significant once brand identity is taken into account. In the third step, weighted distribution coverage was added as an additional control variable. Although the dependent indicator already standardizes sales value by distribution intensity, including this variable provides a more conservative estimate by capturing possible residual differences in market exposure across products.

To further investigate whether packaging claims operate as universal performance drivers or instead function as positioning signals whose effectiveness depends on brand identity, interaction effects between brand and claim categories were also estimated. This step makes it possible to test whether the same claim category is associated with different performance outcomes depending on the brand displaying it. Given the indulgence-oriented nature of the biscuit category and the central role of brand positioning in this market, interaction effects were interpreted as indicators of brand-contingent claim effectiveness rather than as purely independent claim contributions.

The same modelling sequence was replicated using the performance trend indicator as the dependent variable in order to assess whether packaging claims are associated not only with static performance efficiency but also with product performance dynamics over time. Overall, this analytical strategy makes it possible to distinguish between the independent role of packaging claims, the contribution of brand identity and distribution coverage, and the extent to which claim effectiveness varies across brands within an indulgence-oriented product category.

Results. *The empirical analysis was conducted through a stepwise regression strategy designed to assess whether packaging claims are associated with product performance in the biscuit category and whether their effectiveness varies across brands once brand identity and distribution coverage are taken into account. Results are presented for both static performance efficiency, measured through EURO per point of weighted distribution (EURO PP), and performance dynamics, measured through the variation in EURO PP over time.*

The first model estimated the association between packaging claims and performance without controlling for brand identity. In this initial specification, several claim categories showed statistically significant associations with EURO PP. In particular, free-from claims were positively associated with performance ($p = 0.035$), while wholegrain claims were negatively associated with performance ($p = 0.040$). Environmental sustainability claims also showed a negative and statistically significant association with EURO PP ($p = 0.014$). These results suggest that some claim categories are associated with systematic performance differences when considered independently of brand-related effects.

However, once brand identifiers were introduced into the model, the explanatory role of packaging claims decreased substantially, while brand effects remained strong and statistically significant. In contrast, most claim categories lost statistical significance after controlling for brand identity. Only environmental sustainability claims remained negatively associated with EURO PP ($p = 0.044$), while social sustainability claims showed a marginally significant positive association ($p = 0.051$). Overall, these findings suggest that a substantial share of performance variation is associated with brand-related differences rather than with packaging communication alone.

Weighted distribution coverage was then included as an additional control variable in order to capture possible residual variation in market exposure across products. As expected, distribution coverage did not show a statistically significant association with EURO PP once the dependent variable had already been standardized by distribution intensity ($p = 0.543$), confirming the internal consistency of the performance indicator used.

To evaluate whether packaging claims operate as universal performance drivers or instead function in a brand-contingent way, interaction effects between brand and claim categories were also examined. The interaction analysis revealed substantial heterogeneity in claim effectiveness across brands, indicating that the same claim category may be associated with different performance outcomes depending on the brand displaying it. This pattern is consistent with the interpretation of packaging claims as positioning signals embedded within broader brand identity strategies rather than as uniformly effective category-level drivers.

To assess whether packaging claims are associated with performance dynamics rather than only with static performance levels, the same modelling strategy was replicated using the variation in EURO PP between the current year and the previous year as the dependent variable. The results show that packaging claims are not systematically associated with performance growth once brand identity and distribution coverage are taken into account. None of the claim categories displayed statistically significant coefficients in the trend specification, and distribution coverage also

remained non-significant (p = 0.295). Similarly, brand identifiers did not show consistent associations with performance variation over time.

Taken together, these results indicate that brand-related factors account for a substantial share of performance variation within the biscuit category, while packaging claims display limited independent explanatory power once brand identity is controlled for. The interaction effects further suggest that claim effectiveness varies across brands rather than operating uniformly across the category, supporting the interpretation of packaging claims as positioning signals embedded within brand identity strategies rather than as universal drivers of product-level performance.

Research limitations. *This study presents several limitations that should be considered when interpreting its results. First, the structure of the dataset, based on product–claim combinations derived from packaging information, makes it possible to evaluate the relative role of multiple claim categories within a unified framework, but does not allow testing the effect of individual claims in complete isolation from broader communication architectures. Packaging claims frequently appear simultaneously on product packs and are often embedded within broader brand identity and positioning strategies, making it difficult to disentangle their fully independent contribution to product performance.*

Second, the interaction analysis between brand identity and claim categories suggests that claim effectiveness varies across brands rather than operating uniformly across products. However, the limited number of observations available for some brand–claim combinations constrains the estimation of fully saturated interaction models with strong statistical precision. For this reason, the interaction effects should be interpreted primarily as indicators of brand-contingent positioning patterns rather than as definitive brand-specific causal estimates.

A further limitation concerns the focus of the analysis on the presence of claim categories rather than on the overall structure and complexity of packaging communication. The study should therefore be interpreted as part of a broader research agenda on packaging communication and market performance. The study does not explicitly consider whether performance outcomes may also depend on the concentration or dispersion of informational signals displayed on the package. A relevant direction for future research therefore concerns the role of communication entropy in packaging strategies, investigating whether more focused communication centred on a limited number of claims leads to higher performance efficiency than communication architectures characterized by multiple simultaneous claims. More broadly, future studies could examine whether simplified and coherent communication strategies outperform more complex claim configurations, or whether broader informational richness enhances positioning effectiveness in competitive retail environments.

An additional limitation concerns the scope of packaging information included in the analysis. The study focuses exclusively on front-of-pack claims, as these represent the most visible elements of product communication at the point of purchase and are therefore more likely to influence rapid consumer decision-making in retail contexts. However, packaging communication is typically distributed across multiple informational layers, including side- and back-of-pack content such as nutritional details, certifications, ingredient-related information, and more extended explanatory messages. These elements may also contribute to shaping product perception and positioning, but they were not included in the present analysis. Future research could therefore extend the investigation to the full set of packaging information provided across all pack surfaces in order to assess whether the overall architecture, consistency, and depth of packaging communication further influence product performance and positioning effectiveness beyond front-of-pack claims alone.

Managerial implications. *The findings of this study suggest that packaging claims should not be treated as universal performance drivers in the biscuit category. Once brand-related effects are taken into account, most claim categories lose explanatory power, indicating that shelf-level commercial efficiency depends primarily on brand identity and positioning rather than on the mere presence of front-of-pack messages. This result has an important managerial implication: the inclusion of claims on packaging is unlikely to enhance performance per se unless those claims are coherent with the brand's existing positioning strategy and with the broader meaning that the brand conveys in the market.*

From this perspective, packaging communication should not be designed through imitation of category communication trends or by mechanically adding claims that are currently popular in the market. Rather, claims should be selected and combined according to their strategic fit with brand identity, with the role that the product is expected to play within the brand portfolio, and with the type of associations the company intends to reinforce at the point of sale. In other words, the results suggest that claims are more effective when they contribute to a coherent brand narrative than when they are used as isolated communication devices.

Moreover, the interaction analysis highlights that claim effectiveness is not uniform across brands. The same claim may support product performance for one brand while being ineffective, or even disadvantageous, for another. This implies that managers should evaluate packaging claims not as standardized category-level levers, but as brand-contingent positioning tools whose effectiveness depends on the fit between the claim, the brand, and the competitive context. More generally, the findings indicate that effective packaging communication depends less on the simple presence of multiple claims and more on their consistency with brand strategy and market positioning.

Originality of the paper. *This paper contributes to the literature on packaging communication by providing an empirical assessment of the market performance implications of multiple packaging claims using a real-world product-level dataset from the Italian FMCG market. Unlike much of the existing research, which typically examines single claim categories*

or focuses on perceptual outcomes in experimental settings, the present study evaluates the relative role of different claim types simultaneously within a unified analytical framework. By accounting for brand identity and weighted distribution coverage, the paper shows whether front-of-pack claims act as independent performance drivers or as positioning signals whose effectiveness is contingent on brand-related strategies within an indulgence-oriented food category.

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Employee communication as a lever for enablement: Insights from The State of the art of employee communication in Italy

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Abstract. *This paper is part of a broader multi-method study investigating employee communication as a strategic business lever for employee enablement within the specific socioeconomic context of Italy. In particular, this paper examines the evolutionary path of employee communication as it transitions toward an authentic strategic role within organizations. It also analyzes the role of management in fostering an environment that enables employees to act as strategic communicators and addresses future challenges for employee communication.*

To explore these topics, the study leverages 16 interviews conducted in Italy in 2025 with consultants and experts in employee communication.

Findings show that employee communication has shifted from an operational function to a real strategic lever for companies and that COVID-19 pandemic served as a catalyst for these changes, although some interviewees remain skeptical about the long-term sustainability of this new importance of employee communication. Findings also indicate that effective employee communication now demands a holistic approach, integrating responsibilities traditionally associated with human resources, information technology, and external communication functions. Additionally, findings show that employee communication serves as an antenna for organizational climate and a control room for employee experience. Key characteristics that enhance the strategic value of employee communication include the shift toward bidirectional dialogue, and the empowerment of employees as active communicators, specifically as ambassadors internally and externally. However, a "Cinderella" status remains, as the function often lacks formal authority and a relevant role in the company governance compared to HR or external communication functions.

While the generalizability of these findings is limited by their specific geographic focus and potential social desirability bias, this study provides unique insights rooted in a specific cultural setting, allowing assessment of the specific configuration and evolutionary patterns of employee communication in Italy.

Keywords: *employee communication; employee enablement; internal communication; strategic communication; employee communication behavior*

Framing of the research. *Employee communication, also known as internal communication, is the area of strategic communication through which organizations engage in dialogue with employees, considered primary stakeholders (Mazzei, 2025b; Mazzei & Butera, 2024; Falkheimer & Heide, 2022; Men & Bowen, 2017; Tkalac Verčič et al., 2012; Welch & Jackson, 2007). It is likely the most important aspect of strategic communication, as without it an organization cannot simply exist and operate (Mazzei, 2025b).*

Routed into the resource theory of the company, employee communication can be defined (Mazzei, 2010) "as a set of interactive processes aimed at generating the catalytic resources that make a company work. These two resources consist of knowledge to fuel working processes and employee engagement that trigger employees to apply their knowledge to company processes" (Mazzei, 2025a, 197-198).

Internal communication begins before employees join an organization and continues after they leave it (Tkalac Verčič et al., 2021). It has three primary aims: aligning employees, activating employees, and fostering engagement and employee voice (Mazzei & Butera, 2024). Aligning employees means ensuring they understand corporate objectives, sharing the organizational culture and values with them, and providing the information they need for organizational functioning. Activating employees involves encouraging voluntary and strategic employee communication behavior that support the organization. Fostering engagement and employee voice entails sustaining the engagement of employees and an open climate that empowers them to express ideas, suggestions and constructive dissent. Moreover, it should be acknowledged that listening is both a prerequisite for and an integral part of all internal communication objectives (Mazzei & Butera, 2024).

Emphasizing that employees are essential for generating intangible resources for competitive advantage (Mazzei, 2010, 2025a), due to the relational nature of this process in organizations, implies that all employees play a key communicative role (Mazzei, 2025b). Employees are individuals who initiate communication flows and send messages to colleagues and managers: in other words, they are active agents of communication within the organizational context (Frandsen & Johansen, 2011; Heide & Simonsson, 2011; Kim & Rhee, 2011; Mazzei, 2010).

To understand employee communication behavior in a comprehensive way, a holistic mapping based on two distinctions has been proposed (Mazzei, 2018, 2025b): the first distinguishes between voice and silence behavior; and

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the second considers the intention behind the communicative actions. In this mapping, voice and silence are viewed as the two opposite poles of a continuum, as both are deliberate and conscious communicative actions expressed in different ways (Mazzei, 2018, 2025b). Considering the intention behind the communicative actions, the holistic mapping of employee communication behavior distinguishes between "procompany communication behavior" and "anticompany communication behavior". These terms express unequivocally that the subject in favor of or against whom the actions of an employee are directed is the company, not society or a social group in general (Mazzei, 2018, 2025b). Therefore, the holistic mapping includes four possible categories of employee communication behavior: voice and silence, each further distinguished by a procompany or anticompany intention (Mazzei, 2025b). Procompany employee communication behavior can be both in-role and extra-role, and are voluntary and discretionary (Mazzei, 2025b). Therefore, they cannot emerge by means of prescriptions and control techniques but rather emerge more indirectly and genuinely through the management of a series of levers. This concept is referred to as enablement (Mazzei, 2014).

The concept of enablement has been incorporated into employee communication as a core element of the consultancy function performed by communication professionals (Zerfass & Franke, 2013), who act as facilitators supporting employees in their communicative responsibilities (Heide & Simonsson, 2011), and are evolving into designers of the overall employee experience (Men, 2021). Consequently, the primary objective of the employee communication department is to create a comprehensive internal experience that shapes perceptions, attitudes, actions, and behavior (Men, 2021), thereby fulfilling a strategic enabling role (Men & Bowen, 2017). Ultimately, employee enablement involves developing communication strategies within a consistent framework of workplace conditions that foster effective and positive communicative engagement (Mazzei, 2025a) while avoiding prescriptions and control mechanisms that would be ineffective (Mazzei & Ravazzani, 2017). Based on the concept of enablement, Mazzei (2014) explored the perceptions of managers about the relevance of employee communicative actions and investigated whether the companies they worked for had implemented specific employee communication strategies. The study found that managers considered employee communication behavior as the basis for company success, specifically for the implementation of the company strategy and as a source of competitive advantage, knowledge creation and sharing, stakeholder engagement, and reputation building processes.

To sustain the active role of employees as communicators, the employee communication function managed by the organization serves as a fundamental lever for engaging the workforce, ensuring they are informed, motivated, and actively contributing to the success of the company: employee communication plays an important role in enabling employees to be strategic communicators (Mazzei, 2025a). Indeed, it provides the context for organizational actions, the meaning of events, knowledge, information, and motivation (Mazzei, 2014). For employee enablement, it is crucial to adopt strategies based on the integration of employee communication with human resource management and relationship-building practices (Mazzei, 2014).

This theoretical framework led to the development of the Enabling Model of Employee Communication (Mazzei, 2025b; Mazzei & Quaratino, 2020). This model highlights specific characteristics of employee communication. First, it is intended to be strategic – supervised by top management, allocated dedicated resources, and recognized as a source of value. Second, it is managed with a managerial approach, using planning and evaluation methods typical of the managerial cycle. Third, it aims to activate employees through supervisor-employee dialogue and by creating environments that encourage the voice and free expression of employees. Fourth, it is open to experimenting with new social arenas that arise from digitization. These characteristics should enhance the generation of the most important intangible resources for competitive advantage, particularly employee engagement as a prerequisite for strategic employee communication behavior.

Purpose of the paper. *This study is part of a broader research project: "The state of the art of employee communication in Italian companies". It investigates employee communication as a strategic business lever for employee enablement within the specific socioeconomic context of Italy and examines the evolutionary path of employee communication. This broad research is the second edition of the one conducted in 2019 and is based on a multi-method approach: first, qualitative research through 16 interviews with experts and consultants and 16 dialogues between academics and practitioners; second, quantitative research through a survey involving a sample of 115 companies; third, comparative analysis of 13 industry reports on employee communication or related topics produced in Italy and abroad in the period 2019-2025.*

The present paper discusses the findings of the first explorative phase based on interviews and it aims at identifying key themes that allow for describing the evolutionary path of employee communication as it transitions toward an authentic strategic role within organizations. It also aims at focusing the role of management in fostering an environment that enables employees to act as strategic communicators, and addresses future challenges for employee communication.

Methodology. *The paper is based on empirical research using the accounts of 16 consultants and experts in employee communication. Qualitative data were collected through 16 interviews conducted between June and September 2025. The sample includes a high concentration of executive leaders from leading communication and consulting agencies. The sample counts 7 CEOs and Presidents, 6 Partners and Managing Directors, 2 independent consultants specialized in internal communication, and 1 Creative Director. Among the interviewees, 4 are women and 12 are men.*

The semi-structured interview guide covered topics including a) the strategic relevance of internal communication and its evolution, b) the use of managerial communication as a strategic lever, c) the involvement of employees as active

communicators, and d) the future challenges for employee communication. The findings are described below according to these themes. It is worth noting that the findings of this qualitative study have been discussed with a group of companies which provided additional insights. These were useful to interpret the data collected through a survey that is part of the broader research within which this qualitative study was conducted and that is not the subject of this paper.

Results.

a) The strategic relevance of internal communication and its evolution. The results show a significant evolution in employee communication within Italian companies. According to the interviewees, it has shifted from a purely operational function to a genuine strategic lever for companies, capable of guiding people as a real asset and influencing leaders in their strategic decisions. This transformation was accelerated by the COVID-19 pandemic, which served as a turning point. During the emergency, employee communication had to bridge physical distance, maintain the corporate community, and reunite teams through constant information flows. Although some interviewees remain skeptical about the long-term sustainability of this new, important role for employee communication, data indicate a general increase in the number of people working in this function and a rise in dedicated budgets.

According to interviewees, using employee communication strategically means going beyond simple alignment with corporate objectives to include culture, values, and the organizational model, thereby stimulating motivation and a sense of belonging. Employee communication acts as an "antenna" that detects the corporate climate and guides people, especially during times of crisis and change. It supports major contemporary transformations, such as digitalization and sustainability, by conveying the meaning of change even before its operational impacts are felt. Furthermore, the purpose of employee communication has expanded, incorporating responsibilities and activities traditionally associated with Human Resources, such as employee well-being, diversity, equity and inclusion and the management of the internal climate; Information Technology, such as Intranet and digital channels management; and external communication, with which it now shares responsibility for company reputation. This expansion into non-traditional responsibilities and functions raises the question of whether the term "employee communication" is still sufficient to describe such a broad business function.

According to the interviewees, in this new strategic vision of employee communication the role of top management is crucial. The strategic role for employee communication is enhanced if the company is viewed as a storytelling community, with the CEO as the primary content curator. However, a cultural challenge persists: many top managers still underestimate the potential of employee communication, involving it only after decisions have been made, which limits its strategic impact. In these cases, top management is unaware of the powerful role employee communication can play, and employee communication has yet to gain authority within the organization. It can be said that it is still often considered as a "Cinderella" when compared to the human resources and external communication functions: even when its strategic importance is recognized, it is not given a significant organizational role in governance and processes, nor are people with leadership and specific skills assigned to this function.

Another fundamental pillar of a strategic employee communication approach is bidirectionality. Employee communication increasingly manages the dialogue between central functions and the organizational periphery and sustains employee participation. People want to participate, trust those who trust them, and have opportunities to express their ideas. Unfortunately, this still conflicts with the Italian business tradition, which has historically favored top-down communication. According to the interviewees, nowadays top managers have a significant need to listen in order to guide the organization, given the speed and complexity of the current environment. However, listening also requires a willingness to engage: when a manager or an organization listens to someone, they must also take responsibility for providing feedback and taking action. It is necessary to accelerate the implementation of actions and responses to requests.

b) The use of managerial communication as a strategic lever. In this process, managerial communication plays a crucial role. In particular, middle management acts as the "transmission belt," according to interviewees. Middle managers are essential for cascade communication, gathering and relaying bottom-up information, and facilitating horizontal communication. They form a "compressed community" between top management and employees, as well as between company objectives and operational tasks. They also foster a sense of belonging and involvement through employee communication. This is especially important in contexts marked by high complexity and significant cultural differentiation, such as companies that have expanded through acquisitions, where integration relies heavily on middle managers. In these cases, while top management is typically already aligned with company objectives, the challenge is to involve the rest of the company population.

In the context of hybrid work, managerial communication is also pivotal for ensuring bidirectionality. The physical presence of employees facilitates informal communication that can partially bypass managerial barriers, but in hybrid contexts informal communication is weakened. Therefore, in such contexts middle managers need to act as facilitators, ensuring communication with remote employees. According to interviewees, another important point is that managers today are communication producers: it is not the internal communication function telling managers what they have to communicate, but rather the managers themselves who express the need. Often, they detect changes and requests faster than the organization does.

c) The involvement of employees as active communicators. The theme of participation mentioned above can be associated to the involvement of employee as active communicators, and in particular according to the interviewees to the concept

of employee ambassadorship, which companies are actively promoting in two main ways: first, organizations seek to involve employees in internal dissemination and to foster people engagement around organizational values; second, they are leveraging the potential of employees for external communication in their role as ambassadors. This approach is highly effective for talent acquisition, especially with Gen Z, and for this reason, according to interviewees, it will continue expanding and being adopted.

To encourage the spread of employee ambassadorship, some companies have also introduced a gamification component as an incentive, for example by offering shopping vouchers to employees who publish posts first or whose posts receive the most likes. However, it is important to emphasize that the process of creating ambassadors should not be forced. Instead, companies should offer employee training to develop the necessary skills and support, for instance by providing tools or repositories of content, graphics, and photographs. This can enable individuals to become active communicators. Related to the role of employees as creators of content, it should be noted that the employee communication function does not necessarily need to develop and distribute content directly, but should instead recognize and amplify the content created by employees, adding value to it. In this sense, employee communication is no longer just a content production center but a control room that coordinates content dissemination.

d) The future challenges for employee communication. The future challenges for professionals in this sector are numerous and complex and can be grouped into activities and objectives, and the professional role itself. Regarding activities and objectives, employee communication will need to act as an agent of cultural change on key topics such as diversity, equity, and inclusion, working closely with the HR department to develop a people strategy aligned with the purpose of the company.

Managing communication in hybrid work environments will be crucial, as physical dispersion can erode the sense of community; in this context, employee communication must act as a unifying force. The ability to measure the impact of employee communication activities through tangible indicators will be equally important, as this will help move beyond the perception of employee communication as merely an overhead cost.

According to the interviewees, another challenge is related to technological evolution, which requires reflection on the role of human intelligence in employee communication: integrating Artificial Intelligence into work activities should focus on personalizing messages without sacrificing the human touch, transparency, and consistency that new generations of workers strongly expect.

Regarding the profession, one interviewee stated that "in any company, communicating is the only job that everyone thinks they can do, because we are born as communicators; we are communicators as human beings". Professional credibility must therefore be earned on the ground, which is more difficult when it does not involve technical expertise. Another challenge is the absence of direct internal reporting to the CEO, while there is a need for direct access to this figure to enable quick action. Additionally, communication teams have become complex and multidisciplinary, requiring the introduction of new mindsets and skills, breaking out of the usual model and encouraging cross-fertilization among teams.

Research limitations. *This study purposely aimed to map the most advanced practices of employee communication in Italy and for this reason the 16 qualitative interviews were conducted within the Italian socioeconomic context, with all interviewees being consultants and experts from leading companies in Northern Italy to provide detailed, nuanced data offering an overview of the state of employee communication in organizations that are well-developed examples of its use. This precise choice implies that despite the insights gained from this study, two main limitations should be acknowledged and addressed in future investigations. First, the sample size could be increased and its composition diversified to represent the average situation in Italy. Second, the qualitative nature of the research relies on the subjective accounts of consultants and experts, introducing the potential for social desirability bias, in which interviewees may emphasize their aspirations rather than the daily operational realities to which they refer in their accounts.*

Managerial implications. *The effectiveness of employee communication is a critical factor in company dynamics and, as noted at the beginning of this paper, is probably the most important aspect of strategic communication, as without it an organization cannot simply exist and operate (Falkheimer & Heide, 2018; Mazzei 2025b).*

First, this research shows that, for employee communication to function as a true strategic lever, companies must move beyond a purely operational approach and top-down communication model, adopting an approach that recognizes the relevance of a bidirectional communication flow and encourages employees to take an active role as communicators. Accordingly, managers should go beyond using employee communication merely for informational alignment but also leverage its role as an "antenna" to detect the organizational climate and support people during times of crisis and change. Organizations should make listening a core activity: collecting feedback should be viewed not as a formality, but as a commitment to rapid, visible organizational action and human-centred engagement.

Secondly, another key managerial implication of the study is the need to legitimate the employee communication function. According to some interviews, this function still holds a "Cinderella" status compared to more established functions, organizations should better value the contribution that employee communication makes to leadership, allocate larger dedicated budgets, and consider establishing direct reporting lines to the CEO to ensure that its strategic impact extends beyond mere dissemination after decisions are made. Only then can employee communication help shape important employee outcomes such as engagement and citizenship behavior.

Third, enhancing interdepartmental collaboration for synergistic interventions, particularly with human resources, information technology, and external communication functions, is crucial, given that today employee communication shares with these functions a range of responsibilities and activities: from promoting employee well-being to managing internal digital channels and governing company reputation.

Fourth, instead of merely producing content, the employee communication function should adopt an enablement approach, equipping employees with training, tools, and repositories that facilitate their role as organic brand ambassadors.

Finally, the leading role of employee communication is especially important in contemporary work settings characterized by hybrid and remote work, where organizations strive to bridge the physical and cultural gaps created by digital transformation. In particular, middle managers are tasked with preserving features typical of traditional, in-person employee communication, such as bidirectionality in manager-employee relationships and informal, serendipitous communication.

Originality of the paper. *While employee communication research has expanded over the last few years, much of the literature still treats communicative dynamics as culturally neutral (Verčič et al., 2025). By analyzing the evolution of employee communication, its challenges, and its role as an enabler within the specific socioeconomic context of Italy, this study provides unique insights rooted in a specific cultural setting, allowing assessment of its specific configuration and evolution patterns in the country.*

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Strategic Communication Measurement in GLAM sector

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Abstract. *Strategic communication has gained prominence in galleries, libraries, archives, and museums (GLAMs) for enhancing audience engagement, digital participation, and public value creation. Yet, evaluation practices remain narrowly focused on media visibility and channel metrics, with limited attention to stakeholder outcomes and firm-level impact. This paper proposes an integrated framework for strategic communication measurement in GLAMs sector, combining Public Value Theory, the RACE model (Research, Action planning, Communication, Evaluation), the Barcelona Principles 4.0 and the AMEC Integrated Evaluation Framework. The framework connects communication planning processes with internationally recognised evaluation standards, positioning measurement as a strategic lever rather than a descriptive reporting activity. Adopting an exploratory qualitative research design, the study applies the framework to two European museums using secondary institutional data. The analysis provides an initial mapping of communication objectives, activities, outputs, out-takes, outcomes and impact indicators within the proposed evaluation architecture. The findings highlight the analytical usefulness of the framework for structuring communication evaluation in cultural firm, while also revealing that publicly available evidence remains concentrated on visibility and engagement metrics, with more limited transparency regarding outcomes and societal impact. The paper contributes to the literature by integrating strategic communication management, communication measurement standards and public value theory within a single analytical structure applicable to the GLAM sector.*
Keywords: *strategic communication; GLAM; public value; communication measurement; Barcelona Principles; RACE*

Framing of the research. The *GLAM sector is operating in an environment which is becoming increasingly complex. Several factors, including public mission, social legitimacy, financial constraints, digital transformation and growing expectations of inclusion and participation, shape this environment. International cultural policy frameworks increasingly expect these institutions to promote accessibility, diversity, audience participation and broad public access, while justifying their public role through visible social and cultural contribution (European Commission, 2014; UNESCO, 2015; European Union, 2019; Council of Europe, 2022). In this context, communication can no longer be understood merely as a promotional or informational lever. Instead, it has been demonstrated to contribute to institutional identity, cultural mediation, stakeholder relationship management, and public accountability (Capriotti, 2013; Centeno, 2021).*

This strategic relevance is particularly evident in GLAMs, where value creation is largely intangible and relational. Effective communication is instrumental in fostering trust, encouraging participation, building reputation, engaging diverse audiences, and establishing legitimacy. These factors collectively influence the institution's ability to attract audiences, secure funding, and garner institutional support (Capriotti, 2013; Zerfass et al., 2020; Falkheimer et al., 2024; Montella, 2024). From this perspective, communication is increasingly recognised as a substantive strategic lever, especially in contexts characterised by resource scarcity, environmental change, competition for public attention and pressure to demonstrate societal impact (Hallahan et al., 2007; Invernizzi & Romenti, 2011; Zerfass et al., 2020; Falkheimer et al., 2024).

Nevertheless, while the strategicity of communication is widely acknowledged, its evaluation remains problematic. This study is primarily anchored in the scholarly stream of strategic communication measurement and evaluation, which examines how communication activities can be systematically assessed against objectives and societal outcomes within broader communication management processes (Siano et al., 2013). Within this field, a growing body of literature has emphasised the need to move beyond output-based indicators and to develop evaluation models capable of capturing the broader effects of communication on stakeholders, performance and public value (Macnamara, 2018; Zerfass et al., 2012; Zerfass & Volk, 2017).In practice, communication is still frequently assessed through media visibility or channel-specific metrics, whereas its effects on stakeholders, performance and public value are much less systematically measured (Gregory & Watson, 2008; Zerfass et al., 2010). This limitation is of particular significance in the cultural sector, where the outcomes of relevance are often concerned with learning, inclusion, participation, trust and community engagement rather than mere exposure or reach. In this sense, the persistence of invalid proxies such as Advertising Value Equivalents (AVE) has further reinforced reductionist approaches that fail to capture the actual contribution of communication (Watson, 2013).

Recent advances in communication measurement have produced internationally recognised evaluation standards, notably the Barcelona Principles 4.0 and the AMEC Integrated Evaluation Framework (IEF). However, these standards are rarely integrated with managerial communication planning models such as RACE (Research, Action planning, Communication, Evaluation), particularly within the GLAM sector. This paper addresses this gap by proposing an

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integrated analytical framework that connects communication planning processes with internationally recognised evaluation standards.

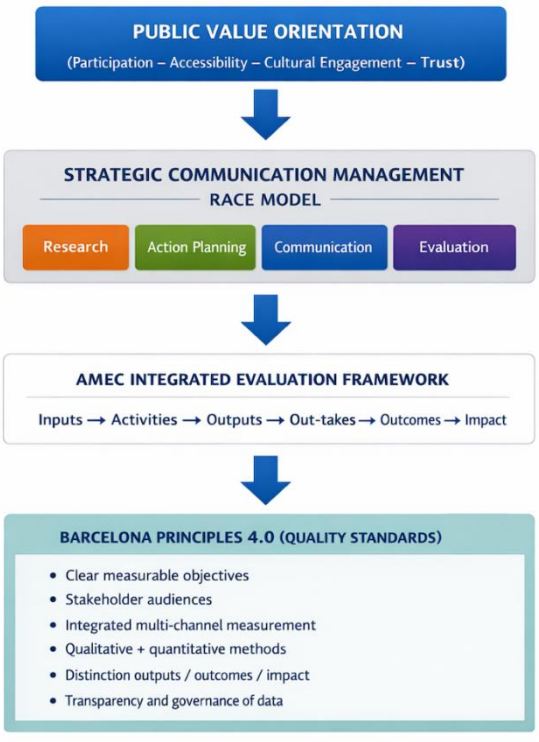
Purpose of the paper. *The present paper aims to address this gap by proposing an integrated framework that responds to three shortcomings identified in the extant literature. Firstly, research on strategic communication in cultural firms is fragmented between managerial planning models and evaluation standards. Secondly, studies on communication in GLAM institutions remain largely tactical or marketing-oriented, with limited attention to the relationship between communication activities and public value creation. Thirdly, the measurement of communication continues to privilege media visibility and channel-based outputs, while stakeholder outcomes and societal impact remain less systematically assessed.*

Against this background, the paper pursues two main objectives. First, it develops a conceptual framework integrating the above-mentioned approaches. Second, it provides an exploratory empirical application of the framework to two GLAM cases to assess its initial analytical usefulness in real-world communication practices. In doing so, the paper conceptualises communication measurement not as an ex-post reporting activity, but as a strategic lever capable of connecting communication objectives, stakeholder engagement, mixed-method indicators and public value creation. The resulting framework is intended to guide future empirical applications and support a more rigorous analysis of communication practices in cultural institutions.

The extant literature on the subject highlights the need for a more systematic integration between strategic communication planning and communication measurement practices in GLAMs. Whilst models such as RACE structure the managerial process of communication planning, measurement frameworks such as the Barcelona Principles and the AMEC Integrated Evaluation Framework provide standards and analytical categories for evaluating communication performance. However, these approaches are rarely integrated into a single framework that supports both communication management and evaluation in cultural firms.

To address this gap, the paper proposes an integrated framework that combines Public Value Theory, the RACE communication management model, and the Barcelona Principles 4.0, operationalised through the AMEC Integrated Evaluation Framework. Within this architecture, Public Value Theory provides the normative orientation linking communication activities to societal outcomes, while the RACE model structures the communication management cycle. The AMEC framework defines the evaluative chain connecting objectives, activities and impact. The Barcelona Principles 4.0 guide the measurement process by emphasising the definition of clear objectives, the identification of stakeholder audiences, the integration of qualitative and quantitative methods, and the distinction between outputs, outcomes and impact. Within the proposed framework, these principles function as quality guidelines ensuring transparency, methodological robustness and the avoidance of invalid metrics such as Advertising Value Equivalents. Figure 1 illustrates the conceptual architecture of the proposed framework.

Figure 1: Integrated framework for strategic communication measurement in GLAM sector



Source: author's elaboration

Methodology. *This study employs an exploratory qualitative research design to test the applicability of the integrated framework proposed in this paper. Exploratory qualitative approaches are particularly suitable when research seeks to investigate emerging phenomena or to develop and test conceptual frameworks in contexts where empirical evidence is still limited (Stebbins, 2001; Creswell, 2013). The purpose of the empirical analysis is not to provide definitive conclusions about communication effectiveness, but rather to explore whether the proposed framework can be meaningfully applied to real-world communication practices in GLAM institutions.*

The development of the integrated framework follows a theory-driven abductive approach, combining conceptual synthesis and iterative alignment across three streams of literature: strategic communication management, communication measurement, and public value theory. Specifically, the framework was constructed through three analytical steps: (i) conceptual decomposition of the core components of the RACE model, the AMEC Integrated Evaluation Framework, and the Barcelona Principles 4.0; (ii) cross-model alignment to identify complementarities and structural connections between planning and evaluation dimensions; and (iii) operational translation into a structured analytical template composed of observable variables (objectives, activities, outputs, out-takes, outcomes, and impact). This process allows the framework to function not only as a conceptual integration but also as an operational and empirically applicable tool.

The empirical analysis focuses on two illustrative cases: the Uffizi Galleries (Italy) and the Rijksmuseum (Netherlands). In particular, the cases serve as empirical settings in which the proposed framework is applied to map communication activities and evaluate their alignment with established communication evaluation principles.

The Uffizi Galleries are among the most prominent museum complexes in Italy, housing world-renowned collections of Renaissance art and attracting millions of visitors annually. In recent years, the museum has developed a highly visible digital communication strategy, characterised by intensive use of social media platforms, informal storytelling formats and audience-oriented narratives aimed at expanding and diversifying publics.

The Rijksmuseum is among the leading European museums in digital cultural communication and open-access strategies. Through initiatives such as Rijksstudio and the large-scale digitisation of its collections, the museum has developed an ecosystem that enables global online access, user participation and the creative reuse of cultural heritage. These initiatives have positioned the museum as an international reference point for digital engagement and open cultural data.

These institutions were selected on three main criteria. First, both institutions belong to the GLAM sector and operate within publicly oriented cultural systems characterised by strong institutional missions and stakeholder engagement. Second, both museums display highly visible communication strategies across multiple communication channels, particularly in digital environments and social media ecosystems. Third, both institutions provide substantial publicly accessible documentation on their communication activities, enabling the reconstruction of communication objectives, initiatives and observable results through secondary sources. The use of a multiple-case study approach allows to explore complex organisational phenomena and to examine the applicability of conceptual frameworks in real-world contexts (Yin, 2018; Eisenhardt, 1989). The selection of two internationally recognised museums with highly visible communication strategies enables testing of the framework in contexts where communication plays a central role in audience development and public value creation.

Data collection is contingent on the use of secondary data sources. Information was gathered from institutional websites, annual and strategic reports, press releases, institutional blogs, and official social media accounts. Further evidence was obtained from press coverage, interviews with institutional representatives, and publicly available presentations. The utilisation of secondary data sources is widely recognised as an appropriate qualitative research strategy for analysing organisational practices and publicly available institutional materials (Bowen, 2009; Johnston, 2014). In circumstances where detailed internal evaluation data has not been publicly disclosed, such sources can be of particular value.

Each case was analysed using a structured analytical template derived directly from the integrated framework proposed in this study. This template operationalises the framework by translating its conceptual components into observable analytical dimensions for examining institutional communication practices. The template maps communication activities to the phases of the RACE model while simultaneously assessing evaluation practices using the analytical categories of the AMEC Integrated Evaluation Framework, including inputs, activities, outputs, out-takes, outcomes and impact. Concurrently, the analysis assesses whether communication practices align with the methodological principles established by the Barcelona Principles 4.0. These principles encompass clear objectives, stakeholder orientation, multi-channel measurement, and the integration of qualitative and quantitative evidence.

The empirical analysis was conducted through a structured qualitative content analysis (Bowen, 2009), applying the analytical template as a coding scheme. Specifically, collected data were systematically coded by assigning observed communication practices to predefined categories derived from the framework. This procedure enables not only descriptive mapping but also analytical interpretation of the degree of alignment between communication activities and evaluation practices, as well as the identification of potential gaps across different levels of measurement (outputs, out-takes, outcomes, and impact).

As the empirical component of this research is currently ongoing, the case analysis presented in this paper should be considered preliminary. The aim is to provide an initial exploratory assessment of how the proposed framework can be applied to the analysis of communication practices in GLAM institutions; future research will further develop the

empirical investigation through additional cases and, potentially, the integration of primary data.

To operationalise the proposed framework for empirical analysis, the study translates its conceptual components into a structured analytical template for examining communication practices in GLAM institutions. The framework integrates the managerial logic of the RACE model with the evaluative structure of the AMEC Integrated Evaluation Framework and the methodological standards of the Barcelona Principles 4.0. By associating each phase of the communication process with specific evaluative categories and indicators, the framework enables GLAM sector to assess communication not only in terms of visibility but also in relation to stakeholder engagement, participation and public value creation.

This operationalisation also enhances the transparency and replicability of the analytical process, allowing the framework to function as both a conceptual model and a diagnostic tool for evaluating communication practices in cultural institutions.

Figure 1 illustrates the conceptual architecture of the integrated framework, while Table 1 summarises its operational structure.

Results. *As said, to explore the applicability of the framework, two illustrative cases were analysed: the Uffizi Galleries and the Rijksmuseum. Both institutions demonstrate robust communication visibility, active utilisation of digital platforms, and unambiguous relevance for audience engagement and public participation.*

Beyond their descriptive relevance, these cases provide analytically suitable contexts to assess the alignment between communication strategies and evaluation practices, particularly across different levels of measurement (outputs, out-takes, outcomes, and impact).

The Uffizi Galleries have adopted a communication strategy strongly oriented toward digital engagement, audience expansion, and institutional storytelling. Their multichannel presence combines website content, press relations and highly visible social media communication on platforms such as Instagram, TikTok and Facebook. The museum has amassed a following of over 1.17 million across various social media platforms, garnering a total of 13.8 million page views and an impressive 2.2 million individual users. The case demonstrates substantial evidence of outputs and audience reactions, while direct outcome and impact metrics are less systematically disclosed.

From an analytical perspective, the case reveals a strong concentration of measurement practices at the level of outputs and out-takes, with limited formalisation of indicators capturing behavioural change, stakeholder relationships, or longer-term public value creation.

Table 1: Integrated framework for strategic communication measurement in GLAM sector

RACE phase	***Managerial purpose***	***AMEC IEF components***	***Barcelona Principles relevance***	***GLAM operational focus***	***Example indicators***
Research	*Understand mission, context and stakeholders*	*Organizational objectives; Communication objectives; Target audiences; Inputs*	*Clear measurable objectives; stakeholder understanding; transparency*	*Define public value goals, map audiences, analyse communication context*	*mission statements, audience segmentation, stakeholder map*
Action Planning	*Translate strategic goals into operational communication plans*	*Planning elements; resources; targets*	*Objectives aligned with measurement; multi-channel planning; mixed methods*	*Define SMART objectives, KPIs, benchmarks and communication channels*	*KPI frameworks, campaign plans, PESO channel mix*
Communication	*Implement communication activities across channels*	*Activities; Implementation*	*Measurement across all relevant channels; qualitative and quantitative data*	*Execute communication initiatives across physical and digital environments*	*content production, media coverage, events, partnerships*
Evaluation (outputs/outtakes)	*Assess immediate communication performance and audience response*	*Outputs; Out-takes*	*Distinguish outputs from outcomes; avoid AVEs*	*Measure reach, engagement, attention and initial audience reactions*	*reach, impressions, engagement rate, attendance*
Evaluation (outcomes/impact)	*Assess broader stakeholder and organizational effects*	*Outcomes; Impact*	*Focus on outcomes and impact; transparency of evaluation*	*Evaluate effects on participation, trust, cultural engagement and public value*	*participation rates, visitor growth, community engagement, reputation indicators*
Learning / feedback	*Integrate evaluation results into future planning*	*Evaluation insights and learning*	*Measurement as continuous governance process*	*Adapt strategies based on evidence and improve future communication planning*	*revised strategies, updated KPIs*

Source: author's elaboration

The Rijksmuseum provides a complementary case study centred on digital openness, audience participation and reuse of cultural content. Through initiatives such as Rijksstudio, the museum enables users to explore, download and creatively reuse high-resolution artworks, thereby extending cultural participation beyond physical visits. The case demonstrates compelling evidence of digital dissemination, user participation and global reach. However, the measurement of broader outcomes and impact remains less transparent in public documentation.

Similarly, while the Rijksmuseum demonstrates advanced practices in enabling participation and access, the explicit measurement of downstream effects—such as learning outcomes, cultural inclusion, or societal impact—remains only partially observable through available data.

The cross-case analysis suggests that the framework is analytically useful for mapping communication practices in the GLAM sector and distinguishing between strategic objectives, communication activities, outputs, out-takes, outcomes and impact. At the same time, the cases confirm that publicly available evidence remains much stronger for outputs and engagement indicators than for more advanced outcome and impact measures.

More importantly, the application of the framework enables the identification of structural gaps in communication evaluation, highlighting a systematic misalignment between strategic intentions (e.g., participation, accessibility, public value) and the metrics effectively adopted by institutions.

Overall, the cases illustrate how the integrated RACE–AMEC–Barcelona framework enables a structured analysis of communication practices in GLAM institutions by linking communication activities to different levels of evaluation, from outputs and audience reactions to broader stakeholder outcomes and public value impact. They demonstrate strong evidence of multichannel communication strategies and measurable outputs, whereas the systematic measurement of outcomes and impact remains less transparent.

Beyond its descriptive function, the framework operates as a diagnostic tool, allowing researchers and practitioners to assess the degree of alignment between communication practices and evaluation standards, and to identify areas where measurement systems remain underdeveloped. In this sense, the findings suggest that current communication practices in leading GLAM institutions are still predominantly oriented toward visibility and engagement metrics, while the transition toward outcome- and impact-based evaluation—central to contemporary communication measurement standards—remains incomplete. This reinforces the relevance of the proposed framework as a mechanism for shifting communication evaluation from a reporting activity to a strategic governance process.

Table 2: Application of the Integrated Framework to the Case Studies

Framework dimension	***Uffizi Galleries (Italy)***	***Rijksmuseum (Netherlands)***
Research (objectives & stakeholders)	*Strategic goal of expanding audiences and increasing accessibility through digital communication and social media engagement. Communication policy explicitly states the goal of promoting heritage, strengthening institutional identity and fostering participation with communities and cultural stakeholders.*	*Strategic objective of connecting global audiences with art and history through digital access and open cultural data. The museum aims to make online experiences as valuable as physical visits and engage global digital audiences.*
Action planning (communication strategy)	*Multichannel communication strategy integrating website, press office and social media platforms (Instagram, TikTok, Twitter, Facebook). Campaigns focus on storytelling, humorous reinterpretations of artworks and audience-oriented narratives targeting younger publics.*	*Digital communication strategy centred on open access and participatory engagement. Initiatives such as Rijksstudio allow users to explore, download and reuse artworks, encouraging creative participation and global digital engagement.*
Communication activities (implementation)	*Extensive social media presence with visual storytelling, meme culture reinterpretations and participatory formats. Communication campaigns regularly involve influencers and digital creators to attract younger audiences.*	*Implementation of digital platforms, apps and interactive online experiences. Rijksstudio enables users to create personal collections and interact with high-resolution artworks from the museum's collection.*
Outputs (observable communication results)	*Strong growth in social media visibility. The museum became the most followed Italian museum online, reaching over 1.17 million followers across social platforms by 2023. Website traffic reached over 13.8 million page views with more than 2.2 million users.*	*Extensive digital dissemination of collections and online platforms. The Rijksmuseum provides hundreds of thousands of digital artworks online and encourages downloading and sharing through its open digital ecosystem.*
Out-takes (audience reactions)	*High engagement levels in comments, shares and user-generated content around artworks. Social media interactions demonstrate active audience participation and digital cultural engagement.*	*Active user participation through Rijksstudio collections and creative reuse of artworks. Digital platforms enable users to curate personal collections and share museum content.*
Outcomes (stakeholder effects)	*Increased international visibility and audience expansion through digital engagement strategies. The museum also became the most visited cultural site in Italy in 2021 with 1.72 million visitors.*	*Strengthened global digital engagement and cultural participation through open access to collections and participatory platforms. Online engagement contributes to extended audience interaction with the museum's collections.*
Impact (organizational and societal effects)	*Strengthened reputation as an innovative museum in digital communication and audience engagement. Communication strategies contribute to expanding cultural accessibility and public participation.*	*International recognition as a leading institution in open digital heritage and participatory museum practices, influencing global standards in digital cultural communication.*

Source: author's elaboration

Research limitations. *The present study acknowledges several limitations, yet concomitantly identifies promising avenues for future research. Firstly, the empirical analysis is dependent on secondary data sources. Whilst this approach facilitates the systematic observation of publicly visible communication practices across institutions, it does not provide access to internal evaluation systems, unpublished KPIs or organisation-specific measurement processes. Consequently, ongoing research is necessary to expand empirical investigation by collecting additional data sources and potentially integrating primary data. Secondly, the empirical investigation focuses on two illustrative cases. The Uffizi Galleries and the Rijksmuseum offer valuable insights into the application of the proposed framework in leading GLAM institutions, characterised by strong communication, visibility and digital engagement. However, future research will extend the analysis to a broader set of cultural firms to test the framework across different institutional contexts and communication environments. Ultimately, given that the empirical element of the research is still in progress, the case analysis presented in this paper should be interpreted as a preliminary application aimed at testing the analytical usefulness of the framework. This exploratory phase is already being complemented by additional case analyses and further empirical refinement to strengthen the framework's applicability and robustness for evaluating communication practices in the GLAM sector.*

Managerial implications. *The framework provides actionable guidance for communication managers in GLAM institutions by translating abstract evaluation principles into operational decision-making tools.*

First, it supports the design of measurement architectures aligned with strategic objectives, encouraging managers to define ex-ante KPIs linked not only to visibility but also to stakeholder outcomes (e.g., participation, trust, inclusivity). For example, instead of relying solely on engagement rates, institutions can integrate indicators such as repeat visitation, co-creation activities, or community partnerships. Second, the framework enables the development of integrated dashboards, where communication activities are systematically linked to outputs, out-takes, outcomes, and impact. This facilitates internal accountability and supports reporting to public stakeholders and funding bodies. Third, by embedding evaluation within the RACE cycle, the framework promotes continuous learning processes, allowing institutions to adapt communication strategies based on evidence rather than intuition.

Compared to existing models used in practice, the proposed framework differs in its ability to: (i) connect planning and evaluation in a single structure; (ii) explicitly incorporate public value dimensions; (iii) provide a replicable template applicable across different GLAM contexts.

Originality of the paper. *This paper contributes to the literature by advancing an integrative, operational framework that goes beyond merely juxtaposing existing models. While prior studies have independently addressed (i) communication planning processes (e.g., RACE), (ii) evaluation standards (e.g., Barcelona Principles), and (iii) measurement architectures (e.g., AMEC IEF), this study systematically connects these dimensions within a single coherent analytical and managerial structure tailored to the GLAM sector. The novelty of the framework lies in three specific contributions. First, it introduces a process–evaluation alignment, linking each phase of the communication cycle (RACE) with corresponding evaluative categories (AMEC IEF), thus overcoming the traditional separation between planning and measurement. Second, it embeds Public Value Theory as a normative anchor, explicitly connecting communication activities to societal outcomes, which remains underdeveloped in existing communication measurement models. Third, the framework provides a practical operationalisation through a structured analytical template, enabling empirical application and comparability across cases. Therefore, this study addresses a structural gap in the literature by transforming fragmented approaches into a governance-oriented measurement system, where communication evaluation becomes an integral component of strategic management and public value creation in cultural institutions.*

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Strategy, Experience, Conversation: A Conceptual Model of Corporate Space as Strategic Communication

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Abstract. *Despite substantial research on organizational space from ergonomic, psychological, and corporate identity perspectives, a coherent conceptual framework for understanding the strategic communication function of corporate space remains absent from the literature. This paper addresses that gap by proposing a three-dimensional conceptual model that repositions corporate headquarters as an active strategic communication instrument. The model argues that organizational space operates simultaneously across three communicative dimensions: (1) the strategic dimension, in which space encodes and transmits the organization's strategic trajectory, business model, and competitive positioning across historical phases of capitalism; (2) the experiential dimension, in which space mediates the aesthetic and relational construction of work experience, organizational identity, and the imagined relationship between people, work, and the corporation; and (3) the conversational dimension, in which iconic corporate headquarters function as agenda-building mechanisms in urban public discourse, actively shaping which issues, values, and organizational narratives enter collective attention. Drawing on three intersecting literature streams, organizational studies on space, strategic communication theory, and urban sociology , the paper develops each dimension theoretically and illustrates them through case evidence, including the Nuvola Lavazza headquarters and other international models. The contribution is both theoretical, advancing a multi-dimensional framework for strategic communication scholarship, and managerial, offering communication professionals a model for conceptualizing, designing, and governing corporate space as a consequential strategic communication asset.*

Keywords: *corporate space; strategic communication; organizational identity; agenda-building; work experience; public sphere*

Framing of the research. *Corporate space has been studied from multiple disciplinary perspectives: Among others, organizational behaviour and management have examined how physical environments shape productivity, wellbeing, and culture (Oyedeji, Ko, & Lee, 2025); corporate identity scholarship has treated architectural choices as expressions of organizational identity and legitimacy (Hatch, 1987; Balmer, 2011); sustainability research has highlighted how spatial disconnection from local communities undermines corporate responsibility (Mazutis, Slawinski, & Palazzo, 2021); and urban sociology has documented how corporate buildings reshape city landscapes and civic life (Mozingo, 2014). Cultural, educational, and experiential dimensions of corporate space have also received growing attention as organizations invest in museums, public programmes, and community-facing spaces that exceed purely operational functions.*

Despite this breadth of scholarly and organizational interest, a fundamental gap persists. None of these traditions has yet produced a conceptual framework for understanding corporate space as a form of strategic communication, that is, as a deliberately designed and managed communicative instrument through which organizations pursue their strategic objectives, construct stakeholder relationships, and participate in public discourse. The organizational and managerial literature tells us that space matters, and that it communicates something, but it has not theorized how communication professionals and senior managers can think about, design, and activate corporate space as a coherent strategic communication asset. This theoretical and practical deficit is the motivating problem of the present paper

The strategic dimension of organizational space as communication has been peripherally and in a fragmented manner tackled by several authors. Lefebvre's (1991) theory of the social production of space draws attention to the gap between space as designed and intended by its planners, space as materially inhabited and navigated in practice, and space as experienced and interpreted by its users. This tripartite understanding has been productive in organizational research for revealing how the communicative intent inscribed in architectural design may be affirmed, modified, or resisted by those who live and work in the space (Taylor & Spicer, 2007; Dale & Burrell, 2008). In strategic communication, the Communication Constitutes Organization (CCO) perspective has established that materiality, including physical artifacts, technologies, and spatial arrangements, actively participates in constituting organizational reality rather than merely reflecting it (Bencherki et al., 2021). Andrews (2017) and Bacevice and Wilhoit Larson (2023) have called explicitly for approaches that treat corporate buildings as rhetorical entities that afford or constrain communication practices. Individually, these contributions illuminate different facets of the relationship between corporate space and communication; none, however, has synthesized them into a model that is actionable for strategic communication theory and practice.

Moreover, as hybrid work has disrupted assumptions about the office as a default site of activity, organizations face urgent questions about why, how, and for whom the corporate headquarters should exist. Participating in addressing these questions requires to theories the issue of how can a communication perspective enrich this discussional and bring novel understanding on the functions that corporate space can perform, and that gives managers the theoretical

vocabulary to act on them. The result is a persistent under-exploitation of one of the most powerful and durable communication assets a corporation possesses

Purpose of the paper. *The purpose of this paper is to develop a three-dimensional conceptual model of corporate space as strategic communication. The model is intended to serve both theoretical and managerial functions: theoretically, it integrates disparate literature streams into a framework that advances the field of strategic communication by establishing corporate space as a legitimate and consequential domain of scholarly inquiry; managerially, it provides communication professionals and organizational leaders with a structured way of thinking about how corporate space can be designed, governed, and communicated to achieve strategic objectives.*

Methodology. *This paper adopts a conceptual and theory-building approach. The methodology combines a review of three intersecting literature streams with the development of an original conceptual framework grounded in that review and illustrated through illustrative case example. The literature review encompasses publications from the past thirty years in leading international journals in management, strategic communication, and urban sociology, selected using the Academic Journal Guide rankings. A corpus of 90 articles was mapped enabling identification of the dominant theoretical frameworks, empirical patterns, and persistent gaps that motivate the proposed model (Oyedeji, Ko, & Lee, 2025; Romenti, 2024).*

Results. *The spatial strategic dimension: The first dimension of the model concerns relationship between corporate spatial investment and organizational strategy. The use of organizational space has always been part of the intersection between the discourse on corporate strategy, internationalization, and the projection of corporate positioning within the broader environment. What organizational and strategic communication research has not yet adequately theorized is how corporate space has historically encoded and transmitted strategy, thus how the physical configuration of a headquarters embodies and communicates a particular understanding of what the organization is, what it does, and how it positions itself in competitive, social, and institutional landscapes.*

Corporate spatial strategy has evolved through distinct phases, each corresponding to a particular moment in the history of capitalism and the corporation's understood role in society, and each constituting a distinct chapter in the strategic communication function of organizational space.

In the American post-war industrial phase, the dominant spatial logic was one of containment and consolidation. The insulated suburban campus, exemplified by AT&T Bell Laboratories and the broader typology of the American corporate estate (Mozingo, 2014), communicated stability, self-sufficiency, and institutional authority through its very withdrawal from urban complexity. The communicative message was inward-facing: the corporation as a complete, self-enclosed social world, capable of providing everything its workforce needed and unwilling to be distracted by the turbulence of the city. Space here functioned as a communication of power through separation.

The knowledge economy phase introduced a fundamentally different communicative imperative. As intellectual talent replaced physical labour as the primary source of competitive advantage, corporate space became a tool for attracting and retaining the people organizations most needed, and for signalling membership in the networks that defined innovation and prestige. The proliferation of R&D campuses, innovation hubs, and flagship headquarters was not merely a response to functional needs: it was a strategic communication investment. For example the establishment of WPP's campus model, or the open innovation spaces adopted by major pharmaceutical companies, illustrates how organizations in knowledge-intensive sectors used their physical environments to communicate credibility and proximity to ideas to position themselves spatially within the epistemic geography of their industry. The campus became a material claim about where the future was being made.

A different and particularly revealing communicative dynamic can be spot in the financial sector, where the tension between visibility and secrecy is constitutive of the business itself. Financial headquarters are designed to communicate simultaneously in two registers: outward-facing, they project institutional solidity, trustworthiness, and permanence to markets, regulators, and clients; inward-facing, they maintain the controlled opacity that proprietary operations require. This dual communicative logic, broadcasting stability while concealing process, is legible in the spatial grammar of financial district buildings worldwide, from the monumental lobbies designed to inspire confidence to the windowless trading floors shielded from external observation. Space, in this sector, is not merely a backdrop to the business: it is an active instrument for managing the information environment.

The experiental dimension: The second dimension of the model concerns the role of corporate space in constructing the aesthetic and relational experience of work, the way in which spatial design mediates how organizational members understand, feel, and imagine their relationship to work, to the organization, and to one another. This dimension draws on the rich literature on identity, organizational identification, and the aesthetics of organizational life, while extending it into a specifically communicative register.

Research by Elsbach (2003) established that the personalization of workspaces is directly correlated with organizational identification: the degree to which employees can inscribe their own presence and identity onto the spaces they inhabit shapes the depth of their sense of belonging. This insight has been extended by subsequent research demonstrating how spatial arrangement mediates the formation of organizational culture, the circulation of informal knowledge, and the construction of collective memory (Stigliani & Ravasi, 2012). Space is not a neutral backdrop to these processes: it constitutes them, in the sense that CCO (Communication Constitutes Organization) theory gives to that term

(Bencherki et al., 2021). The aesthetic choices embedded in design — materials, light, colour, scale, atmosphere are not decorative; they are communicative acts that shape the experienced meaning of work and the imagined identity of the organization (Gagliardi, 2006; Strati, 2010).

A critical insight for strategic communication is that the aestheticization of work experience through space is not a neutral process but a corporately mediated one. When an organization invests in the aesthetic quality of its workspaces such as in natural light, biophilic elements, materials of warmth and texture, spatial configurations that support both concentration and encounter it is not merely providing amenities. It is constructing a particular imaginary of work: a vision of what it means to be part of this organization, of the quality of relationship the organization offers its members, and of the kind of future the organization is building. This imaginary is communicated before any word is spoken, through the sensory and spatial experience of simply being in the building, This dimension also encompasses the temporal construction of organizational identity through space. Identity research has established that corporate identity involves the temporal projection of a particular organizational self one that integrates remembered history, present values, and imagined future (Suddaby, Foster, & Quinn Trank, 2010; Balmer, 2011). Space is the materialization of this temporal dimension: it cements the historical development of corporate identity and makes the organization's sense of its own past and future spatially experienceable (Hatch & Schultz, 2017). Buildings that embed and display organizational heritage through architectural references to founding moments, display of historical artifacts, integration of archival materials into the spatial design communicate a particular kind of organizational self-understanding that no verbal or digital communication can replicate with the same durability and immediacy.

The conversational dimension: the third and most theoretically novel dimension of the model argues that iconic corporate headquarters, those invested with deliberate narrative and communicative strategy, function as agenda-building mechanisms in the public sphere (Carroll & McCombs, 2003). This proposition shifts attention from the internal and dyadic communicative functions of space to its role in shaping public discourse at the level of the city, the sector, and the broader cultural environment.

Historically, civic spaces like public squares, parliaments, libraries, cathedrals, and news media institutions were the primary arenas of public agenda formation: the spaces where issues were selected, framed, and brought to collective attention. Corporate buildings have increasingly come to perform an analogous function. A headquarters that is open to the public, hosting global summit, exhibitions, cultural events, educational programmes, and community gatherings, becomes a literal arena in which the corporation acts as gatekeeper, promoter, and framer of the issues and ideas it selects to platform. More diffusely, an architecturally iconic building shapes public discourse through its urban presence, its circulation in media and on social platforms, and the questions it activates in the public imagination about who the organization is, what it stands for, and what role it claims in urban and civic life.

An exemplary case that illustrates all three dimensions operating in coherent integration is Nuvola Lavazza . Across the strategic dimension: the building was designed to externalize Lavazza's business model and brand values architecturally, embedding the product experience,the ritual, warmth, and sociality of coffee, into the sensory fabric of the workspace and inverting the "placelessness" pattern that sustainability research identifies as a strategic liability. Across the experiential dimension: the building functions as a narrative micro-universe where personal and collective stories about the organization and the city accumulate and circulate, constructing organizational memory and identity through the spatial experience of those who inhabit and visit it (Vaara et al., 2016). Across the conversational dimension: the museum, public piazza, events programme, and deliberate architectural narrativization have transformed Nuvola into an active landmark, one that generates 367 average monthly searches by name against 6 for "sede Lavazza", and that activates public curiosity about the organization's history, values, and civic role far beyond what any conventional communication programme could achieve.

Research limitations. *As a conceptual paper, the primary limitation is the absence of systematic empirical testing of the proposed model. The three dimensions are developed through theory-building and illustrated through case evidence; they are not empirically derived from primary data or statistically validated.*

A second limitation concerns the conceptual treatment of the three dimensions as analytically distinct. In practice, the strategic, experiential, and conversational dimensions of corporate spatial communication are deeply interdependent and mutually constitutive: the agenda-building function of a corporate landmark is only achievable when the experiential and strategic dimensions are coherently aligned, and the strategic communication function of space is always mediated by the lived experiences of those who inhabit it. The model's three-part structure is a theoretical simplification that enables analytical clarity at the cost of some phenomenological complexity.

A third limitation is the primarily Western and large-corporation orientation of the empirical cases. The model's propositions are grounded in evidence from Italian and US contexts and focus on large, resource-rich organizations with the capacity to invest substantially in headquarters design and programming. How the three dimensions apply in smaller organizations, different cultural contexts, and non-profit or public sector institutions remains to be explored.

Managerial implications. *The model generates several direct implications for the practice of strategic communication and organizational management. Most fundamentally, it argues that communication professionals must expand their professional remit to include spatial governance: the integration of architectural choices, spatial programming, and narrative investment into the broader communication strategy. Corporate real estate and facilities decisions have*

traditionally been made without communication expertise and the theoretical framework developed here shows why this represents a systematic under-exploitation of a consequential communication asset. With respect to the strategic dimension, managers should ask whether the design and location of their headquarters coherently communicates the organization's strategic positioning and business model, and whether spatial investments reinforce or contradict the narratives the organization is seeking to establish with stakeholders. The evolution of spatial strategy, from operational enclosure to civic embeddedness, suggests that organizations whose headquarters remain spatially insulated from their communities are communicating a strategic posture that is increasingly misaligned with contemporary stakeholder expectations around sustainability, transparency, and civic responsibility.

With respect to the experiential dimension, managers should evaluate the degree to which the aesthetic and relational design of their workspaces communicates the organization's values and identity in ways that are coherent with its verbal and visual communication. This includes attention to sensory coherence between product and space (as in the Lavazza model), to the spatial embodiment of organizational heritage and future orientation, and to the grounding–opening dynamic: whether the building is experienced as an invitation or a barrier by the multiple publics it encounters.

With respect to the conversational dimension, managers should assess whether their headquarters is functioning as an active or passive agenda builder and what investments in narrative, programming, and public accessibility would be required to shift it from one category to the other

Originality of the paper. *The paper makes three original contributions to scholarly and professional knowledge. First, it proposes the first explicit three-dimensional conceptual model of corporate space as strategic communication, an integrated framework that goes beyond the existing literature's treatment of space as an ergonomic variable, identity expression, or employer branding lever, and articulates a multi-register understanding of its communicative functions. By bringing together organizational space studies, strategic communication theory, and urban sociology, the paper creates a conceptual platform for a genuinely interdisciplinary research agenda. Indeed the paper makes an original contribution to the conceptualization of the strategic communication function itself. By demonstrating that corporate space is a consequential site of strategic communication , one that operates across internal, stakeholder, and public sphere levels simultaneously and generates durable communicative effects that exceed those of conventional communication channels, the paper argues for an expanded understanding of strategic communication as a discipline that can draw from architcture, organization studies, and urban studies to advance its own agenda.*

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The role of marketing communication strategy and professional expertise in AI adoption: insights from an exploratory study

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Abstract. *Artificial intelligence (AI) is increasingly reshaping marketing by enabling firms to automate content creation, personalize communication, and predict customer behavior (Davenport et al., 2020; Huang & Rust, 2021). Although AI technologies are recognised as a fundamental component of the broader technological evolution that businesses must embrace to remain competitive (Chen et al., 2022), existing studies highlight several challenges and opportunities that must be carefully managed for effective adoption, including technological infrastructure, ethical concerns, and organizational readiness (Amin et al., 2025).*

Focusing on organizational readiness, the marketing literature identifies several barriers to effective AI implementation, such as high costs, lack of specialized skills, resistance to change, and difficulties in integrating AI into existing processes (Dwivedi et al., 2021; Elhajjar, 2025). However, there is still limited understanding of how firms - particularly SMEs - operationalize AI adoption in practice, especially in the domain of marketing communication.

This paper aims to shed light on the role of communication strategy and professional expertise in facilitating AI adoption in marketing communication. Specifically, it presents the results of an empirical study examining the extent of AI adoption and its main applications in marketing communication among SMEs, from the perspective of marketing and communication managers. It further investigates whether the level of AI adoption intensity is associated with the presence of a communication strategy. Additionally, the study analyses how firms - grouped according to their level of AI adoption - differ in terms of marketing communication expenditure, the adoption of communication performance measurement systems, and the configuration of human resources dedicated to communication activities (i.e., in-house, outsourced, or hybrid).

In this paper, AI adoption in marketing communication is not viewed merely as the implementation of a technological tool but rather as a strategic decision that can influence firms' strategic choices. From a dynamic capabilities' perspective, firms are required to develop the ability to sense emerging technological opportunities, seize them through strategic integration, and reconfigure their resource base accordingly (Teece et al., 1997; Teece, 2007). Consistent with the resource-based view, the value generated by AI in marketing communication depends on the effective combination of technological resources with complementary organizational capabilities, such as strategy and marketing expertise (Barney, 1991; Wade & Hulland, 2004).

The findings indicate that SMEs characterized by the presence of a marketing communication strategy exhibit higher levels of AI adoption and firms with higher AI adoption levels tend to report greater investment in marketing communication (as a percentage of revenue), a higher incidence of communication performance measurement practices, and a more balanced configuration of communication resources between internal and external solutions.

Overall, the results suggest that Italian SMEs still make relatively limited use of AI in marketing communication. At the same time, the presence of a communication strategy is associated with higher levels of AI adoption, while more advanced adoption is linked to resource configurations characterized by a stronger balance between internal capabilities and external expertise.

Keywords: *Marketing communication; Artificial Intelligence (AI); marketing communication strategy; internal and external communication competences; small and medium-sized enterprises (SMEs), B2C market*

Framing of the research. *The integration of AI into marketing reflects a broader technological transformation that firms must embrace to remain competitive in an increasingly digital marketplace (Chen et al., 2022). AI technologies offer several advantages, including greater personalization, more effective targeting, higher return on investment (ROI), improved efficiency and automation (Kumar et al., 2024). Similarly, Amin et al. (2025), highlight that leveraging AI technologies, enables firms to personalize customer experiences, support decision-making, and streamline operations.*

The ability to analyse vast amounts of data in real time further strengthen customer engagement and optimizes strategic decision-making. Through predictive analytics, machine learning, and natural language processing, AI plays a critical tool in advertising personalization and marketing automation (Casado-Aranda et al., 2023). In this context, machine learning algorithms, allows marketers to align messages more closely to customers' preferences, thereby improving communication effectiveness (Gupta et al., 2020). Additionally, voice recognition applications are gaining increasingly relevance in marketing communication, as they enable more natural, conversational, and personalized interactions between firms and customers, while also reshaping search behaviours, customer journeys, and content delivery strategies (Huh et al., 2023).

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Overall, AI is reshaping marketing communication by supporting data-driven decision-making, enabling advanced personalization, and facilitating more adaptive and responsive communication strategies (Davenport et al., 2020; Huang & Rust, 2021).

However, despite these benefits, AI adoption in marketing and marketing communication entails several challenges, including technological infrastructure, ethical concerns, and organizational readiness (Amin et al., 2025). Focusing on organizational readiness, a growing stream of literature has examined the conditions that enable the effective integration of AI into marketing communication.

Davenport et al. (2020) state that firms initially deploy AI to support efficiency-enhancing and task-specific applications before moving toward more strategic integration and emphasize that the effectiveness of AI in marketing communication depends on the accurate definition of the target audience, as the quality of AI-driven insights is closely linked to the relevance of input data (Ramos, 2023). In this respect, a clear understanding of the intended audience is essential to ensure meaningful outputs and avoid ineffective or misleading marketing decisions. Alongside audience definition, maintaining a consistent brand voice represents a critical requirement. Misalignment between AI-generated content and established brand identity may lead to inconsistencies in communication, potentially undermining brand authenticity and confusing consumers (Kirkby et al., 2023; Brüns & Meißner, 2024).

From an operational perspective, AI enables a more systematic and data-driven approach to content creation and optimization. Its integration into social media communication allows firms to continuously refine content based on performance data and evolving audience preferences (Bashang & Puttanna, 2023; Haleem et al., 2022). Nevertheless, recent studies highlight that the effectiveness of these processes remains contingent upon data quality and contextual understanding. Limitations such as content inconsistency and difficulties in capturing nuanced brand meaning still require further advancements in machine learning techniques (Kubovics, 2024).

While AI supports the development of more targeted and adaptive marketing communication strategies across multiple channels, contributing to improved customer engagement and marketing effectiveness (Kumar et al., 2019), a deeper understanding of the determinants - particularly those related to organizational readiness - of AI adoption in marketing communication is still needed.

In this regard, the literature has primarily focused on selected elements of marketing communication strategy, such as target audience definition and brand voice, while paying limited attention to other relevant strategic components that may influence AI adoption. These include, for instance, the use of marketing communication performance measurement systems, the level of investment in communication activities, and, more broadly, the presence of a comprehensive communication strategy. Building on the integrated marketing communications (IMC) tradition, which conceptualizes marketing communication as a strategic and integrated process, incorporates key planning elements (Kotler & Keller, 2016), and emphasizes coherence across touchpoints (Porcu et al., 2019), marketing communication strategy can be conceptualized as "an integrated planning framework that aligns objectives, target audiences, messaging, channels, and resource allocation to ensure consistency across touchpoints and enable the optimization of communication approaches to achieve marketing and communication objectives".

Such a strategy is closely linked to a firm's overall strategic positioning, as communication activities are designed to convey and reinforce the brand's distinctive position in the minds of target consumers (Kotler & Keller, 2016; Keller, 2013).

Accordingly, it can be expected that the presence of a marketing communication strategy - whether formal or informal - as well as a clearly defined strategic positioning, is associated with a more intensive (and effective) adoption of AI in marketing communication.

Another relevant factor or organizational readiness facilitating of AI adoption in marketing communication concerns human resources and, more specifically, the governance of competencies. While prior research has emphasized the importance of employee skills and organizational readiness, limited attention has been paid to how firms configure internal and external resources to support AI adoption. Understanding the most effective combination of in-house capabilities and external expertise represents a critical yet underexplored issue, particularly in the context of SMEs.

Beyond skill development, the adoption of AI in marketing communication also raises important questions regarding the governance of resources, particularly the balance between internal marketing capabilities and external expertise. In the marketing literature, this issue has traditionally been framed as the choice between internalizing activities and outsourcing them to specialized partners (Ghosh & John, 1999). Firms must therefore determine which communication activities should remain under internal control and which can be delegated to external consultants, such as communication agencies, digital marketing specialists, or technology providers.

External partners can provide specialized expertise, advanced technological knowledge, and analytical capabilities that may not be readily available within the firm (Florea & Munteanu, 2020). They can offer access to sophisticated data analytics tools, AI applications, and marketing technology infrastructures. At the same time, internal marketing capabilities remain essential to ensure strategic alignment, maintain brand coherence, and coordinate communication activities across channels (Moorman & Day, 2016; Morgan et al., 2018). Internal teams play a central role in defining brand positioning, communication objectives, and the overall strategic direction.

In the context of AI adoption, this balance becomes even more critical. Implementing AI in marketing communication requires not only technological expertise but also the ability to translate data-driven insights into coherent strategies and brand-consistent messages. As a result, firms may increasingly rely on hybrid governance structures, combining internal strategic capabilities with external technological and analytical expertise (Huang & Rust, 2021; Verhoef et al., 2021).

Such configurations can enable firms to leverage external innovation while retaining control over strategic communication decisions and brand management.

Hence, two main gaps related to organizational readiness can be identified, referring to key factors that may facilitate AI adoption in marketing communication. The first concerns marketing communication strategy, including specific elements such as budget allocation and the use of performance measurement systems. The second relates to the composition of human resources, particularly the configuration between internal, external, and a mixed approach.

In this paper, AI adoption in marketing communication is conceptualized not merely as the introduction of a technological tool, but as a strategic choice that can shape firms' communication strategies and marketing decision-making processes. From a dynamic capabilities' perspective, firms need to sense technological opportunities, integrate them into marketing activities, and reconfigure their resources accordingly (Teece et al., 1997; Teece, 2007). Consistent with the resource-based view, the value of AI depends not only on the technology itself, but on its integration with complementary organizational capabilities (Barney, 1991; Wade & Hulland, 2004). Recent marketing research further highlights that effective AI deployment requires the development of new marketing capabilities and the integration of technological resources with organizational expertise (Davenport et al., 2020; Huang & Rust, 2021).

Against this background, this study examines the extent to which SMEs adopt AI in marketing communication and the specific activities supported by AI, based on the perspectives of marketing and communication managers or their collaborators. SMEs represent a particularly relevant context, as their more limited resources and capabilities often make the adoption of new technologies and strategic communication practices more challenging.

More specifically, the study investigates whether AI adoption is associated with the presence of a communication strategy and a clearly defined strategic positioning. It also explores whether firms differ in their configuration of internal and external communication resources. By linking AI use to strategic orientation and organizational capabilities, the study provides insights into how strategy and expertise shape the effective use of AI in marketing communication.

The analysis is based on data from an online survey of SMEs and focuses on three main areas: (1) firm characteristics, (2) the adoption of communication strategies and AI uses, and (3) the configuration of internal and external communication competences.

Given the structural constraints typical of SMEs, understanding how these firms integrate AI into their marketing communication practices is particularly relevant. This study contributes to the emerging literature on AI in marketing by highlighting the role of organizational and strategic readiness in supporting the adoption and effective use of AI-based communication tools.

Accordingly, the study addresses the following research questions:

RQ1: What is the level of AI adoption intensity among SMEs in marketing communication, and of key uses (content creation, data analysis and data personalization)?

RQ2: Is there a statistically significant difference in AI adoption between firms with and without a communication strategy?

RQ3: To what extent do firms, grouped by their level of AI adoption, differ in terms of (a) marketing communication expenditure, (b) the use of performance measurement systems, and (c) the configuration of communication resources (in-house, outsourced, or hybrid)?

Purpose of the paper. *Drawing on the Resource-Based View and the Dynamic Capabilities perspective, this paper investigates the extent and patterns of artificial intelligence (AI) adoption in marketing communication among SMEs. Specifically, the study examines the level of adoption and its main applications from the perspective of marketing and communication managers. It further examines whether differences in AI adoption levels are associated with the presence of a communication strategy.*

In addition, the study explores how firms, grouped according to their level of AI adoption, differ in terms of marketing communication investment intensity, the use of performance measurement systems, and the configuration of communication resources (in-house, outsourced, or hybrid).

Adopting a quantitative and comparative approach, this exploratory study provides insights into the relationship between AI adoption and firms' communication strategies and organizational configurations, thereby contributing to a better understanding of the role of organizational readiness in shaping AI adoption in marketing communication practices.

Methodology. *The study draws on data from an online survey of Italian manufacturing SMEs operating in B2C markets. The questionnaire was developed based on the marketing communication literature and pre-tested through pilot interviews with two entrepreneurs to ensure clarity and relevance.*

The analysis is based on four sections of the questionnaire: (1) firm characteristics; (2) the intensity of AI adoption in marketing communication and key uses ; (3) AI adoption in firms with and without a communication strategy; and (4) the relationship between AI adoption intensity and the marketing communication budget, the presence of a performance measurement system, and the composition of internal and external communication competences.

Communication strategy was defined as "an integrated planning framework that aligns objectives, target audiences, messaging, channels, and resource allocation to ensure consistency across touchpoints and enable the optimization of communication approaches to achieve marketing and communication objectives". The questionnaire included items

measured using a five-point Likert scale, complemented by dichotomous and multiple-choice questions. Descriptive statistics were employed to summarize the data, and ANOVA was conducted to identify significant differences among groups. Data were collected through an email survey administered in November 2025-Januyary 2026 to a panel of firms provided by Sigma Consulting, a consulting firm based in Pesaro (Italy). The final sample includes 151 respondents holding communication-related roles in manufacturing SMEs.

Results and discussion. *The sample of 151 SMEs is heterogeneous, including both small and medium-sized firms, and is broadly representative of Italian manufacturing SMEs in terms of sectoral distribution and geographic origin.*

Table 1. Sample characteristics

Variable	Description	Group 1 (%)	Group 2 (%)	Group 3 (%)	Sample (%)
Size	Small (10-49)	40,4	36,7	48,6	41,1
	Medium (50-249)	59,6	63,3	51,4	58,9
Sector	Furniture, wood and wood products	10,4	10,2	8,6	9,9
	Food and beverages	25,4	30,6	34,3	29,1
	Paper, printing and graphics	4,5	8,2	5,7	6
	Textiles, apparel, footwear and accessories	7,5	12,2	20	11,9
	Home appliances and electronics	16,4	6,1	5,7	10,6
	Chemicals and pharmaceuticals	11,9	16,3	14,3	13,9
	Motor vehicles and transport equipment	10,4	8,2	0	7,3
	Other	13,5	8,2	11,4	11,3
Provenance	Northern Italy	56,7	51	40	51
	Central Italy	26,9	28,6	14,3	24,5
	Southern Italy and Islands	16,4	20,4	45,7	24,5
Revenue (€)	≤ €2 million	20,9	26,5	31,4	25,2
	€2 - 5 million	22,4	14,3	22,9	19,9
	€5 - 10 million	26,9	20,4	25,7	24,5
	> €10 million	29,9	38,8	20	30,5
Revenue trend	Growing	56,7	51	26	47,7
	Stable	32,8	24,5	60	36,4
	Declining	10,5	24,5	14	15,9

To address the first research question, the results indicate (Table 2) that the intensity of AI adoption in marketing communication among the sampled SMEs, measured on a 1–5 Likert scale, remains relatively low. Specifically, respondents report that approximately 56% of firms do not use AI or use it only to a very limited extent, 29.14% report a moderate level of adoption, and only 14.57% indicate a high level of use (i.e., "much" or "very much").

Table 2. AI intensity adoption in marketing communication of SMEs

AI adoption level	Frequency (n)	Percentage (%)
Not at all	56	37.09%
A little	29	19.21%
Moderately	44	29.14%
Much	19	12.58%
Very much	3	1.99%
Total	151	100%

Furthermore, the typologies of AI adoption presented below (Table 3) indicate that AI is primarily used for content creation and data analysis. A substantial proportion of AI use is also dedicated to data personalization. Other activities (n = 3) mainly relate to translation tasks.

Table 3. Key uses of AI in marketing communication

AI uses	Yes (n)	Yes (%)	No (n)	No (%)
Content creation	47	49.47%	48	50.53%
Data analysis	45	47.37%	50	52.63%
Data personalization	32	33.68%	63	66.32%
Other	3	0.00%	92	96.84%
Total	95	100%	95	100%

To address RQ2, the study first shows that the majority SMEs in the sample (55.6%) either do not adopt a communication strategy or only implement it partially (Table 4). It then demonstrates that firms with a formal

communication strategy (Group 1) exhibit a statistically significant higher level of AI adoption intensity compared to those that adopt it partially or not at all (Table 5).

Table 4. Adoption of Communication Strategies among SMEs

Group	Adoption level	N	%
Group 1	Fully adopted	67	44.4
Group 2	Partially adopted	49	32.5
Group 3	Not adopted	35	23.1
Total		151	100.0

Although the overall level of AI use in communication remains relatively moderate on a 1–5 Likert scale, firms adopting a communication strategy (Group 1) reports a significantly higher intensity of AI use (mean = 2.552) compared with Groups 2 and 3 (Table 4).
Furthermore, Group 1 reports a significantly higher perception of strategic positioning (mean = 3.627) compared with the other two groups.

Table 5. Strategic positioning and AI use intensity in marketing communication

	Mean			Dev. St.			ANOVA			
	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3	SumSq	MeanSq	F	p_value
AI use intensity	2,552	2,204	1,657	1,197	1,040	0,938	18,475	9,238	7,750	0,001
Clearly defined strategic positioning	3,627	3,265	2,371	0,982	0,908	0,877	36,394	18,197	20,814	0,000

Finally, to address RQ3, firms characterized by the adoption or not of a communication strategy - and higher versus levels of AI use - tend to rely more on externally managed communication resources (29.9%) and exhibit a stronger preference for hybrid configurations (37.3%) compared to the other groups.

Table 6. Relationship between AI intensity adoption and communication marketing professionals

	Group 1		Group 2		Group 3		Total sample	
BUDGET (% ON REVENUE)								
<1%	7	10,4%	13	26,5%	16	45,7%	36	23,8%
1%-5%	25	37,3%	24	49,0%	10	28,6%	59	39,1%
5%-10%	24	35,8%	9	18,4%	9	25,7%	42	27,8%
>10%	11	16,4%	3	6,1%	0	0,0%	14	9,3%
MEASUREMENT OF MARKETING COMMUNICATION PERFORMANCE								
Yes	47	70,1%	23	46,9%	3	8,6%	73	48,3%
No	20	29,9%	26	53,1%	32	91,4%	78	51,7%
MARKETING COMMUNICATION SKILLS								
In-House	22	32,8%	30	61,2%	28	80,0%	80	17,7%
Externally managed	20	29,9%	8	16,3%	3	8,6%	31	6,8%
A mixed approach	25	37,3%	11	22,4%	4	11,4%	40	8,8%
							151	

The results reported in Table 6 highlight systematic differences across groups of SMEs distinguished by their level of AI adoption in marketing communication. Firms characterized by higher levels of AI adoption (Group 1) report a greater intensity of investment in marketing communication. Specifically, 16.4% of firms in Group 1 allocate more than 10% of their revenues to marketing communication, compared with 6.1% in Group 2, while no firms in Group 3 report such levels of investment. Similarly, the adoption of communication performance measurement practices is more prevalent among firms with higher levels of AI adoption (70.1% in Group 1), compared with firms in Group 2 (46.9%) and Group 3 (8.6%).

More broadly, the findings of this exploratory study provide initial insights into what characterize SMEs with different level of adoption of AI in marketing communication.

Regarding RQ1 the results suggest that its use among SMEs remains relatively limited. AI is predominantly employed in specific key uses, particularly content creation and data analysis, indicating that it is mainly used to support operational tasks rather than being fully integrated across communication processes and strategy. This pattern is consistent with prior research suggesting that firms initially deploy AI to support efficiency-enhancing and task-specific applications before moving toward more strategic integration (Davenport et al., 2020). In this sense, AI in SMEs still appears to function more as an augmentative tool rather than as a fully embedded component of marketing communication strategy. The results suggest that AI is primarily used for content creation and data analysis and prediction, while its application in data visualization appears to be less prevalent. These uses are consistent with the key benefits of AI in marketing communication, particularly in terms of automation, personalization, and data-driven decision-making (Davenport et al., 2020; Huang & Rust, 2021; Casado-Aranda et al., 2023). In particular, content creation is closely associated with the automation of marketing activities and the personalization of communication, while data analysis and prediction support more informed decision-making processes (Gupta et al., 2020; Davenport et al., 2020). By contrast, the lower adoption of AI for data visualization may reflect a more limited use of AI to enhance the presentation and communication of insights, with firms prioritizing applications that more directly support operational and strategic marketing activities.

With respect to RQ2, the findings indicate that firms with a communication strategy exhibit significantly higher levels of AI adoption intensity compared to those that adopt it partially or not at all. This result supports the view that organizational readiness plays a crucial role in enabling AI adoption in marketing communication (Amin et al., 2025). In particular, the presence of structured strategic and organizational elements - such as clearly defined objectives, target audiences, and communication processes - appears to facilitate a more intensive use of AI.

This evidence is consistent with prior research suggesting that the effectiveness of AI depends on the quality of input data and the clarity of strategic orientation (Davenport et al., 2020; Ramos, 2023), as well as on the alignment between AI applications and key communication elements such as brand voice and audience definition (Kirkby et al., 2023; Brüns & Meißner, 2024). More broadly, it confirms that firms with more developed marketing communication strategies - understood as integrated and structured planning frameworks (Kotler & Keller, 2016; Porcu et al., 2019)- are better positioned to integrate AI into their communication activities.

Overall, the results suggest that the presence of organizational and strategic structures not only supports but may also enhance the intensity - and potentially the effectiveness - of AI adoption in marketing communication.

From this perspective, the findings suggest that AI does not substitute strategic marketing thinking but rather amplifies its importance. Firms with clearer communication strategies - articulating targets, messages, and positioning - appear better equipped to leverage AI tools more intensively. This is consistent with the Integrated Marketing Communications (IMC) view, which emphasizes the importance of alignment and coherence across communication elements (Kotler & Keller, 2016; Porcu et al., 2019). In the absence of such clarity, the potential of AI may remain underexploited or lead to inconsistent communication outputs.

Turning to RQ3, the results indicate that differences in AI adoption levels - closely associated with the presence of a communication strategy - are linked to distinct patterns in communication investment, performance measurement practices, and resource configuration. Firms with higher levels of AI adoption invest more in marketing communication, are more likely to adopt formal measurement practices, and rely on a more balanced mix of internal and external resources. These findings extend prior research by showing that, beyond commonly examined elements such as target audience definition and brand voice, other components of marketing communication strategy - such as budget allocation and performance measurement systems - also support AI adoption in marketing communication. This is consistent with the integrated marketing communications (IMC) perspective, which emphasizes the alignment between strategic elements, resource allocation, and performance monitoring (Kotler & Keller, 2016; Porcu et al., 2019).

These findings also align with the resource-based view and dynamic capabilities perspective, which stress that the value of technological resources depends on their combination with complementary organizational capabilities (Barney, 1991; Teece et al., 1997). Higher levels of investment and the adoption of performance measurement practices can thus be interpreted as manifestations of organizational readiness (Amin et al., 2025), enabling a more effective integration of AI into communication activities.

Moreover, the prevalence of hybrid configurations - combining internal strategic competences with external expertise - supports prior research suggesting that AI adoption often requires access to specialized capabilities not fully available in-house (Huang & Rust, 2021; Verhoef et al., 2021), while internal resources remain essential to ensure strategic alignment and brand coherence (Moorman & Day, 2016; Morgan et al., 2018). This balance is particularly challenging for SMEs, where resource constraints may limit both the development of internal capabilities and the effective use of

external expertise, making the achievement of an optimal configuration more difficult.
Overall, AI adoption in marketing communication appears embedded in broader strategic and organizational readiness.

While the results indicate systematic associations, they do not imply causality. Rather, firms with stronger strategic structuring and more developed organizational configurations tend to exhibit higher levels of AI adoption.
At the same time, the limited diffusion of AI among SMEs highlights persistent barriers, including resource constraints, lack of specialized competences, and insufficient strategic formalization. Despite its recognized potential (Kumar et al., 2019; Haleem et al., 2022), AI adoption in marketing communication remains uneven and contingent on firm-specific conditions.

Research limitations. *This study should be interpreted in light of the limitations typical of exploratory research. In particular, the analysis relies on a relatively small sample and primarily descriptive statistics, thus providing an initial empirical exploration rather than definitive conclusions.*

Nevertheless, the study offers valuable and original insights into AI adoption in marketing communication and raises relevant questions for future research. By highlighting the relationship between AI adoption and organizational readiness - specifically the presence of a communication strategy and the configuration of communication competences - the findings open promising avenues for further investigation.

Managerial implications. *The findings offer several implications for managers seeking to adopt AI in marketing communication. First, effective AI adoption requires not only technological skills but also strong marketing communication competences. While AI tools can personalize customer experience, improve decision-making, and streamline operations, their value depends on firms' ability to define clear objectives, understand target audiences, and ensure coherent communication processes.*

Second, the presence of a communication strategy emerges as a key enabling condition for AI adoption. Firms with a well-defined strategic positioning and structured communication processes appear better able to leverage AI across a broader range of activities, particularly in content creation and data-driven decision-making. In this sense, AI should not be viewed merely as a tool for automating operational tasks, but as a resource that can support and reshape communication strategies.

Third, SMEs need to carefully manage the configuration of competences supporting AI adoption. The results suggest that combining internal communication capabilities with external expertise - such as consultants or specialized agencies - facilitates the integration of AI into communication activities. In addition, collaborations with universities and research centers can help firms access advanced knowledge, develop new capabilities, and accelerate AI implementation.

Overall, managers should approach AI adoption as a strategic capability-building process that combines technological knowledge, communication expertise, and organizational learning.

Originality of the paper. *This paper contributes to the emerging literature on the challenges firms face in adopting AI in marketing communication- particularly in terms of organizational readiness - by providing early empirical evidence on how SMEs integrate AI into their communication activities. Although based on a relatively small sample and primarily descriptive statistics, the study offers exploratory insights that can inform and guide the development of more robust future research, both quantitative and qualitative, on the strategic adoption of AI in marketing communication. The originality of the study lies in linking AI adoption not only to technological capabilities but also to strategic communication variables, such as the presence of a communication strategy, a clear strategic positioning, and the use of balanced mix of internal and external expertise in marketing communication activities. Therefore, the research highlights the importance of a strategic approach to marketing communication as a key organizational readiness factor enabling the effective use of AI tools.*

Furthermore, the study opens several avenues for future research. In particular, further studies could investigate how communication strategy influences the scope and intensity of AI adoption in marketing communication and how firms combine internal capabilities and external expertise to support AI-driven communication practices. Future research could also employ larger samples and more advanced quantitative methods to better understand the relationship between strategic communication variables and the effective integration of AI into marketing communication activities. In addition, in-depth case studies are needed to explore how organizational readiness evolves alongside AI adoption over time, providing a deeper understanding of the underlying mechanisms and development processes.

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To Err Is Human… and Authentic? Typos and Message Authenticity in the Age of Artificial Intelligence

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Abstract. *Minor linguistic imperfections are generally considered detrimental to communication effectiveness. However, in a context where AI-generated texts are increasingly widespread and characterized by near-perfect linguistic accuracy, small typos may acquire new interpretative meanings.*

Drawing on signaling theory and cue utilization perspectives, this study intends to examine how the presence of typos influences perceived message authenticity and how this relationship is a) contingent on the formality of the communication and b) shaped by individuals' familiarity with AI-generated content. Because formal communication establishes stronger expectations of linguistic correctness, the authenticity-enhancing effect of typos may weaken when a message adopts a formal tone. At the same time, individuals who frequently interact with AI systems are exposed to highly polished and flawless texts, which may be perceived as algorithmic rather than human. In this context, typos may contribute to higher perceptions of authenticity.

A 2×2 experimental design manipulating message formality and the presence of typos is intended to be employed in order to test the proposed hypotheses. The results of this study could potentially contribute to research on consumer behavior in digital communication contexts by showing that small linguistic cues can influence perceptions of message authenticity. More broadly, it can add a new layer in understanding how the diffusion of AI technologies may reshape the meaning of traditional signals of quality and authenticity in written communication.

Keywords: *AI; communication formality; linguistic typos; perceived authenticity; signaling theory*

Framing of the research. *In digital communication environments, individuals increasingly rely on linguistic cues to evaluate the credibility, authenticity, and reliability of messages (Cox et al. 2017; Kakaria et al. 2023). Because online interactions often lack contextual and interpersonal signals, recipients frequently use surface-level characteristics of communication to infer the quality and authenticity of information they encounter (Berger and Packard 2016). Linguistic elements such as grammar, spelling, and style therefore become important signals shaping message evaluation (Packard and Berger 2024).*

Prior research in communication and marketing has shown that textual accuracy often functions as a heuristic cue, signaling competence and professionalism of the source (Connelly et al. 2011; 2025). Linguistic errors, such as spelling mistakes or typographical errors, can introduce disfluency and signal a lack of credibility or attention to detail (Marinelli et al. 2025), which risks undermining perceived authenticity. As a result, recipients may interpret such small typos as indicators of lower informational quality, thereby reducing positive evaluations of the message.

However, the interpretation of linguistic cues does not occur in a vacuum. The meaning attributed to linguistic elements depends on contextual expectations and communication norms. In particular, the communication register, in terms of more or less formal content, plays an important role in shaping these expectations (Berger and Packard 2023; Kakaria et al. 2023). Formal messages typically convey professionalism, institutional authority, and precision, both online and offline (Yadav 2025). Consequently, audiences expect higher levels of linguistic correctness in formal communication. When errors occur in such contexts, they may represent stronger violations of normative expectations compared to similar errors in informal communication settings.

At the same time, the contemporary marketing communication landscape is undergoing a profound transformation due to the rapid diffusion of AI technologies capable of generating human-like text (Davenport et al. 2019; Desveaud and Pavone 2026). AI-generated communication is typically characterized by high levels of linguistic accuracy, stylistic coherence, and higher levels of grammatical correctness than human-generated text (Illia et al. 2022). While these characteristics often enhance efficiency and clarity, they may also introduce new interpretative dynamics in how audiences evaluate textual content (Zhu and Molnar 2026).

In particular, perfectly polished language may be perceived as a signal of algorithmic generation rather than human authorship. On the web, consumers are used to language mistakes such as typos, for example in online reviews, and may thus perceive perfectly correct language as a byproduct of AI (Cox et al. 2017). As individuals become increasingly familiar with AI, they may more easily detect AI-generated content (Moravec et al. 2024) and start associating error-free language with algorithm-generated communication. In this context, minor imperfections such as typographical errors may paradoxically function as cues of human involvement, spontaneity, or authenticity.

Understanding how audiences interpret small linguistic imperfections as typos in this evolving technological environment represents an important area for research. While previous studies have primarily treated linguistic errors

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as uniformly negative signals, the rise of AI-mediated communication suggests that their meaning may become more nuanced.

Thus, this study intends to examine how the presence of typographical typos influences perceived message authenticity, and how this relationship is shaped by the register of the message (formal/informal) and individuals' familiarity with AI-generated content. Specifically, in this study we refer to linguistic imperfections as the presence of small typos in communicated information, whose effects may extend beyond basic communication processing.

Purpose of the paper. *The purpose of this ongoing study is to investigate whether and how minor linguistic typos can influence the evaluation of digital messages and how emerging AI-based tools can reshape the meaning of traditional linguistic signals. In particular, this work-in-progress research focuses on the role of typographical errors in shaping perceived message authenticity. Therefore, the study tries to answer the following research questions: does the presence of linguistic typos shape the perceived authenticity of digital messages? Do language formality and people's familiarity with AI technologies moderate this relationship?*

From a signaling perspective, linguistic accuracy is traditionally interpreted as an indicator of competence, professionalism, and careful message construction (Wells et al. 2011). Accordingly, error-free language signaled intentionality and quality control, whereas linguistic imperfections indicated carelessness or lack of effort. As a consequence, textual errors undermined positive evaluations of communication (Cox et al. 2017).

However, we argue that these assumptions may require reconsideration in the age of generative AI. As digitally mediated communication becomes increasingly populated by highly polished and grammatically flawless texts, linguistic perfection may no longer signal only competence. It may also raise the possibility that a message was generated, or at least heavily shaped, by AI rather than written by a human. In this emerging context, minor typographical errors may operate as cues of spontaneity, human presence, and imperfect but genuine authorship. Therefore, although typos have traditionally been viewed as detrimental, in communication environments increasingly shaped by generative AI they may enhance perceived message authenticity by signaling human authorship and reducing the impression of algorithmic generation.

H1: The presence of typos in a message positively affects perceived message authenticity.

Moreover, the impact of linguistic typos may depend on the expectations associated with the communication register (Cox et al. 2017). Formal communication messages typically establish stronger expectations regarding linguistic precision and correctness, due to the higher-level communication register (Flanagin et al., 2020; Yadav 2025). In such settings, errors may represent a more salient violation of expectations and may therefore produce stronger negative evaluations. Conversely, in more informal settings, people would tolerate linguistic imperfections, as communicated information is usually less important and a more easy-going tone is considered acceptable. Therefore, we argue for the following hypothesis:

H2: The positive effect of typos on perceived authenticity is weaker when the message is formal rather than informal.

At the same time, the interpretation of linguistic signals may be influenced by individuals' familiarity with AI technologies (Moravec et al. 2024). AI-generated texts are typically characterized by high levels of grammatical accuracy and stylistic consistency, which often appears of superior quality to human-generated text, especially at the eye of non-experts (Illia et al. 2022). As individuals become more accustomed to interacting with AI-generated content, they may start associating perfectly polished language with machine-generated communication rather than human authorship.

In this context, minor linguistic typos may function as cues of spontaneity and human involvement. Consequently, individuals who are more used to interacting with AI tools may be less likely to interpret typographical errors as negative signals, rather perceiving them as signals of authentic human communication. Thus, we argue for our third hypothesis:

H3: The relationship between typos and perceived authenticity is moderated by individual frequency of AI use, such that the positive effect of typos becomes stronger as the frequency of AI use increases.

Methodology. *To test the proposed hypotheses, the study adopts a mixed-methods design.*

In a first phase, a quasi-experimental design will be employed. Combining experiments and survey studies is an advantageous approach (Lavrakas et al. 2019) and particularly appropriate for examining relationships between communication cues and message evaluations, as they allow researchers to isolate the effects of specific textual features.

The research employs a 2 × 2 experimental design manipulating two aspects: presence of typographical errors (typos vs. no typos) and message formality (formal vs. informal communication register).

Participants are assigned to one of two online questionnaires. Surveys are anonymized and a full informative is available at the beginning on respondents' rights. In one questionnaire, participants evaluate two informal messages that vary in the presence or absence of typographical errors. In the second questionnaire, participants evaluate two formal messages with the same textual manipulation (presence and absence of typos). This structure allows the study to compare the impact of linguistic errors across different communication registers while maintaining consistent message content.

The experimental stimuli consist of short written texts designed to resemble realistic digital communication scenarios. Across conditions, the informational content remains constant, while the communication register and the presence of typographical errors vary systematically. After reading the text, respondents were asked a set of questions replicated for

each of the two scenarios on their perceptions of the message. The last part of the survey contained questions pertaining to individual-level information, such as demographics and habits pertaining to technological and AI-based usage.

The independent variable is the presence of typographical errors, whereby 1 indicates the presence and 0 the absence of typos. Perceived message authenticity represents the main dependent variable. It is measured using a multi-item 7-point Likert scale from Chiu et al. (2012), capturing the extent to which the message appears authentic, believable, and realistic. Two moderators are included in the design: message formality and frequency of AI use. The latter is measured as an individual-level variable capturing how often respondents interact with AI-based tools in their activities. This variable will be included as a second moderator in order to examine whether technological familiarity influences how linguistic imperfections are interpreted.

Additional control variables, including demographic characteristics of the respondents and their general digital experience are collected in the very last part of the survey to account for potential confounding factors.

To test the hypotheses, the data will be analyzed using logistic regression models examining both the direct and interaction effects of the independent variables. Logistic regression allows the study to estimate the probability that a message is evaluated as authentic as a function of the presence of typographical errors, message formality, and individual frequency of AI use. Interaction terms will be included to assess both the moderating role of message formality and the one of AI usage frequency.

The quantitative study will be followed by a qualitative stage based on semi-structured interviews. The interview structure aims at deepening people's perceptions of linguistic typos, how these may affect their information processing and their expectations according to the (in)formality if the message. Moreover, we will interview frequent users of AI-based tools to understand whether frequent users of AI-based tools evaluate the authenticity of messages containing typos differently from other individuals. Interviews will be recorded and transcribed following the procedure by Riessman (2008), with participants' consent, then undergo manual thematic coding to ensure proper collection, interpretation and presentation of the interviews content.

Results. *Since the research is currently ongoing, this section outlines the analytical approach and the expected patterns based on the theorized relationships. First, the analysis will examine the direct effect of typographical errors on perceived message authenticity. In line with the theoretical arguments presented earlier, it is expected that messages containing typographical errors will be perceived as more authentic than error-free messages, consistent with H1.*

Second, the analysis will test the interaction between typographical errors and message formality. Because formal communication contexts establish stronger expectations of linguistic correctness, the authenticity-enhancing effect of typos is expected to weaken when the message adopts a formal tone. Evidence of this moderation would provide support for H2.

Finally, the study will examine the moderating role of frequency of AI use. Individuals who frequently interact with AI-generated content may more readily associate perfectly polished language with machine-generated communication. In this context, typographical errors may be more strongly interpreted as cues of human authorship. Therefore, the positive effect of typos on perceived authenticity is expected to become stronger as the frequency of AI use increases, consistent with H3.

Research limitations. *This study presents several limitations that should be acknowledged.*

First, the study relies on an experimental design using controlled textual stimuli. While this approach allows for strong internal validity and enables the isolation of specific linguistic cues, it may not fully capture the complexity of real-world communication environments. In practice, digital communication often involves multiple simultaneous cues—such as visual elements, contextual information, and source characteristics—that may interact with linguistic signals in shaping message evaluation.

Second, the experiment focuses on short written messages presented within an online survey context. Although this design allows for controlled comparisons across conditions, it may not fully reflect how individuals encounter and process messages in everyday digital environments. Future research could examine similar effects in more naturalistic settings, such as social media interactions, email communication, online reviews, or marketing messages.

Third, the study investigates a limited set of linguistic cues, specifically typographical errors. While this choice allows for a clear and focused manipulation, other forms of linguistic variation—such as stylistic tone, punctuation, grammatical complexity, or conversational style—may also influence how audiences evaluate message authenticity. Future studies could therefore explore a broader range of linguistic features that may signal either human authorship or automated communication.

Fourth, the moderating role of AI familiarity is captured through self-reported frequency of AI use. Although this measure provides a useful proxy for individuals' exposure to AI-generated content, it may not fully capture the complexity of individuals' interactions with AI technologies. Future research could employ more refined measures of technological familiarity, such as objective indicators of AI usage, technological literacy, or attitudes toward AI-generated communication.

Fifth, the empirical setting of the study may limit the generalizability of the findings. The data are collected within a specific geographical context, and cultural differences may influence how linguistic imperfections are interpreted in communication. Norms regarding linguistic accuracy, formality, and communication style may vary across countries and

languages. Future research could therefore replicate the study in different cultural and linguistic settings in order to assess the cross-cultural robustness of the findings.

Finally, the sample used in this study is not randomly drawn from the general population. As is common in experimental research conducted through online surveys, participants are recruited through convenience sampling procedures. Although this approach is suitable for testing causal relationships in experimental settings, it may limit the external validity of the results. Future research could replicate the study using more diverse and representative samples in order to strengthen the generalizability of the findings.

Managerial implications. *The findings of this study may have important implications for organizations, marketers, and communication professionals operating in increasingly AI-mediated environments. As digital communication becomes more automated and AI-generated content becomes widespread, the interpretation of linguistic cues may evolve in ways that challenge traditional assumptions about communication quality.*

Traditionally, organizations have emphasized linguistic perfection and grammatical accuracy as key indicators of professionalism, competence, and credibility. Error-free language has long been considered a hallmark of high-quality communication and a signal of careful message construction. However, the widespread adoption of AI-generated communication tools may alter how audiences interpret these signals. Because AI-generated texts are typically characterized by highly polished and grammatically flawless language, audiences may increasingly associate perfect linguistic accuracy with algorithmic generation rather than human authorship.

In this context, the findings suggest that small linguistic imperfections may function as cues of human presence and spontaneity. When used appropriately, minor typographical errors—particularly in informal communication settings—may contribute to perceptions of authenticity by signaling that the message was produced by a human rather than a machine. This does not imply that organizations should intentionally introduce errors into their communication, but rather that they should recognize the growing complexity of linguistic signals in AI-mediated environments.

More broadly, the study highlights the central role of linguistic choices in shaping perceptions of authenticity in digital communication. Language correctness and register are not merely technical aspects of writing but strategic elements that influence how audiences interpret the credibility of a message and its source. For organizations increasingly relying on automated communication systems, such as chatbots, virtual assistants, and AI-generated marketing content, carefully designing the language aspects of these systems becomes essential (Ozuem et al. 2024). The way chatbots interact with users, including their level of formality, fluency, and conversational naturalness, can significantly influence users' perceptions of authenticity and trust.

In addition, the findings suggest that organizations may benefit from considering consumer heterogeneity in their communication strategies. As frequency of use of AI technologies varies widely across individuals, audiences may interpret linguistic cues differently depending on their level of familiarity with AI-generated content. Consumers who frequently interact with AI tools may be more likely to associate perfectly polished language with machine-generated communication and therefore interpret minor imperfections differently than individuals with limited exposure to AI systems. Segmenting audiences based on their familiarity with AI technologies may therefore help organizations design more effective communication strategies and calibrate their digital communication interactions accordingly.

Finally, the study underscores the importance of aligning linguistic elements with communication context (Cox et al. 2017). While minor imperfections may sometimes contribute to perceptions of authenticity in informal interactions, maintaining high linguistic accuracy remains essential in formal communication settings, where errors may strongly undermine professionalism and credibility. Organizations should therefore carefully balance authenticity cues and linguistic correctness depending on the communication context, the medium used, and the characteristics of the target audience.

Originality of the paper. *This study contributes to the literature on digital communication and message evaluation in several ways.*

First, it advances existing research on linguistic cues by examining how minor textual imperfections influence perceptions of authenticity rather than focusing solely on traditional outcomes such as perceived quality, credibility, or price evaluations (Marinelli et al. 2025). While prior research has largely treated linguistic errors as uniformly negative signals, the present study highlights how their interpretation may vary depending on contextual and technological factors.

Second, the study introduces the role of AI familiarity as a key contextual factor shaping the interpretation of linguistic signals. While previous studies have considered general web or social media experience as determinants of communication effectiveness, this research suggests that familiarity with AI-generated content represents an increasingly relevant dimension influencing how audiences interpret linguistic cues (Zhou et al. 2018). In particular, the findings suggest that individuals who frequently interact with AI tools may interpret perfectly polished language differently from individuals with lower exposure to AI-generated communication.

Third, by integrating signaling theory with emerging research on AI-mediated communication, the paper highlights how technological change may transform the meaning of traditional indicators of communication quality. Traditional communication paradigms have typically associated linguistic accuracy and formal precision with higher credibility and authenticity. However, the diffusion of AI-generated texts may partially challenge these assumptions by introducing new interpretative dynamics in which perfectly flawless language may sometimes be perceived as a signal of algorithmic generation rather than human authorship.

Overall, the study provides new insights into how small linguistic details can produce disproportionate effects on message evaluation in contemporary digital environments (Longa 2004). In doing so, it contributes to a better understanding of how authenticity perceptions are shaped in increasingly automated communication ecosystems.

The study also opens several avenues for future research. First, qualitative approaches such as in-depth interviews or focus groups could be employed to further explore how consumers interpret linguistic imperfections in AI-mediated communication and to better understand the cognitive processes underlying authenticity judgments. Such approaches may provide richer insights into how individuals distinguish between human and machine-generated messages.

Second, future research could examine more granular differences in individuals' interactions with AI technologies. Rather than focusing solely on the frequency of AI use, scholars could investigate how different types of AI engagement—such as using generative AI for work, studying, creative tasks, or everyday information search—shape perceptions of authenticity and trust in digital communication.

Third, future studies could explore how trust in AI technologies moderates these effects. As attitudes toward AI vary across individuals (Zhu and Molnar 2026), the relationship between linguistic cues and authenticity perceptions may depend on broader psychological factors such as trust in technology, perceived algorithmic competence, or concerns about automation.

Last, the rapid evolution of digital communication environments suggests that traditional communication paradigms may need to be reconsidered. As AI-generated content becomes increasingly prevalent, the cues that individuals use to infer authenticity, credibility, and human authorship may evolve over time. Understanding how these signals are reinterpreted in online environments therefore represents an important direction for future research.

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Agentic AI Readiness in Italian SMEs: System Integration, Business Model Reinvention and the Intention–Capability Gap in the Post-Globalisation Era

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Abstract. *In the era of post-globalisation and agentic AI, SME competitiveness increasingly depends not only on adopting digital tools, but on redesigning the managerial, infrastructural and governance conditions that allow intelligent systems to act across organisational boundaries. Despite growing awareness of AI as a strategic imperative, many SMEs fail to translate this awareness into a structured, governed and integrated capability. The gap between declared intent and actual organisational capability, what we term the Intention-Capability Gap (ICG), remains large and poorly understood, yet is critical to navigate as AI transitions toward agentic architectures that demand deep system integration. This paper investigates the structural conditions that explain the ICG in Italian SMEs, using original survey data collected from 124 Piedmontese (Italy) firms in 2025. We focus on three interlocked dimensions: (1) the nature of the AI benefits that firms seek, predominantly operational efficiency, which technically requires deep system integration; (2) the actual level of digital maturity and system integration achieved; and (3) the governance and training configurations that predict readiness. Our main findings are: the primary expected benefit from AI is operational efficiency (cited by 67% of firms), yet only 16% report high system integration and 43% cite poor AI knowledge as their leading barrier. Mean ICG is +13.7 (normalised to [−100, +100]), with 68% of firms aspiring to more AI than their current infrastructure can support. Digital maturity varies significantly by firm size (Kruskal-Wallis $H = 18.89$, $p < .001$), consistent with the resource-based prediction that organisational scale is a structural precondition for digital infrastructure investment (Guangliang et al., 2025). Training intensity is the dominant predictor of both digital maturity and AI strategic awareness in multivariate analysis; firms adopting a mixed governance model display higher maturity and integration in bivariate analysis, though this advantage is largely mediated by size and training once controls are applied. An exploratory model predicting the ICG from structural firm characteristics yields no significant predictors (adj. $R^2 = -0.010$). This result is interpreted with caution, given the measurement limitations inherent in difference scores derived from single-item ordinal variables. However, it is consistent with the hypothesis that the gap reflects firm-specific dynamics, including legacy infrastructure configuration and leadership-level digital awareness, that vary independently of size, sector, and governance type. The paper argues that AI readiness in Italian SMEs is fundamentally a knowledge and capability challenge, not a financial one. Policy implications favour targeted training support and hybrid governance models over generic investment incentives, and point toward the need for firm-level diagnostic assessment of integration readiness alongside standard categorical support mechanisms. The paper contributes to the conference theme by showing that agentic business model reinvention is constrained less by tool availability than by the managerial capacity to integrate systems, develop knowledge micro-foundations and govern hybrid human–AI transformation in fragmented post-globalisation environments.*

Keywords: *Agentic AI; SMEs; system integration; digital governance; business model reinvention; intention–capability gap; post-globalisation.*

1. Framing of the research. Management is undergoing a structural transition. In the era of post-globalisation, firms face fragmented value chains, geopolitical uncertainty and accelerating technological change; at the same time, agentic AI is shifting digital transformation from the adoption of isolated tools to the orchestration of autonomous, adaptive and cross-functional systems. The dominant paradigm of the past years, AI as a collection of discrete, task-specific tools, is giving way to what researchers and practitioners are calling the agentic economy: an emerging productive order in which AI systems operate as autonomous agents capable of orchestrating multi-step workflows, coordinating across organisational subsystems, and adapting their actions in response to environmental feedback (Rothschild et al., 2025; Tan & Huang, 2025; Huang, 2025). In agentic architectures, a model does not merely answer a question; it perceives context, sets sub-goals, invokes tools, and executes sequences of decisions across time (Huang, 2025). Rothschild et al. (2025) develop this concept at the level of market interactions; this paper applies the framework one level inward, arguing that participation in this emerging market order presupposes a prior investment in intra-firm system integration that most SMEs have not yet made.

This transition has a precise organisational prerequisite: system integration. An agentic AI cannot orchestrate processes it cannot access, extract value from data it cannot read, or act across functions without interoperability among the digital systems on which those functions depend. The infrastructure required, integrated data environments, connected process systems, and accessible APIs, is qualitatively different from what sufficed for isolated AI applications, and most firms have not yet built it.

This is particularly relevant in a post-globalisation setting. Italian SMEs are increasingly required to respond to fragmented supply chains, regionalised markets and volatile coordination demands. Agentic AI could support this transition by improving visibility, automation and adaptive decision-making, but only where firms possess the system integration and managerial capabilities required to connect data, processes and decisions. SMEs account for 99.9% of

Italian enterprises, employ approximately 64% of the private-sector workforce, and generate around 66% of national value added (Istat, 2025; European Commission, 2024); micro-enterprises with fewer than ten employees represent nearly 95% of the total firm population (European Commission, 2021). Italy's competitive trajectory in the agentic economy will therefore be determined largely by whether this vast and heterogeneous population can build the organisational prerequisites for AI integration, not merely deploy consumer-grade AI tools.

The evidence to date is sobering. Approximately 70.2% of Italian SMEs have reached a basic level of digital intensity - broadly in line with the EU27 average range of 58–73% - yet AI adoption remains limited to only 8.2% of firms. For high digital intensity, Italian SMEs substantially underperform relative to EU peers: the EU27 average stands at approximately 27%, pointing to a structural polarisation between widespread basic adoption and a thin tail of genuinely advanced digital capability (Eurostat, 2025). Only 17.8% of Italian firms invest in digital training for their staff, 4.5 percentage points below the EU27 mean (European Commission, 2024).

This paper investigates that distance empirically. Drawing on an original survey of 124 Piedmontese SMEs conducted in 2025, we address three research questions.

RQ1: What structural factors predict digital maturity and AI strategic importance in Italian SMEs, and which are genuinely amenable to managerial intervention?

RQ2: What is the empirical distribution of the mismatch between firms' AI ambitions and their digital capacity, and what does it reveal about their readiness for agentic business model reinvention?

RQ3: Do observable structural characteristics, size, sector, governance model, training intensity, and founding era account for meaningful variation in the ICG, or does the gap vary independently of these characteristics in ways that challenge categorical approaches to AI readiness support?

Purpose of the paper. This paper makes three contributions. It proposes a novel quantitative operationalisation of the Intention-Capability Gap (ICG), a signed, normalised measure on a [−100, +100] scale, as a reproducible diagnostic instrument for SME readiness for agentic AI, building on UTAUT-based precedents that document analogous intention-capability gaps under external shocks (Ranatarisza et al., 2025). It identifies the structural predictors of digital maturity and AI strategic importance through multivariate analysis, distinguishing fixed endowments from actionable factors. Moreover, it reports an exploratory null result in M3: no structural variable significantly predicts the ICG, a finding interpreted with caution given the psychometric limitations of difference scores, but consistent with the hypothesis that integration readiness requires firm-level diagnostic assessment alongside categorical policy instruments.

2. Theoretical Background. Research on AI adoption in SMEs has evolved through two broad phases. The first, still dominant in quantitative surveys, focuses on adoption rates and their structural determinants, firm size, resources, and innovation orientation, within the Technology-Organisation-Environment framework (Tornatzky and Fleischer, 1990). These studies consistently document an adoption deficit among SMEs relative to large firms and identify cost, knowledge, and infrastructure as the primary barriers (Dwivedi et al., 2021). The second, emerging phase shifts the question from whether firms adopt AI to how, with what governance, at what level of organisational integration, and with what structural sustainability (Warner and Wäger, 2019; Verhoef et al., 2021). Our paper contributes to this second phase, and specifically to its least-developed dimension: the organisational conditions that determine whether AI ambition can be translated into structured, governed capability.

A central theoretical anchor for this translation is the role of human knowledge assets. Drawing on the knowledge-based view of the firm and dynamic capabilities perspectives, empirical evidence from private SME contexts demonstrates that internally accumulated digital capabilities are the primary determinants of AI adoption, outweighing the effect of external environmental support, institutional incentives, and generic financial instruments (Arroyabe et al., 2024). In Italian SME settings specifically, intellectual capital, encompassing managerial competence, decision-making skills, and technology-related human capital, has been shown to be the dominant determinant of digital maturity, with strategic and proactive management practices mediating the relationship between knowledge endowments and digital outcomes (Tortora et al., 2024). The underlying cognitive mechanism is consistent with the Technology Acceptance Model (Davis et al., 1989): prior knowledge exposure shapes perceived usefulness, which in turn drives adoption behaviour. In private SME contexts, where formal IT functions are typically absent, and technology decisions rest on a small number of individuals, the digital self-efficacy of those individuals, itself a function of accumulated knowledge and prior training exposure, directly shapes both their technology assessments and their adoption trajectories (Malodia et al., 2023). This dynamic differs from technology adoption in public-sector organisations, where institutional mandates, procurement rules, and bureaucratic incentives intervene between individual attitudes and organisational behaviour (Giraldi et al., 2024); in private micro-enterprises, there is no such organisational buffer, and the cognitive capacity of the owner-manager becomes the binding constraint on digital capability development (Dwivedi et al., 2021). Training intensity is not merely a human resource variable; it is the organisational micro-foundation on which digital capability is built.

Agentic economy, system integration and business model reinvention. The agentic economy changes the managerial problem from whether firms adopt AI to whether they can redesign coordination, decision-making and organisational boundaries around intelligent systems (Tan & Huang, 2025; Huang, 2025). For SMEs, this means that business model reinvention depends less on experimenting with standalone tools and more on building the digital architecture through which AI agents can access data, execute workflows and coordinate with internal and external actors in platform-based, servitised and ecosystemic forms of value creation (Chatterjee et al., 2023; Secundo et al., 2025).

System integration represents the specific, high-leverage dimension of digital maturity that the agentic transition makes newly critical. Contemporary AI applications in business operations share a common architectural requirement: access to structured, real-time data flows from multiple operational systems (Davenport and Ronanki, 2018). This is what enterprise-grade integration provides, and what most SMEs lack. From a dynamic capabilities perspective (Teece et al., 1997), the capacity to build and maintain system integration is a sensing and reconfiguring capability, not a one-time investment. Firms that rely entirely on external expertise for digital governance risk failing to develop the absorptive capacity (Cohen and Levinthal, 1990) needed to assimilate and deploy integrated AI systems over time. The governance model, specifically, who owns digital decisions inside the firm and how that ownership is structured, thus shapes integration outcomes not directly, but through its effect on the accumulation of internal knowledge and organisational learning.

3. Methodology. Data were collected through a structured questionnaire administered to Piedmontese firms between September and December 2025, as part of the OICE research cycle. The instrument covers eight thematic modules: firm profile, human capital and training, process-level digitalisation across five functional areas (administration, sales/CRM, logistics, marketing, production/R&D), digital governance, strategic AI perception, barriers to adoption, public support utilisation, and investment priorities. The full instrument is documented in OICE (2026).

The final sample comprises N = 124 firms that completed at least the human capital section[1]. Table 1 summarises the sample profile.

Table 1 - Sample profile (N = 124). Source: OICE survey 2025–2026, authors' elaboration

Variable / Category	n	%
Firm size		
< 10 employees (micro)	52	41.9%
10–49 employees (small)	35	28.2%
50–249 employees (medium)	27	21.8%
≥ 250 employees (large)	10	8.1%
Sector		
Services	103	83.1%
Manufacturing/industry	21	16.9%
Revenue		
< €1 million	56	45.2%
€1–10 million	44	35.5%
> €10 million	24	19.4%
Founding period		
Pre-2000 (legacy)	65	52.4%
2000–2009	29	23.4%
2010+ (recent / digital-native)	30	24.2%

The sample is dominated by micro-enterprises (42%) and service-sector firms (83%), reflecting the composition of the Piedmontese SME population. Sampling was purposive rather than probabilistic, targeting heterogeneous firm profiles across size, sector, and digital maturity. Results are descriptive of this population rather than population estimates with known precision.

3.1 Key variables. *Digital maturity* is operationalised as the unweighted mean of five Likert-scored items (1–5) measuring the self-assessed level of current digitalisation across five functional areas: administration and accounting, sales and customer management, logistics and supply chain, marketing and communication, and production and R&D. The resulting index (maturita_digitale) has a mean = 2.61, SD = 1.05, N = 101.

AI strategic importance (*ai_importanza_n*) is a single five-level item measuring the perceived strategic centrality of digital technologies and AI for the firm's future (mean = 3.22, SD = 1.23, N = 92). Two features of this measure warrant explicit declaration. The item uses verbal anchors only at the extremes of the scale—"Poco importante" (1) and

[1] Response rates vary by module: N = 124 for training; N = 101 for the digitalisation sub-index; N = 94 for governance; N = 92 for strategic AI importance. All reported bases reflect module-specific respondents.

"Estremamente importante" (5)—with three intermediate levels designated by typographic markers without verbal labels. This partial-anchor design is more susceptible to respondent-level idiosyncratic interpretation of intermediate categories than a fully labelled scale. The 32 firms with missing values on this item correspond to non-response on the AI perception module, which was administered as a branching section contingent on prior engagement with digital governance questions; firms that did not complete the governance section were less likely to reach the AI module.

System integration is a three-level ordinal variable (absent/partial/high) capturing the degree of data connectivity across the firm's digital systems. *Training intensity* is a four-level ordinal variable (none/ under evaluation / occasional / structured). *The governance model* distinguishes internal, mixed (internal + external), and purely external management of digital transformation.

The *Intention-Capability Gap* (ICG) is computed as:

$$ICG_i = \frac{A_i - M_i}{4} \times 100$$

where A_i denotes the AI strategic importance score and M_i the digital maturity index of the firm i, both measured on a 1–5 scale. The denominator 4 normalises the difference to the interval [−100, +100], with positive values indicating AI ambition in excess of current digital capacity. A positive ICG indicates that stated AI ambition exceeds current digital capacity; a negative value indicates the reverse. Mean ICG = +13.7 (SD = 30.2, median = +15.0, N = 92). A psychometric limitation of the ICG must be explicitly acknowledged. The difference scores computed from variables with asymmetric reliability are known to be disproportionately dominated by the measurement error of the less reliable component, in this case, the single-item importance score. The reliability of a difference score is a complex function of the reliabilities of both components and their intercorrelation; when one component is a single ordinal item, the resulting difference score carries substantially greater noise than either input. As a consequence, all ICG-based findings must be treated as exploratory and interpreted with commensurate caution.

3.2 Analytical approach. Bivariate analysis uses Kruskal-Wallis tests with Dunn post-hoc corrections (Bonferroni adjustment) for group comparisons on ordinal variables, Spearman rank correlation for bivariate associations, and chi-square with Monte Carlo simulation (B = 9,999) for contingency tables with small expected cell counts, applicable here to the governance × integration cross-tabulation given n = 11 for the external governance group. Multivariate analysis employs a parallel-specification strategy across three models with identical predictor sets: M1 (OLS, outcome = digital maturity), M2 (cumulative link ordinal logistic, outcome = AI strategic importance), and M3 (OLS with HC3 heteroskedasticity-robust standard errors, outcome = ICG). HC3 robust standard errors are used for M1 and M3. The proportional odds assumption in M2 is assessed via nominal_test; no violation is detected (minimum p = 0.075). VIF values are uniformly below 1.5, ruling out multicollinearity. All analyses were conducted in R 4.3.

The multivariate subset is N = 92, reflecting complete cases on all predictor and outcome variables. This reduction from N = 124 is driven primarily by non-response on the governance module, which was administered as a branching section and disproportionately skipped by micro-enterprises: firms with fewer than ten employees represent 41.9% of the full sample but 35.9% of the multivariate subset. This differential attrition constitutes a form of selection that may attenuate the estimated effects of firm size and partially underrepresent the most resource-constrained segment of the population in the multivariate models.

4 Results.

4.1 The Integration Paradox: a barrier to agentic business model reinvention. The most revealing finding in the data is a structural mismatch between the AI outcomes firms seek and the organisational infrastructure they currently possess, a pattern we term the Integration Paradox and develop theoretically in the Discussion. Operational efficiency is the dominant expected benefit, cited by 67% of respondents (N = 92), nearly twice the rate of the second-ranked benefit (greater data and process visibility: 41%). Operational efficiency delivered through AI, workflow automation, predictive analytics, intelligent process monitoring and agentic coordination requires that AI systems can perceive and act on data from across the firm's operational backbone. This is precisely what system integration provides. However, only 16% of sampled firms report high system integration (N = 93); 62% report partial integration, and 22% report its complete absence. Eighty-four per cent of firms therefore lack the integration level that would make their primary AI aspiration technically accessible at the agentic level. The barrier data confirm the organisational nature of this constraint: poor AI knowledge is cited by 43% of respondents as a leading barrier, integration complexity by 39%, and financial cost, often assumed to be the binding constraint, by only 35%, co-ranked with difficulty identifying concrete use cases.

The ICG captures this tension at the firm level (N = 92). Mean ICG is +13.7 (SD = 30.2, median = +15.0). Sixty-eight per cent of firms exhibit a positive ICG: their stated AI ambition exceeds current digital capacity. Twenty-three per cent exhibit a negative ICG, indicating a digital infrastructure that currently outpaces their declared strategic ambitions, a pattern consistent with underutilised capability. However, it may also reflect deliberate strategic restraint or sectoral contexts with lower AI competitive pressure. The remaining 9% are in approximate alignment. The distribution is near-symmetric (skewness ≈ −0.05), confirming that the ICG captures genuine variance in strategic positioning rather than a ceiling or floor artefact.

4.2 Structural predictors: a size threshold, not a gradient. *Digital maturity* varies significantly across firm size categories (Kruskal-Wallis H = 18.89, p < 0.001), consistent with the resource-based prediction that organisational scale is a structural precondition for digital infrastructure investment (Arroyabe et al., 2024; Guangliang et al., 2025). *Training intensity* is the dominant predictor in multivariate analysis: structured training carries a coefficient of +1.64 points on the

1–5 maturity scale relative to firms with no training programme ($p < 0.001$). The direction and approximate magnitude of this estimate are preserved under parsimonious robustness specifications (binary training indicator; model without founding era controls), as declared in Section 3.2. Furthermore, any engagement with training, even occasional, substantially raises both digital maturity and AI strategic awareness relative to no engagement at all, consistent with a threshold rather than a linear effect of training investment.

Post-hoc Dunn analysis reveals that the size effect is not a smooth gradient but a threshold: the significant contrasts are between micro-enterprises (mean = 2.24) and firms with 50 or more employees (50–249: mean = 3.13; ≥250: mean = 3.57). The gap between micro and small firms (10–49: mean = 2.48) is not statistically significant (p.adj = 1.000). **Digital maturity** improves materially only when firms cross approximately 50 employees, the level of organisational complexity at which integrated process management becomes both operationally necessary and economically feasible.

The ICG pattern is non-monotonic across firm size. Micro-enterprises show the lowest mean ICG (+11.0), not because they are well-aligned, but because their AI ambition is also correspondingly low (mean AI strategic importance: 2.79). Small and medium firms show the highest ICG (+16.9 and +16.4, respectively), reflecting AI aspirations that outpace current capability. Large firms (≥250 employees) show a near-alignment mean of +2.5. The interpretation that larger firms have progressively brought capacity into line with intent is theoretically plausible and consistent with the resource-based view, but cannot be confirmed from this cell size.

4.3 Governance, training, and the mediation structure. Bivariate analysis shows that the governance model is associated with digital maturity: mixed-governance firms report a mean maturity of 2.95, compared to 2.48 for internally governed firms and 2.30 for externally governed firms (Kruskal-Wallis H = 7.52, p = 0.023). Mixed-governance firms also show substantially higher system integration: 23% report high integration, compared to 13% for internal-only firms and 0% for purely external governance. The purely external configuration is particularly revealing: no firm relying entirely on outside providers reports high integration, consistent with the absorptive capacity argument that deep integration requires internal cognitive engagement that cannot be outsourced (Cohen and Levinthal, 1990).

Table 2 presents the parallel-specification results for M1 and M2.

Table 2 — Multivariate results: M1 (digital maturity, OLS) and M2 (AI strategic importance, ordinal logistic). N = 92. M1 reports unstandardised β with HC3 robust SE; M2 reports log-odds ratios with profile SE

Predictor [ref. category]	M1: β	(SE HC3)	M2: log-OR	(SE)
Firm size [ref. <10 employees]				
10–49 employees	0.082	(0.240)	0.471	(0.517)
50–249 employees	0.628*	(0.254)	1.410*	(0.559)
≥ 250 employees	0.650*	(0.275)	0.550	(0.801)
Sector [ref. Services]				
Manufacturing	0.050	(0.290)	−0.306	(0.562)
Training intensity [ref. None]				
Under evaluation	0.563*	(0.244)	1.381*	(0.637)
Occasional	0.931**	(0.302)	2.059**	(0.648)
Structured	1.641***	(0.250)	2.035**	(0.657)
Governance [ref. Internal]				
Mixed	0.059	(0.228)	−0.730	(0.457)
External	−0.323	(0.272)	−0.881	(0.656)
Founding era [ref. Pre-2000]				
2000–2009	0.112	(0.243)	0.234	(0.515)
2010+	0.250	(0.217)	−0.648	(0.553)
N	**92**		**92**	

*Source: Author's elaboration. Reference: <10 employees, Services, No training, Internal governance, Pre-2000. † p<.10; * p<.05; ** p<.01; *** p<.001. R^2 / Nagelkerke R^2 0.477/0.275. Adj. R^2 for M1 0.405*

The multivariate results in Table 2 clarify the structure underlying these bivariate associations. Once training intensity and firm size are controlled, the mixed-governance coefficient collapses to near-zero in M1 ($\beta = 0.059$, SE = 0.228, $p = 0.798$). The governance advantage observed bivariately is real but mediated: medium-sized firms are disproportionately likely to adopt mixed governance (72% of 50–249 employee firms versus 32% of micro-enterprises), and training intensity covaries strongly with size. The bivariate governance advantage largely reflects these underlying structural confounds rather than an independent governance effect.

Training intensity emerges as the dominant independent predictor across both M1 and M2, a finding whose stability under parsimonious robustness specifications is documented in Section 3.2. In M1, structured training carries a coefficient of 1.641 (SE = 0.250, $p < 0.001$), representing a difference of approximately 1.7 points on the five-point maturity scale, or roughly 41% of the full scale range, relative to firms with no training programme. In M2, the cumulative proportional odds ratio for occasional training is 7.84 (log-OR = 2.059, $p = 0.001$), and for structured training, 7.66 (log-OR = 2.035, $p = 0.002$), indicating that trained firms are approximately eight times more likely to report a higher level of AI strategic importance than untrained firms, holding all other predictors constant. Post-hoc Dunn analysis reveals a structural discontinuity: the significant contrast is between firms with no training and all firms with any training, regardless of intensity. Firms with occasional and structured programmes do not differ significantly from each other (p.adj = 1.000). The first step, even an ad hoc engagement with digital training, produces the largest marginal return. This threshold pattern is theoretically consistent with the digital self-efficacy mechanism identified in private SME contexts (Malodia et al., 2023): the cognitive barrier to engaging with digital technologies is highest before any training exposure, and the marginal return to subsequent investment diminishes once that initial barrier has been crossed.

4.4 The diagnostic value of M3. M3 yields $R^2 = 0.112$ and adj. $R^2 = -0.010$; no predictor reaches significance. As established in Section 3.1, the ICG is a difference score constructed from variables with asymmetric reliability, making it disproportionately susceptible to measurement noise. The adj. R^2 of −0.010 is consistent with this, and the absence of significant predictors should be read as exploratory and inconclusive rather than as confirmed evidence of no structural effect.

Two features of the output nonetheless merit attention. First, the directional pattern is theoretically coherent: all variables associated with higher maturity in M1, structured training ($\beta = -10.327$), mixed governance ($\beta = -10.062$), and digital-native founding era ($\beta = -13.751$), carry negative coefficients in M3, suggesting a tendency to reduce the gap; intermediate size categories carry positive coefficients. Uniform directional consistency of this kind is not expected under pure noise, and suggests the model may be underpowered rather than genuinely uninformative. Second, no predictor approaches even marginal significance (minimum $p \approx 0.12$), consistent with the hypothesis that the ICG reflects firm-specific dynamics, legacy infrastructure, leadership-level digital awareness, not captured by categorical structural variables. This is presented as an exploratory prompt for future research; policy implications follow in the Discussion.

5. Discussion

5.1 Theoretical interpretation. The findings support a reframing of the AI adoption challenge as a management transformation problem. In line with the conference theme, the results show that readiness for the agentic economy is not reducible to technological adoption; it depends on the reconfiguration of managerial knowledge, governance arrangements and system integration capabilities. First, the Integration Paradox documents a previously unnamed form of adoption barrier that is distinct from both financial constraints and strategic inertia. Firms in our sample are not resistant to AI, they actively desire it, with a mean AI strategic importance of 3.22 on a five-point scale and 68% exhibiting positive ICG. Their aspirational trajectory is blocked not by unwillingness but by infrastructural insufficiency: the most desired AI application category is also the most organisationally demanding. This extends Cohen and Levinthal's (1990) absorptive capacity framework to the specific architectural requirements of agentic AI; firms cannot realise value from systems they cannot integrate. The Integration Paradox is therefore the paper's central theoretical contribution to the conference theme. It shows that, in the post-globalisation and agentic economy, business model reinvention is not blocked primarily by the absence of AI tools, but by the absence of the organisational architecture that allows intelligent systems to act across processes, functions and boundaries. Fragmented value chains and volatile coordination demands increase the strategic value of agentic AI. However, these benefits become actionable only when firms possess integrated data flows, interoperable processes and governance routines capable of connecting human and algorithmic decision-making. The connection to Rothschild et al. (2025), Tan and Huang (2025), and Huang (2025) is therefore not only technological but managerial: while these contributions frame the agentic economy mainly at the level of market interactions and AI-agent architectures, the present paper translates that framework inside the firm, showing that SME participation in the agentic economy depends on system integration as a precondition for business model reinvention. This translation from an external market-interaction theory to an internal operational theory is an original theoretical bridge: it implies that participation in the agentic economy is gated not only by strategic intent, but by the underlying infrastructure of intra-firm data connectivity.

Second, the training threshold finding contributes to the dynamic capabilities literature (Teece et al., 1997; Warner and Wäger, 2019) by identifying the knowledge micro-foundation of digital capability in SMEs. Dynamic capabilities are typically conceptualised at the organisational level; our data suggest that in the SME context, where formal IT functions

are absent and technology decisions rest on a small number of individuals, the binding constraint is the knowledge and cognitive capacity of those individuals. Empirical evidence from private SME contexts consistently confirms this mechanism: digital self-efficacy, the accumulated technological knowledge of the owner-manager, directly shapes both technology assessments and adoption trajectories, with professionally led SMEs significantly outperforming on digital transformation outcomes (Malodia et al., 2023). In Italian SME settings specifically, intellectual capital and human capital endowments have been shown to be the dominant determinants of digital maturity, with knowledge-based management practices mediating the relationship between individual competence and organisational digital outcomes (Tortora et al., 2024). This dynamic differs from technology adoption in public-sector organisations, where institutional mandates and bureaucratic incentives intervene between individual attitudes and organisational behaviour (Giraldi et al., 2024); in private micro-enterprises, there is no such organisational buffer. Our finding adds a structural discontinuity to this theoretical picture: it is the transition from no training to any training that matters most, not the subsequent intensity of investment. This lowers the barrier for action for resource-constrained micro-enterprises and implies that the marginal return to a first, modest training initiative is substantially larger than the marginal return to scaling up an existing programme.

Third, the governance mediation finding clarifies a frequently cited but under-specified relationship in the SME digitalisation literature. Mixed governance is positively associated with digital maturity and system integration in bivariate analysis, a result consistent with theoretical predictions about hybrid knowledge structures (Cohen and Levinthal, 1990). However, this advantage disappears in multivariate models once size and training are controlled. The implication is that the governance model is not an independent lever: its effect is contingent on the organisational knowledge base it operates on. Firms that build internal knowledge through training and cross the organisational complexity threshold associated with medium size naturally tend toward mixed governance, not the other way around. Governance follows capability; it does not precede it.

Finally, the exploratory null result in M3, whose directional coherence and psychometric limitations are documented in Section 4.4, is consistent with the hypothesis that the ICG reflects strategic and cognitive dynamics varying as a function of firm-specific legacy infrastructure and accumulated digital architecture rather than class-level structural characteristics. This implies that population-level benchmarks and categorical incentive schemes are insufficient guides for AI readiness on their own: what is needed, in addition to broad-based training and financial instruments, is a diagnostic layer that assesses individual firms' integration gaps before prescribing investment pathways.

Research limitations. Four limitations qualify the interpretation of these findings. First, the sample is non-probabilistic, over-represents service-sector and underestimates micro-enterprise firms; generalisations to manufacturing-intensive regions or the broader Italian SME population require caution. Second, the governance variable shows approximately 25% item non-response due to the branching structure of the questionnaire, reducing the multivariate sample to N = 92 and potentially introducing selection bias. Third, digital maturity is self-assessed; social-desirability bias may compress variance and attenuate true associations. The ICG computation further inherits this measurement uncertainty: all ICG-based findings should be treated as exploratory. Fourth, the cross-sectional design precludes causal inference: the training-maturity association is consistent with both a capability-building interpretation and reverse causality.

The study does not directly measure post-globalisation pressures, business model change, ecosystem positioning or organisational well-being. Its contribution is therefore to identify a readiness condition for agentic business model reinvention, rather than to observe reinvention outcomes directly. Future research should connect ICG measures to longitudinal evidence on business model redesign, supply-chain reconfiguration, organisational resilience and well-being.

Managerial implications and Policy implications. A practical implementation sequence follows from the findings: first, conduct a firm-level integration diagnostic; second, activate low-threshold AI and digital training even before large-scale investment; third, develop hybrid governance arrangements in which external expertise works alongside internal managerial learning; fourth, pilot agentic use cases only where data flows and process ownership are sufficiently integrated. System integration is not a downstream concern to be addressed after AI tools have been selected; it is an upstream prerequisite that determines which AI tools will generate value at the agentic level. Firms currently at partial integration (62% of our sample) should treat the transition to high integration as the primary infrastructure investment before expanding their AI tool portfolio. The exploratory M3 result, where no structural predictor significantly explains the ICG, is consistent with the interpretation that the technical requirements of system integration vary considerably depending on each firm’s legacy infrastructure, historical technology choices, and operational architecture. If this interpretation holds, it implies that sector or size benchmarks alone are insufficient guides for AI readiness assessment: each firm requires a firm-specific diagnostic of its integration gaps and connectivity barriers before a meaningful AI investment roadmap can be designed.

The training threshold finding offers an actionable message for resource-constrained micro-enterprises. The data show that the largest marginal return to training occurs at the first step; any engagement with digital or AI training substantially raises both digital maturity and AI strategic awareness relative to firms with no training at all. The distinction between occasional and structured programmes is not statistically significant. This lowers the barrier for action: a modest, informal training initiative produces organisational returns comparable to a structured programme in this sample.

For policymakers, the findings suggest that AI support schemes should move beyond generic technology subsidies toward capability-building instruments that combine integration assessment, managerial training and hybrid advisory support. This is especially important for micro and small firms, where the first step into training produces the largest marginal benefit.

Originality of the paper. The originality of the paper lies in translating the agentic economy from a broad technological and market-level scenario into a measurable managerial readiness problem at the firm level. This paper offers three distinct original contributions. First, it proposes a novel quantitative operationalisation of the Intention-Capability Gap (ICG) as a reproducible, firm-level diagnostic construct calibrated to the architectural demands of the agentic AI transition. The conceptual terrain of intention-capability gaps is not new: UTAUT-based research has identified and formalised analogous constructs, showing, for instance, how external shocks can decouple behavioural intention from actual technology use when infrastructure and digital literacy gaps intervene (Ranatarisza et al., 2025). What the present paper contributes is not the conceptual invention of the gap itself. However, its specific quantitative operationalisation, a signed, normalised measure on a [−100, +100] scale, is applied to the novel context of SME readiness for agentic AI. Unlike adoption measures (which capture only the presence or absence of AI tools) or maturity indices (which capture capability without reference to strategic intent), the ICG is a measure of strategic positioning relative to the agentic transition.

Second, the paper identifies the Integration Paradox, the systematic co-occurrence of high demand for operational-efficiency AI benefits and low system integration, as a named empirical phenomenon in Italian SMEs. This paradox has not been previously documented in the Italian context and has significant implications for how AI adoption support programmes are designed. The paradox implies that the most desired AI application category is also the most organisationally demanding: it cannot be resolved by tool availability or financial subsidy alone.

Third, the paper makes a methodological contribution through the exploratory null result in M3: no observable structural predictor significantly explains the ICG. This is presented not as proof of absence but as a suggestive pattern pointing toward firm-level architectural heterogeneity, a form of variation that categorical policy instruments cannot adequately capture on their own, and that calls for diagnostic approaches alongside broad-based diffusion instruments. The paper thus contributes to a broader conversation about the governance and capability architecture of the emerging agentic economy.

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Allocazione delle risorse, modalità di governance ed esiti cooperativi: coopetizione versus cooperazione nell'industria vinicola

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Abstract: *La ricerca sulla coopetizione, ancorché copiosa, si è prevalentemente concentrata sulle relazioni diadiche, ossia le relazioni interimpresa che coinvolgono due rivali orientati a collaborare su attività circoscritte, sia temporalmente, sia nei contenuti dell'accordo, (*project-based*). Più recentemente, sia il mondo accademico, sia il mondo delle imprese hanno sottolineato come la coopetizione multilaterale presenti interessanti opportunità, riconoscendone al contempo le peculiarità legate al numero degli attori coinvolti e alla durata della relazione che, diversamente dalla coopetizione diadica, non si esaurisce necessariamente con l'uscita di uno dei soci dell'accordo. Questo lavoro si propone di indagare in che modo le imprese coinvolte in relazioni di multilateral coopetition mantengano l'impegno collettivo pur disponendo, sia dell'autonomia necessaria per affrontare la competizione con gli altri concorrenti, sia dell'opzione di uscita, riconducibile alla possibilità di disimpegnarsi parzialmente o totalmente dall'accordo. Muovendo dall'analisi di tre cooperative vitivinicole, il lavoro confronta diverse modalità di governance collegate alla coopetition multilaterale. Nello specifico, l'analisi rileva la presenza di tre distinti modelli di governance: uno basato sulla pura collaborazione, uno sulla piena esclusività dei soci alla multilateral coopetition e uno sull'esclusività parziale. In quest'ultima forma di governance, i soci dell'accordo multilaterale mantengono la propria autonomia, preservando al contempo l'impegno a permanere nella coopetizione multilaterale. In tal modo, il lavoro propone una nuova forma di coopetizione — la* collective coopetition *— in cui la competizione tra i soci favorisce i risultati collettivi. Il contributo alla ricerca sulla coopetizione consiste nell'avanzamento della teoria sulla coopetizione multilaterale e nella dimostrazione di come le modalità di governance rendano possibile una collaborazione piena e duratura tra competitor.*
Parole chiave: *coopetizione; cooperazione; allocazione delle risorse; modalità di governance; cooperative vinicole; avversione alla perdita*

Inquadramento della ricerca. *Gli studi di strategia hanno tradizionalmente affrontato il tema della rivalità interimpresa considerando la competizione come la principale leva strategica e la cooperazione come una forma — implicita o esplicita — di collusione capace di ridurre, anziché accrescere, il benessere economico collettivo (Hoffmann et al., 2018). Il crescente coinvolgimento delle imprese in relazioni cooperative — anche con imprese concorrenti (Hamel, 1991; Lado, Boyd & Hanlon, 1997) — ha tuttavia fatto emergere la coopetition (Brandenburger & Nalebuff, 2021; Bengtsson & Kock, 2000). In coopetition le imprese collaborano e competono con i propri rivali per condividere risorse complementari e perseguire benefici collettivi, a condizione che la relazione sia adeguatamente gestita (Kostis et al., 2024). Poiché la scelta di cooperare non annulla l'intento competitivo verso il partner (Lorange & Roos, 1991; Hamel, 1991), la presenza di meccanismi di salvaguardia è essenziale per contenere e gestire le tensioni legate a comportamenti opportunistici e alla naturale tendenza a far prevalere l'interesse individuale su quello collettivo (Kale, Singh & Perlmutter, 2000; Khanna, Gulati & Nohria, 1998).*

La letteratura sul tema della coopetition ancorché copiosa, si è prevalentemente concentrata sulle relazioni diadiche, temporanee o project-based (Gnyawali & Park, 2011; Bengtsson & Kock, 2014; Raza-Ullah et al., 2020). Nei fatti la coopetition multilaterale — intesa come la simultanea cooperazione e competizione tra più di due competitor — pone invece sfide qualitativamente differenti (Rouyre et al., 2024), in gran parte riconducibili al crescente numero di attori coinvolti, che intensifica la rivalità, accresce la complessità nella gestione delle complementarità e innalza i costi di coordinamento (Chiambaretto et al., 2020; Lazzarini, 2007). Inoltre, nella multilateral coopetition *l'ingresso o l'uscita di singoli soci non dissolve necessariamente la relazione: le imprese possono disimpegnarsi parzialmente, riallocare risorse o adottare comportamenti opportunistici senza uscire formalmente dall'accordo. Segue l'emergere di nuove riconfigurazioni di* multilateral coopetition *dove la creazione di valore e la distribuzione dei benefici e dei rischi avviene tra le imprese rimanenti (Raza-Ullah et al., 2023) e dove i risultati collettivi, in termini di standard qualitativi, traiettorie innovative, posizionamento settoriale, dipendono dalla partecipazione continua di molteplici competitor.*

Nonostante il crescente interesse dell'accademia a comprendere come funzionano le multilateral coopetition*, e la crescente rilevanza empirica in diversi settori, resta irrisolta una questione centrale: cosa rende il commitment nella multilateral coopetition quando le imprese possono mantenere sia l'autonomia, sia le opzioni di uscita dall'accordo.*

La letteratura di governance interimpresa enfatizza i contratti formali e i meccanismi di controllo e di allineamento degli incentivi per ridurre l'opportunismo tra i soci (Cao & Lumineau, 2015; Gulati et al., 2012; Williamson, 1979). Sebbene rilevanti, questi meccanismi non sono pienamente consistenti con la coopetizione multilaterale, dove by design, i soci hanno autonomia decisionale e dove, di conseguenza, la governance definisce il modo in cui le imprese percepiscono autonomia, rischio e opportunità, orientandone la partecipazione continuativa verso un esito percepito come vincolante, rischioso o strategicamente vantaggioso (Doz, 2019; Raza-Ullah et al., 2024).

Obiettivo del paper. *Questo lavoro esplora in che modo le imprese in multilateral coopetition hanno interesse a mantenere l'impegno collettivo pur disponendo dell'autonomia necessaria a competere con gli altri concorrenti e ad esercitare l'opzione di uscita dall'accordo potendo, dunque, disimpegnarsi parzialmente o totalmente.*

La letteratura esistente evidenzia una dicotomia tra due forme di governance: una non-esclusiva — che preserva l'autonomia a scapito del commitment — ed una, formalmente esclusiva— che garantisce il commitment sopprimendo l'iniziativa competitiva (Bresser, 1988; Birchall, 2011; Chaddad & Cook, 2004). Muovendo dall'analisi di tre cooperative europee operanti sotto diversi assetti di governance cooperativa e competitiva, lo studio intende superare tale dicotomia presente in letteratura proponendo una terza modalità alternativa, definita 'soft exclusivity'*, capace di preservare l'autonomia individuale e commitment collettivo all'interno della multilateral coopetition. La* soft exclusivity*, non impone l'allocazione totale delle risorse ai soci tramite regole vincolanti cosi come non si affida a una partecipazione volontaria priva di salvaguardie, ma sostiene il commitment attraverso incentivi, servizi a valore aggiunto e allineamento volontario, consentendo ai soci di restare legalmente liberi e al contempo avere interesse strategico per una partecipazione continuativa alla cooperativa.*

Lo studio in parola intende offrire tre contributi principali. Primo, si avanza la ricerca sulla coopetizione multilaterale spiegando come il commitment collettivo possa essere sostenuto tra molteplici competitor senza ricorrere né alla piena esclusività né al puro coordinamento di mercato. Secondo, si introduce il concetto di collective coopetition, in cui cooperazione e competizione sono strutturalmente embedded nella governance di un assetto collettivo, anziché bilanciate esternamente. Terzo, si mostra come le modalità di governance plasmino autonomia percepita, costi opportunità e rischio, influendo sulla volontà delle imprese di restare impegnate nella coopetizione multilaterale.

Metodologia. *La natura esplorativa della domanda di ricerca suggerisce l'adozione del metodo dei casi studio (Yin, 2009) con un approccio comparativo (Eisenhardt,1989, 2021) tra tre cooperative vinicole operanti in Francia, Germania e Italia e fondate alla fine degli anni '50. La selezione dei casi rientra nel processo di campionamento teorico tesa a consentire la replicazione analitica - attraverso governance mode distinte nelle politiche di esclusività delle scelte di allocazione delle risorse tra i soci - piuttosto che consentire una generalizzazione statistica (Eisenhardt e Graebner, 2007). Segue come la scelta è coerente con l'obiettivo euristico di comprendere il ruolo della governance e delle decisioni di allocazione delle risorse in multilateral coopetition.*

Le cooperative vitivinicole rappresentano un contesto empirico particolarmente privilegiato. Accordi cooperativi possono riguardare, sia aspetti collegati all'adozione di policy sulla sostenibilità e adattamento climatico (Christ et al., 2017), sia aspetti più strettamente collegati alla produzione, al marketing e alla etichettatura territoriale (Chetty e Wilson, 2003; Taplin, 2010). Le differenti dotazioni dei soci delle cooperative si traducono in differenti benefici e limiti per gli aderenti alle cooperative, acuendo, dunque la necessità di una governance che sia equa e strategicamente coerente (Lazzarini, 2007). La coopetizione verticale multilaterale si configura come una forma di interdipendenza dove la creazione di un common dipende dal continuo e significativo apporto di ciascun socio, nella consapevolezza che l'ingresso, l'uscita e il disimpegno parziale di ciascuno ridefinisce — piuttosto che dissolvere — l'assetto complessivo della cooperativa. Le cooperative vitivinicole mettono a fuoco queste dinamiche in un contesto istituzionalizzato: i soci cooperano come fornitori nei confronti della cooperativa, ma possono agire anche come competitor, sia nei confronti della cooperativa, sia tra di loro nei mercati a valle (Couderc & Marchini, 2011; DiVito & Sharma, 2019). Ciascun socio mantiene autonomia legale e discrezionalità nelle scelte di allocazione delle uve, tra produzione propria e conferimento alla cooperativa. In regime di piena esclusività, i soci conferiscono tutta l'uva alla cooperativa, eliminando di fatto la competizione sul mercato; in regime di non-esclusività, i soci allocano solo una parte della produzione, generando una situazione di coopetition continua. Queste caratteristiche rendono le cooperative un caso analiticamente appropriato per studiare come la governance sostenga la coopetizione multilaterale nel tempo.

La raccolta dei dati è avvenuta tramite interviste con i soci delle cooperative e con i membri dei consigli di amministrazione delle cooperative stesse. Le interviste sono state condotte nel triennio 2022-2025; Il dataset complessivo ammonta a 38 interviste di durata minima di 30 minuti, supportato da materiale opportunamente registrato e trascritto.

Risultati. *Dalla ricerca emergono alcuni risultati interessanti, sia in merito alle forme di governance della* multilateral coopetition*, sia rispetto ai meccanismi che ne sostengono il funzionamento. Un primo dato mette in discussione la visione ottimista della coopetition come riportato dalla letteratura, secondo cui la condivisione delle risorse in coopetition generi benefici reciproci per tutti i partner (Lechner et al., 2019). Lo studio evidenzia come, nelle cooperative non esclusive, i partner tendono a trattenere le uve di qualità superiore per produrre il proprio vino, conferendo quelle di qualità inferiore alla cooperativa. La realizzazione di benefici privati prevale dunque sullo sviluppo di benefici comuni, ed è in questo quadro che le modalità di governance assumono un ruolo discriminante.*

L'analisi identifica tre pattern distinti. Il primo, pure exclusivity*, si fonda su un sistema di incentivi che scoraggia l'uscita e promuove la* retention *attraverso prezzi competitivi, condizioni di pagamento affidabili, accesso a competenze tecniche e infrastrutture condivise, rendendo il conferimento esclusivo delle uve l'opzione più vantaggiosa per i soci. Il secondo,* soft exclusivity*, si basa su un modello orientato ai servizi — assistenza tecnica, supporto alla qualità, logistica e accesso al mercato — per accrescere il commitment volontario senza imporre esclusività formale: i soci restano legalmente liberi di uscire o diversificare, ma sono incentivati ad allocare le migliori risorse al collettivo.*

Il terzo, collective coopetition*, prevede che i soci agiscano come partner attivi, condividendo best practice e specializzandosi per ottimizzare le complementarità del prodotto finale. Questa specializzazione alimenta una*

competizione interna per un riconoscimento qualitativo più elevato, generando un ciclo virtuoso in cui cooperazione e competizione coesistono all'interno del collettivo. Contrariamente alla letteratura che assegna alla fiducia un ruolo centrale, lo studio rivela che in due modalità di governance (esclusività e non-esclusività) è l'avversione alla perdita, non la fiducia, a trattenere i soci. La soft exclusivity*, riducendo strategicamente i rischi percepiti e offrendo costantemente prezzi elevati e servizi premium, allinea gli incentivi individuali al commitment collettivo senza fare affidamento sulla fiducia interpersonale.*

Limiti della ricerca. *I risultati potrebbero essere condizionati dal fatto che i casi studiati interessano cooperative che operano in regioni considerate di alta qualità per la produzione vinicola. Segue come i produttori potrebbero già beneficiare di vantaggi comuni che non richiedono sforzi collaborativi. Inoltre, l'analisi non tiene in considerazione le peculiarità di dotazione di risorse dei singoli soci che possono, dunque, condizionare la valutazione della modalità di governance che prevedere il conferimento esclusivo, o non esclusivo delle uve alla cooperativa.*

La ricerca case study non ha l'ambizione della generalizzabilità: le conclusioni possono essere tratte solo dal caso alla teoria. Sebbene i risultati sul commitment nella coopetition verticale multilaterale siano centrati sulle cooperative vinicole, possono essere estesi a cooperative similmente orientate, specialmente nelle industrie globali food and beverage. Analogamente, le cooperative nel retail, come nell'hardware, articoli sportivi e turismo, affrontano questioni comparabili. Sebbene la discussione evidenzia, dunque, alcune specificità del settore vinicolo, in particolare il ruolo delle connessioni territoriali che vincolano i produttori alla loro cooperativa, limitando le alternative strategiche, studi specifici in altri settori potrebbero estendere la ricerca. Il settore retail, in generale, è soggetto a questioni coopetitive simili: ad esempio, nel settore dell'abbigliamento e nel business della moda, i franchisee locali competono con i flagship store degli stessi brand pur essendo entrambi collegati alla stessa impresa capofila detentrice del brand.

Un ulteriore percorso per la ricerca futura riguarda i meccanismi socio-cognitivi che sono emersi dalla nostra analisi dei casi come concetti promettenti. Concetti come l'identificazione collettiva, l'identità e l'allineamento degli obiettivi possono costituire micro-fondamenta del commitment sostenuto in assetti multilaterali.

Implicazioni manageriali. *Lo studio presenta implicazioni che si estendono oltre i confini del settore vitivinicolo. Sul piano manageriale, contribuiamo al dibattito su trigger, processi e outcome della coopetizione (Bengtsson & Raza-Ullah, 2016; Minà & Dagnino, 2025) distinguendo tra strutture di governance formali — come i contratti di esclusività — e meccanismi di allineamento degli incentivi — come prezzi competitivi e servizi superiori. Le strutture formali assicurano il commitment delle risorse, ma possono inibire il coinvolgimento attivo dei soci delle cooperative; i meccanismi di incentivo, al contrario, conseguono risultati analoghi preservando l'autonomia percepita dei soci. Per chi gestisce le cooperative e la rete, investire in servizi a valore aggiunto e in sistemi di incentivazione può rivelarsi più efficace rispetto ad imporre vincoli contrattuali nel sostenere una partecipazione di qualità nel lungo periodo.*
Più in generale, il lavoro consente le seguenti implicazioni manageriali collegate a come gli attori decidano l'allocazione di risorse simili e che differiscono per livello di qualità e complementarità, scegliendo tra uso proprietario e uso collaborativo in funzione della modalità di governance. Questa impostazione è comune ad altri fenomeni rilevanti, sia in ambito pubblico sia privato. Si considerino, a titolo di esempio, i regimi di proprietà intellettuale che disciplinano le invenzioni universitarie: nei paesi in cui è ammesso il professor privilege*, la proprietà intellettuale è riconosciuta al ricercatore, che può decidere se sfruttare il brevetto in proprio o concederlo al* patent pool *di ateneo (Martínez & Sterzi, 2021). Vi sono evidenze in università europee che hanno dissolto i propri pool di brevetti proprio sotto questo regime, a riprova di come l'assenza di meccanismi di governance adeguati comprometta l'allocazione collaborativa delle risorse. A livello micro, la questione si applica anche alle alleanze di R&S tra concorrenti: un aspetto finora trascurato riguarda quali dipendenti vengano effettivamente allocati — scienziati di punta o ricercatori junior — e come tale scelta sia condizionata dalla governance dell'alleanza (Walter et al., 2015). La ricerca rappresenta dunque un primo passo nell'indagine di una questione più ampia e trasversale: come le decisioni di allocazione delle risorse nelle relazioni coopetitive siano plasmate da forme differenti di governance.*

Originalità del lavoro. *Lo studio fornisce tre contributi principali. In primo luogo, il lavoro consente di arricchire il dibattito emergente sulla coopetition multilaterale spiegando come il commitment collettivo possa essere sostenuto tra molteplici competitor senza ricorrere né alla piena esclusività né al puro coordinamento di mercato. Secondo, il lavoro introduce il concetto di* collective coopetition *come forma avanzata di relazione interimpresa dove cooperazione e competizione sono strutturalmente* embedded *nella governance di un assetto collettivo basato sulle complementarità collettive dei soci e sulla crescente specializzazione. Questa prospettiva estende il lavoro precedente sulle tensioni sottese alla coopetition (Bengtsson et al., 2016; Kostis et al., 2024) spostando l'attenzione dalla gestione delle tensioni relazionali tra competizione e cooperazione a uno* strategizing *collettivo abilitato dalla governance tra molteplici competitor. La* collective coopetition *consente di fare leva sulle tensioni per stimolare cooperazione e competizione sana attraverso la specializzazione. Terzo, il lavoro contribuisce alla comprensione dei meccanismi che favoriscono la cooperazione tra rivali, dove la fiducia non è una condizione necessaria per spiegare l'engagement, mentre l'avversione alla perdita emerge come meccanismo prevalente (*Kahneman & Tversky, 1979, 1992).

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Anticipatory Governance in Action: Reframing Organizational Adequacy as a Strategic Infrastructure for Early Risk Detection

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Abstract. *Firms increasingly operate under conditions of systemic uncertainty, requiring organizational architectures capable of anticipating and managing emerging risks. This paper reconceptualizes organizational adequacy as an anticipatory governance infrastructure, shifting the focus from compliance-based structures to dynamic systems enabling early risk detection. Adopting an exploratory sequential mixed-methods design, the study integrates qualitative insights with panel data analysis on Italian firms. The findings show that organizational adequacy, captured through governance, structural, and information-system variables, significantly enhances financial stability and reduces distress probability. In particular, information-processing mechanisms emerge as the primary drivers of anticipatory capacity. The study contributes by introducing the notion of anticipatory organizational architecture and offers managerial implications for designing organizations capable of detecting weak signals and sustaining performance in uncertain environments.*
Keywords: *anticipatory governance; organizational adequacy; risk management; financial distress*.

Framing of the research. *Contemporary firms operate within increasingly complex and non-linear environments characterized by persistent uncertainty, institutional plurality, and systemic interdependence. The progressive erosion of stable competitive equilibria and the emergence of continuous disruption have then shifted the locus of strategic advantage from external positioning toward the internal capacity of organizations to process information, anticipate discontinuities, and sustain adaptive responses over time (Gutterman, 2023). Within this context, the design of internal organizational arrangements assumes a central role, not merely as a mechanism of coordination, but as a foundational infrastructure for managing uncertainty and ensuring organizational continuity (Stanikzai and Mittal, 2025). The literature on organizational design has long emphasized that structure constitutes a critical lever through which firms align internal processes with strategic objectives (Chandler, 1962). Organizational structures define the allocation of responsibilities, the distribution of authority, and the architecture of information flows, thereby shaping the organization's ability to coordinate activities and respond to environmental contingencies (Volpe and Vagnani, 2014; Luciano et al., 2026). In particular, the balance between differentiation and integration has been identified as a key design challenge, as it determines the extent to which organizations can simultaneously exploit specialized capabilities and maintain coherence across units (Lawrence and Lorsch, 1967; Goold and Campbell, 2002). However, while this stream of research has extensively explored the relationship between structure and performance, it has predominantly focused on efficiency, coordination, and strategic alignment, leaving relatively underdeveloped the role of organizational architecture in enabling anticipatory capabilities and early detection of systemic risks (Weick, 1993).*

Parallel developments in corporate governance and risk management have partially addressed these issues, yet remain conceptually fragmented. The corporate governance literature, in fact, has traditionally focused on monitoring mechanisms, board composition, and agency cost reduction (Jensen and Meckling, 1976; Fama and Jensen, 1983), with limited attention to the internal organizational infrastructures through which risk signals are generated and interpreted. Similarly, enterprise risk management frameworks have emphasized formalized processes for identifying and controlling risk exposures, often neglecting the broader organizational context that enables or constrains the effective interpretation and escalation of risk-related information (Weick and Sutcliffe, 2015). As a result, existing research provides only a partial understanding of how internal organizational arrangements contribute to the firm's capacity to anticipate and manage emerging instability.

This theoretical gap becomes particularly salient in light of recent regulatory developments at both the European and national levels, which have progressively expanded the scope of corporate governance from ex-post control toward ex-ante risk detection and organizational resilience. Within the European context, directives and regulatory frameworks increasingly emphasize the importance of internal control systems, risk governance, and organizational accountability as key pillars of financial stability and sustainable corporate conduct. In Italy, this evolution has been formalized through the introduction of the requirement for adeguati assetti organizzativi, amministrativi e contabili, which explicitly mandates firms to adopt organizational arrangements capable of ensuring timely detection of crisis signals and preservation of business continuity. This regulatory shift reflects a deeper transformation in the conceptualization of governance, whereby organizational design is no longer viewed solely as an efficiency-enhancing mechanism, but as a legally embedded infrastructure for anticipatory risk management and strategic continuity.

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However, despite its growing practical and normative relevance, the concept of organizational adequacy remains theoretically underexplored within management studies. Existing contributions have addressed related dimensions, such as internal control systems and organizational design, but have rarely integrated these perspectives into a coherent framework linking organizational architecture with crisis detection capabilities. In particular, there is a lack of theoretical models that explain how governance structures, information systems, and decision-making processes jointly enable the continuous generation, interpretation, and escalation of weak signals within the firm.

Recent advancements in digitalization and artificial intelligence (AI) further amplify the relevance of this issue. As decision-making processes become increasingly mediated by algorithmic systems, the effectiveness of organizational governance depends not only on data availability, but also on the interpretability, transparency, and controllability of information flows (Raisch and Krakowski, 2021; Brynjolfsson and McAfee, 2014; Raisch and Krakowski, 2021). Emerging research highlights that organizational resilience in data-intensive environments is contingent upon the integration of technological capabilities with governance mechanisms that ensure meaningful human oversight and ethical accountability (Mikalef et al., 2022; Zhang and Sun, 2023). In this perspective, interpretability emerges as a critical governance capability linking technological compliance with cognitive and organizational resilience (Albert et al., 2026). Building on these theoretical premises, this study argues that the notion of organizational adequacy cannot be satisfactorily captured within existing frameworks of corporate governance, organizational design, or risk management when considered in isolation. This fragmentation results in a critical blind spot: the absence of a unifying conceptualization of the firm as an anticipatory system, in which governance structures and decision processes are jointly configured to enable early warning and adaptive response. The core theoretical contribution of this study then lies in shifting the focus from governance as control to governance as organized sensemaking under uncertainty. Specifically, the paper introduces the concept of anticipatory organizational architecture, defined as the integrated configuration of structural arrangements, information systems, and decision protocols that enable the continuous generation, interpretation, and escalation of weak signals related to financial and strategic risk.

Purpose of the paper. *This paper aims to develop and empirically ground a novel conceptualization of organizational adequacy as an anticipatory governance infrastructure, capable of enabling firms to detect, interpret, and respond to emerging financial and strategic risks under conditions of systemic uncertainty. Moving beyond compliance-based and static interpretations of organizational arrangements, the study then seeks to reposition internal organizational design as a central mechanism through which firms build early-warning capabilities and sustain adaptive performance.*

Specifically, the paper pursues two interrelated objectives. First, it develops a theoretically integrated framework that connects organizational design, corporate governance, and risk management into a unified perspective centered on anticipation, information processing, and adaptive decision-making. Second, it empirically investigates how different configurations of internal organizational arrangements influence firms' ability to maintain financial stability and detect early signals of distress. In doing so, the study introduces and operationalizes the concept of anticipatory organizational architecture. This perspective shifts the focus from ex-post control and structural alignment toward a dynamic understanding of organizations as systems designed to process uncertainty and enable timely intervention (Tarafdar et al., 2019). The paper contributes to the literature by advancing a theoretically and empirically grounded framework that extends existing approaches in three fundamental ways. First, it expands organizational design theory by moving beyond the classical "structure–strategy fit" paradigm and introducing the notion of structure–uncertainty fit, whereby organizational effectiveness depends on the ability of internal architectures to process ambiguity and detect emerging disruptions, rather than merely execute predefined strategies. Second, it enriches corporate governance literature by repositioning governance mechanisms from ex-post monitoring devices to ex-ante cognitive infrastructures, capable of shaping how organizations perceive and interpret risk before it materializes. Third, it contributes to the literature on risk management by embedding risk detection within the broader organizational context, demonstrating that early-warning capabilities are not solely the outcome of formal risk systems, but emerge from the interaction between governance structures, information flows, and organizational routines. Building on this conceptual foundation, the paper then addresses the following research questions (RQs):

- *RQ1: How can organizational adequacy be conceptualized as an anticipatory governance infrastructure enabling firms to detect early signals of risk under uncertainty?*
- *RQ2: How do different configurations of organizational arrangements influence firms' capacity for early risk detection and financial stability?*

Methodology. *This on-going study adopts an exploratory sequential mixed-methods design (qual → QUAN), in line with established methodological frameworks for integrating theory-building and empirical testing (Creswell and Plano Clark, 2018; Edmonds and Kennedy, 2017). This design is particularly appropriate when investigating complex and under-theorized phenomena, as it allows the researcher to first inductively identify key dimensions of the construct and subsequently test their empirical relevance (Yin, 2018). The choice of a mixed-methods approach is motivated by three main considerations. First, organizational adequacy, as conceptualized in this study, represents a multidimensional and partially latent construct that cannot be directly observed through quantitative proxies alone. Second, the literature highlights the need for integrative approaches capable of linking organizational, governance, and financial dimensions without relying on purely causal inference. Third, prior research demonstrates that firm-level financial indicators provide*

meaningful signals of organizational conditions and performance, particularly in the context of financial distress and stability (Altman et al., 2017; Barboza et al., 2017).

Accordingly, the research design consists of two sequential phases. The qualitative phase aims to identify and theoretically structure the key dimensions of organizational adequacy, while the quantitative phase tests their relationship with firm-level financial stability and early distress signals. This sequential logic ensures both construct validity and empirical robustness, allowing qualitative insights to inform the operationalization of variables used in the econometric analysis. To ensure consistency across phases, both qualitative and quantitative analyses are grounded in a common empirical domain, focusing on firms operating within a comparable institutional and regulatory environment. This alignment minimizes inferential incongruity between datasets and enhances the interpretability of results (Edmonds and Kennedy, 2019).

Qualitative phase. *The qualitative phase adopts a multiple case study design, which is particularly suitable for theory building in contexts characterized by limited prior conceptualization (Yin, 2018). Case selection followed a theoretical sampling logic, aimed at maximizing variation in organizational configurations, governance structures, and exposure to financial stress. The sample includes firms differing in size, ownership structure, and organizational complexity, allowing both literal and theoretical replication. Data collection involved multiple sources to ensure triangulation and enhance internal validity (Eisenhardt, 1989). Specifically, the analysis draws on:*

- *semi-structured interviews with senior managers, financial officers, restructuring advisors, and governance experts*
- *internal governance documentation, including reporting systems, planning documents, and risk management procedures*
- *publicly available financial disclosures and organizational reports*

Interviews were conducted using a semi-structured protocol focusing on governance mechanisms, information flows, financial monitoring practices, and decision-making processes under conditions of uncertainty. Each interview lasted between 60 and 90 minutes and was transcribed for analysis. Qualitative data were analyzed using thematic coding and pattern-matching techniques, following established qualitative analysis procedures (Yin, 2018). This process led to the identification of four recurrent dimensions of organizational adequacy:

- *governance architecture and accountability mechanisms;*
- *financial monitoring and forecasting systems;*
- *strategic planning and risk assessment processes;*
- *information transparency and reporting infrastructures.*

These dimensions form the basis for the operationalization of organizational adequacy in the quantitative phase (Kroll et al., 2016).

Quantitative phase. *The quantitative phase examines the relationship between organizational adequacy and financial stability using firm-level panel data. The dataset was constructed using the AIDA database (Bureau van Dijk), which provides standardized financial information for Italian firms. The initial dataset included firms operating across multiple sectors, with the aim of capturing heterogeneity in organizational structures. Selection criteria were defined to ensure data reliability and comparability, including:*

- *availability of complete financial statements for at least five consecutive years*
- *active operational status*
- *exclusion of firms in regulated financial industries*

After data cleaning and validation, the final dataset includes approximately 1,000 firms, corresponding to over 5,000 firm-year observations across the period 2018–2024. Multi-year observations were used to reduce idiosyncratic fluctuations and enhance the stability of financial indicators.

Variables and empirical specification

Financial stability, as the dependent construct of the study, is operationalized through a multidimensional set of indicators widely adopted in the financial diagnostics and distress prediction literature (Altman et al., 2017; Wang, 2017) (Table 1).

In line with prior empirical contributions, the construct is captured through a combination of profitability, leverage, and solvency proxies that jointly reflect the firm's ability to sustain its financial obligations over time. Specifically, the Interest Coverage Ratio (EBIT/Interest Expenses) is employed as a primary measure of operating sustainability, complemented by leverage-based indicators such as Debt-to-Equity and Debt-to-EBITDA ratios, which capture the firm's capital structure and debt sustainability. In addition, forward-looking proxies of default risk derived from financial ratios are incorporated to account for the probabilistic dimension of financial distress.

The key independent construct, organizational adequacy, is not directly observable and is therefore operationalized through a set of structural and governance-related proxy variables derived from the qualitative phase of the research. These proxies are designed to capture the multidimensional nature of internal organizational arrangements as theorized in the conceptual framework. In particular, governance-related variables include board size, the proportion of independent directors, and the presence of formal supervisory or control bodies, reflecting the firm's monitoring and oversight capacity. Organizational structure variables capture the internal allocation of managerial responsibilities and resources, including the size of the management team and the existence of dedicated finance and risk management functions. Finally, information system variables are introduced to reflect the firm's capacity to generate, process, and

disseminate relevant information, including the frequency of financial reporting, the adoption of integrated ERP systems, and the time horizon of financial forecasting practices. To isolate the effect of organizational adequacy on financial stability, the empirical model incorporates a set of control variables commonly used in the literature. These include firm size, measured as the natural logarithm of total assets, leverage ratios capturing capital structure effects, sales growth as a proxy for dynamic performance, firm age reflecting organizational maturity, and industry fixed effects to control for sector-specific heterogeneity.

Table 1: Variable Definition and Operationalization

Variable Category	Construct	Operationalization / Proxy	Measurement	Theoretical Rationale
Dependent Variable	Financial Stability	Interest Coverage Ratio	EBIT / Interest Expenses	Operating sustainability and ability to service debt (Altman et al., 2017)
		Leverage Indicators	Debt/Equity; Debt/EBITDA	Capital structure sustainability and financial risk exposure
		Default Risk Proxies	Ratio-based distress indicators	Forward-looking probability of financial distress (Wang, 2017)
Independent Variable	Organizational Adequacy (latent construct)	Governance Structure	Board size; independence ratio; control bodies	Monitoring capacity and oversight effectiveness (Jensen & Meckling, 1976)
		Organizational Structure	Management team size; finance/risk functions	Allocation of responsibilities and decision capacity
		Information Systems	Reporting frequency; ERP adoption; forecasting horizon	Information processing and anticipatory capability
Control Variables	Firm Size	Log of total assets	Continuous (log-transformed)	Organizational scale effects
		Leverage	Debt ratios	Financial structure control
		Sales Growth	% annual change in revenues	Dynamic performance proxy
		Firm Age	Years since incorporation	Organizational maturity
		Industry Effects	Industry dummies	Sectoral heterogeneity
Data Treatment	Preprocessing	Winsorization	1st–99th percentile	Outlier mitigation (Hair et al., 2019)
		Standardization	Z-score transformation	Cross-variable comparability
Estimation Strategy	Panel Model	Fixed-effects regression	(\mu_i, \lambda_t)	Controls for unobserved heterogeneity
		Robustness Checks	Logistic regression; Z-score thresholds	Alternative distress specifications
		Machine Learning	Random Forest	Non-linear relationships and variable importance
		Dimensionality Reduction	PCA	Extraction of latent financial structures

Source: our processing

All continuous variables undergo standard preprocessing procedures to ensure statistical robustness and comparability across observations. Specifically, variables are winsorized at the 1st and 99th percentiles to mitigate the influence of extreme values and outliers, and subsequently standardized using z-score transformation, in line with established practices in multivariate financial analysis (Hair et al., 2019; Wang, 2017). The relationship between organizational adequacy and financial stability is estimated through panel data regression models of the following form:

$$FinancialStability_{it} = \alpha + \beta_1 OrganizationalAdequacy_{it} + \beta_2 Controls_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

where $\mu_i$captures unobserved firm-specific heterogeneity and $\lambda_t$controls for time-specific effects. This specification allows for the isolation of within-firm variation over time while accounting for both cross-sectional and temporal dependencies.

To ensure the robustness of the empirical results, alternative model specifications are employed. In particular, logistic regression models are estimated using binary distress indicators, allowing for the assessment of the probability of financial distress. Additional robustness checks are conducted using alternative distress thresholds based on Z-score

quartile distributions (Altman et al., 2017), thereby capturing non-linearities in financial risk profiles. Furthermore, machine learning techniques, specifically random forest models, are implemented to assess variable importance and explore potential non-linear relationships between organizational variables and financial outcomes (Barboza et al., 2017). Given the relatively high dimensionality of financial indicators in relation to sample size, Principal Component Analysis (PCA) is applied as a dimensionality reduction technique to extract latent financial structures and mitigate multicollinearity issues (Pittelkow and Wilson, 2007; Hair et al., 2019). This approach enables the interpretation of financial indicators as aggregated organizational signals, consistent with the theoretical framing of the study, whereby financial performance reflects underlying governance and organizational configurations. Overall, this empirical strategy ensures a rigorous integration of theoretical constructs and quantitative evidence, allowing for a nuanced analysis of how internal organizational arrangements influence firms' capacity to maintain financial stability and anticipate distress.

Results. *The empirical findings provide strong and consistent support for the theoretical reconceptualization of organizational adequacy as an anticipatory governance infrastructure (Table 2).*

Table 2: Empirical Results. Organizational Adequacy and Financial Stability

Hypothesis / RQ	Relationship Tested	Method	Key Result	Statistical Evidence	Interpretation
RQ1	Organizational Adequacy → Financial Stability	Panel Regression (FE)	Positive and significant effect	$\beta > 0$, $p < 0.01$	Organizational adequacy enhances firms' ability to sustain financial obligations
RQ1	Organizational Adequacy → Leverage Risk	Panel Regression (FE)	Negative and significant effect	$\beta < 0$, $p < 0.05$	Higher adequacy associated with more sustainable capital structures
RQ1	Organizational Adequacy → Distress Probability	Logistic Regression	Negative and significant effect	Marginal effects < 0, $p < 0.05$	Reduced likelihood of financial distress
RQ1	Latent Structure of Organizational Adequacy	PCA	Single dominant factor identified	High explained variance	Adequacy operates as a higher-order capability (sensing & processing)
RQ2	Information Systems → Financial Stability	Panel + Random Forest	Strongest positive effect	Highest variable importance	Information processing is the core driver of anticipatory capacity
RQ2	Governance Variables → Financial Stability	Panel Regression	Positive but conditional effect	Significant with interactions	Governance effective only when supported by information systems
RQ2	Organizational Structure → Financial Stability	Panel Regression	Positive but weaker effect	Lower coefficients	Structural complexity alone is insufficient
RQ2	Interaction Effects (Governance × Information)	Extended Models	Complementarity effect	Significant interaction terms	Anticipatory capacity emerges from system integration
Robustness	Alternative distress thresholds	Z-score models	Results confirmed	Consistent across quartiles	Stability of findings across specifications
Robustness	Non-linear relationships	Random Forest	Threshold effects identified	Variable importance ranking	Effects intensify beyond maturity levels

Source: our processing

Across all model specifications, the results highlight that internal organizational arrangements are not merely background conditions, but constitute a statistically and economically significant determinant of firms' capacity to sustain financial stability and anticipate emerging distress.

With reference to RQ1, which concerns the conceptualization of organizational adequacy as an anticipatory governance infrastructure, the empirical analysis confirms that the construct is both analytically coherent and empirically identifiable. The dimensional structure derived from the qualitative phase is validated through the quantitative analysis, as the selected proxy variables exhibit stable and theoretically consistent patterns across models. In particular, the application of PCA reveals that variables related to governance structures, information systems, and organizational configuration converge into a latent factor that explains a substantial portion of the variance in financial performance indicators. This latent dimension can be interpreted as a synthetic measure of organizational sensing and processing capacity, supporting the notion that organizational adequacy operates as a higher-order capability rather than a

collection of isolated mechanisms. The panel regression results further reinforce this interpretation. The coefficient associated with organizational adequacy is positive and statistically significant across all baseline models when financial stability is proxied through the Interest Coverage Ratio. This indicates that firms characterized by more structured governance systems, more advanced information infrastructures, and more articulated organizational configurations exhibit a systematically higher capacity to sustain operating margins relative to financial obligations. At the same time, the same construct shows a negative and statistically significant association with leverage-based risk indicators, suggesting that firms with higher levels of organizational adequacy tend to adopt more sustainable financial structures and display lower exposure to debt-related vulnerability.

Importantly, these relationships remain robust after controlling for firm size, growth dynamics, capital structure, and industry-specific effects, thereby isolating the independent contribution of organizational variables. The magnitude of the estimated coefficients suggests that organizational adequacy exerts a non-trivial effect on financial outcomes, comparable in scale to traditional financial determinants such as leverage and firm size. This finding provides empirical support for the theoretical argument that internal organizational architectures play a central role in shaping firms' ability to manage uncertainty. The robustness of these results is further confirmed through alternative model specifications. Logistic regression models, in which financial distress is operationalized as a binary outcome, show that higher levels of organizational adequacy are associated with a significantly lower probability of entering distress conditions. The estimated marginal effects indicate a meaningful reduction in distress likelihood for firms positioned in the upper quartiles of the adequacy distribution. Similarly, when alternative distress thresholds based on Z-score quartiles are employed, the results remain consistent, confirming that the relationship holds across different operationalizations of financial risk.

Turning to RQ2, which investigates how different configurations of organizational arrangements influence firms' capacity for early risk detection and financial stability, the findings reveal a differentiated and non-linear structure of effects across the various dimensions of organizational adequacy. Among these, information-related variables emerge as the most influential predictors. Firms characterized by higher frequency of financial reporting, the adoption of integrated ERP systems, and longer forecasting horizons consistently exhibit superior performance across all stability indicators. These variables display the highest statistical significance and effect sizes in both regression and machine learning models. This suggests that the firm's ability to generate timely, forward-looking, and internally integrated information represents the primary mechanism through which anticipatory capabilities are operationalized. From a theoretical perspective, this finding substantiates the interpretation of anticipatory governance as fundamentally rooted in the architecture of information flows. Governance-related variables also display a significant, albeit more conditional, impact. The presence of formal control bodies and higher levels of board independence are associated with improved financial stability; however, their effect appears to be contingent upon the presence of adequate information systems. In models where interaction effects are considered, governance variables exhibit stronger significance when combined with high levels of reporting frequency and forecasting capability. This indicates that governance structures contribute to anticipatory capacity not in isolation, but as part of a broader system of information processing and interpretation. Such evidence supports the reconceptualization of governance as an ex-ante cognitive infrastructure, rather than a purely monitoring mechanism.

Organizational structure variables, including management team size and the presence of dedicated financial functions, display a positive but comparatively weaker effect. While these variables contribute to financial stability, their explanatory power is lower than that of information-related factors. This suggests that structural complexity alone does not generate anticipatory capabilities unless it is effectively coupled with mechanisms for information integration and interpretation. In this sense, the results point to a complementarity effect between structural and informational dimensions, whereby the effectiveness of one depends on the presence of the other. The machine learning analysis provides additional support for these findings by identifying the relative importance of variables in predicting financial outcomes. Random forest models consistently rank information system variables as the most influential predictors, followed by governance indicators, while structural variables occupy a secondary but still relevant position. The non-linear nature of these models also reveals threshold effects, suggesting that the impact of organizational adequacy becomes significantly stronger beyond certain levels of information system maturity and governance formalization.

Taken together, the results suggest that organizational adequacy operates as a systemic and configurational capability, emerging from the interaction between governance mechanisms, organizational structures, and information infrastructures. Firms that exhibit high levels of alignment across these dimensions are characterized by a markedly superior ability to detect weak signals, anticipate financial imbalances, and maintain stability over time. Conversely, firms with fragmented or incomplete configurations display significantly higher vulnerability to financial distress, even when controlling for traditional financial indicators (Williams et al., 2017). From a theoretical standpoint, these findings provide strong empirical support for the transition from a "structure–strategy fit" paradigm toward a structure–uncertainty fit logic. The ability of firms to process ambiguity, integrate information, and anticipate disruptions emerges as a critical determinant of performance in complex environments. Moreover, the results substantiate the reinterpretation of governance as a forward-looking, sensemaking-oriented infrastructure, and of risk management as an emergent property of organizational systems rather than a set of formalized procedures.

Research limitations. *While offering relevant theoretical and empirical insights, the study is subject to several limitations. First, the operationalization of organizational adequacy through proxy variables may not fully capture its latent and multidimensional nature, potentially simplifying complex cognitive, structural, and informational dynamics. Second, the reliance on firm-level secondary data reflects formal organizational arrangements rather than their effective functioning, thus limiting the ability to observe how governance and information systems operate in practice. Third, although the use of panel models with fixed effects enhances internal validity, potential endogeneity issues, such as reverse causality,cannot be entirely excluded. Finally, the focus on the Italian institutional and regulatory context may constrain the generalizability of the findings, suggesting the need for future cross-country and longitudinal research to validate and extend the proposed framework.*

Managerial implications. *The findings carry significant managerial implications by repositioning organizational adequacy from a compliance requirement to a strategic lever for anticipatory decision-making and risk governance. Rather than static structures, organizational arrangements emerge as dynamic information-processing architectures through which firms can detect weak signals and anticipate financial instability. First, managers should prioritize the design of integrated and forward-looking information systems, as reporting frequency, ERP adoption, and forecasting capabilities emerge as key drivers of financial stability. This implies shifting from periodic reporting toward continuous monitoring and real-time signal detection. Second, governance mechanisms should be conceived as cognitive infrastructures, whose effectiveness depends on the quality, integration, and interpretability of available information. Strengthening boards without enhancing information environments is unlikely to improve outcomes. Third, the results highlight the need to align organizational structures with information flows. Structural complexity alone is insufficient unless supported by mechanisms that facilitate rapid signal transmission and escalation. Finally, anticipatory capacity emerges as a configurational capability, requiring systemic alignment between governance, structure, and information systems. In this perspective, regulatory requirements on organizational adequacy can be reframed as an opportunity to build resilience, enhance adaptability, and sustain long-term performance.*

Originality of the paper. *This paper offers a distinctive contribution to the management literature by reframing organizational adequacy as an anticipatory governance infrastructure, thereby bridging a critical gap between organizational design, corporate governance, and risk management. Moving beyond dominant views centered on efficiency and compliance, the study advances a novel perspective of the firm as an anticipatory system, in which governance, structure, and information architectures jointly enable early signal detection and proactive intervention. The introduction of the concept of anticipatory organizational architecture represents a key theoretical advancement, shifting the focus from structure–strategy fit to structure–uncertainty fit and positioning internal arrangements as dynamic capabilities for sensing and responding to emerging disruptions. Finally, the paper strengthens its originality through a rigorous mixed-methods design, combining qualitative theory-building with quantitative validation. In doing so, it moves beyond conceptual abstraction and provides empirically grounded evidence on how organizational configurations shape financial stability, offering a new foundation for understanding firms in conditions of systemic uncertainty.*

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Big Data Potenziati dall'Intelligenza Artificiale e Innovazione dei Modelli di Business Sostenibili

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Abstract. *La rapida digitalizzazione degli ambienti di business ha generato una crescita senza precedenti nella disponibilità di dati, rendendo i big data una risorsa strategica fondamentale per le organizzazioni. Allo stesso tempo, la diffusione delle tecnologie di AI ha significativamente rafforzato la capacità delle imprese di elaborare ed estrarre valore da grandi volumi di dati. Sebbene studi precedenti abbiano analizzato separatamente il ruolo dei big data e dell'AI nell'innovazione dei modelli di business, un'attenzione limitata è stata dedicata al modo in cui queste tecnologie possano congiuntamente abilitare l'innovazione sostenibile dei modelli di business e a come le imprese debbano governarle strategicamente. Questo studio affronta tale lacuna analizzando come i big data potenziati dall'AI possano supportare le imprese nella riprogettazione dei propri modelli di business al fine di generare simultaneamente valore economico, ambientale e sociale. Adottando un approccio qualitativo induttivo basato sulla metodologia Gioia, analizziamo dati qualitativi raccolti da 212 CEO e manager iscritti a un Executive MBA presso una prestigiosa business school europea. I risultati mostrano che l'uso congiunto di AI e big data influenza diversi componenti del business model canvas, consentendo alle imprese di migliorare la creazione, la distribuzione e la cattura di valore nelle tre dimensioni della sostenibilità. Allo stesso tempo, l'adozione di queste tecnologie introduce sfide di governance legate ai rischi etici, alla sicurezza dei dati e al consumo energetico. Lo studio contribuisce alla letteratura su big data, AI e innovazione sostenibile dei modelli di business proponendo un framework di governance strategica che spiega come le imprese possano sfruttare i big data potenziati dall'AI per generare valore sostenibile.*
Keywords: *Big data; Intelligenza artificiale; Innovazione sostenibile, Business Model*

Framing of the research. *Negli ultimi anni, la rapida trasformazione digitale degli ambienti economici ha aumentato drasticamente la quantità di dati generati da individui, organizzazioni e infrastrutture digitali. Questa crescita esponenziale della disponibilità di dati ha trasformato i big data in una risorsa strategica che le imprese cercano sempre più di sfruttare per rafforzare la propria competitività e migliorare i processi decisionali (Cappa et al., 2021; Sestino et al., 2020). Si stima che il volume globale dei dati crescerà da 174 zettabyte nel 2024 a oltre 500 zettabyte entro il 2029, evidenziando la crescente importanza delle strategie data-driven per le organizzazioni che operano in mercati sempre più digitalizzati. I big data si distinguono dai dataset tradizionali per alcune caratteristiche specifiche comunemente descritte attraverso il framework delle "5V" (Cappa et al., 2021): volume, velocità, varietà, veridicità e valore. Quando queste dimensioni operano congiuntamente, i big data possono generare significative opportunità per le imprese migliorando le capacità di previsione, supportando decisioni strategiche più efficaci, aumentando l'efficienza operativa e favorendo lo sviluppo di nuovi prodotti e servizi. In questo senso, i big data rappresentano un importante abilitatore dell'innovazione organizzativa e del vantaggio competitivo nelle economie digitali.*

Tuttavia, il valore strategico dei big data non può essere pienamente realizzato senza le capacità tecnologiche necessarie per elaborare e interpretare grandi volumi di informazioni complesse. In questo contesto, l'intelligenza artificiale (AI) è emersa come una tecnologia complementare in grado di potenziare il valore dei big data (Dwivedi et al., 2023; Zhou et al., 2017). Le tecnologie di AI, in particolare le tecniche di machine learning e deep learning, permettono alle imprese di analizzare grandi dataset, individuare pattern nascosti, generare previsioni e automatizzare processi decisionali. Grazie a queste capacità, l'AI consente alle organizzazioni di trasformare i dati grezzi in insight utili per supportare il processo decisionale strategico e l'apprendimento organizzativo. Da una prospettiva strategica, la combinazione tra big data e AI è sempre più riconosciuta come un fattore chiave per l'innovazione dei modelli di business (Acciarini et al., 2023; Ritala et al., 2024). I modelli di business descrivono il modo in cui le imprese creano, distribuiscono e catturano valore attraverso le proprie attività, mentre l'innovazione del modello di business si riferisce ai cambiamenti nell'architettura di tali attività. La trasformazione digitale dei settori industriali ha creato nuove opportunità per le imprese di riprogettare i propri modelli di business sfruttando tecnologie basate sui dati. Ad esempio, aziende come Amazon e John Deer hanno integrato con successo analisi dei dati e tecnologie di AI nelle proprie attività per generare nuove proposizioni di valore e sviluppare offerte innovative basate sui servizi.

Parallelamente, le imprese stanno affrontando una crescente pressione da parte degli stakeholder e della società affinché integrino la sostenibilità nelle proprie decisioni strategiche (D'Angelo et al., 2022; Mostaghel et al., 2023). Le preoccupazioni ambientali, le aspettative sociali e la crescente rilevanza della responsabilità d'impresa hanno spinto le organizzazioni a riconsiderare il modo in cui progettano e gestiscono i propri modelli di business. Questo cambiamento ha portato all'emergere dei modelli di business sostenibili, i quali mirano a creare valore economico affrontando allo

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stesso tempo sfide ambientali e sociali (Laasch, 2018; Kılıç e Atilla, 2024). L'innovazione sostenibile dei modelli di business rappresenta quindi una sfida strategica fondamentale per le organizzazioni che intendono conciliare performance economica e obiettivi di sostenibilità. Tuttavia, nonostante il crescente interesse verso i modelli di business sostenibili, i meccanismi attraverso i quali le imprese possono innovare efficacemente i propri modelli di business in direzione della sostenibilità rimangono ancora poco compresi. In particolare, il ruolo delle tecnologie digitali come big data e AI nell'abilitare l'innovazione sostenibile dei modelli di business ha ricevuto un'attenzione limitata nella letteratura. Sebbene studi precedenti abbiano esaminato come le tecnologie digitali supportino l'innovazione dei modelli di business, è ancora poco chiaro come tali tecnologie possano essere governate strategicamente per favorire la creazione di valore sostenibile. Da una prospettiva di governance, l'adozione di AI e big data solleva diverse sfide strategiche. Le organizzazioni devono sviluppare adeguate capacità per gestire le infrastrutture dei dati, garantire l'uso etico degli algoritmi, proteggere la privacy dei dati e mitigare i rischi tecnologici. Inoltre, l'utilizzo di sistemi decisionali basati sull'AI introduce nuove problematiche di governance legate alla trasparenza, alla responsabilità e ai bias algoritmici.

Per analizzare queste dinamiche, il business model canvas rappresenta un utile framework analitico. Il business model canvas concettualizza il modello di business attraverso 9 blocchi (Osterwalder e Pigneur, 2010): segmenti di clientela, proposizione di valore, canali, relazioni con i clienti, flussi di ricavi, risorse chiave, attività chiave, partnership chiave e struttura dei costi. Modifiche in uno qualsiasi di questi elementi possono generare innovazione del modello di business.

Partendo da questo framework, il nostro studio esamina come l'integrazione dell'AI per potenziare i big data possa influenzare le diverse componenti del business model canvas e consentire l'innovazione sostenibile dei modelli di business. A tal fine, adottiamo le prospettive teoriche delle dynamic capabilities e della complexity theory. Le dynamic capabilities evidenziano la capacità delle imprese di individuare opportunità, coglierle attraverso investimenti strategici e trasformare le risorse organizzative in risposta ai cambiamenti ambientali (Bocken e Geradts, 2020; Garud et al., 2011). La complexity theory suggerisce invece che le tecnologie digitali aumentano la complessità organizzativa ma allo stesso tempo consentono di individuare nuove soluzioni a problemi strategici complessi. Combinando queste prospettive teoriche, esploriamo dunque come le imprese possano governare strategicamente i big data potenziati dall'AI per riprogettare i propri modelli di business in modo da generare simultaneamente valore economico, ambientale e sociale.

Purpose of the paper. *L'obiettivo è analizzare come le imprese possano sfruttare l'uso congiunto di AI e big data per realizzare innovazione sostenibile dei modelli di business. In particolare, lo studio affronta la seguente domanda di ricerca:*

Come possono le imprese governare strategicamente i big data potenziati dall'AI per abilitare l'innovazione sostenibile dei modelli di business?

Nel rispondere a questa domanda di ricerca ci auspichiamo di contribuire alla letteratura di strategia e management in diversi modi. In primo luogo, ampliando la letteratura sui big data evidenziando il ruolo strategico delle tecnologie di AI nel potenziare il valore che le organizzazioni possono estrarre dai grandi dataset. In secondo luogo, contribuiamo alla letteratura emergente sull'innovazione dei modelli di business analizzando gli effetti congiunti di AI e big data sulle architetture di creazione del valore delle imprese. Inoltre, arricchiamo la letteratura sull'innovazione sostenibile dei modelli di business mostrando come le tecnologie digitali possano supportare l'integrazione degli obiettivi di sostenibilità nelle strategie aziendali. Dal punto di vista della governance, speriamo anche di fornire indicazioni sulle capacità organizzative e sulle pratiche manageriali necessarie per gestire efficacemente i rischi associati all'adozione di AI e big data.

Methodology. *Per esplorare la domanda di ricerca, adottiamo un disegno di ricerca qualitativo induttivo basato sulla grounded theory (Gioia et al., 2013; Glaser e Strauss, 1967). I dati sono stati raccolti da manager partecipanti a un Executive MBA presso una business school europea accreditata EQUIS, AMBA e AACSB. La raccolta dei dati è stata effettuata attraverso un questionario composto da domande aperte riguardanti l'utilizzo congiunto di big data e AI nelle imprese. Il questionario include domande aperte relative ai 9 blocchi del business model canvas e alle tre dimensioni della sostenibilità: economica, ambientale e sociale. Il questionario è stato somministrato online tramite la piattaforma Qualtrics tra novembre e dicembre 2025. Hanno partecipato allo studio 212 manager provenienti da 34 settori industriali differenti. I dati raccolti consistono in circa 59 pagine di testo. L'analisi è stata condotta seguendo le tre fasi della metodologia Gioia: 1); first order coding; 2) second order themes; 3) aggregate dimensions. Il processo di codifica è stato supportato dal software MaxQDA.*

Results. *I risultati delle risposte aperte dei manager mostrano che l'integrazione tra AI e big data influenza diversi blocchi del business model canvas e favorisce la creazione di valore sostenibile.*

Creazione di valore ambientale. *AI e big data permettono alle imprese di ottimizzare la gestione delle risorse e ridurre il consumo energetico. L'analisi predittiva dei big data consente di anticipare la domanda e adattare i processi produttivi in tempo reale riducendo sprechi e inefficienze. Le imprese possono inoltre progettare prodotti più sostenibili analizzando il ciclo di vita dei prodotti e selezionando materiali con minore impatto ambientale.*

Distribuzione di valore ambientale. *Le tecnologie digitali permettono alle imprese di promuovere comportamenti di consumo più sostenibili tra i clienti. Piattaforme digitali e sistemi di comunicazione basati sull'AI consentono di diffondere informazioni relative alle pratiche ambientali e di coinvolgere i consumatori in pratiche più responsabili.*

Cattura di valore ambientale. *I risultati mostrano tuttavia anche alcune criticità; in particolare, l'elaborazione di grandi dataset richiede elevata potenza computazionale, con conseguente aumento del consumo energetico delle infrastrutture digitali. Le imprese devono quindi bilanciare i benefici ambientali con i costi energetici associati alle tecnologie digitali.*
Creazione di valore sociale. *AI e big data possono contribuire al miglioramento delle condizioni di lavoro e alla promozione dell'inclusione organizzativa. L'analisi dei big data consente di monitorare il benessere dei dipendenti e individuare eventuali disuguaglianze. I sistemi di AI possono far leva sui big data inoltre per identificare segnali precoci di condizioni di lavoro non sicure.*
Distribuzione di valore sociale. *Le tecnologie digitali migliorano anche il coinvolgimento degli stakeholder esterni. I sistemi di comunicazione personalizzati grazie allo sfruttamento dei big data permettono alle imprese di offrire servizi più inclusivi e migliorare la relazione con clienti e comunità.*
Creazione di valore economico. *Dal punto di vista economico, AI e big data migliorano significativamente la capacità decisionale delle organizzazioni. Le imprese sfruttando big data possono identificare opportunità di mercato, migliorare la pianificazione strategica e ottimizzare la gestione della supply chain.*
Distribuzione di valore economico. *L'analisi dei dati consente inoltre una maggiore personalizzazione dei prodotti e dei servizi. I sistemi di customer service basati su AI migliorano la qualità dell'interazione con i clienti e riducono i tempi di risposta.*
Cattura di valore economico. *Infine, l'integrazione tra AI e big data permette di sviluppare nuovi flussi di ricavo basati su servizi data-driven e offerte personalizzate.*
I risultati emersi dall'analisi qualitativa evidenziano dunque che l'integrazione tra AI e big data può influenzare diversi elementi del business model canvas lungo le tre dimensioni della sostenibilità: economica, ambientale e sociale. In particolare, l'uso congiunto di queste tecnologie supporta nuovi meccanismi di creazione del valore, favorisce modalità innovative di distribuzione del valore agli stakeholder e contribuisce allo sviluppo di nuove forme di cattura del valore per le imprese. Allo stesso tempo, l'adozione di tecnologie data-driven può generare alcune tensioni legate ai costi, ai rischi tecnologici e agli impatti ambientali delle infrastrutture digitali.

Research limitations. *Lo studio presenta alcune limitazioni. In primo luogo, i dati si basano sulle percezioni dei manager e non su indicatori oggettivi di performance. Inoltre, il campione è concentrato su manager che hanno seguito lo stesso programma di formazione.*

Managerial implications. *I risultati di questa ricerca offrono diverse implicazioni rilevanti per manager e decision maker che intendono sfruttare i big data potenziati dall'AI per supportare l'innovazione sostenibile dei modelli di business. In particolare, i risultati evidenziano che l'integrazione tra AI e big data non rappresenta soltanto una scelta tecnologica, ma costituisce una decisione strategica che richiede adeguati meccanismi di governance organizzativa.*

Una prima implicazione riguarda la necessità di sviluppare solidi sistemi di data governance. Poiché i big data rappresentano una risorsa strategica sempre più rilevante per le imprese, le organizzazioni devono definire strutture di governance in grado di garantire la qualità, la sicurezza e l'utilizzo responsabile dei dati. In particolare, i manager devono implementare politiche di gestione dei dati che assicurino la trasparenza degli algoritmi, la protezione della privacy e la conformità alle normative emergenti sulla gestione dei dati. Senza adeguati sistemi di governance, l'adozione di tecnologie basate sui dati può generare rischi reputazionali e legali che potrebbero compromettere i benefici derivanti dall'innovazione digitale (Ghasemaghaei e Turel, 2020). Una seconda implicazione riguarda il ruolo dell'AI come capacità strategica organizzativa. I nostri risultati mostrano che l'AI non dovrebbe essere considerata soltanto uno strumento tecnologico operativo, ma una capacità strategica che consente alle imprese di trasformare i dati in insight utili per il processo decisionale. In questo senso, l'integrazione tra AI e big data può supportare le imprese nel migliorare la qualità delle decisioni strategiche, anticipare cambiamenti di mercato e sviluppare nuove opportunità di innovazione del modello di business. Pertanto, i manager dovrebbero integrare le tecnologie di AI nei processi di pianificazione strategica e nelle pratiche di analisi competitiva, al fine di migliorare la capacità dell'organizzazione di individuare opportunità emergenti e di adattarsi a contesti competitivi dinamici (Teece, 2010).

Un'altra implicazione riguarda lo sviluppo delle capacità organizzative necessarie per sfruttare le tecnologie data-driven. L'adozione di AI e big data richiede competenze interdisciplinari che combinino conoscenze tecnologiche, analitiche e manageriali. I risultati suggeriscono che le imprese dovrebbero promuovere la creazione di team interfunzionali che integrino competenze di data science con competenze strategiche e manageriali. Questo tipo di integrazione consente di tradurre gli insight derivanti dai dati in decisioni strategiche efficaci e in iniziative di innovazione del modello di business (Ritala et al., 2024). Un'ulteriore implicazione riguarda il ruolo delle tecnologie digitali nel supportare strategie di sostenibilità aziendale. I risultati mostrano che l'integrazione tra AI e big data può facilitare la creazione di valore sostenibile attraverso il miglioramento dell'efficienza operativa, la riduzione del consumo di risorse e lo sviluppo di soluzioni innovative orientate alla sostenibilità. In questo modo, le tecnologie digitali possono contribuire all'allineamento tra strategie aziendali e obiettivi di sostenibilità (Bocken e Geradts, 2020).

Tuttavia, i risultati evidenziano anche che l'adozione di AI e big data introduce nuove sfide manageriali legate ai rischi etici e tecnologici. Ad esempio, i sistemi di AI possono generare bias algoritmici o produrre decisioni difficili da interpretare, riducendo la trasparenza dei processi decisionali. Inoltre, l'elaborazione di grandi volumi di dati richiede infrastrutture digitali che possono comportare elevati consumi energetici. I manager devono quindi sviluppare pratiche

di governance responsabile dell'AI che includano meccanismi di monitoraggio degli algoritmi, audit dei sistemi di AI e procedure di gestione dei rischi tecnologici (Dwivedi et al., 2023).

Infine, i risultati suggeriscono che l'integrazione tra AI e big data può favorire nuove opportunità di innovazione del modello di business. Attraverso l'analisi dei dati e l'automazione dei processi decisionali, le imprese possono sviluppare nuovi servizi digitali, offerte personalizzate e modelli di business basati sui dati. Queste opportunità consentono alle imprese di migliorare la creazione di valore per i clienti e di sviluppare nuove fonti di ricavo. Tuttavia, per sfruttare pienamente tali opportunità, i manager devono adottare una prospettiva strategica orientata alla trasformazione del modello di business e alla gestione integrata delle tecnologie digitali.

Nel complesso, i risultati indicano che le imprese che intendono sfruttare il potenziale dei big data potenziati dall'AI devono sviluppare un approccio integrato che combini innovazione tecnologica, governance organizzativa e strategie di sostenibilità. Solo attraverso tale integrazione le organizzazioni potranno trasformare le tecnologie digitali in un vero vantaggio competitivo sostenibile.

Originality of the paper. *Lo studio contribuisce alla letteratura integrando tre filoni di ricerca: big data, AI e innovazione sostenibile dei modelli di business. Il contributo principale consiste nell'introdurre una prospettiva di governance strategica per comprendere come le imprese possano sfruttare le tecnologie digitali per creare valore sostenibile. Sebbene ricerche precedenti abbiano analizzato separatamente il ruolo dei big data nell'innovazione organizzativa e l'impatto dell'AI sui processi decisionali, la letteratura ha dedicato minore attenzione al modo in cui queste due tecnologie possano operare congiuntamente per supportare la trasformazione dei modelli di business in chiave sostenibile. Il nostro studio affronta tale lacuna esaminando l'integrazione tra AI e big data come leva per l'innovazione sostenibile dei modelli di business. In particolare, il nostro studio estende la letteratura sui big data mostrando come il valore strategico dei dati possa essere amplificato dall'utilizzo dell'AI, che consente alle imprese di trasformare grandi quantità di informazioni in insight utili per l'innovazione del modello di. In secondo luogo, il lavoro contribuisce alla letteratura sull'innovazione dei modelli di business evidenziando come l'integrazione tra AI e big data possa influenzare diversi blocchi del business model canvas, modificando i meccanismi di creazione, distribuzione e cattura del valore*

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Building sustainable development actions by leveraging on values-led collaborations: a comparative case study analysis

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Abstract. *For decades, both business and public organisations have largely oriented their actions towards economic performance and the efficient allocation of financial resources, while social and environmental considerations remained marginal to core decision-making processes. Increasingly, however, organisational purpose and value creation for sustainable development are understood as multidimensional, requiring the integration of economic viability, social equity, and environmental responsibility. Both private and public organisations are therefore called to reimagine their innovation strategies, practices, and monitoring systems in order to secure long-term performance while contributing to the resilience of broader socio-ecological systems in which they exist. In this sense, adopting a collaborative perspective becomes essential to reframing organisational challenges in their contexts and enabling systemic innovation pathways towards problem-solving for complex issues.*

This paper aims at contributing to the ongoing debate on which could be useful configurations of actors to implement changes towards sustainable models by leveraging on values-led public-private collaborations. Four cases are analysed to build a comparative, place-based picture of four innovative initiatives led by public or private actors operating under resource constraints and committed to ensuring multilevel value creation. Focusing on contexts characterised by institutional complexity and limited financial capacity, the study examines how organisations and citizens attempt to balance monetary resource allocation with social inclusion and environmental sustainability criteria to incrementally innovate their practices and solve complex issues. By reframing sustainability as a question of organisational design rather than solely of performance outcomes or indirect impact, the study contributes to debates on values-led collaboration towards sustainability-oriented innovation pathways.

Keywords: *sustainable development; public-private partnership; values-led collaborations; place-based innovation*

Framing of the research. What if the main obstacle to sustainability were not a lack of tools, metrics, or commitment, but the way organisations imagine themselves and their purpose? Much of contemporary management thinking still continues to assume that organisational success is inseparable from expansion, optimisation, and the efficient use of financial resources (Porter, 1985). However, two decades ago Hart and Milstein already underlined the need for a more complex approach in framing the sustainable development of firms and their ecosystems in the current global panorama (Hart and Milstein, 2003).

Growth - of scale, output, and performance indicators - remains too often the implicit horizon against which organisational action is arranged, even when social and environmental concerns are formally acknowledged. Within this imaginary, environmental and social sustainability are tolerated insofar as they can be aligned with efficiency, competitiveness, or innovation priorities, but they rarely challenge the underlying assumption that organisations must ultimately economically grow in order to survive and succeed. As Hart and Milstein (2003) argue, such a constrained understanding of sustainability leaves firms *ill-equipped* to address environmental and social challenges in a strategic manner.

Degrowth scholarship further challenges the classic economic assumptions of organisational activity (D'Alisa et al., 2014). Drawing on ecological economics and political theory, this body of work challenges narratives of "green growth", arguing that they often function as comforting myths, promising to reconcile economic expansion with ecological limits without addressing the structural drivers of environmental degradation and social inequality. From this perspective, environmental sustainability initiatives that remain embedded within growth-oriented rationalities risk reproducing the very conditions they seek to mitigate. Yet, degrowth scholars also acknowledge a sobering reality: abandoning growth as a societal objective without changing politically and institutionally current conditions is implausible (Kallis et al., 2018). In many economies, employment systems, welfare provision, and public revenues remain structurally tied to economic expansion. Under such conditions, a rapid disengagement from growth-oriented frameworks may generate social instability, undermining the very objectives of equity and collective well-being that sustainability agendas seek to advance. Social sustainability, therefore, should not be treated as a residual outcome of either growth or degrowth trajectories (Alexander et al., 2020; Vifell and Soneryd, 2012). Rather, it depends on the reconfiguration of institutional arrangements, redistributive mechanisms, and organisational practices capable of safeguarding livelihoods while operating within ecological limits (Janssen and Basta, 2024).

This tension raises a central question for management and organisation studies: how can organisations balance the interplay between growth and degrowth instances without reducing sustainability to a binary opposition? The challenge lies in developing alternative and more complex imaginaries capable of reshaping the processes through which organisations govern themselves, define value, and make collective decisions under conditions of economic, social and

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ecological constraints (Dyck et al., 2019; Engert et al., 2016). From this perspective, sustainability emerges as an organisational problem before it becomes an ideological or economic one. The issue is how organisations structure purpose, responsibility, and accountability when growth and individual performance can no longer serve as the sole and unquestioned sources of legitimacy (Engert et al., 2016).

Indeed, management and organisation studies have increasingly engaged with sustainability, responsibility, and the redefinition of organisational purpose. A growing body of work has examined how organisations incorporate social and environmental concerns into strategies, business models, and performance systems, often emphasising values-led management, stakeholder engagement, and the alignment between economic and societal goals (Bocken et al., 2014; Hart and Milstein, 2003; Pasamar et al., 2023). This literature has contributed important insights into why sustainable development matters for organisations and its stakeholders and how it can be framed as a strategic priority rather than a peripheral concern.

As Freeman already stated, there can be no means without ends (Popa et al., 2015). Redefining values and the value to be achieved is fundamental to introducing transformative pathways in established organisations (Mazzucato, 2018; Seray et al., 2020). In fact, the core values represent fundamental references to develop strategies, organizational models, and adapt operations toward the defined objectives.

Of course, this is also valid if organizations want to orient their actions towards sustainable development. In a context of rapid and often disruptive changes, organizations are called to working on multiple dimensions of value that may conflict. In this context, both public and private institutions need to considering a broader set of resources, actors, and processes to be activated according to a negotiated set of values and desired final goal of their actions (Gray and Jani, 2016; Osborne et al., 2022; Porter and Kramer, 2011). Thus, organizations are called to reimagine their operational models and collaborations to ensure an effective and efficient use of current resources and including others' resources into their network (Cucino et al., 2025; Osborne et al., 2022; Vinaixa et al., 2022).

Once the values and value to be achieved are defined, the translation from theory to practice needs infrastructures, capitals, and procedures to be implemented in balanced configuration of actors and actions (Dai et al., 2024). In this panorama, place-based and collaborative approaches are suited to sustain both private and public organizations in developing alliances with a systematic collaboration funded on a shared set of core values and oriented to a shared achievement of a multidimensional global value (Hofstad et al., 2026; Malmborg et al., 2025).

Despite this growing attention towards integrating complex visions of sustainable development into strategic plans of private and public institutions, two interrelated evidence gaps remain. First, much of the sustainability literature continues to bring evidence on the strategy building as a normative prescription, while limited insights are available on the processes needed to translate sustainability-oriented values into everyday organisational and decision-making activities (Berke and Conroy, 2000; Cortinovis and Geneletti, 2018). Second, while management scholarship has acknowledged the limits of growth-centred models and the shortcomings of technocratic sustainability approaches, sustainable development is often treated as something organisations must comply to - through initiatives, metrics, certifications, or innovations - rather than as something that reshapes how organisations are governed, how value is defined, and how collective priorities are negotiated between stakeholders at different level of actions.

Purpose of the paper. In this paper, we will present a comparative analysis of case studies that represent examples of complex organisational arrangements aimed at balancing different values to building multistakeholder sustainable development pathways. The paper is structured as follows. In the next paragraph, we describe the comparative methodology adopted in the study. The subsequent section presents the findings of the cross-case analysis. Finally, we discuss the implications of our findings for management and organisation studies, and outline directions for future research.

Methodology. The presented research adopts a qualitative multiple case study design to explore how sustainability-oriented transformations develop in practice (Stake, 2006). A comparative approach is particularly suitable for investigating complex organisational arrangements embedded in specific territorial and institutional contexts, highlighting the implemented processes, and identifying recurring patterns across heterogeneous settings and issues. The research focuses on case studies of values-led collaborations built to test innovative solutions within resource-constrained environments.

Case selection and analysis were guided by the sustainable value framework proposed by Hart and Milstein (2003), which identifies four interrelated strategic dimensions:

1. *Resource efficiency and pollution prevention*, reducing operational inefficiencies and environmental harm;
2. *Product stewardship and accountability*, engaging increasingly interconnected civil society actors, responding to growing transparency demands, and incorporating social and environmental expectations into organisational governance and value creation processes;
3. *Clean technology*, investing in future-oriented innovations;
4. *Sustainability vision*, developing long-term strategic orientation towards sustainable development.

These drivers articulate sustainability across both internal–external and short–long term dimensions, offering a dynamic perspective on how organisations can generate economic, social, and environmental value simultaneously.

In this study, the framework is used as an analytical lens to examine how public organisations and their partners attempt to reconcile growth-dependent institutional logics with the need to operate within ecological limits while safeguarding social sustainability.

Cases were selected through a sampling strategy aimed at identifying initiatives that explicitly engage with multidimensional value creation and reflect, at least in part, the drivers outlined in the sustainable value framework. Three cases were retrieved from already established open databases. In particular, we searched the Governance International Case Studies database (https://www.govint.org/our-resources/case-studies) and the Case Collection of the Columbia University (https://www.sipa.columbia.edu/sipa-education/picker-center-executive-education/case-collection). Furthermore, the authors added a case where they have been directly involved with a participatory research approach. Each case refers to a diverse geographical and sectoral contexts, to ensure analytical variation while maintaining a shared focus on sustainability-oriented organisational transformation under resource constraints.

The first case (Case 1) concerns the Proximity Care and the Population Health spoke of the Tuscany Health Ecosystem (THE), developed in remote areas of the Tuscany region (Italy) (https://www.proximitycare.it; https://tuscanyhealthecosystem.it/spoke-10/; anonymised). Coordinated by a Research University and structured as a multi-actor collaboration among regional universities, healthcare authorities, municipalities, third-sector organisations and private foundations, the initiatives promote integrated care models and digital solutions to enhance accessibility and continuity of care. It represents an effort to reconcile economic sustainability, equitable access and environmental considerations within a territorially embedded public healthcare system. The second case (Case 2) examines Partnerships for Parks in New York City (USA), an urban governance initiative led by the NYC Parks Department in collaboration with community organisations and private partners. The project focuses on the regeneration and long-term stewardship of public spaces through collaborative management arrangements integrating public, civic and private actors (https://www.sipa.columbia.edu/sites/default/files/2022-10/Case_Partnerships%20for%20Parks.pdf). The third case (Case 3) analyses off-grid solar initiatives in Uganda, involving public agencies, private energy firms and local communities. These initiatives seek to expand energy access while balancing affordability, market viability and environmental sustainability (https://www.sipa.columbia.edu/sipa-education/picker-center-executive-education/case-collection/offgrid-solar). The fourth case (Case 4) explores the Çiğdemim Neighbourhood Association initiative in Turkey, supported by international development actors such as the UN capital Development Fund (UNCDF) and local entrepreneurs. The project promotes sustainable local development through community-based organising and collaborative resource mobilisation (https://www.govint.org/our-resources/case-studies/case-study/cigdemim-neighbourhood-association-in-turkey-promoting-sustainable-development).

The study relies primarily on the available documental secondary data, including case reports, institutional documents, websites, and policy materials. As already stated, the authors were directly involved in the development of the Proximity Care and THE projects, thus they had access to additional contextual insights and internal documentation.

The authors conducted an in-depth analysis of each case individually aiming at identifying the core elements of each stakeholders configurations, values, and value arrangements. Subsequently, a cross-case comparison was undertaken to identify recurring patterns, shared tensions, and context-specific variations.

Results. The first set of results emerged from the analysis of each case study, according to the predefined categories. Two cases were located in rural or marginalised areas (Case 1 and Case 3), while other two regard public areas and neighbourhoods (Case 2, Case 4).

Each case falls within the strategic dimension of *Product stewardship and accountability,* which is linked to participation and transparency as described. This dimension is concretely introduced through specific transformative imaginaries that mobilise political and collective actions. In this sense, Case 1 activities are built on the idea that remote or marginal areas can function as testing grounds for innovative and sustainable health and social care models. By prioritising investment in these territories, the initiatives develop and pilot new solutions that may later be scaled to more densely populated contexts. In Case 2, a long-standing public–private partnership was grounded in the belief that public parks are central to neighbourhood prosperity and citizens' quality of life. The regeneration and stewardship of urban green spaces are therefore framed as both a civic responsibility and a strategic investment in local well-being. Case 3 is based on a bottom-of-the-pyramid market strategy aimed at developing affordable products and services for economically vulnerable populations. Implemented within the renewable energy sector, the initiative combines environmental sustainability with social inclusion through business models designed to be both financially viable and socially responsible. Finally, Case 4 originates from the citizens-led initiative within a specific neighbourhood who sought to improve their living conditions across multiple domains. Active citizen engagement in voluntary caring for the territory constitutes the driving force of the movement. Moreover, their actions bring forward specific requests for collaboration with public and private actors.

Moving forward to the comparative analysis results, some initiatives originated from collective goals and others from private interests. In both cases, effective collaboration arrangements required the shared definition of values and value to be achieved through integrated actions. In none of the cases did alignment emerge automatically. Rather, institutions and citizens actively mobilised to sharing transformative imaginaries and translating them into concrete initiatives and organizational or governance arrangements. As alignment gradually took shape, actors began to commit both material and immaterial resources in pursuit of collectively defined objectives. Yet collaboration remained inherently dynamic and at times fragile. Recurring barriers included limited trust between public and private actors, scepticism among citizens

or users, complex and often slow decision-making processes, and constraints related to infrastructure and spatial availability. Across cases, development unfolded in a longitudinal and non-linear manner, requiring continuous negotiation of priorities, adjustment and recalibration of collaborative strategies.

> *"All of those groups had representatives who you would meet with on a regular basis. On the one hand it helped expedite certain things through the city process, but on the other hand, it meant that you had to work with five agencies that had very different priorities."* (Case 2)

> *Disparities in quality of solar panels in Uganda threatened the credibility of companies.* (Case 3)

Case 3 illustrates how trust between public and private actors can emerge when roles, responsibilities and risk-sharing mechanisms are clearly defined. It represents a configuration in which economic value creation is explicitly aligned with social objectives through the deployment of environmentally sustainable technologies. Local enterprises operate with a commercial logic, seeking financial returns from the provision of renewable energy products and services. However, market expansion depends on the purchasing capacity of economically vulnerable populations. To address this constraint, firms introduced context-sensitive financial mechanisms, such as *pay-as-you-go* models, enabling affordability while maintaining business sustainability.

> *At the kiosks, users could not only charge their phones or use to connect to the internet, but also receive digital services such as payment service from the franchisee. […] The devices economically empowered a group often denied opportunity in the Uganda labour market. 'Most of the kiosks owners were women'.* (Case 3)

> *By introducing solar-powered water pumps for drinking and irrigation, Innovation Africa helped both to raise the burden of unpaid work off women and to improve community health*. (Case 3)

Across the public–private alliances examined, an effective starting point appears to lie in informal agreements that allow actors to experiment with innovative solutions before formalising shared governance arrangements. These preliminary, flexible forms of collaboration create space for trust-building and mutual learning, reducing the risks associated with immediate institutionalisation.

> *Davis, for one, was adamant about keeping the city's relationship with the Conservancy fluid, eschewing formal contracts or announcements that might suggest the city was receding control of the property to the private sector* "*There was no lease. There was no license agreement. There wasn't anything."* (Case 2)

> *The association organises street parties and other social events […] also to provide a platform for other NGOs […] the neighbourhood plays an important role in 'nudging' the local council to become more forward-thinking.* (Case 4)

All the cases also show that having contemporary bottom-up movements and top-down support is central to ensuring that the experimental phase evolves into ordinary changes. Furthermore, it emerges that individual leaders and collective boards are needed to push forward the collaboration by adhering to and spreading the transformative imaginaries on a local basis.

> *The Proximity care activities needed top-down support in order to achieve concrete changes in health and social care processes. Indeed, the research team was involved in merging the contributions from the territory with the formal actions required to catalyze them.* (Case 1)

> *The most important partnership here is between engaged and passionate citizens and their government.* (Case 2)

> *The U.N. Capital Development Fund (UNCDF) […] Rather than focusing on national governments or corporations, the organization developed expertise in assisting both local governments and private actors. (Case 3)*

Decentralizing responsibilities can also enhance the activation of local resources. This element relates to a devolving power initiative from institutional actors and standard alliances and to open innovation approaches.

> *Engaging local municipalities and citizens in actively collaborating with the public services has been key to guaranteeing successful implementation. Furthermore, it was central to building trust among actors and the targeted territory over time. The higher the rate of participation, the more enlarged set of resources and impacts could be created.* (Case 1)

> *"I learned that there was something, not quite magical but very dramatic, that began to happen when you decentralized authority. Instead of everything having to come to the commissioner, you start pushing it down and creating people in charge of pieces of who a sense of their own, the breadth of authority you're willing… to delegate to them. You begin to have more efficient things begin to happen more innovation."* (Case 2)

Since collaboration is not always for good purpose, we should underline some negative side-effects of the models introduced in the cases. In fact, public-private partnerships can lead to corruption or inequitable access to good quality services and products.

> *The High Line did create a real estate boom. For some, that was a negative. The pace, scale and price range of much of the development adjacent to the High Line raised questions about equity and influence in city planning.* (Case 2)

Overall, it is clear that facilitating or hindering elements have relevance and activate according to specific imaginaries, actors, and infrastructure configurations at the local level. The contingent evolution of shared values and imaginaries seems to give diverse relevance to the elements, thus favouring or impeding the value creation processes. The Uganda case is emblematic in this regard. The growth of the off-grid solar market was driven by the convergence of complementary imaginaries: on the one hand, the bottom-of-the-pyramid approach, which frames economically

vulnerable populations as active market participants; on the other, a vision of socially responsible investment pursued by firms operating in the renewable energy sector.
Public-private partnerships emerged overall as a flexible and adaptable model, while also raising questions about the concrete risk of generating inequity and so diminishing the social sustainability of the solutions. For example, the more active communities could achieve better results just because of their visibility for the public actors. Furthermore, there exist public-private partnerships less performative than others.

> *"Some cities argued that large gifts claimed as tax deductions cost the public pursue needed tax revenues, and benefited already wealthy parks while depriving the general public".* (Case 2)

The Proximity Care and THE initiatives offer a particularly interesting approach to addressing this risk. Rather than concentrating innovation in central and already well-served areas, they encourage centres of research excellence and advanced care provision to engage directly with decentralised and often marginalised territories and populations. In doing so, the projects aim to counterbalance patterns of inequity that are frequently reinforced by conventional models of innovation diffusion, whereby new solutions are firstly implemented in urban centres and only later extended to more remote or underserved areas. Similarly, the New York City parks case reports suggestions regarding *the creation of a Neighborhood Parks Alliance, which would form partnerships between a well-financed conservancy, a "contributing park" and "member parks" in need of more money and support.* In practice, the Central Park Conservancy had already extended its management model to twelve additional parks through an expanded agreement with the city, demonstrating the potential of cross-park resource redistribution within a collaborative framework. At the same time, representatives of the High Line leadership emphasised that public funding alone was insufficient to sustain urban park systems, arguing for broader reinvestment across the city and beyond traditional public–private arrangements. However, the reliance on private funding raises normative concerns. While private contributions can enhance public services, they should not justify reductions in public expenditure without transparent consideration of the distributive and allocative implications of such choices.

Research limitations. Our analysis has many limitations. First of all, the selection of cases was based on a purposive sample according to a specific reference framework. It could be interesting to apply a similar analysis to other cases coming from different data sources and further geographical and cultural contexts. Secondly, we focused our analysis on the explicit value definitions of stakeholders while there could be some covered goals and imaginaries that pushed forward the reported cases. Finally, further research would be needed to better explore the implications of local approaches for the global ecosystems where the stakeholders arrangements are embedded in.

Discussion and Managerial implications. The presented results showed concrete examples of values-led collaborations oriented to sustainable development. The central aspect to be underlined regards the importance of building the process over time and across interests (Ansell and Gash, 2008; Veeman and Politylo, 2003). Collaborative configurations can have moments of turbulence over time. Initial sharing of values needs to be supported by an organizational attitude to seek solutions that adapt step by step to the evolution of contexts. The establishment of iterative shared-value and innovation processes can ensure flexibility if contexts, people, and resources change. To this end, change management practices should be implemented at different decision-making levels (Da Ros et al., 2024).

Ecosystems need continuous effort to stabilize the collaboration over time. Indeed, it could be the case that impact emerges as a "contingency" - which is the project –, thus the joint efforts remain punctual over time and cannot be valued as possible transferable models of action. Managers should always envision a portion of projects dedicated to testing and developing scalability models over time and in other comparable areas (anonymised; Hofstad et al., 2026).

Institutional theory reminds us that organisational change is embedded within broader normative, regulative and cultural-cognitive structures (Scott, 2014). Similarly, research on socio-technical transitions demonstrates that sustainable transformation requires supportive institutional arrangements capable of sustaining new practices beyond isolated experiments (Geels, 2002). Without such support, sustainability initiatives risk remaining fragmented or short-lived.

Capitals are needed for effective and durable alliances. Financial, human, and social capitals are central and should be used with the right intention and sustained over time. Transformative imaginaries are also crucial to orient individual and collective actions towards complex goals, especially when innovations are introduced in contexts with scarce resources or conflicting needs to be merged (anonymised; Bryson et al., 2015; Porter and Kramer, 2011). Surely, a shared value orientation does not eliminate tensions between economic, social, and environmental goals; rather, it provides a normative anchor through which such tensions can be deliberated and governed in the specific places.

Each of the presented cases required a personalized-innovation pathway to ensure the effectiveness of solutions in non-standard territories (Hambleton and Howard, 2013; Kubacki et al., 2017). Managers can take advantage from imagining modular approaches that adapt to local ecosystems. For example, private interests in the Uganda case led to the development of incremental innovations regarding service models adapted to local needs more than disruptive introduction of technologies or big changes.

Public–private efforts integration highlights the importance of mobilising heterogeneous resources, competencies, and capitals across organisational boundaries if the aim is to address complex issues while guaranteeing sustainable development (Stanton and Oliver, 2026). Resource dependence theory suggests that organisations can rely on external actors to access critical resources, thereby shaping patterns of collaboration and power (Pfeffer and Salancik, 1978). More recent work on ecosystems and cross-sector partnerships further emphasises that complex societal challenges require

coordinated action among public, private and third-sector actors (Adner, 2017; Bryson et al., 2015). Indeed, integrating diverse resources expands the capacity to pursue economic viability, social provision, and environmental responsibility simultaneously. As the cases show, institutions need time and space to reduce their prejudices and setting up joint actions.

Regarding the private sphere, common people and communities emerge as concrete protagonists of sustainable development strategies for value creation. Citizen and community engagement reflects the recognition that sustainability challenges cannot be addressed through managerial decision-making alone. Stakeholder theory has long emphasised that organisations are embedded in networks of relationships that shape both legitimacy and performance (Freeman, 1984; Mahajan et al., 2023). More recent work highlights the importance of including diverse actors - including citizens, community groups and civil society organisations - in co-producing public value and negotiating complex trade-offs (Ansell and Gash, 2008; Audretsch et al., 2022; Bryson et al., 2015; Osborne et al., 2022). Engaging communities is therefore not merely a participatory add-on, but a structural condition for redefining organisational purposes in multidimensional terms. If public administrations withdraw into themselves, they miss the opportunity to best bring out or channel the hidden capital of civic activism (Bovaird and Loeffler, 2014; De Rosis et al., 2020; Loeffler, 2021). And they also miss the opportunity to learn new skills, activating open innovation circuits where there is usually stagnation due to bureaucratic rigidity (Audretsch et al., 2022; Cui and Wu, 2016; Hubert, 2011). Companies for their part can build alliances and increase market's trust thanks to actions that on the at a first sight seem only collateral to their core values. Yet these actions may contribute to their reputation and growth in terms of customer and stakeholder relationships while orienting their organizations towards sustainable development, as known. Furthermore, as with the High Line Park example, collaborating to create public value could also bring benefits in terms of private revenues while guaranteeing a balance with social and environmental sustainability (Porter and Kramer, 2011).

Originality of the paper. This work presented a multiple case study analysis to illustrate concrete examples of values-led collaborations towards sustainable development in specific territories. Firstly, we underlined the need for enhancing evidence-based studies regarding the translation of strategic management into sustainable-oriented actions. Secondly, qualitative evidence was used to underline the facilitating and hindering factors to be implemented or addressed when developing alliances towards sustainable development. Finally, we discussed the results by showing the central topics that both public and private managers should consider when working with complex issues by adopting a sustainable development vision. By examining how stakeholders define value, allocate responsibility, and govern trade-offs across economic, social and environmental dimensions, this study aims to contribute to management and organisation scholarship in three ways. First, it shifts the focus from sustainability as outcome to sustainability as process. Second, it advances understanding of how organisations operationalise value pluralism under growth constraints. Third, it unveils the role of collaborative arrangements in enabling transformative pathways towards sustainable development.

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Certified management systems as governance infrastructures for ESG assurance readiness

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Abstract. *The introduction of mandatory assurance for sustainability information, reinforced by the Corporate Sustainability Reporting Directive (CSRD), has accelerated the diffusion of ESG verification practices while simultaneously highlighting several operational challenges related to data quality, the fragmentation of information processes, and the weakness of internal control systems. Although the literature has extensively examined sustainability reporting frameworks and assurance standards, comparatively less attention has been devoted to the organizational infrastructures that enable their effective and credible implementation.*

This study investigates the role of certified management systems as governance mechanisms supporting ESG assurance, interpreting them as organizational infrastructures capable of structuring information flows, strengthening internal control processes, and improving the reliability of sustainability data. Adopting a comparative qualitative research design, the study analyzes firms characterized by different configurations of ISO 9001 and ISO 14001 certification, comparing certified and non-certified organizations. The analysis is based on a structured protocol derived from international assurance standards and focuses on four key dimensions: ESG data traceability, the formalization of internal control processes, the breadth of the assurance scope, and the level of assurance adopted.

The findings show that certified management systems operate as governance infrastructures that enable higher-quality assurance practices by promoting more reliable data, more structured verification procedures, and a greater organizational readiness to adopt more advanced levels of assurance. The contribution of this study lies in reinterpreting ESG assurance not merely as a technical compliance requirement, but as the outcome of organizational capabilities embedded within management systems. In doing so, the research offers theoretical implications for the literature on sustainability governance and managerial insights for the structural integration of ESG practices into corporate processes.

Keywords. *ESG assurance; certified management systems; sustainability governance; ISO 9001; ISO 14001; ESG data quality; organizational transformation.*

Framing of the research. *The primary goal of the CSRD is to elevate sustainability reporting to the same level of importance as financial disclosure, repositioning ESG disclosure as a structural component of corporate governance rather than a peripheral communication tool. ESG strategies have become critical differentiation factors—not only due to the growing relevance of the triple bottom line (Elkington, 1997), but also because companies face increasingly stringent legislation on non-financial disclosure and intensifying stakeholder expectations regarding corporate social responsibility. In this perspective, sustainability reporting is progressively embedded into strategic and governance architectures, reinforcing its role in value creation and legitimacy-building processes (Eccles, Ioannou, & Serafeim, 2014).*

The directive CSRD imposes two key obligations: (1) annual management reports must include sustainability information aligned with European Sustainability Reporting Standards (ESRS); and (2) all sustainability reports must undergo assurance by an auditor or authorized provider. According to the CSRD (2022), from 2024, large companies already subject to the NFRD are required to publish sustainability statements in accordance with ESRS guidelines, while listed SMEs will progressively enter the scope of application. The directive introduces the principle of double materiality and requires limited assurance as a minimum, with the European Commission mandated to adopt more detailed assurance standards by October 2026.

At the global level, the regulatory landscape has further evolved with the introduction of IFRS Sustainability Standards, consolidating ESG reporting into a transnational governance architecture. Within this context, the most widely adopted sustainability assurance standards are ISAE 3000 (IAASB, 2013) and AA1000AS (AccountAbility, 2020). ISAE 3000 governs assurance engagements other than audits or reviews of historical financial information and is predominantly adopted by accounting-based assurance providers, while AA1000AS adopts a principles-based, stakeholder-oriented approach and is more frequently used by non-accounting providers. Both frameworks distinguish between limited and reasonable (or high/moderate) assurance levels, reflecting different degrees of evidence gathering and confidence.

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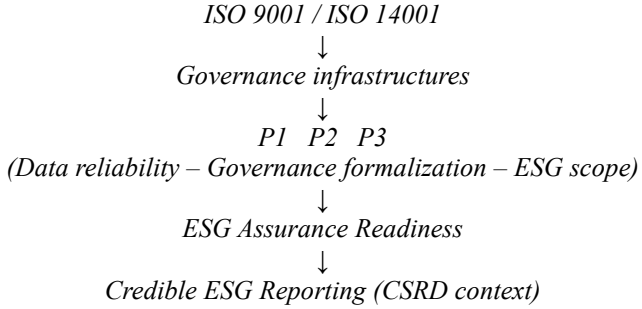
The assurance process aims to enhance credibility, transparency, and reliability of non-financial information, serving as a strategic instrument to strengthen trust among shareholders, creditors, and broader stakeholder groups. Prior research highlights that assurance contributes to reducing informational asymmetries and enhancing market confidence (Simnett, Vanstraelen, & Chua, 2009; Cohen & Simnett, 2015; Garefalakis et al., 2025). However, two critical issues emerge. First, under stringent regulatory requirements, assurance risks being perceived as a mere compliance exercise—a "tick-box" activity aimed at satisfying legal obligations rather than substantiating authentic ESG commitment. Second, as Doxey and Sealy (2022) suggest, mandatory sustainability reporting and assurance may exacerbate the expectation gap (Porter, 1993) between auditors and users (Deegan et al., 2006), generating discrepancies between what auditors perform and what stakeholders expect in terms of accountability, transparency, and forward-looking ESG performance.

In parallel, ISO Management System Standards represent a structured mechanism for standardizing CSR-related practices, reducing operational risks and costs, and enhancing stakeholder trust (Boiral, 2011). These voluntary frameworks—particularly ISO 9001 (Quality Management Systems) and ISO 14001 (Environmental Management Systems)—formalize managerial routines and embed sustainability into operational processes (Delmas & Montiel, 2009; Heras-Saizarbitoria & Boiral, 2013). Recent bibliometric analyses further highlight the growing role of ISO management system standards within the corporate sustainability literature, emphasizing their contribution to the integration of environmental and governance practices into organizational routines (Ronalter, Poltronieri & Gerolamo, 2023).

ISO 9001 emphasizes process-based approaches, KPI monitoring, and continuous improvement (Fahmi et al., 2021; Hunt et al., 2021; Khan et al., 2020), while ISO 14001 institutionalizes environmental performance monitoring, waste reduction, and emission control (Dewi et al., 2020; Hunt et al., 2021). Through these mechanisms, firms strengthen data traceability, documentation discipline, and internal control routines—core organizational elements potentially underpinning credible ESG assurance.

Moreover, in the evolving European landscape—characterized by the Corporate Sustainability Due Diligence Directive (CSDDD) and subsequent regulatory recalibration through the Omnibus I simplification package—the scope and intensity of sustainability obligations have been strategically adjusted to balance competitiveness and accountability. In such a context, the need for robust, internally grounded assurance practices becomes even more salient, as firms must demonstrate factual social and environmental commitment beyond formal regulatory compliance. Consequently, ESG assurance effectiveness appears increasingly dependent on the maturity of internal governance infrastructures rather than solely on the formal adoption of external standards (De Roeck, Maon, & Haar, 2021; Kuo, Yeh, & Yu, 2022; Adams, 2015; Wang, 2023).

Figure 1. Certified management systems as governance infrastructures enabling ESG assurance readiness (own elaboration)



Purpose of the paper. *Against this regulatory and governance backdrop, the objective of this research is to assess whether and how the adoption of ISO 9001 and ISO 14001 systems improves the quality and effectiveness of ESG assurance according to ISAE 3000 and AA1000AS standards. The study is grounded in the assumption that ESG assurance effectiveness is not merely a function of externally imposed assurance standards but is deeply embedded in organizational governance infrastructures shaped by certified management systems.*

Specifically, the research question guiding this study is: can certified management systems reduce the application-related criticalities of assurance standards and support the transition to higher levels of assurance? By conceptualizing assurance as an integrated management tool rather than an isolated technical requirement, this study aims to bridge the gap between legal obligation and substantive ESG governance.

Building on this framework, three propositions are formulated. First, ISO-certified firms show higher ESG data reliability (P1), as formalized procedures and monitoring systems enhance data traceability and control discipline (Simnett, Vanstraelen & Chua 2009). Second, ISO certification is associated with broader assurance scope (P2), given the structured integration of sustainability processes across organizational functions (Cohen & Simnett 2015). Third, ISO certification is associated with stronger formalization of internal governance and control mechanisms supporting ESG assurance (Wang 2023) (P3). Through this perspective, the paper contributes to the literature on sustainability

governance and management systems by reframing ESG assurance as an organizational capability emerging from structured governance routines rather than as a purely regulatory compliance mechanism.

Methodology

Research design. This study adopts an exploratory comparative multiple-case study design to investigate whether certified management systems function as organizational governance infrastructures supporting ESG assurance readiness. Case study methodology is particularly suitable for examining emerging managerial phenomena characterized by regulatory transformation and evolving governance practices (Eisenhardt, 1989; Yin, 2018). Consistent with case-based research traditions, the objective of the analysis is analytical rather than statistical generalization, aiming to identify organizational mechanisms linking certified management systems to ESG data governance and assurance-related practices (Yin, 2018). Cases were selected through theoretical sampling to ensure variation in governance infrastructures while maintaining sector comparability (Eisenhardt & Graebner, 2007). The sample includes five firms operating in the Italian coffee production industry, a sector increasingly exposed to sustainability pressures related to environmental impact, responsible sourcing, and supply chain transparency. In the analysis of the five coffee sector firms, case selection did not prioritize firm size—while acknowledging its analytical relevance—but rather the materiality of corporate responsibility practices and observed theoretical variation. Consistent with Gioia et al. (2013) and Small (2009), in inductive comparative studies the crucial element is not the number or homogeneity of cases, but the empirical depth of the data, their theoretical relevance, and the quality of the comparison to identify significant ESG organizational patterns. Case selection followed four criteria: sector homogeneity, availability of ESG and sustainability documentation, variation in ISO certification status (ISO 9001 and ISO 14001), and the presence of observable sustainability disclosure practices. The final sample includes three ISO-certified firms and two non-certified firms, enabling comparison between different levels of managerial formalization. Although the firms differ in organizational size and complexity, the analysis does not aim to isolate causal effects but rather to explore whether certified management systems are associated with more structured governance infrastructures supporting ESG assurance processes. The empirical analysis relies on multiple documentary sources to enhance construct validity through data triangulation (Yin, 2018), including sustainability reports and ESG disclosures, corporate governance documents, codes of ethics and compliance frameworks, documentation related to quality and environmental management systems, and publicly available information on sustainability policies and supply chain practices. These materials provide insights into governance routines, ESG data management processes, and disclosure practices relevant to sustainability assurance. Building on prior literature on sustainability assurance and governance infrastructures (Simnett, Vanstraelen, & Chua, 2009; Cohen & Simnett, 2015; Bakarich, Baranek, & O'Brien, 2023), four analytical dimensions were identified: ESG data reliability and traceability, referring to the extent to which sustainability information is systematically measured and documented; formalization of governance and control mechanisms, referring to the presence of structured compliance systems, internal controls, and governance procedures; breadth of ESG disclosure perimeter, referring to the scope of sustainability information disclosed across environmental, social, and supply chain dimensions; and ESG assurance readiness, referring to the degree to which organizational processes and documentation routines appear capable of supporting credible external assurance. These dimensions capture key organizational capabilities that facilitate credible ESG assurance processes (Ruohonen & Kullas, 2024; Sánchez, Zorio-Grima, & Merello, 2026). The analysis followed a two-stage procedure. First, within-case analysis was conducted to map governance structures, ESG disclosure practices, and management routines for each firm. Second, cross-case comparison was used to identify recurring patterns associated with ISO-certified management systems. This analytical strategy follows the logic of pattern matching and replication typical of comparative case study research (Yin, 2018), allowing identification of organizational configurations that may support ESG data governance and potential assurance processes.

Results. *The comparison is conducted between three firms certified under ISO 9001 and ISO 14001(Borbone, Esse Caffe and Kimbo) and two non-certified firms (Dersut and Goppion), suggesting that certified management systems are associated with more structured CSR and ESG governance practices.*

The analyzed sample comprises five firms operating within the same industry (coffee production). The comparison is based on three key dimensions:

- *Environmental attention (CO_2e tons, packaging sustainability, environmental protection initiatives);*
- *Social impact (gender gap and local community engagement);*
- *Governance (presence of Model 231 and Code of Ethics) and Supply chain (sustainable sourcing and certified suppliers).*

A comparative overview of key ESG governance indicators across the analyzed firms is presented in Table 1, in particular:

- ***Environment (E):** The analysis highlights how ISO-certified companies leverage ISO 14001 to translate environmental performance into objective KPIs, thereby facilitating the work of assurance providers;*

- ***Social (S):*** *Non-certified firms tend to focus on ad-hoc, local, and voluntary initiatives. Conversely, ISO-certified firms formalize the 'S' pillar through sustainable procurement procedures, rendering social impact measurable and auditable;*
- ***Governance (G):*** *Governance mechanisms (e.g., 231 Models, Ethical Codes) and Supply chain governance within ISO-certified firms are not treated in isolation; rather, they are embedded within the quality management system. This ensures that sustainability policies are not merely declarative but effectively monitored and enforced.*

Table 1 – Comparative ESG governance indicators between ISO-certified and non-certified firms

Dimension	***Indicator***	***ISO firms (n=3)***	***Non-ISO firms (n=2)***
Environmental management	*Carbon footprint measurement*	*3 / 3 firms*	*0 / 2 firms*
	Sustainable packaging	*3 / 3 firms*	*1 / 2 firms*
	Environmental initiatives	*3 / 3 firms*	*1 / 2 firms*
Social impact	*Women employees (%)*	*20.3%*	*48.5%*
	Local community initiatives	*3*	*4*
Governance structures	*Model 231*	*3 / 3 firms*	*0 / 2 firms*
	Code of ethics	*3 / 3 firms*	*2 / 2 firms*
Supply chain governance	*Sustainable procurement policies*	*3 / 3 firms*	*0 / 2 firms*
	Certified suppliers	*2 / 3 firms*	*1 / 2 firms*

Although firm size remains a relevant contextual factor in the adoption of ISO certifications—often a determinant of resource availability and integration into global value chains—this study focuses specifically on the organizational practices associated with these standards. By holding organizational scale as a backdrop, the analysis isolates the role of certified management systems in structuring governance mechanisms relevant to ESG assurance. The comparative analysis examines five firms operating in the Italian coffee production industry, including three companies certified under ISO 9001 and ISO 14001 and two firms without such certifications. The analysis aims to identify organizational patterns associated with certified management systems and to explore their role in structuring governance mechanisms relevant to ESG assurance.

The evidence provides support for Proposition 1 (P1), which suggests that certified management systems are associated with higher levels of ESG data reliability and traceability. Firms operating under ISO-certified systems systematically quantify environmental indicators, such as carbon emissions, and provide more structured documentation of sustainability-related metrics within their reporting frameworks. In contrast, non-certified firms tend to rely more heavily on descriptive narratives that highlight environmental initiatives without consistently adopting standardized measurement systems or methodological explanations. This difference does not necessarily indicate superior environmental performance; rather, it reflects the presence of more formalized procedures for collecting, monitoring, and documenting sustainability-related information, thereby enhancing the traceability and reliability of ESG data.

The analysis also provides evidence consistent with Proposition 2 (P2), which proposes that certified management systems are associated with a broader scope of ESG disclosure and sustainability practices. ISO-certified firms demonstrate more structured environmental and supply chain initiatives, including sustainable packaging strategies, environmental monitoring systems, and supplier qualification processes incorporating sustainability criteria. These practices indicate that ESG considerations are more systematically integrated into organizational processes and extend beyond internal operations to include elements of supply chain governance. Non-certified firms also engage in sustainability initiatives, particularly through community-oriented activities and local social involvement; however, such initiatives are generally less embedded within formal management systems and therefore more difficult to translate into standardized ESG metrics and structured reporting practices.

Finally, the findings support Proposition 3 (P3), which posits that certified management systems are associated with stronger formalization of governance and internal control mechanisms relevant to ESG management. Firms adopting ISO standards display higher levels of organizational formalization through documented procedures, governance frameworks, and internal monitoring routines that support the management and verification of sustainability-related information.

A significant finding emerges from the comparative analysis: none of the evaluated firms currently adopts external ESG assurance. The sustainability reports and social balance sheets prepared between 2023 and 2024 were not subject to third-party verification under ISAE 3000 or AA1000 standards, as such assurance remains outside current mandatory requirements. Despite the absence of formal external verification, ISO-certified firms exhibit governance structures, monitoring routines, and documentation practices capable of supporting verification processes. This suggests that certified management systems may function as preparatory infrastructures supporting ESG assurance readiness.

In this context, ISO 9001 and ISO 14001 certifications play a significant role in strengthening the credibility of ESG-related practices. Certified management systems operate as verifiable internal managerial tools that signal genuine corporate commitment to sustainability through auditable processes and structured data governance. These characteristics help bridge the assurance gap in voluntary ESG reporting by providing organizational mechanisms that facilitate the generation of traceable and verifiable sustainability information.

Overall, the findings indicate that while ISO certifications do not necessarily determine the substantive level of ESG performance, they contribute to structuring internal governance routines that underpin credible sustainability reporting. Rather than directly improving ESG outcomes, ISO-based systems appear to facilitate the development of internal monitoring mechanisms, standardized documentation procedures, and governance structures that enhance the reliability and traceability of sustainability information.

The evidence indicates that ESG assurance readiness depends not only on using external assurance standards but also on the maturity of internal governance in certified management systems. ISO certifications can help firms move from voluntary sustainability disclosure to more structured and verifiable ESG reporting.

Research limitations. *This study provides exploratory insights into the role of ISO 9001 and ISO 14001 as governance infrastructures potentially supporting ESG assurance readiness. However, some limitations should be acknowledged. First, the small number of cases prevents statistical generalization; consistent with qualitative case study research, the findings should therefore be interpreted as analytical generalizations identifying potential organizational patterns rather than causal relationships (Yin, 2018). Differences in firm size and organizational complexity may also influence governance formalization and ESG disclosure practices; nonetheless, this study intentionally prioritizes the analysis of management practices over scalar differences. Second, the analysis relies on document-based desk research using publicly available sources such as sustainability reports and governance documentation. Although this approach enables data triangulation, reliance on disclosed information may introduce reporting bias and does not allow direct observation of internal processes. Future research could expand the empirical scope through larger cross-sector samples and complementary qualitative or quantitative methods.*

Managerial implications. *The findings of this study provide several managerial insights for organizations facing the increasing institutionalization of sustainability reporting and assurance requirements. In particular, the results suggest that certified management systems such as ISO 9001 and ISO 14001 can function as internal governance infrastructures that support the structuring of ESG information and the development of assurance-ready processes. By formalizing operational procedures, monitoring activities, and documentation routines, these systems facilitate the collection and traceability of sustainability-related data, which are critical elements for credible ESG disclosure. Prior research has highlighted that structured management systems contribute to embedding sustainability practices within organizational processes and strengthening transparency toward stakeholders (Boiral, 2011; Delmas & Montiel, 2009; Heras-Saizarbitoria & Boiral, 2013).*

From a managerial perspective, these findings are particularly relevant in light of the growing regulatory pressure introduced by frameworks such as the Corporate Sustainability Reporting Directive (CSRD), which requires companies to provide more structured, comparable, and verifiable sustainability information. In this context, managers may benefit from leveraging existing management systems not only as operational tools but also as governance mechanisms capable of strengthening internal control environments and supporting the reliability of ESG data. Previous studies emphasize that robust internal governance structures play a key role in enhancing the credibility of sustainability reporting and facilitating external assurance processes (Simnett, Vanstraelen, & Chua, 2009; Cohen & Simnett, 2015).

Integrating ESG indicators within established management systems may help organizations move beyond symbolic sustainability disclosure toward more structured and verifiable practices. Embedding sustainability metrics into existing managerial routines can support more consistent monitoring of ESG performance and reduce the risk of superficial reporting practices often associated with greenwashing. In this sense, strengthening internal governance mechanisms represents a practical pathway for managers seeking to improve the credibility of sustainability commitments and reinforce stakeholder trust in corporate ESG strategies (Busch & Friede, 2018; Eccles, Ioannou, & Serafeim, 2014). The implications of this study transcend the mere analysis of management systems, positioning ESG as a transversal prerequisite for long-term corporate survival. In an increasingly complex regulatory landscape, characterized by the growing demand for external assurance—notably under the CSRD—the adoption of ISO 9001 and ISO 14001 standards functions not merely as a compliance exercise, but as an enabling governance infrastructure. While external assurance remains a future requirement for these firms, the structural 'readiness' provided by ISO certifications suggests that

certified organizations are significantly better equipped to bridge the gap between their ESG performance and the assurance of their sustainability reporting.

The central thesis posits that, in response to sustainability demands necessitating pragmatism and efficiency—consistent with the objectives of the Omnibus I simplification package—certified management systems act as 'complexity reducers'. They enable firms to transition from self-referential narratives to approaches grounded in traceable data and formalized processes. Consequently, the adoption of these standards is not a

procedural shortcut, but a mechanism that enables firms to meet limited assurance requirements—thereby validating their commitment to stakeholders—while simultaneously minimizing information asymmetries and transaction costs associated with external verification. Ultimately, certification serves as an indicator of 'organizational soundness,' allowing firms to navigate the complexities of the sustainable transition and transforming regulatory obligations into a strategic lever for competitive positioning.

Originality of the paper. *This study contributes to the growing debate on sustainability governance by offering a governance-based interpretation of ESG assurance readiness. While existing literature has extensively examined sustainability reporting standards, regulatory developments, and the diffusion of assurance practices, comparatively less attention has been devoted to the internal organizational infrastructures that enable credible ESG assurance. Recent research highlights the role of assurance in enhancing the reliability and credibility of sustainability information (Simnett, Vanstraelen, & Chua, 2009; Cohen & Simnett, 2015; Bakarich, Baranek, & O'Brien, 2023), yet the organizational mechanisms that support these outcomes remain insufficiently explored. The originality of this study lies in conceptualizing certified management systems, specifically ISO 9001 and ISO 14001, not merely as operational or compliance-oriented tools, but as governance infrastructures that structure ESG data management, internal control routines, and organizational processes relevant to sustainability assurance. By examining firms with different certification configurations, the study shows how these systems may contribute to the development of organizational capabilities that facilitate ESG data traceability, formalized governance practices, and broader sustainability disclosure frameworks.*

In doing so, the paper bridges two research streams that have often evolved separately: the literature on sustainability reporting and assurance, and the literature on management system standards and organizational formalization. While previous studies have emphasized the role of ISO standards in improving operational efficiency and environmental management (Boiral, 2011; Heras-Saizarbitoria & Boiral, 2013), their potential implications for ESG assurance and sustainability governance have received limited attention. By linking certified management systems to the structuring of ESG information and assurance-related governance routines, this study reframes ESG assurance not simply as a regulatory compliance mechanism but as an organizational capability embedded within internal management architectures.

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Configurations of Resilience in Inter-Organizational Networks

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Abstract. *This study examines how inter-organizational business networks build resilience in the face of crises. Prior research has mainly treated structural characteristics and coordination mechanisms as separate explanations of resilience. However, we still lack a clear understanding of how these elements combine to influence resilience outcomes across networks with varying characteristics. We adopt a configurational perspective and investigate how these elements jointly shape networks' time to recovery after disruption. Using survey data on 224 Italian formal business networks ("contratti di rete") and fuzzy-set Qualitative Comparative Analysis (fsQCA), we identify configurations associated with both resilience and non-resilience. The findings show that resilience consistently depends on the joint presence of resource complementarity and relational coordination, while the role of formal coordination varies across network configurations. More specifically, we develop a scale-contingent view of inter-organizational resilience: in small, vertically organized networks, resource complementarity and relational coordination can sustain fast recovery, whereas in large, horizontally organized networks, fast recovery requires formal coordination alongside relational practices. Overall, this study advances a configurational understanding of network resilience by showing that fast recovery depends on distinct combinations of network structure and coordination mechanisms, rather than on any one-size-fits-all network design.*
Keywords: *business networks; resilience; formal coordination; fsQCA*

Framing of the research. *Studies on how networks of organizations react to crisis – such as supply chains, innovation ecosystems, humanitarian networks, and trans-organizational systems (Chesley & D'Avella, 2020; Kim et al., 2024; Toufaily & Zalan, 2023) – reveal that inter-organizational resilience cannot be understood as a single capability possessed by individual organizations but as a patterned, collective capacity that allows networks of interdependent firms to sustain or restore functioning when facing external and internal threats.*

Within this literature, a central debate concerns how such resilience is achieved. One stream emphasizes network design, highlighting structural features such as size, structure, and resources as key determinants of resilience (Carnovale et al., 2025; Cobben et al., 2026). A second stream foregrounds collaborative and relational practices, arguing that trust, shared understanding, and coordination routines enable collective recovery even under severe disruption (Kim et al., 2021; Guo et al., 2025). These perspectives are often treated as competing explanations, framing resilience as the outcome of either "more structure" or "more collaboration."

We contend that this opposition may be misleading. Studies on resilient practices and paradoxical organizing show that stability and flexibility, structure and agency, often coexist and interact rather than substitute for one another (Majoor, 2015; Van den Berg, 2021). Similarly, research on ecosystem and supply chain resilience suggests that different combinations of conditions can generate comparable resilience outcomes (Fornasiero & Tolio, 2025; Naderpajouh et al., 2018). Yet, empirical evidence specifying which combinations matter, and under what conditions, remains limited.

Adopting an fsQCA approach for exploring an original dataset of 224 Italian business networks of organizations that signed formal alliances (labelled "contratti di rete"), we identify configurations of network structure and coordination mechanisms that enable networks to recover from crises. Our results show that relational coordination may turn into a liability when it substitutes for resource complementarity or for coordination arrangements suited to larger networks. In doing so, we advance a scale-contingent, configurational theory of inter-organizational resilience: in small, vertically coupled networks, relational and informal coordination can sustain fast recovery, whereas in large, horizontally organized networks, fast recovery requires formal coordination alongside relational practices. By specifying how different configurations of network structure and coordination mechanisms jointly produce resilience, this study contributes to debates on agentic resilience (Kok et al., 2021) and resilient practices (Majoor, 2015) and extends research on inter-organizational systems by moving beyond one-best-way explanations of network resilience.

Purpose of the paper. *This study aims to explain how inter-organizational business networks build resilience in the face of crisis. Specifically, we examine how structural characteristics and coordination mechanisms combine to produce fast recovery, focusing on configurations of network size, verticality, resource complementarity and overlap, and formal and relational coordination. In doing so, we develop a configurational understanding of network resilience. To motivate this objective, we review the literature and identify the gap this study addresses.*

Prior research has highlighted the multiple benefits firms derive from participation in inter-organizational business networks, including enhanced learning and innovation, access to complementary resources, legitimacy, and improved

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performance outcomes (e.g., Cabigiosu et al., 2024; Provan et al., 2007). Building on this stream, recent research has increasingly shifted attention toward how such networks respond when confronted with disruptive events and crisis conditions (e.g. Chesley & D'Avella, 2020; Kim & Doerfel, 2024). In this emerging literature, crises are understood not merely as episodic shocks affecting individual organizations, but as disturbances that propagate through interdependencies, making network-level characteristics particularly salient (Ilseven & Puranam, 2021). In this instance, relevant network attributes are, on the one hand, structural and compositional features that affect the extent to which disturbances can be absorbed without systemic breakdown and, on the other hand, coordination and collaboration mechanisms that influence the network's capacity to mobilize resources and support collective recovery. Accordingly, network performance in times of crisis is increasingly conceptualized in terms of resilience, defined as the ability of the network to maintain core functions under stress and to recover its performance trajectory—returning to pre-crisis levels or achieving improved outcomes within a limited time horizon (Hernes et al., 2025).

Concerning the structural characteristics of business networks, resource complementarity—that is, the extent to which partners possess distinct yet interdependent and mutually reinforcing resources—is generally found to be positively associated with network performance (Jin & Wang, 2021). In the context of crises, resource complementarity may be particularly valuable because it enlarges the network's collective repertoire of resources, thereby increasing its capacity to respond to unexpected disruptions through recombination and redeployment. When shocks undermine established routines or render specific resources temporarily unavailable, networks characterized by complementary resource endowments are better positioned to reconfigure activities and sustain functioning (Duchek, 2020; Williams et al., 2017).

Several scholars emphasize that complementarity does not necessarily imply the absence of similarity between partners. Organizations may simultaneously exhibit complementarity in some resource domains and similarity in others, giving rise to resource-based synergies (Tanriverdi & Venkatraman, 2005). Building on this insight, some studies introduce the notion of resource overlap, which captures the extent to which organizations with different resource endowments may nonetheless share similarities in markets, suppliers, processes, or technological domains (Wang & Zajac, 2007). While prior research offers mixed arguments regarding whether such overlap enhances performance by facilitating coordination and mutual understanding or instead generates competitive tensions, in periods of crisis resource overlap may play a distinct role by supporting network resilience. Specifically, overlap can provide a degree of redundancy and substitutability that allows networks to absorb shocks, compensate for temporarily impaired partners, and reduce dependence on single points of failure. At the same time, shared knowledge bases and overlapping operational domains may facilitate rapid coordination and collective sensemaking (Tasic et al., 2019).

A second relevant aspect in defining the structure of a business network is its degree of verticality, defined as the extent to which network partners are positioned at different stages of the value chain. Whereas some studies (e.g. Runge et al. 2022) argue that vertical relatedness may reduce partners' willingness to share valuable knowledge due to concerns over opportunism and the risk of backward integration, others (e.g., Dyer et al. 2018) suggest that many alliances—particularly buyer–supplier relationships—create value precisely through the combination of complementary tangible assets and specialized capabilities. In periods of crisis, vertical ties can facilitate continuity of operations by securing access to key inputs, coordinating production and distribution activities, and reducing exposure to supply-side disruptions. At the same time, verticality may also introduce vulnerabilities. Power asymmetries and dependency relationships can amplify the impact of disruptions if dominant actors prioritize their own survival or if bottlenecks emerge at specific stages of the value chain. Consequently, the effect of network verticality on resilience is likely to be contingent on how vertical relationships are governed.

A third and final structural characteristic concerns the size of the business network, defined as the number of organizations involved. While a larger number of partners may facilitate risk sharing and increase the pool of available resources and capabilities, prior studies examining the relationship between network size and performance report mixed and inconclusive findings (Heidl et al., 2014). Similarly, in periods of crisis, larger networks can enhance resilience by providing access to a wider range of resources and by increasing the likelihood that at least some partners retain operational capacity when others are disrupted. At the same time, an increase in network size can generate coordination challenges that become particularly salient under crisis conditions. As the number of partners grows, decision-making processes may slow down, communication costs may increase, and the alignment of interests may become more difficult, potentially undermining coherent collective responses. Moreover, large networks may experience difficulties in mobilizing collective action when rapid responses are required, especially in the absence of effective coordination mechanisms (Hillmann, 2021).

The second perspective on network and resilience considers the role of formal and informal coordination mechanisms. Regarding informal coordination mechanisms, relational coordination theory emphasizes the importance of high-quality relationships and communication in managing interdependencies within and across organizations (Bolton et al., 2021). Relational coordination is likely to significantly improve resilience capabilities, helping networks to reduce the negative effects of environmental adversities. In particular, timely communication ensures that information is shared as soon as it becomes available, reducing delays in decision-making and action. Accurate communication involves sharing precise and reliable information, which is critical for making informed decisions during a crisis. Problem-solving communication focuses on addressing issues collaboratively. This approach fosters a culture of teamwork and collective problem-solving, which is essential to anticipate and manage adversities.

Regarding formal coordination mechanisms, short- and long-term planning plays a key role in coping with crises as they provide information that helps actors make sense of disruptions, detect anomalies, and reframe assumptions. In

addition, they shape behavioral and organizational responding by guiding action through revised procedures, prioritising recovery interventions, and by (re)defining responsibilities. However, plans and organizational structures may also narrow attention and reinforce rigid responses if over-emphasised and not complemented by a more interactive use in the subsequent phases (Malmi et al., 2023).

Overall, while extant research has disentangled the distinct implications of structural characteristics and coordination mechanisms for business network performance and (more limitedly) for resilience, it has predominantly examined these dimensions in isolation. As a result, we still lack a comprehensive understanding of how resilient business networks are characterized by the joint configuration of these multiple dimensions. This gap is particularly salient in light of the renewed relevance of resilience as a performance variable, as the increasing frequency of high-impact, low-probability events—such as the coronavirus pandemic, geopolitical conflicts, and raw material shortages—is increasingly threatening firms.

Methodology. *We used the Infocamere register of network contracts to identify all network contracts active as of July 3, 2023. On that date, 8,633 networks were recorded, of which 7,493 were neither bankrupt nor dissolved. Contact information was available for approximately 63% of the potential target population (4,720 networks). The effective sample was further reduced by 35% due to compliance with data protection regulations (EU Regulation No. 2016/679, GDPR).*

Data were collected using a mixed-mode design combining CAWI (Computer Assisted Web Interview) and CATI (Computer Assisted Telephone Interview) between mid-September and mid-November 2023. Among firms reached by telephone, approximately 90% agreed to provide an email address to receive the survey link, together with the privacy notice and a cover letter describing the study objectives. By the end of the fieldwork, approximately 18% of the initial population of 7,493 networks had completed the questionnaire. Overall, the survey yielded 224 completed questionnaires, corresponding to about 3% of the initial target population.

The survey was administered to a key informant within each network (e.g., network manager, representative of the lead firm, or member of the governing body), asking respondents to refer to the most recent year of network activity. The survey instrument included multiple sections; for the purposes of this study, we focused on items capturing network structural characteristics, coordination mechanisms, and resilience outcomes.

Network size *was measured as the total number of member firms.* Network verticality *was derived from respondents' classification of the network as vertical, horizontal, or mixed, and calibrated to distinguish predominantly vertical versus horizontal configurations.* Resource complementarity *was measured through a multi-item, 5-point Likert scale assessing the perceived complementarity of tangible resources, managerial experience, and intangible knowledge among partners.* Resource overlap *was captured using items evaluating similarity in products/services, strategic positioning, and overlap in distributors, clients, and suppliers.*

Relational coordination *was operationalized through items capturing informal interaction, collaborative problem-solving, timely and accurate communication, and overall coordination quality.* Formal coordination *was measured through items assessing the presence of formal governance mechanisms, structured planning processes, operational plans, formal agreements, and organizational structures.*

Finally, resilience *was operationalized as time to recovery after major disruptive events, where respondents indicated how long the network took to fully recover from the most severe crisis experienced in the previous three years. This measure was used to distinguish networks characterized by fast versus slow recovery.*

To analyze the data, we employed fuzzy-set Qualitative Comparative Analysis (fsQCA; Fiss, 2011) to examine how network characteristics combine to shape resilience, operationalized as (short) time to recovery after disruption (DesJardine et al., 2019). FsQCA is a configurational, set-theoretic approach that allows researchers to move beyond estimating the net effects of independent variables and instead identify how multiple conditions jointly combine into configurations that are (not) sufficient for an outcome. The method is particularly well suited to capturing conjunctural causation (i.e., outcomes resulting from specific combinations of conditions), equifinality (the possibility that multiple pathways lead to the same outcome), and causal asymmetry (the idea that the configurations leading to the presence of an outcome may differ from those leading to its absence).

In line with this approach, we calibrated fuzzy sets for network size*,* network verticality *(vertical vs. horizontal structure),* resource overlap, resource complementarity, relational coordination, *and* formal coordination *using theoretically informed thresholds. Calibration transformed raw survey data into set membership scores ranging from full non-membership (0) to full membership (1), enabling the assessment of whether a given network belongs to the set of "large networks," "high complementarity networks," or "high relational coordination networks," and so forth. We then constructed truth tables and applied established consistency and coverage thresholds to identify configurations sufficient for fast recovery and, separately, for the negated outcome (not fast recovery), allowing us to assess asymmetric causal patterns.*

In Tables 1 and 2, in which we report our main results, black circles (●) indicate the presence of a condition within a configuration, while crossed circles (⊗) indicate its absence. Blank cells represent "don't care" conditions, meaning that the presence or absence of that element is not decisive in that specific pathway. Following Fiss (2011), core conditions (large symbols) are those appearing in both the parsimonious and intermediate solutions, whereas peripheral conditions (smaller symbols) appear only in the intermediate solution and play a supporting role within configurations.

Consistency values indicate the degree to which networks sharing a given configuration display the outcome (fast or slow recovery), whereas coverage reflects the empirical relevance of each configuration in explaining the observed cases.

As a first step, we conducted the analysis of necessary conditions to identify conditions that are required for the occurrence of the outcome. In fsQCA, a condition is considered necessary (or almost always necessary) when its consistency exceeds the conventional threshold of 0.90. The results show that only the relational coordination index exceeds the 0.90 consistency threshold (consistency = 0.92), indicating that this condition can be considered necessary for the occurrence of the outcome. As a second step, we conducted the analysis of sufficient conditions.

Results. *Table 1 reports the configurations sufficient for resilience (short time to recovery). The analysis identifies three distinct solutions. Across all resilient configurations, two conditions are consistently present: high resource complementarity and strong relational coordination. Differences across configurations concern network scale, network verticality, and the role of formal coordination.*

The first configuration describes small, vertically organized networks. In this setting, fast recovery is achieved when high resource complementarity is combined with strong relational coordination, while formal coordination is absent or irrelevant. This solution suggests that in tightly coupled vertical chains, informal coordination is sufficient to enable rapid adjustment, provided that actors' resources and capabilities are well aligned. In such contexts, complementarity enlarges the collective action space of the network, enabling rapid recombination and redeployment of resources when disruptions occur. Relational coordination, in turn, facilitates timely communication and shared problem-solving allowing actors to respond without relying on formalized structures. The absence of formal coordination does not undermine resilience here; rather, it appears functional in small, vertically organized networks where interdependencies are clear and coordination can be achieved through direct relational ties.

The second configuration also applies to small, vertically organized networks but with higher diversity among members. Here again, fast recovery depends on the presence of resource complementarity and relational coordination, without the need for formal coordination structures. Diversity does not undermine resilience in this context: it appears compatible with fast recovery when informal coordination operates on a shared material base. This finding suggests that heterogeneity does not necessarily hinder collective responses during crises, as long as actors share complementary resources and maintain strong relational ties that mitigate the potential coordination costs associated with diversity.

The third configuration pertains to large, horizontally organized networks. In contrast to the small-network solutions, resilience in this context depends on the joint presence of both relational and formal coordination mechanisms, alongside high resource complementarity. Informal coordination alone proves insufficient at this scale. As network size and horizontal complexity increase, formal coordination structures become necessary to clarify responsibilities and manage interdependencies across a larger number of actors. Formal coordination provides a shared reference framework that supports collective action, while relational coordination complements it by enabling flexibility and problem-solving in the face of unforeseen disruptions. This configuration highlights that, in large networks, resilience emerges not from replacing informal coordination with formal mechanisms, but from their mutual reinforcement.

Table 2 reports the configurations sufficient for the negated outcome, non-resilience (long time to recovery). The first configuration concerns small, vertically organized networks characterized by strong relational coordination but low resource complementarity and no formal coordination. Despite high levels of informal coordination, these networks fail to recover quickly, suggesting that relational strength can mask underlying capability misalignment. The second configuration applies to large, horizontally organized and diverse networks lacking both resource complementarity and formal coordination, even when relational coordination is present. In this setting, diversity combined with weak coordination structures generates fragmentation and inhibits effective recovery. The third configuration describes small, horizontally organized and relatively homogeneous networks in which formal coordination is present, but resource complementarity is absent. Here, formal rules and resource overlap among actors do not compensate for misaligned or insufficient capabilities, resulting in rigid responses and slow recovery.

Table 1: Sufficient configurations leading to resilience

	Configurations		
	1	2	3
Network Size	Æ	Æ	•
Network Verticality	•	•	Æ
Resource Overlap		Æ	
Resource Complementary Index	•	•	•
Relational Coordination Index	•	•	•
Formal Coordination Index	Æ		•
Raw coverage	0.223	0.192	0.241
Unique coverage	0.070	0.054	0.191
Consistency	0.786	0.836	0.839
Overall Solution coverage		**0.469**	
Overall Solution consistency		**0.810**	

Table 2: Sufficient configurations leading to non-resilience

	Configurations		
	1	2	3
Network Size	Æ	•	Æ
Network Verticality	•	Æ	Æ
Resource Overlap		Æ	•
Resource Complementary Index	Æ	Æ	Æ
Relational Coordination Index	•	•	•
Formal Coordination Index	Æ	Æ	•
Raw coverage	0.192	0.118	0.175
Unique coverage	0.123	0.051	0.073
Consistency	0.797	0.830	0.877
Overall Solution coverage		**0.469**	
Overall Solution consistency		**0.810**	

Research limitations. *The present study is not without limitations, which open up avenues for future research. First, our analysis is based on cross-sectional data collected at a single point in time. Although resilience is conceptualized as the capacity to recover from disruption, our design does not allow us to fully capture its temporal unfolding or to observe how configurations may evolve before, during, and after crises. Future research could adopt longitudinal designs to trace how network structures and coordination mechanisms co-evolve over time, shedding light on whether certain configurations are stable or whether networks shift from one resilience pathway to another as disruptions unfold.*

Second, the empirical setting is limited to 224 Italian business networks formalized through network contracts. While this context offers a unique opportunity to examine formally recognized inter-organizational arrangements, the sample may not be fully representative of the broader population of Italian networks, nor of networked organizations in other institutional environments. Comparative studies across countries, industries, or governance forms could test the robustness of the identified configurations and explore how institutional frameworks and policy regimes shape resilience pathways.

Managerial implications. *This study offers practical guidance for managers and entrepreneurs involved in inter-organizational networks facing turbulent environments. Our findings suggest that resilience requires deliberate alignment between network structures and coordination practices. Managers should therefore avoid replicating governance models across different network structures. In smaller and more tightly coupled networks, investing in strong relational coordination, through trust-building, shared problem-solving, and open communication, may be sufficient to sustain adaptive responses. In larger and more complex networks, however, relational embeddedness must be complemented by clearer formal structures, defined roles, and structured decision-making processes to prevent fragmentation and delays during crises. Moreover, resilience is not only a matter of maintaining relationships but of ensuring that partners bring strategically complementary capabilities. Entrepreneurs entering or designing network contracts should therefore carefully assess how resource interdependencies can be mobilized under adverse conditions. Our results also have implications for policy makers, highlighting the importance to respond to crises with differentiated support strategies. Rather than promoting uniform coordination interventions or providing undirected subsidies, policy makers should help networks strengthen governance arrangements and capability alignment according to their structural characteristics. By supporting both coordination capacity and strategic complementarity, policy initiatives can enhance the systemic resilience of business networks exposed to recurring shocks.*

Originality of the paper. *In this paper, we explored configurations of inter-organizational business networks (contratti di rete) associated with high and low resilience. Structural characteristics and coordination mechanisms of a network are distinct but interdependent aspects that combine in configurations to jointly affect network's capacity to recover from crises. Despite this general wisdom in the resilience literature, studies that explore the combination of those aspects are scant. Consistent with a configurational logic, network resilience does not stem from single optimal design choices, but from distinct combinations of network structure and coordination mechanisms, in which some elements are central while others are absent.*

Drawing on research on inter-organizational networks and resilience, this study advances our understanding of how resilience emerges from the joint configuration of network structure and coordination mechanisms, rather than from isolated structural or relational features. While prior research has emphasized either structural characteristics (e.g., size, verticality, resource composition) or coordination mechanisms in explaining network performance and resilience, our findings demonstrate that neither dimension is sufficient on its own.

First, our findings contribute to resilience studies that conceptualize resilience as a dynamic and multifaceted phenomenon, rather than as a single capability or outcome (e.g., Su & Junge, 2023). While prior studies have identified a wide array of resilience-related capabilities and mechanisms—often emphasizing that resilience entails the development of multiple, sometimes overlapping capacities (Duchek, 2020; Hillmann, 2021)—our configurational results show that resilience does not require the simultaneous presence of all such elements. Instead, fast recovery can emerge

from distinct combinations of structural characteristics and coordination mechanisms, reinforcing the idea of equifinality in resilience outcomes (Shepherd & Williams, 2023).

Second, by focusing on inter-organizational business networks, this study extends predominantly organization-centric models of resilience to a level where interdependencies, coordination, and collective action become central. Our findings empirically substantiate calls to conceptualize resilience as a system-level property that emerges from interactions among actors, resources, and governance arrangements (Chesley, 2020; Naderpajouh et al., 2018). In doing so, we complement multilevel frameworks of resilience by showing how network-level configurations shape recovery trajectories independently of individual organizational attributes.

Third, our results refine capability-based views of resilience (Duchek, 2020) by demonstrating that the effectiveness of resilience-related capabilities is contingent on network structure. Resource complementarity consistently appears as a core condition across resilient configurations, yet its contribution materializes only when embedded within appropriate coordination arrangements. This finding nuances prior claims that emphasize complementarity as universally beneficial, showing instead that its resilience-enhancing role depends on how resources are mobilized and coordinated across the network.

Fourth, the study contributes to ongoing debates on formal versus informal coordination in resilience processes. Our configurational findings reconcile these perspectives by showing that relational and formal coordination are neither universally substitutive nor universally complementary. In small, vertically organized networks, relational coordination alone can sustain fast recovery, whereas in large, horizontally organized networks, resilience requires the joint presence of relational and formal coordination mechanisms. This insight advances a contingency-based understanding of coordination for resilience, aligned with recent work on balancing risk and resilience in complex networks (Carnovale et al., 2025).

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Developing Contextual Leadership in Amateur Football: An Action Research Study

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Abstract. *Leadership plays a critical role in shaping motivation, cohesion, and performance within sports teams. While a substantial body of literature has examined leadership styles in sports contexts, most studies rely on survey-based designs and focus primarily on athletes' perceptions of leadership behaviors. Consequently, relatively little is known about how leadership principles can be intentionally translated into practical interventions and implemented within real-world organizational settings, particularly in amateur sports environments.*

This paper addresses this gap by examining the design and implementation of a contextual leadership intervention conducted within an Italian amateur football club. Adopting an action research approach, the study documents a season-long collaboration between researchers, coaching staff, and players aimed at developing leadership practices capable of supporting motivation, communication, and team cohesion. The intervention included diagnostic activities, leadership development workshops for the coaching staff, individual coaching sessions, and team-wide reflection processes designed to foster a shared understanding of leadership within the group.

The findings highlight how the introduction of structured leadership practices contributed to improving communication, strengthening collective identity, and fostering more adaptive leadership behaviors within the team. While performance outcomes cannot be attributed solely to the intervention, the team experienced a significant improvement in competitive results during the season.

By providing a process-oriented account of leadership implementation in a grassroots sports organization, the study contributes to the literature on sports leadership and highlights the potential of context-sensitive and participatory approaches to leadership development.

Keywords: *leadership; action research; amateur sports; team dynamics; contextual leadership*

Framing of the research. *Leadership has long been recognized as a central factor in shaping individual motivation, group cohesion, and organizational performance across a wide variety of contexts. Over the past decades, leadership research has progressively expanded beyond traditional hierarchical settings to encompass more complex and socially embedded environments, including sports organizations (Day et al., 2014; Northouse, 2022; Di Prima, 2026). In these settings, leadership plays a particularly crucial role because performance outcomes depend not only on technical skills and tactical preparation but also on the psychological climate, interpersonal relationships, and collective identity of the group (Cotterill & Fransen, 2016).*

Within the sports domain, a substantial body of literature has explored how different leadership approaches influence athletes' motivation, well-being, and performance. Transformational leadership, for instance, has been widely studied for its capacity to inspire followers through vision, individualized consideration, and intellectual stimulation (Bass & Riggio, 2006). Empirical studies in sport contexts have shown that coaches who adopt transformational behaviors tend to foster stronger team cohesion, greater intrinsic motivation, and higher satisfaction among athletes (Callow et al., 2009). Similarly, authentic leadership has been associated with trust-building and ethical consistency, emphasizing transparency, relational integrity, and alignment between leaders' values and actions (Avolio & Gardner, 2005). Ethical leadership has also received increasing attention, particularly in contexts where fairness, respect, and moral role modeling shape the quality of interpersonal dynamics within teams (Brown & Treviño, 2006).

In parallel, more recent theoretical developments have emphasized the relational and collective nature of leadership processes. Shared leadership perspectives suggest that influence within groups may be distributed among multiple actors rather than concentrated in a single formal leader (Pearce & Conger, 2003). Within sports teams, this perspective has gained empirical support, as athletes themselves often emerge as informal leaders who contribute to motivation, communication, and coordination during training and competition (Fransen et al., 2014). Similarly, identity leadership theory highlights the role of leaders in fostering a shared sense of "we-ness" within groups, helping members internalize collective goals and align their individual behaviors with the broader team identity (Haslam et al., 2020).

Despite the richness of these theoretical approaches, scholars increasingly acknowledge that leadership styles rarely operate in isolation in real organizational settings. Rather than applying a single "pure" leadership model, effective leaders often combine different behaviors depending on contextual demands, group characteristics, and situational constraints (Yukl, 2013). This perspective resonates with contingency and contextual approaches to leadership, which emphasize that leadership effectiveness depends on the alignment between leadership behaviors and environmental conditions (Fiedler, 1967; Osborn et al., 2002). In complex and heterogeneous contexts, therefore, leadership may be better understood as a dynamic and adaptive process rather than as the application of a predefined style.

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These considerations are particularly relevant in the context of amateur sports organizations. Unlike professional teams, amateur clubs typically operate under conditions of limited financial resources, volunteer-based governance, and heterogeneous levels of commitment among participants (Wicker & Breuer, 2011). Coaches and managers often face the challenge of balancing competitive objectives with educational, social, and developmental goals. Players may differ widely in their motivations, ranging from performance-oriented aspirations to recreational participation or social belonging (Allen & Shaw, 2009). As a result, leadership in amateur sports requires a delicate balance between performance management, motivational support, and group cohesion.

Motivation theories provide an important lens through which to understand these dynamics. Self-Determination Theory (Deci & Ryan, 2000), for example, suggests that individuals experience higher levels of motivation and psychological well-being when three fundamental psychological needs—autonomy, competence, and relatedness—are satisfied. In sports environments, leadership behaviors that support these needs can significantly influence athletes' engagement, persistence, and satisfaction (Ryan & Deci, 2017). Coaches who encourage participation in decision-making, recognize individual progress, and foster positive interpersonal relationships are more likely to create a motivational climate that promotes intrinsic motivation and sustainable performance (Mageau & Vallerand, 2003).

Goal-oriented motivational models also contribute to understanding athletes' behavior in team settings. Research on achievement goal theory distinguishes between mastery-oriented climates, which emphasize personal improvement and learning, and performance-oriented climates, which focus on competition and social comparison (Nicholls, 1989). Leadership practices that promote mastery-oriented environments tend to enhance psychological resilience, cooperation, and long-term engagement among athletes (Ames, 1992). In amateur sports contexts, where participation and personal development are often as important as competitive outcomes, fostering such climates can be particularly beneficial.

However, the practical implementation of leadership theories in amateur sports organizations remains relatively underexplored. Much of the existing research relies on survey-based studies examining athletes' perceptions of leadership behaviors (Cotterill & Fransen, 2016). While these studies provide valuable insights into the relationships between leadership and outcomes such as cohesion or motivation, they offer limited understanding of how leadership models can be intentionally designed, implemented, and adapted within real organizational contexts over time.

Furthermore, the majority of studies focus on professional or elite sports environments, where organizational structures, resources, and performance pressures differ significantly from those found in grassroots and amateur settings. This leaves a gap in the literature regarding how leadership theories can be translated into practical interventions capable of supporting coaches and organizations operating in resource-constrained and socially complex environments.

Addressing this gap requires methodological approaches capable of capturing leadership as an evolving, context-sensitive process. Action research offers a particularly suitable framework for this purpose. By combining inquiry and intervention, action research allows scholars and practitioners to collaboratively design and test organizational changes while simultaneously generating theoretically informed insights (Coghlan & Brannick, 2014). Through iterative cycles of diagnosis, action, and reflection, this methodology enables researchers to observe leadership not only as a phenomenon to be studied but also as a practice that can be intentionally shaped and refined within specific organizational contexts.

Against this backdrop, the present study examines the development and implementation of a contextual leadership intervention within an Italian amateur football club. The project was carried out in collaboration with A.S.D. Polisportiva Garino, a team competing in the Prima Categoria league in Piedmont. Over the course of a full competitive season, an academic team worked closely with the club's coaching staff and players to design and implement a hybrid leadership model integrating elements from multiple theoretical perspectives, including transformational, identity-based, and motivational approaches.

By documenting this process through an action research methodology, the study seeks to contribute to the growing literature on leadership in sports organizations by providing an in-depth account of how leadership principles can be operationalized and adapted in a real amateur football environment. In doing so, it also offers broader insights into the role of contextualized leadership practices in fostering motivation, cohesion, and performance within grassroots sports settings.

Purpose of the paper. *The purpose of this study is to explore how leadership principles can be intentionally designed and implemented within an amateur sports organization through a contextual and practice-oriented approach. While the leadership literature has produced a rich array of theoretical frameworks—ranging from transformational and authentic leadership to shared and identity-based perspectives—much of this research remains predominantly conceptual or relies on cross-sectional empirical designs that examine athletes' perceptions of leadership behaviors. Consequently, relatively little is known about how leadership models can be translated into concrete organizational interventions and systematically implemented within real-world amateur sports settings.*

This study addresses this gap by examining the design, implementation, and outcomes of a leadership development intervention conducted within an Italian amateur football club. Specifically, the project involved the co-creation and application of a contextual leadership model aimed at supporting motivation, cohesion, and performance within the team environment. The intervention was developed collaboratively with the organization and implemented over the course of a full competitive season, allowing for continuous observation, feedback, and adaptation.

More precisely, the paper pursues three main objectives. First, it aims to illustrate how leadership concepts derived from the academic literature can be operationalized within a grassroots sports organization through a structured yet

flexible intervention process. By translating theoretical constructs into practical leadership practices, the study seeks to bridge the gap between leadership theory and managerial application in amateur sports contexts.

Second, the study aims to examine how such an intervention unfolds over time within the complex social dynamics of a football team. Leadership in sports teams is inherently relational and context-dependent, involving interactions among coaches, players, and organizational actors. By adopting an action research perspective, the study provides an in-depth account of how leadership practices can evolve through iterative cycles of observation, reflection, and adjustment.

Third, the paper aims to assess the perceived impact of the intervention on key team dynamics, including motivation, group cohesion, communication patterns, and collective identity. While the primary objective of the project was developmental rather than experimental, the study nevertheless offers valuable insights into the mechanisms through which leadership practices may influence team functioning in amateur sports environments.

Overall, by documenting and analyzing a real-world leadership intervention conducted in collaboration with a football club, this study seeks to contribute to the literature on sports leadership and organizational practice. In particular, it highlights the potential value of context-sensitive and participatory approaches to leadership development, emphasizing how academic knowledge can be mobilized to support practical change processes within grassroots sports organizations.

Methodology. *This study adopts an action research approach to examine the design and implementation of a contextual leadership intervention within an amateur football organization. Action research is particularly suitable for studying leadership processes in real organizational contexts because it combines scholarly inquiry with practical intervention, allowing researchers and practitioners to collaboratively diagnose problems, implement changes, and reflect on their effects (Coghlan & Brannick, 2014). Rather than observing leadership as a static phenomenon, this methodology enables the analysis of leadership as an evolving and context-sensitive process shaped through iterative cycles of action and reflection.*

The study was conducted in collaboration with A.S.D. Polisportiva Garino, an amateur football club located in Vinovo, in the Piedmont region of Italy. Founded in 1986, the club has experienced several phases of closure and revival over the decades, ultimately re-establishing itself as a vibrant community-based organization with a strong emphasis on youth development, fairness, and collective identity.

At the time of the study, the club had grown into a well-structured grassroots organization, with multiple youth teams and a senior squad competing in the Prima Categoria, a middle level amateur football in the Italian league system. Despite having a technically competitive team and a supportive local environment, the club had experienced fluctuating results in previous seasons. As a consequence, the leadership—composed of club directors, the coaching staff, and senior players—identified internal cohesion, psychological well-being, and sustained motivation as key areas requiring improvement.

The collaboration with the academic team emerged organically when the team captain, who was attending a university course on performance management and leadership, proposed the idea of applying leadership theories to the team as part of an academic project. This initiative led to the development of a structured intervention aimed at experimenting with a contextual leadership approach within the team environment.

The intervention was designed as a multi-phase leadership development program implemented across the pre-season period and the early stages of the competitive season. The objective was to introduce leadership practices capable of adapting to the specific dynamics of the team, integrating insights from multiple leadership perspectives and motivational theories.

The process unfolded through five sequential phases, each combining diagnostic, developmental, and reflective components.

The project began with an exploratory diagnostic phase aimed at understanding the psychological and relational dynamics within the team. Data were collected through a combination of semi-structured interviews, anonymous surveys, and informal discussions involving players, coaching staff, and club directors. This phase sought to assess players' motivational drivers, perceptions of leadership, communication patterns, and overall team climate. The diagnostic process revealed a heterogeneous motivational environment: while some players were highly engaged and strongly aligned with the team's objectives, others reported lower levels of involvement, often linked to unclear roles, inconsistent communication, or perceived inequalities in decision-making processes. These insights provided the foundation for designing a leadership intervention tailored to the specific needs and challenges of the team.

Following the diagnostic phase, the intervention focused on the coaching staff, who participated in two intensive leadership workshops. These sessions were designed to develop the coaches' ability to adopt a contextual leadership perspective, emphasizing flexibility, situational awareness, and sensitivity to players' motivational needs. The workshops combined theoretical input with interactive activities such as scenario-based discussions, reflection exercises, and simulations of locker-room situations. Particular attention was devoted to themes such as psychological safety, communication strategies, and the relationship between athletes' well-being and performance outcomes. Through these sessions, the coaching staff began to reconsider traditional directive leadership approaches and explore more adaptive leadership behaviors capable of responding to different situations and individual player needs.

In the following weeks, the intervention moved into a more personalized development phase through one-on-one coaching sessions with the head coach. Over a period of approximately six weeks, four structured meetings were

conducted between the academic team and the coach. These sessions focused on reflecting on critical leadership situations that could emerge during the season, such as managing conflicts within the squad, maintaining motivation after defeats, or communicating difficult decisions such as player rotations. Together, the coach and the researchers analyzed potential scenarios and developed leadership strategies aligned with the principles of contextual leadership. This reflective process encouraged the coach to move beyond purely tactical considerations and to pay greater attention to the emotional and relational dynamics influencing team performance.

A further step in the intervention involved the entire team. A collective session was organized to create a shared understanding of leadership principles and to establish common norms for communication, trust, and accountability within the group. Rather than presenting leadership as a top-down concept imposed by the coaching staff, the session encouraged players to actively reflect on their own experiences of leadership in sports teams and to articulate their expectations regarding leadership behaviors. Through guided discussions and group activities, players and coaches collaboratively defined shared principles regarding feedback practices, decision-making processes, and interpersonal respect. This participatory process was intended to foster greater ownership of the leadership model and to strengthen the collective identity of the team.

Once the competitive season began, the intervention incorporated continuous feedback mechanisms aimed at monitoring the evolution of team dynamics and leadership practices. Short anonymous "pulse" surveys and informal focus groups were periodically used to gather players' perceptions of communication quality, cohesion, and motivational climate. These feedback loops allowed the coaching staff and the research team to identify emerging issues and implement timely adjustments. For example, at one point during the season a decline in perceived cohesion was detected, linked to growing tensions surrounding team selection decisions. In response, the coaching staff organized a dedicated meeting to clarify the rationale behind player rotation policies, reinforcing transparency and restoring trust within the group. Through these iterative cycles of observation, feedback, and adaptation, the intervention maintained its contextual character, continuously aligning leadership practices with the evolving needs of the team.

Results. *The action research intervention generated a series of observable changes in the team's internal dynamics over the course of the season. These changes emerged progressively as leadership practices introduced during the intervention were gradually internalized by both the coaching staff and the players. The results can be interpreted across three interrelated dimensions: the evolution of leadership behaviors within the coaching staff, the transformation of communication and trust dynamics within the team, and the overall impact on collective motivation and performance.*

One of the most immediate outcomes of the intervention concerned the leadership approach adopted by the coaching staff. During the initial diagnostic phase, leadership within the team tended to follow a relatively traditional model typical of amateur football environments, where decision-making authority is strongly centralized in the head coach and communication primarily occurs in a top-down manner. Through the workshops and coaching sessions, the head coach progressively developed a more reflexive and situationally adaptive leadership style. Rather than relying exclusively on directive communication, the coach began to place greater emphasis on dialogue, explanation of decisions, and attention to the emotional climate of the group. This shift was particularly evident in situations involving difficult managerial choices, such as player rotations, tactical adjustments, or responses to disappointing match results. The introduction of structured reflection sessions and scenario discussions also helped the coaching staff anticipate potential relational tensions and adopt more proactive communication strategies. As the season progressed, leadership behaviors increasingly reflected a contextual approach in which decisions were not only technically justified but also framed in ways that acknowledged players' perspectives and motivations.

A second major outcome of the intervention concerned the quality of communication within the team. Initial diagnostic data had revealed the presence of several latent tensions, including perceptions of unequal treatment, limited opportunities for open discussion, and uncertainty regarding players' roles within the squad. The team-wide leadership session and subsequent feedback mechanisms played a key role in addressing these issues. By creating a structured space for collective reflection, the intervention allowed players to articulate expectations regarding leadership, fairness, and mutual respect. This process contributed to the development of a shared vocabulary around leadership and team values, facilitating more constructive interactions between players and coaches. Over time, communication patterns became more transparent and less confrontational. Players reported feeling more comfortable expressing concerns and providing feedback, while the coaching staff demonstrated greater willingness to clarify decisions and explain tactical or organizational choices. These changes contributed to a gradual strengthening of interpersonal trust within the group. In addition, the intervention encouraged the emergence of informal leadership roles among players. Certain team members began to take on responsibilities related to maintaining team morale, mediating conflicts, and reinforcing the collective identity of the group. This development reflected the shift from a purely hierarchical leadership structure toward a more distributed form of influence within the team.

Another important outcome concerned players' motivational orientation. At the beginning of the project, the team displayed a heterogeneous motivational landscape: while some players were strongly driven by competitive goals, others showed lower levels of engagement, often due to previous seasons characterized by inconsistent results. As the intervention progressed, several mechanisms contributed to strengthening players' sense of belonging and commitment. First, the emphasis on communication and psychological safety helped reduce interpersonal tensions and created a more supportive team climate. Second, the explicit discussion of leadership principles encouraged players to view themselves as active contributors to the team's development rather than passive recipients of coaching decisions. The growing

alignment between individual motivations and collective objectives fostered a stronger sense of shared identity. Players increasingly referred to the team using inclusive language and demonstrated higher levels of mutual support both during training sessions and competitive matches.

Although the primary objective of the intervention was developmental rather than performance-oriented, improvements in team dynamics were accompanied by a significant positive trajectory in competitive results. Following an initial period of adjustment during which the team struggled to fully internalize the new leadership practices, performances began to improve steadily. The squad developed greater resilience in response to setbacks and demonstrated stronger cohesion during challenging matches. Over the course of the season, the team entered a prolonged positive streak that allowed it to climb the league standings. Ultimately, A.S.D. Polisportiva Garino concluded the season by securing promotion to a higher division. While it would be methodologically inappropriate to attribute this outcome exclusively to the leadership intervention, qualitative evidence from players and staff suggests that the changes in communication, trust, and collective motivation played a significant role in supporting the team's improved performance.

Overall, the results indicate that the contextual leadership approach implemented through the action research process contributed to fostering a more cohesive, communicative, and motivated team environment. These findings illustrate how leadership theories can be translated into practical interventions capable of shaping the social dynamics of amateur sports teams over time.

Research limitations. *This study presents several limitations that should be acknowledged when interpreting the findings. First, the research is based on a single case study conducted within one amateur football club operating in a specific regional and cultural context. While in-depth case studies allow for rich contextual insights, the findings cannot be directly generalized to other organizations, sports disciplines, or competitive levels.*

Second, the study adopts an action research methodology, which implies a close collaboration between the researchers and the organization involved. While this approach enables a deeper understanding of organizational dynamics and facilitates practical change processes, it may also introduce potential biases related to researcher involvement and participants' awareness of being observed. In particular, the presence of the research team may have influenced some behaviors or perceptions within the group.

Third, the evaluation of the intervention relies primarily on qualitative evidence and perceptual data, including interviews, surveys, and participant feedback. Although these sources provide valuable insights into team dynamics, they do not allow for a rigorous causal assessment of the relationship between leadership practices and performance outcomes. The positive competitive results achieved during the season should therefore be interpreted cautiously, as they may also have been influenced by other factors such as tactical decisions, player skills, or external competitive conditions.

Finally, the temporal scope of the research is limited to a single competitive season. Leadership processes and organizational culture often evolve over longer periods, and further research would be necessary to assess the long-term sustainability of the leadership practices introduced during the intervention.

Future studies could build on this work by conducting comparative analyses across multiple amateur sports organizations, integrating longitudinal data and potentially combining qualitative and quantitative research designs to further explore the relationship between leadership practices, team dynamics, and performance.

Managerial implications. *Despite these limitations, the findings of this study offer several relevant implications for practitioners operating in amateur sports organizations and, more broadly, in team-based environments.*

First, the study highlights the importance of adopting a context-sensitive approach to leadership. Amateur sports teams often bring together individuals with heterogeneous motivations, levels of commitment, and personal expectations. In such environments, rigid leadership styles may prove ineffective. Coaches and team managers may benefit from developing flexible leadership behaviors that can adapt to different situations and individual needs.

Second, the results underline the value of structured reflection and leadership development activities even in grassroots sports contexts. The workshops and coaching sessions implemented during the intervention demonstrated that relatively simple initiatives—such as facilitated discussions, scenario analysis, and feedback sessions—can help coaching staff become more aware of their leadership practices and their impact on team dynamics.

Third, the study emphasizes the importance of open communication and psychological safety within sports teams. Providing players with opportunities to express their perspectives, discuss expectations, and understand the rationale behind managerial decisions can contribute to strengthening trust and reducing potential sources of conflict. In amateur contexts, where financial incentives are often limited, these relational factors may play a crucial role in sustaining motivation and engagement.

Finally, the findings suggest that leadership should not be viewed solely as the responsibility of formal leaders such as coaches. Encouraging the emergence of informal leadership roles among players can strengthen the collective identity of the team and contribute to maintaining cohesion during challenging phases of the season.

Overall, the study indicates that leadership development interventions, when designed in a participatory and context-aware manner, can represent a valuable tool for improving the social and motivational climate of amateur sports organizations.

Originality of the paper. *This paper contributes to the literature on leadership in sports organizations in several ways. First, it provides a process-oriented account of leadership implementation within an amateur football team. While much of the existing research on sports leadership relies on survey-based studies examining athletes' perceptions of leadership behaviors, this study documents how leadership principles can be intentionally designed, introduced, and adapted within a real organizational context over time.*

Second, the research contributes methodologically by applying an action research framework to the study of leadership in grassroots sports. By combining observation with direct organizational intervention, the study offers insights into leadership as a dynamic and socially constructed process rather than as a static set of behavioral traits. This approach enables a deeper understanding of how leadership practices emerge, evolve, and interact with the relational dynamics of teams.

Third, the study extends the literature on sports leadership by focusing on the amateur and community-based sport context, which remains relatively underexplored compared to professional and elite sports environments. Amateur teams operate under unique organizational conditions characterized by limited resources, volunteer engagement, and heterogeneous motivational structures. By examining leadership within this context, the study highlights how theoretical leadership models can be adapted to environments where social and motivational factors often play a central role.

Finally, the paper demonstrates the potential of contextual leadership approaches that integrate insights from multiple leadership theories rather than relying on a single prescriptive model. The findings suggest that leadership effectiveness in amateur sports may depend less on adopting a specific leadership style and more on the ability to combine different leadership practices in response to evolving team dynamics.

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Innovation Setbacks in State-Led Innovation Initiatives: The Case of Malaysia

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Abstract. *Innovation policy plays an important role in economic transformation. Governments invest heavily in science parks, digital corridors, and innovation districts. Many initiatives draw inspiration from models such as Silicon Valley. Many major state-led innovation projects end up neither failing nor succeeding clearly. These cases of persistent underperformance are important for understanding innovation systems. Examining them helps move beyond simple outcome measures. It allows closer analysis of the institutional arrangements, organisational structures, and policy choices that shape innovation trajectories.*

The paper introduces the concept of innovation setbacks which refer to initiatives that continue to operate but do not achieve their original transformative goals. By moving beyond the simple outcome indicators such as patents, firm numbers, or employment growth, the study captures the importances of analysing the institutional arrangements, organisational structures, and policy choices that shape innovation trajectories over time

The analysis focuses on the case of Malaysia's Multimedia Super Corridor (MSC) and Cyberjaya. The study adopts an exploratory case study approach. It combines institutional theory, cluster economics, and systemic innovation failure theory. The case is used descriptively because the research is still in development. The analysis relies mainly on secondary sources and policy documents.

Preliminary findings show that MSC developed infrastructure and attracted multinational firms. However, relational networks and domestic innovation capabilities developed more slowly. These patterns suggest systemic frictions within the ecosystem. The transition to the Malaysia Digital initiative represents a policy response to these challenges.

This work-in-progress paper highlights the value of examining innovation setbacks as a source of policy learning in long-term innovation initiatives.

Keywords: i*nnovation policy, cybercity, Multimedia Super Corridor, innovation setbacks, systemic failure.*

Framing of the research. *Innovation policy has become a central instrument for economic transformation. Over the past three decades, governments have invested heavily in science parks, innovation districts, digital corridors, and smart cities, often inspired by globally illustrious models such as Silicon Valley, Shenzhen, or Singapore's innovation ecosystem. These regions are commonly cited as benchmarks of transformative innovation systems (Wu, Y, 2026; Einhoff & Paunov, 2025; Woo, 2018; Engel, 2015) while projects that are less successful or perhaps stagnant have failed to be studied for their lessons and experiences. This focus on successful ecosystems creates a bias in innovation research by overlooking initiatives that persist but deliver only partial outcomes.*

In practice, many large-scale, state-led innovation projects neither fail outright nor achieve clear success but persist over time with mixed outcomes and limited transformative impact. Despite their prevalence, such cases are often treated as anomalies or policy failures instead of analytically valuable trajectories in their own right.

This paper addresses this gap by introducing the concept of innovation setbacks. Innovation setbacks refer to innovation initiatives that persist over time and generate measurable activity yet fall short of their original transformative ambitions. They are characterised by three core feature like institutional persistence, partial performance and sustained gap between expected and realised outcomes.

Innovation setbacks are different from related concepts. They are not the same as policy failure. They do not mean that a policy halts or collapses. Instead, the policy continues and delivers only partial results. Policy failure usually means that the whole objectives are not achieved. As set out earlier, innovation setbacks refer to situations where an initiative continues to operate only performs below expectations (Brown et.al, 2016; Metcalfe, 2005; Cavalcante, 2024; Björnemalm et.al, 2015). These setbacks also differ from path dependence. Path dependence explains how certain processes reinforce themselves to keep a project on a specific track. In contrast, innovation setbacks describe a situation where a project lasts a long time without fully transforming the system (Pinzón-Camargo et.al., 2021, Henderson, 2019; Veggeland, N., 2008). Similarly, while policy persistence refers to the durability of policy arrangements, it does not capture the sustained gap between expected and realised outcomes, particularly in contexts where policy continues despite recurring limitations linked to governance constraints and uncertainty (Howlett et al., 2015). Innovation setbacks therefore identify a distinct class of long-term initiatives that are durable, resource-intensive, and only partially transformative.

The idea of innovation setbacks provides an alternative analytical lens for analysing complex innovation initiatives by focusing on those with underwhelming performance. It shifts focus from the usual binary success-failure assessments to the organisational, institutional, and policy processes that influence innovation paths across time. This perspective is

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especially pertinent to developing and middle-income economies, which have invested extensively in state-led innovation initiatives in the recent decades to stimulate digital transformation, economic upgrading, and integration into the global economy (Hanna, 2024). These initiatives are backed by substantial public investment, specialised regulatory frameworks, and sustained political support, and are typically framed as strategic responses to global competition, technological change, and perceived risks of economic stagnation (UNCTAD, 2025; Trajtenberg, M., 2009; Lerner, 2009).

The outcomes have been uneven across initiatives. Some have failed to meet initial expectations, whereas others evolved into successful ecosystems (UNCTAD, 2025). Many economies face specific challenges that stem from structural and systemic problems. Institutional fragmentation often hinders progress and weak coordination between government agencies creates inconsistent policies and unclear accountability. A heavy reliance on foreign direct investment can also limit domestic growth. Multinational corporations may not share essential technologies or integrate with local businesses. Furthermore, skill mismatches in the workforce prevent the growth of new industries. Rigid regulations often stop innovation projects from adapting to change. These issues create a gap between policy ambitions and realised outcomes. Consequently, these issues provide important lessons for studying innovation setbacks.

As this stage, the paper examines the case of Malaysia's Multimedia Super Corridor (MSC) and Cyberjaya. The MSC is a long-term project in a middle-income economy that relies on infrastructure. It has attracted investment and sparked technological activity. However, the project has only partially transformed the economy. This makes it a useful case for studying how innovation setbacks happen and how governments respond.

This paper adds to innovation policy research by treating setbacks as a specific category. This approach helps explain why state-led projects often underperform over time. It shows how timing and structural problems shape the results. Finally, the paper provides a system-based method for evaluating long-term innovation policies.

Purpose of the paper. *This paper sets out five interconnected objectives. First; it introduces innovation setbacks as a innovative category for research. This category describes large projects that continue to exist but fail to reach their main goals. Instead of treating them as either success or failure, the paper focuses on cases that fall in between. As discussed earlier, this perspective goes beyond ideas such as policy failure, path dependence, and policy persistence by focusing on initiatives that continue to operate but do not fully transform the system.*

Second, this study emphasises the importance of diagnosing the underlying causes of innovation underperformance. Systemic failure studies provide useful tools for this purpose. Drawing on systemic failure perspectives, particularly the framework developed by Woolthuis et al. (2005), it identifies key bottlenecks such as infrastructural, institutional, and interaction failures within innovation systems.

Third, the paper develops an integrated analytical approach. It combines institutional theory and cluster economics and systemic failure perspectives. In this study innovation setbacks are the main outcome of interest. These theoretical lenses explain why these outcomes happen and how structural problems develop across governance and spatial organisation and capability building.

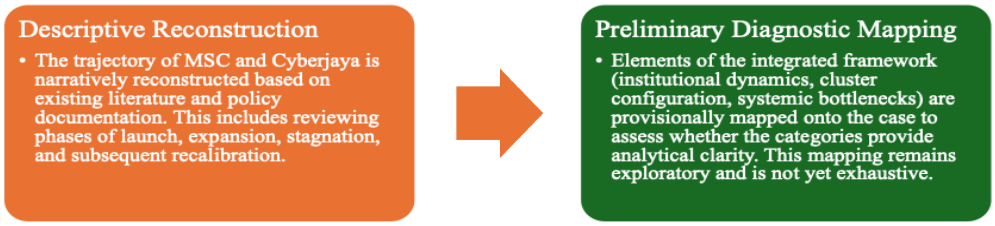
Fourth, the study applies this framework to the case of Malaysia's Multimedia Super Corridor (MSC) and Cyberjaya. This long-running, state-led initiative provides an empirical setting to examine how innovation setbacks emerge and how system-level frictions persist over time.

Finally, the paper contributes to broader theoretical discussions by proposing a more system-oriented and reflective approach to analysing long-term innovation initiatives, particularly in developing and middle-income economies where persistent underperformance is common but often underexplored.

Methodology. *This study adopts an exploratory and conceptually guided case study approach. At its current stage of development, the research focuses on refining an analytical framework. Case study research is well suited for analysing complex and context-dependent phenomena embedded within institutional and policy environments (Yin, 2018; Flyvbjerg, 2006). Malaysia's MSC and Cyberjaya serve as the primary case for this study. This example is important because the project has continued for a long time with only partial success. It shows how innovation initiatives can persist without reaching their full potential. We use this case to test the practical value of the proposed diagnostic perspective.*

In this developmental phase, the case is not used to test hypotheses. Instead, it serves as a platform for structured analytical reflection. This analysis uses secondary data from government documents, institutional report, macro-level indicators, historical accounts of institutional reforms and policy shifts. It also includes official statistics and academic literature. Other sources include reports from independent organisations and press releases. These materials are triangulated to compare policy goals with actual results across different stages of the project.

The analytical strategy proceeds in two steps, as illustrated in Figure 1. First, a descriptive reconstruction of the MSC trajectory is developed based on existing literature and policy documentation. This reconstruction traces the evolution of the initiative from its inception, through phases of infrastructure-led development in Cyberjaya, subsequent periods of sluggish performance and emerging systemic challenges, and more recent policy recalibration through the transition to Malaysia Digital.



Second, a preliminary diagnostic mapping is conducted. This step applies the analytical framework to the case study. It includes elements like institutional dynamics and cluster configuration and systemic bottlenecks. This process tests the explanatory value of these factors. It also shows how structural frictions emerge and continue through different phases of the initiative.

The study uses an abductive approach. This method combines observations from the data with existing theory. Innovation setbacks are measured using three factors. The concept of innovation setbacks is operationalised through three observable dimensions: persistence of the initiative over time, evidence of partial performance in terms of economic activity, and a sustained gap between policy ambitions and realised outcomes. The analysis also examines systemic frictions. These frictions appear as misalignments between infrastructure and networks and coordination and capability building.

At this stage, the analysis remains exploratory and is intended to assess whether the proposed framework provides meaningful interpretive insights when applied to a long-running innovation initiative.

Results. *At this stage of development, several interpretive patterns emerge from the descriptive analysis of MSC and Cyberjaya. The aim is to assess whether the integrated diagnostic framework offers useful insights when applied to a long-running state-led innovation initiative. The findings are organised around four key patterns.*

i. Imbalance between infrastructure development and relational dynamics. Early studies of MSC describe the rapid establishment of physical and regulatory infrastructure (Ramasamy et al., 2004; Huff, 2002). The initiative introduced broadband access, tax incentives, and formal governance mechanisms. From a systemic perspective, these elements represent essential infrastructural foundations that were largely addressed during the initial policy phase (Edquist et al., 1998; Smith, 1999).

However, the relational aspects highlighted by cluster theory developed less strongly (Porter, 1998; Cooke, 2012). Although firms were co-located in Cyberjaya, evidence of sustained knowledge exchange, university–industry collaboration, and interactive learning remained limited (Ejnavarzala et al., 2008; Edgar & Yusof, 2021). This supports the argument that spatial proximity alone does not guarantee effective innovation networks (Grillitsch & Asheim, 2017).

This imbalance is also reflected in innovation outputs. Despite substantial investment over RM384 billion by 2020, domestic patenting activity has declined in recent years. Between 2018 and 2023, patenting in the heart of MSC-Klang Valley fell by 16.2%, while other regions such as Penang and Johor experienced significant growth. This suggests that strong infrastructural development was not matched by equally robust local innovation dynamics.

While infrastructure grew quickly, softer institutional conditions developed more slowly. These include informal norms and trust-based networks and entrepreneurial culture. These factors are critical because they shape economic behaviour (North 1993; Scott 2001).This pattern shows partial performance. It occurs when visible infrastructure expansion does not match the growth of relationships and interactions within the innovation system.

ii. Limited capacity building and knowledge spillovers. MSC attracted multinational corporations during its early years. Several papers note that much of this activity involved service operations and back-office functions (Brooker, 2013; Salman, 2018). Evidence of sustained local research and development engagement remains limited in some sectors.

Quantitative indicators reinforce this pattern About 85% of patent applications in Malaysia come from foreign companies. This shows that the country still relies on technology from abroad instead of creating its own. Meanwhile, patent output from local creators has dropped since 2014. This decline highlights serious limits in Malaysia's own innovation capacity.

This pattern suggests capability constraints within domestic firms. Innovation system perspectives highlight the role of absorptive capacity in enabling knowledge transfer (Smith, 1999; Malerba, 1997). Where local firms lack sufficient technological capabilities, they may struggle to internalise external knowledge flows, limiting the potential for spillovers from multinational actors.

These dynamics point to a form of interaction or network weakness within the innovation system, where linkages between firms, knowledge institutions, and supporting organisations remain limited (Carlsson and Jacobsson, 1997). As proposed by Woolthuis, Lankhuizen and Gilsing (2005), this type of interaction failure occurs when connectivity among firms, knowledge institutions, and supporting organisations is insufficient to sustain collective innovation dynamics. As a result, measurable economic activity is present, but deeper capability development and knowledge diffusion remain constrained, reflecting a pattern of partial performance.

iii. Talent constraints and entrepreneurial limitations. The development of a dynamic innovation ecosystem also depends on the availability and retention of skilled human capital. In this MSC case study, a constant brain drain has been a major problem. As of 2024, about 1.86 million Malaysians, roughly 5.6% of the population, reside abroad, a rate notably higher than the global average. This outflow reflects both structural push and pull factors, including income differentials, limited career mobility, and constrained research and development opportunities within the domestic economy. We believe that the effects on the innovation system are substantial. Losing skilled professionals means there is less technical expertise available. This makes it harder for local companies to learn new technologies or move from basic services into advanced research.

In fields like tech and engineering, a lack of qualified workers stops companies from growing. These patterns show a big gap between policy goals and real MSC was designed to be a knowledge-based economy hub, positioning Malaysia as a centre for high-value innovation. However, the fact that talent keeps leaving suggests the environment is not yet ready for that change. Because of this, innovation continues at a basic level, but the quality and depth of local skills remain low.

Building a dynamic innovation ecosystem also depends on strong entrepreneurial activity. In Malaysia, a robust "technopreneur" culture has been more limited than first expected. While the MSC aimed to create high-growth, innovation-driven companies, startup survival rates remain low. Only about 38% of these ventures stay in business longer than six years.

The type of work done in Cyberjaya reflects this struggle. Even though the area has many companies, most jobs are in service-oriented roles, such as shared services and outsourcing. There is a lack of high-value, innovation-intensive work. This limits the growth of a startup ecosystem that focuses on experimentation, scaling, and creating new knowledge.

These patterns suggest that entrepreneurial growth has not kept up with the expansion of infrastructure and policy. As a result, while businesses exist and the economy is active, the ecosystem lacks the depth found in highly innovative regions. This leads to partial performance, where the environment for long-term entrepreneurial success remains underdeveloped.

iv. Institutional fragmentation and gradual policy recalibration. Over nearly three decades, MSC has undergone multiple phases of restructuring. Institutional adjustments reflect attempts to refine policy direction and respond to emerging challenges (Weber & Rohracher, 2012). However, repeated restructuring also indicates coordination challenges across policy institutions. Previous studies highlight misalignment between ministries and fragmented implementation processes (Mohan, 2004; Hassan & Abu Talib, 2015).

From an institutional perspective (North, 1993), this suggests that formal policy frameworks have not always aligned with broader governance structures. This lack of coordination makes it difficult to execute a unified strategy, often leading to a gap between high-level policy goals and actual ground-level results.

The initial focus of the MSC matched global ICT priorities of the late 1990s. However, as innovation moved toward fintech, artificial intelligence, and digital platforms, the MSC was slow to adapt. This shows trajectory dependency, where old institutional and technological choices keep the project on a set path (Smith, 1999). Instead of a breakthrough, the system grew through small, layered adjustments.

Recent policy changes show an attempt to fix these limits. In 2022, the government replaced the MSC with the Malaysia Digital initiative. This new strategy expanded the scope of digital policy and created more flexible rules. Significant changes included removing location requirements so that firms no longer must be based in specific zones like Cyberjaya. The government also lowered entry barriers for companies and introduced outcome-based incentives where rewards are linked to actual performance.

These changes also signal a shift away from an infrastructure-centred model toward a more flexible and inclusive approach, particularly for startups and smaller firms, while expanding into emerging sectors such as artificial intelligence and digital platforms. Several supporting initiatives accompany the new policy direction. MyDigital ID provides a national digital identity platform, the DE Rantau program aims to attract global digital talent, and the Malaysia Digital Arrival Card supports digital immigration processing.

Taken together, these patterns point to a trajectory characterised by continuity alongside uneven transformation. The MSC has generated significant outcomes, including investment inflows, firm attraction, and employment creation, proving it is not a policy failure. However, these achievements remain uneven when compared to the original ambition of a Silicon Valley-type ecosystem. While physical infrastructure was built, the softer ecosystem such as the dense innovation networks, entrepreneurial vigour, strong linkages between startups, universities, and investors, remained underdeveloped, reflecting partial performance,

The transition to Malaysia Digital represents a strategic reworking rather than a total reset. By removing geographical constraints, lowering entry barriers and broadening the sectoral focus, the policy is adapting to solve earlier issues of spatial rigidity and limited local capability. Early indicators show progress where the country's digital sector activity continues to expand. Malaysia's digital economy contributed approximately 25% of GDP in 2025 (Gomes, 2025), and e-commerce revenue is projected to reach RM1.64 trillion (The Edge Markets, 2024). Since 2022, Malaysia has attracted RM184.7 billion in approved data centre investments, supporting the Malaysia Digital initiative as the country aims for 2,100 MW of operational capacity by the end of 2026 (Bank Negara Malaysia, 2025).

While these figures demonstrate measurable progress, this shift remains an evolution of existing foundations. Ultimately, this captures the dynamics of an innovation setback: the system is actively evolving and showing signs of

progress, but the gap between the original high-level ambition and the realised structural transformation remains a work in progress. This suggests that while the hardware of policy has been updated, the software of deep systemic change is still being rewritten.

Research limitations. *This study has several limitations. These limits reflect the exploratory and developmental stage of the research.*

First, the analysis relies mainly on secondary sources. These sources include policy documents, academic studies, government statistics, and public reports. While these materials provide valuable longitudinal and institutional insights, they may reflect official narratives and retrospective interpretations, and do not capture the perspectives and practices of key actors within the MSC ecosystem. Future research will include interviews with policymakers, firms, and institutional stakeholders.

Second, the case of MSC and Cyberjaya is used only as an explanatory example. The aim is to explore and refined the concept of innovation setbacks. The interpretations presented here could be enhanced together with full empirical evaluation. A test of robustness for this interpretation through different data sources and analytical approaches would be beneficial

Third, the analytical framework is still evolving. The framework combines institutional theory, cluster economics, and systemic innovation perspective. The operationalisation of these perspectives remains exploratory. Further research should refine the framework, clarify casual mechanisms and assess its explanatory influence more systematically.

Finally, the study focuses on a single case study. Although MSC provides a strong example of a long-running technopole project, it would be useful to capture a diversity of policy contexts and innovation initiatives. Comparative studies across different projects, regions and countries would be useful to strengthen the applicability of this idea of innovation setbacks.

These limitations highlight clear paths for future research, specifically the need for deeper data, broader comparisons, and a more polished theoretical approach.

Managerial implications. *The preliminary findings of this study offer several implications for policymakers and public agencies involved in innovation policy design and their evaluation thereof.*

First, policymakers should adopt a broader diagnostic approach for innovation policies. Many large-scale programs evolve over long periods. Standard indicators such as patents, firm counts, or employment growth capture only part of the picture. Policy evaluation should also consider institutional alignment, network formation, and capability development within the innovation ecosystem. Regular audits would allow governments to better see their investments are translating into innovation or just a surface level growth.

Second, the findings indicate that infrastructure investments itself are not enough. The investments in digital infrastructure and regulatory incentives are important foundations. However, they do not automatically generate vibrant innovation ecosystems. Policymakers need to actively find ways to allow people to connect. This can be done with creating a platform for university-industry collaboration, innovation intermediaries support and creating specific channel for knowledge exchange.

Third, another core priority would be strengthening the domestic capability development. The presence of multinational firms can bring investment and employment. However, knowledge spillovers depend on the absorptive capacity of local firms. In order to strengthen this, a targeted intervention like SME upgrading programs, entrepreneurship initiatives, and R&D support can help local companies to learn new technologies and capabilities.

Fourth, better coordination across policy institutions remains essential. Large projects often involve multiple ministries and regulatory bodies. Weak coordination can produce fragmented implementation and inconsistent policy signals. Creating clear governance structures and shared institutional objectives can improve long-term policy coherence.

Finally, policymakers should treat persistent underperformance as a source of learning opportunities. When long-running initiatives only produces partial outcomes, it usually points to deep rooted structural issues. A diagnostic approach to innovation setbacks can help governments identify structural bottlenecks and adjust policy strategies over time.

Originality of the paper. *The present study makes three interwoven contributions to the growing field of innovation policy research. First, it introduces innovation setbacks as a distinct analytical category, extending beyond binary success and failure frameworks. While systemic failures and policy effectiveness have been widely examined (Edquist et al., 1998; Woolthuis et al., 2005), initiatives that persist institutionally while falling short of transformative goals have received less attention.*

Second, the study adds a temporal dimension to systemic innovation failure. Existing frameworks typically identify bottlenecks in infrastructure, networks, institutions, and capabilities at specific points in time (Edquist et al., 1998; Woolthuis et al., 2005). This paper instead highlights how these structural frictions accumulate and persist over longer periods, shaping the trajectory of innovation initiatives.

Third, the study integrates institutional theory, cluster economics, and systemic innovation failure perspectives to explain how enduring misalignments between governance structures, spatial dynamics, and capability development

influence long-term outcomes. Although these approaches have been applied separately in innovation studies (Porter, 1998; North, 1993), their combined application provides a more comprehensive framework for analysing persistent underperformance in state-led initiatives.

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La performance ESG riduce il rischio di crisi e fallimento delle PMI? Il ruolo della dimensione e dei fattori ambientali

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Abstract. *L'obiettivo di questo lavoro è stato studiare come la performance di sostenibilità influenzi la probabilità di crisi e di fallimento delle PMI. Abbiamo scoperto che una maggiore performance ESG è associata a una minore probabilità sia di crisi che bancarotta delle PMI, ma questo effetto "protettivo" è concentrato nelle PMI più piccole. Inoltre, l'effetto protettivo è diverso per i 3 pilastri E, S e G e dipende inoltre dalla materialità ambientale del settore in cui opera l'impresa. Infatti, a livello di singole componenti, sono Governance e Social a guidare questo effetto, mentre la dimensione ambientale non mostra effetti significativi. Inoltre, il ruolo protettivo della componente sociale scompare nei settori caratterizzati da elevata materialità ambientale, dove il rischio ambientale è più alto. I nostri risultati evidenziano che la performance ESG nelle PMI non è uniformemente protettiva, ma dipende dalla dimensione dell'impresa e dalle caratteristiche settoriali. Il nostro studio offre una ulteriore importante novità, perché abbiamo utilizziamo i rating ESG per le PMI forniti da CRIF, una fonte di dati autorevole grazie alla quale abbiamo acquisito score di sostenibilità generalmente difficili da ottenere. Inoltre offriamo una prospettiva nuova per il management delle PMI sul ruolo eterogeneo delle componenti ESG e della materialità ambientale nel determinare la resilienza finanziaria di queste imprese.*
Keywords: *ESG; PMI; Crisi d'Impresa; Bancarotta; Ambiente*

Framing of the research. *Vivere a lungo e prosperare. Questo è ciò che tutte le comunità vorrebbero, ma per raggiungere questi obiettivi, devono vivere a lungo e prosperare anche le imprese, che rappresentano una fonte essenziale di benessere per la società (Neumann, 2021). Nonostante ciò, sopravvivere e ottenere buone performance nel lungo periodo è diventato sempre più difficile per le imprese, a causa della crescente complessità dei mercati e della rapidità dei cambiamenti tecnologici (Benito, 2026; Pitelis et al., 2024). Di conseguenza, molte imprese sperimentano situazioni di difficoltà finanziaria e, purtroppo, questo fenomeno è in costante aumento, come sottolineato dal recente report di Allianz Trade, il quale evidenzia: "Secondo il nostro ultimo Global Insolvency Report, il numero di fallimenti globali continuerà ad aumentare nei prossimi due anni: dopo l'aumento del 10% nel 2024, dovrebbero crescere del 6% nel 2025 e del 3% nel 2026. Ciò si tradurrebbe in 5 anni consecutivi di aumento dei fallimenti (2022 - 2026)" (Allianz, 2025). In questo contesto, la capacità di individuare segnali preoci di allerta delle possibili difficoltà finanziarie future rappresenta un elemento cruciale per la continuità aziendale, per prevenire conseguenze negative e piu in generale per limitare la distruzione di valore (Laux & Zheng, 2023). Questa esigenza di previsione preventiva ha attirato l'interesse non solo dei professionisti, ma anche della ricerca accademica, che ha sviluppato nel tempo diversi modelli e negli ultimi anni principalmente modelli basati sull'intelligenza artificiale, dimostratisi più efficaci rispetto ai metodi tradizionali basati su tecniche statistico-matematiche (Barboza et al., 2017). Questi modelli si sono basati principalmente su variabili finanziarie; tuttavia, arallelamente all'adozione di modelli predittivi sempre più sofisticati, è emersa anche la necessità di integrare in questi modelli di previsione del fallimento anche variabili non finanziarie (Grunert et al., 2005). Questo aspetto è particolarmente rilevante poiché la natura storica delle informazioni finanziarie (principalmente i bilanci passati) limita la capacità di cogliere tempestivamente cambiamenti strutturali e strategici che possono condurre al distress, dato che tali informazioni risultano già superate al momento dell'analisi. Tuttavia, sebbene alcuni studi abbiano già affrontato questo tema, l'introduzione di variabili non finanziarie rimane ancora parzialmente un'area inesplorata nella letteratura sulla previsione della crisi e del fallimento. Al proposito, la review di Dasilas & Rigani (2024) evidenzia infatti che quasi tutti gli studi esistenti si basano su indicatori finanziari. In questo filone di ricerca emergente, un fattore non finanziario che potrebbe svolgere un ruolo chiave nella previsione del fallimento è il livello di sostenibilità aziendale e, in particolare, la performance ESG delle imprese. Dalla letteratura emerge sia che l'utilizzo di dati non contabili è ancora limitato, sia che gli studi si concentrano prevalentemente su grandi imprese o società quotate (Sun et al., 2025), mentre viene spesso dedicata minore attenzione al fallimento delle PMI. Il focus sulle grandi imprese è spesso giustificato dal fatto che il loro fallimento comporta conseguenze rilevanti per la società, come dimostrano noti casi di collasso aziendale quali Enron, Lehman Brothers e WorldCom, frequentemente citati negli studi sul fallimento. Tuttavia, è strano che non sia stata prestata particolare attenzione al ruolo delle PMI, poiché il loro impatto complessivo sull'economia è significativo e la loro crisi non può essere ignorata.*

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Purpose of the paper. *L'adozione di pratiche sostenibili può influenzare la performance aziendale sia in modo positivo sia negativo e, di conseguenza, incidere anche sulla probabilità di fallimento dell'impresa (Atif & Ali, 2021). La performance aziendale è infatti strettamente legata al rischio di default, come già evidenziato dai contributi seminali di Altman (1968) e Ohlson (1980). Più recentemente, Seefloth et al. (2025) sottolineano che "la ricerca sulla relazione tra performance di sostenibilità delle imprese e rischio di distress finanziario rientra nello studio delle associazioni tra sostenibilità e performance finanziaria". Gli autori evidenziano inoltre che questo filone di letteratura si basa principalmente sulla shareholder theory e sulla stakeholder theory.*

Secondo la prospettiva tradizionale della shareholder theory (M. Friedman, 1970), le imprese dovrebbero massimizzare il valore per gli azionisti e quindi evitare strategie che possano peggiorare la performance finanziaria. Nel contesto della sostenibilità, ciò implica limitare i costi aggiuntivi associati al raggiungimento di livelli più elevati di sostenibilità.

Al contrario, la stakeholder theory enfatizza il ruolo delle imprese nel massimizzare il benessere sociale (Freeman, 1984). Da questa prospettiva, le organizzazioni con elevata performance di sostenibilità hanno maggiori probabilità di essere percepite come legittime dagli stakeholder, grazie al loro impegno credibile verso obiettivi sostenibili. Oggi gli stakeholder svolgono un ruolo cruciale nel determinare la sopravvivenza e il successo delle imprese e mantenere una reputazione positiva nei loro confronti può contribuire a migliorare la performance e ridurre il rischio di fallimento. Questo meccanismo si basa sulla signalling theory, secondo cui gli investimenti in sostenibilità agiscono come segnali osservabili che rafforzano la legittimità dell'impresa e dimostrano la sua volontà di perseguire obiettivi sostenibili. Pertanto, poiché gli investimenti in sostenibilità possono generare sia vantaggi sia svantaggi in termini di performance aziendale, proponiamo due ipotesi alternative.

H1a - La performance ESG (e le sue componenti E, S e G considerate individualmente) è positivamente associata alla probabilità di crisi e default delle PMI.

H1b - La performance ESG (e le sue componenti E, S e G considerate individualmente) è negativamente associata alla probabilità di crisi e default delle PMI.

In linea con la Signalling Theory, sosteniamo che l'impatto della performance ESG sulla probabilità di crisi o fallimento delle PMI possa essere influenzato dalla dimensione d'impresa. Le PMI di maggiori dimensioni inviano al mercato segnali di maggiore stabilità rispetto a quelle più piccole. Inoltre, esse soffrono meno di asimmetrie informative (Fasano & La Rocca, 2023) e risultano finanziariamente più solide, poiché affrontano minori vincoli finanziari (Fasano et al., 2025). Di conseguenza, gli stakeholder reagiscono favorevolmente al comportamento dell'impresa e la probabilità di crisi o fallimento risulta più bassa.

Tuttavia, da una prospettiva alternativa, le PMI più grandi risultano già legittimate dal mercato, poiché la loro dimensione è percepita positivamente dagli stakeholder. Pertanto, quando un'impresa è già ben percepita grazie alla sua dimensione, investimenti eccessivi in sostenibilità e un livello molto elevato di performance ESG potrebbero essere valutati meno favorevolmente. Questo argomento è coerente con l'attention-based view, secondo cui un impegno eccessivo verso la sostenibilità può segnalare agli stakeholder una possibile deviazione dell'attenzione dagli obiettivi di redditività. Alla luce di queste considerazioni, formuliamo due ipotesi alternative.

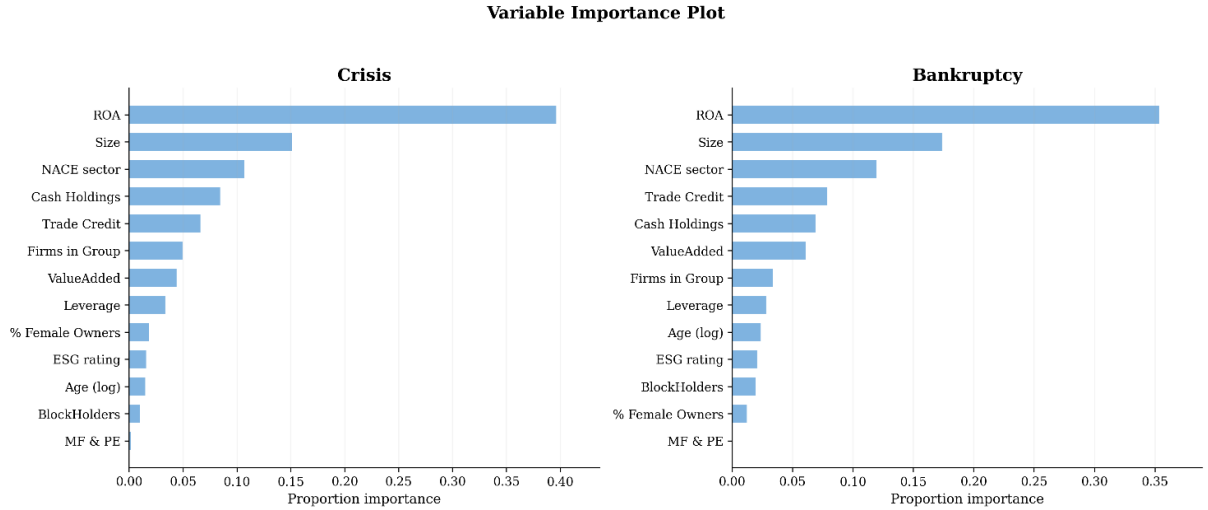
H2a – La dimensione della PMI modera positivamente la relazione tra la performance ESG (e le sue componenti E, S e G considerate individualmente) e la probabilità di crisi e default.

H2b – La dimensione della PMI modera negativamente la relazione tra la performance ESG (e le sue componenti E, S e G considerate individualmente) e la probabilità di crisi e default.

Methodology. *La nostra analisi si basa su un dataset panel a livello di impresa composto da 1.290 PMI italiane non finanziarie osservate nel periodo 2022–2024, per un totale di 3.371 osservazioni impresa-anno. I dati finanziari e contabili sono tratti dal database Orbis di Moody's. I punteggi ESG sono forniti da CRIF, uno dei principali credit bureau italiani, che valuta ciascuna impresa su una scala da 1 (migliore) a 5 (peggiore) lungo tre dimensioni, Environmental, Social e Governance, e costruisce un punteggio ESG complessivo come media ponderata delle tre componenti. Le due variabili dipendenti utilizzate nel nostro modello sono due variabili dummy. La variabile Crisis assume valore pari a 1 se in un determinato anno l'impresa si trova in una situazione di distress, e 0 altrimenti. La variabile Bankruptcy assume valore pari a 1 se l'impresa è fallita, e 0 altrimenti. Le altre variabili utilizzate sono quelle comunemente impiegate nella letteratura esistente. La principale variabile indipendente, ESG rating, come discusso in precedenza, varia da 1 a 5, dove 5 identifica le PMI più sostenibili. Il moderatore è la variabile Size, misurata come il logaritmo naturale del totale degli asset dell'impresa.*

Results. *Abbiamo stimato un modello di machine learning utilizzando un Gradient Boosting Classifier (scikit-learn) in Python per prevedere la probabilità di distress aziendale. L'analisi dell'importanza delle variabili riportata nella Figura 1, utilizzando Crisis come variabile da prevedere, evidenzia che la redditività, misurata tramite il ROA al tempo t-1, rappresenta di gran lunga il predittore più rilevante. Al secondo posto la dimensione aziendale e poi il settore di appartenenza. Anche ESG sembra avere un ruolo.*

Figura 1



Il primo insieme di risultati della nostra analisi è presentato nella Tabella 1.

Tabella 1

	Panel A: Crisis				Panel B: Bankruptcy			
Variable	**(0)**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
ESG Score t-1		-0.2404***	-0.1204*	-0.7477***		-0.2732***	-0.1747**	-0.5369**
		(0.0678)	(0.0729)	(0.2707)		(0.0665)	(0.0730)	(0.2629)
Size	-0.2044***		-0.1972***	-0.2933***	-0.2001***		-0.1917***	-0.2464***
	(0.0243)		(0.0246)	(0.0515)	(0.0226)		(0.0228)	(0.0494)
ESG xSize				0.0441**				0.0260
				(0.0189)				(0.0187)
ROA t-1	-2.4962***	-3.1318***	-2.4666***	-2.5292***	-2.2990***	-2.8702***	-2.2811***	-2.3088***
	(0.3961)	(0.3792)	(0.3907)	(0.3888)	(0.3854)	(0.3502)	(0.3806)	(0.3806)
Cash Holdings t-1	-2.0921***	-1.8910***	-2.0051***	-2.0066***	-1.7986***	-1.5787**	-1.7108***	-1.6938***
	(0.6648)	(0.6662)	(0.6555)	(0.6450)	(0.6676)	(0.6660)	(0.6597)	(0.6496)
ValueAdded t-1	0.0385	-0.1959	0.0154	-0.0298	0.1644	-0.0863	0.1440	0.1233
	(0.2412)	(0.2465)	(0.2395)	(0.2415)	(0.2350)	(0.2450)	(0.2342)	(0.2353)
Leverage t-1	0.6167*	0.3366	0.6042*	0.6015*	0.4079	0.1003	0.3903	0.4017
	(0.3525)	(0.3177)	(0.3510)	(0.3559)	(0.3462)	(0.3223)	(0.3460)	(0.3460)
Trade Credit t-1	-0.4469*	-0.2322	-0.4349	-0.4054	-0.1102	0.1531	-0.0764	-0.0558
	(0.2634)	(0.2473)	(0.2649)	(0.2684)	(0.2641)	(0.2389)	(0.2660)	(0.2657)
BlockHolders t-1	0.0053**	0.0044**	0.0053**	0.0048**	0.0050**	0.0048**	0.0051**	0.0048**
	(0.0023)	(0.0019)	(0.0023)	(0.0023)	(0.0022)	(0.0019)	(0.0022)	(0.0022)
Age (log)	-0.0511	-0.1529**	-0.0373	-0.0560	-0.1025	-0.2003***	-0.0830	-0.0935
	(0.0817)	(0.0731)	(0.0817)	(0.0830)	(0.0849)	(0.0749)	(0.0863)	(0.0875)
Firms in Group	-0.2330**	-0.3123***	-0.2267**	-0.2356**	-0.2079*	-0.2922**	-0.1987*	-0.2035*
	(0.1021)	(0.1132)	(0.1008)	(0.1007)	(0.1080)	(0.1219)	(0.1084)	(0.1077)
% Female Owners	0.0320	0.2694	0.0140	0.0028	-0.0444	0.1929	-0.0676	-0.0754
	(0.2024)	(0.1765)	(0.1998)	(0.2037)	(0.2037)	(0.1758)	(0.2016)	(0.2032)
Mutual Funds & PE	-1.7312*	-2.0416***	-1.7776*	-1.7422**	-1.3010*	-1.6049***	-1.3566*	-1.3193*
	(0.9078)	(0.6557)	(0.9075)	(0.8563)	(0.7428)	(0.5805)	(0.7452)	(0.7123)
N obs	3371	3371	3371	3371	3371	3371	3371	3371
N firms	1290	1290	1290	1290	1290	1290	1290	1290
Pseudo R^2	0.5847	0.5129	0.5873	0.5919	0.5554	0.4834	0.5610	0.5628
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster SE	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Firm
Winsor.	p1-p99	p1-p99	p1-p99	p1-p99	p1-p99	p1-p99	p1-p99	p1-p99

Le colonne (1) e (5) mostrano il modello di base con ESG rating e l'insieme delle variabili di controllo, ma senza Size. Il coefficiente di ESG rating è negativo e statisticamente significativo sia per Crisis (colonna 1) sia per Bankruptcy (colonna 5), indicando che livelli più elevati di performance ESG sono associati a una minore probabilità di crisi e fallimento, supportando l'ipotesi H1b.

Le colonne (2) e (6) introducono la dimensione della PMI (Size) insieme al punteggio ESG. Size presenta in entrambe le colonne un coefficiente negativo e altamente significativo, indicando che le PMI più grandi hanno una minore probabilità di crisi e fallimento. In entrambe le colonne, la significatività statistica del coefficiente di ESG rating si riduce, pur rimanendo significativa, mostrando che parte dell'effetto protettivo è assorbito dal fattore Size. Ciò suggerisce che l'associazione tra performance ESG e distress è in parte legata alle differenze nella dimensione d'impresa.

Le colonne (3) e (7) introducono il termine di interazione tra ESG rating e Size, fornendo l'evidenza principale sul ruolo moderatore della dimensione. In entrambe le colonne, il coefficiente di ESG rating rimane negativo e significativo, mentre il termine di interazione ESG×Size è positivo e statisticamente significativo per la variabile Crisis e positivo ma non significativo per Bankruptcy. Questo indica che la dimensione d'impresa modera significativamente la relazione protettiva tra performance ESG e distress finanziario, supportando l'ipotesi H2a. In particolare, l'effetto negativo, cioè protettivo, dell'ESG sulla probabilità di distress è più forte per le PMI più piccole e si attenua all'aumentare della dimensione d'impresa. In altre parole, la performance ESG agisce come uno scudo contro il distress finanziario principalmente per le imprese più piccole, mentre per le PMI più grandi l'effetto marginale protettivo tende ad annullarsi.

Per illustrare meglio i risultati, includiamo anche la Figura 2, che riporta gli Average Marginal Effects (AME), e la Figura 3, che mostra come l'effetto marginale dell'ESG vari al variare della dimensione d'impresa sia sulla Crisis (sinistra) sia sulla Bankruptcy (destra), evidenziando una riduzione dell'effetto all'aumentare della dimensione della PMI.

Figura 2

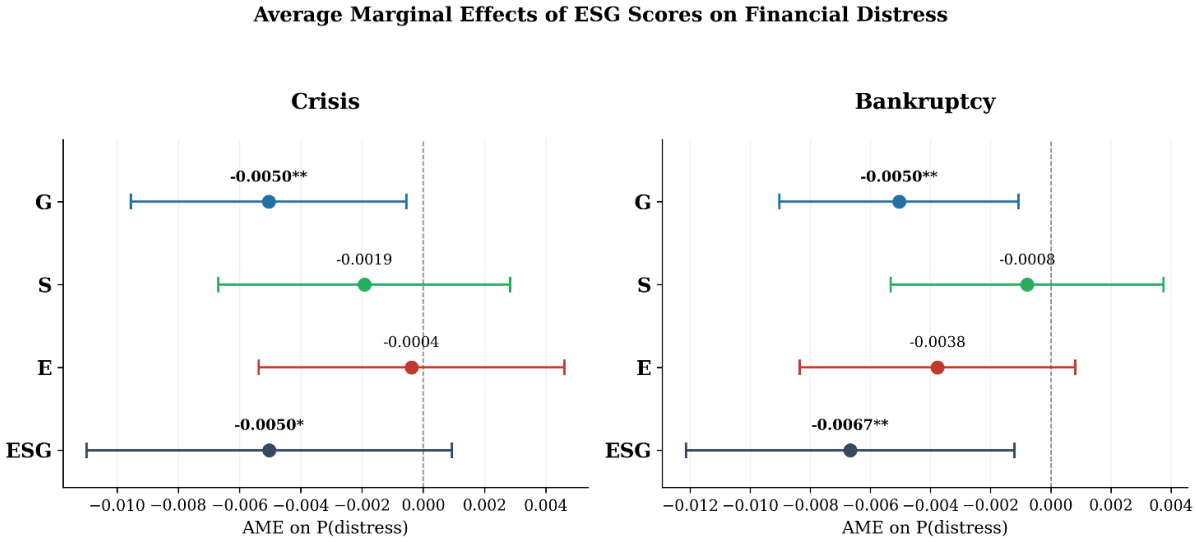
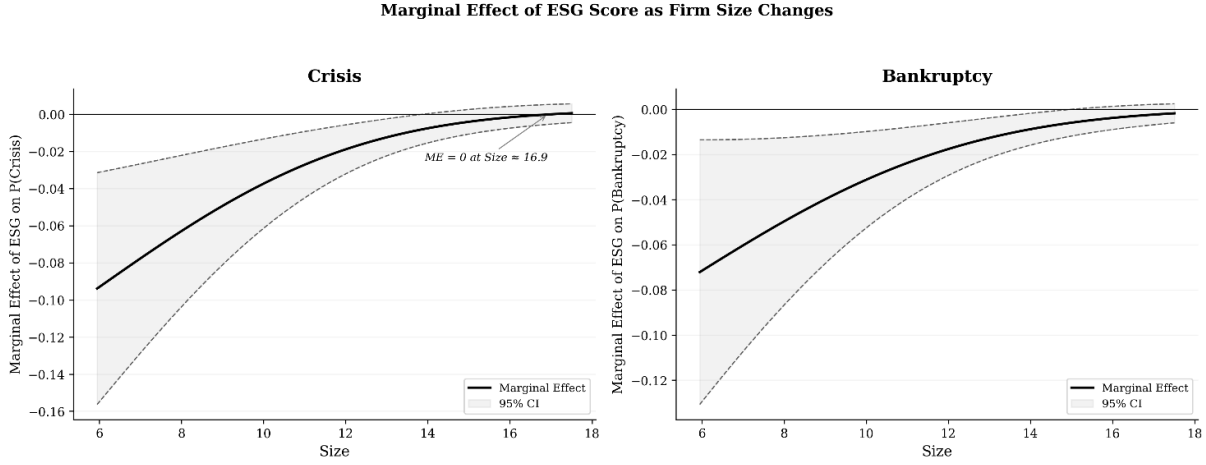


Figura 3



*Per approfondire quali dimensioni della performance ESG guidino i risultati aggregati, stimiamo modelli probit separati per ciascun pilastro: Environmental (E), Social (S) e Governance (G). La tabella è disponibile su richiesta e i risultati mostrano che il pilastro Governance emerge come il predittore più rilevante, con un coefficiente negativo e altamente significativo sia per Crisis (–0.1927***) sia per Bankruptcy (–0.1916***). Il pilastro Environmental non risulta mai statisticamente significativo in nessuna specificazione, mentre il pilastro Social presenta una significatività al limite. Quando viene introdotta la variabile Size, tutti i punteggi dei singoli pilastri perdono significatività statistica, confermando il ruolo dominante della dimensione d'impresa già osservato per il punteggio ESG complessivo.*

È importante notare che, a differenza del punteggio ESG aggregato, i termini di interazione Pillar×Size non risultano statisticamente significativi per nessun pilastro individuale. Ciò suggerisce che il meccanismo di moderazione legato alla dimensione opera a livello del costrutto ESG complessivo, piuttosto che sulle singole dimensioni.

Analisi della materialità ambientale. Alla luce dell'eterogeneità tra i pilastri e dell'assenza di un effetto significativo per il pilastro Environmental, analizziamo se la relazione tra punteggi ESG e distress finanziario vari in funzione della materialità ambientale del settore in cui opera l'impresa. Classifichiamo i settori come ambientalmente rilevanti (E_mat = 1) sulla base del EU Taxonomy Delegated Act 2021/2139. La Tabella, disponibile su richiesta, presenta modelli che includono l'interazione tra ciascun punteggio e la dummy E_mat. Il risultato più rilevante riguarda il pilastro Social. L'interazione S×E_mat è positiva e statisticamente significativa (p = 0.031 per Crisis, p = 0.072 per Bankruptcy), mentre l'effetto principale del pilastro Social è negativo e significativo. Ciò indica che il pilastro Social ha un effetto protettivo nei settori non caratterizzati da materialità ambientale, ma questo effetto scompare completamente nei settori ambientalmente rilevanti, dove l'interazione positiva compensa l'effetto negativo principale. Le interazioni tra ESG, E e G con E_mat non risultano invece statisticamente significative, suggerendo che questa eterogeneità settoriale è specifica del solo pilastro Social.

Research limitations. *I limiti di questo studio riguardano il focus sulle PMI italiane, l'utilizzo di un unico provider di dati ciaoESG e la mancata analisi degli effetti dinamici di lungo periodo*.

Managerial implications. *Dal punto di vista teorico, evidenziamo come il ruolo dell'ESG come segnale verso gli stakeholder sia condizionato dalla dimensione dell'impresa. Mostriamo infatti che le PMI più piccole, caratterizzate da maggiori asimmetrie informative, beneficiano maggiormente dell'ESG in termini di credibilità, mentre per le imprese più grandi tale funzione segnaletica risulta meno rilevante. Sul piano manageriale, suggeriamo che le PMI più piccole dovrebbero considerare l'ESG, in particolare governance e pratiche sociali, come una leva concreta per ridurre il rischio finanziario e rafforzare le relazioni con gli stakeholder. Sottolineiamo inoltre che, nei settori a elevata materialità ambientale, le iniziative sociali devono essere accompagnate da una gestione credibile dei rischi ambientali. Per le PMI più grandi, invece, evidenziamo l'importanza di mantenere un equilibrio tra obiettivi di sostenibilità e performance economica. Infine, sottolineiamo le implicazioni per istituzioni finanziarie e policy maker, suggerendo di non considerare l'ESG come una misura uniforme, ma di tener conto delle sue diverse componenti, della dimensione aziendale e delle caratteristiche settoriali.*

Originality of the paper. *Il presente studio si distingue per diversi elementi di originalità che contribuiscono ad arricchire il dibattito accademico sulla relazione tra sostenibilità e rischio di fallimento. Introduciamo un focus specifico sulle PMI, un ambito ancora poco esplorato nella letteratura ESG, che si è finora concentrata prevalentemente su grandi imprese e società quotate. Questo rappresenta un contributo rilevante, poiché le PMI costituiscono una componente fondamentale del tessuto economico, ma risultano spesso caratterizzate da maggiore vulnerabilità finanziaria e da una minore disponibilità di dati ESG standardizzati.In secondo luogo, il nostro lavoro integra in modo innovativo variabili non finanziarie, in particolare la performance ESG, nei modelli di previsione del distress e del fallimento. In un contesto in cui la maggior parte degli studi continua a basarsi quasi esclusivamente su indicatori contabili, mostriamo come la sostenibilità possa rappresentare una dimensione informativa aggiuntiva e rilevante per comprendere la fragilità finanziaria delle imprese.*

Un ulteriore elemento di originalità risiede nell'analisi delle eterogeneità degli effetti ESG. Dimostriamo infatti che l'impatto della sostenibilità non è uniforme, ma dipende in modo cruciale dalla dimensione d'impresa. In particolare, evidenziamo che i benefici dell'ESG in termini di riduzione del rischio di distress sono più marcati per le PMI di dimensioni ridotte, contribuendo così a chiarire condizioni e limiti dell'efficacia della sostenibilità come leva strategica.

Infine, il nostro studio introduce una prospettiva ancora poco indagata, analizzando il ruolo della rilevanza ambientale del settore. Mostriamo che l'effetto protettivo delle diverse componenti ESG varia in funzione delle caratteristiche settoriali, e in particolare che il contributo della dimensione sociale si annulla nei settori in cui i fattori ambientali sono economicamente rilevanti. Questo risultato evidenzia l'importanza di considerare il contesto competitivo e regolatorio nel valutare l'impatto della sostenibilità.

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Società Italiana di MANAGEMENT

Short papers

Track:
Supply Chain Management, Logistics & Operations



Beyond productivity: Digital transformation and workers' well-being in warehouse operations

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Abstract. *The digital transformation and automation phenomena of logistics workplaces, particularly in warehousing, are posing growing attention to the human element of operations. From a people-centric perspective, while such investments may enhance logistics performance, they may also affect the well-being of logistics workers. Understanding the implications of digital transformation and automation for workers, therefore, remains a crucial issue for logistics research. Despite growing interest in this topic, we still know little about whether and why the same technological intervention may simultaneously reduce workers' physical effort and increase productivity, while also weakening other aspects such as perceived work meaningfulness, social relationships at work, or engagement with tasks. This highlights the importance of examining workers' well-being from a multidimensional perspective. This short paper aims to develop a series of experimental studies (scenario-based and on-field) focusing on a specific warehouse digitalization intervention: the introduction of sensor-enabled vehicle systems designed to guide and partially automate pickers' activities. Semi-structured interviews with managers and logistics workers will first be conducted to inform the design of the experimental studies. This research aims to contribute to the socio-technical systems theory by demonstrating how the technical subsystem of a digitally-transformed warehouse interacts with the social subsystem, represented by pickers' perceptions of their well-being at work. In addition, the study seeks to provide practical managerial guidance on how digitalization initiatives can be implemented while considering their implications for workers' well-being.*
Keywords: *Worker well-being, Productivity, Digital technology, Scenario-based experiment, Field study, Socio-technical systems*

Framing of the research. Over recent decades, the logistics and supply chain management (LSCM) discipline has evolved through several transformative phenomena, from sustainability imperatives to heightened risk management (van Hoek & Wong, 2025), from digitalization and automation to a growing attention for the human element and a people-centric approach (Holmström et al., 2019; Pagell & Wilhelm, 2025). In warehousing in particular, digital transformation and automation have long been perceived as a main driver of future business success, resulting in picking and material-handling activities being increasingly supported by sensors, software, and automated decision aids (Holmström et al., 2019; Winkelhaus et al., 2022). Yet, humans remain a vital part of logistics workplaces as workers continue to shape logistics performance through their decision-making, execution, and interaction with digital systems (Corbett et al., 2024; Kadir et al., 2019; Winkelhaus et al., 2022). Therefore, understanding the implications of digital transformation and automation for workers remains a crucial issue for logistics research, with significant influence on the outcomes of logistics systems.

Digital investments are often justified through promises of effort reduction, increased productivity, and improved operational control. However, extant evidence suggests that these gains cannot be assumed to translate automatically into positive worker experiences (Scott et al., 2021; Westphal et al., 2025). As a matter of fact, digital transformation modifies work characteristics, thus determining changes in individual workers' perceptions and evaluations of their conditions at work (i.e., their well-being at work) (Winkelhaus et al., 2022; Westphal et al., 2025). Logistics workers' well-being has climbed up practitioners' agenda in light of labor shortages and pressures on firms to demonstrate they are behaving in a socially responsible way (Corbett, 2024; Pagell & Wilhelm, 2025). As a result, major international brands have started to perform audits that assess physical dimensions of well-being (Bellingan et al., 2020; Lamb & Kwok, 2016). Likewise, LSCM scholars have been calling for research that examines the role of the supply chain ecosystems in ensuring the health, safety, and well-being of employees and customers (Douglas et al., 2024; Mollenkopf et al., 2024), expanding the traditional logistical mission into one that encompasses social outcomes (Bowersox, 1998). Together with physical dimensions (Cantor et al., 2016; Douglas et al., 2024; Roberts et al., 2024), job satisfaction has frequently been investigated as a proxy for workers' well-being (Autry & Daugherty, 2003; Weiss & Brief, 2001; Winkelhaus et al., 2022). However, recent evidence has highlighted that well-being is much more complex and multi-dimensional, as it includes *hedonic* aspects (e.g., job satisfaction or positive affect at work), *eudaimonic* aspects (e.g., meaning at work), and social aspects (e.g., relationships with peers and leaders) (Bellingan et al., 2020; Fisher, 2014; Martela, 2025).

While existing LSCM studies have examined impacts of technology adoption on human operators mainly through adjacent outcomes such as job characteristics, job satisfaction, safety, or performance (e.g., Cantor et al., 2016; Salanova et al., 2004; Westphal et al., 2025; Winkelhaus et al., 2022), LSCM scholarship now calls for research that places well-being outcomes at the center and recognizes their multi-dimensionality (Mollenkopf et al., 2024). An expanded conceptualization of workers' well-being is relevant as it allows us to shed light on possible trade-offs or misalignments between different well-being dimensions. In fact, digital transformation interventions, intended to reduce effort and

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improve workflow and performance, may still undermine workers' autonomy, thus impacting on one or more facets of workers' well-being (e.g., reducing job satisfaction) (Autry & Daugherty, 2003; Grant et al., 2007; Robert et al., 2020).

We still lack an understanding of how digital transformation and automation in warehouse operations reshape different dimensions of workers' well-being. In particular, we know little about whether and why the same intervention may simultaneously reduce physical effort, eventually increase productivity, while also weakening perceived work meaningfulness, social relationships at work, or engagement with work and tasks. The specific research question is: *how does digital transformation in warehouse operations influence workers' perception of different dimensions of their well-being?* This short paper addresses this gap by developing a series of experimental studies (scenario-based and on-field) on a warehouse digitalization intervention: the introduction of sensor-enabled vehicle systems designed to guide and partially automate pickers' activities.

Purpose of the paper. Building on literature on digital transformation and automation in logistics, and on workers' well-being research, this study aims to examine how multiple dimensions of worker well-being evolve as a result of technology implementation, uncovering positive, negative, and counterintuitive worker responses. Moreover, the research aims at revealing whether trade-offs exist between productivity and well-being perceptions. To reach our aims, we turn to socio-technical systems (STS) theory (Bostrom & Heinen, 1977; Cooper & Foster, 1971).

Workers' well-being. Workers' well-being has emerged as an increasingly important construct across organizational research (Danna & Griffin, 1999; Knight & Haslam, 2010). Within LSCM literature, recent calls for research have highlighted the need to integrate the experiences of people and communities (Pagell & Wilhelm, 2025) and to reframe supply chains as people-centric systems, ones that recognize, encapsulate, and actively promote the well-being of logistics workers. In the broadest sense, employee well-being refers to the overall quality of workers' experience and functioning at work, encompassing how positively they evaluate their job and how well they function psychologically in it (Fisher, 2014; Grant et al., 2007). While job satisfaction has long been the dominant proxy, recent work shows that this indicator is too narrow. Contemporary scholarship distinguishes at least hedonic or evaluative aspects (e.g., job satisfaction), affective states (e.g., approaching work with excitement and joy), and eudaimonic dimensions such as motivation, meaning, and purpose at work. Social and physical dimensions are also increasingly recognized as integral rather than peripheral to well-being (Bellingan et al., 2020; Martela, 2025). This broader understanding is especially relevant in logistics and supply chains, where worker experiences have often been overshadowed by efficiency and performance concerns (Bruccoleri et al., 2014; Roberts et al., 2024). Although LSCM scholarship has begun to address precarious work, safety, and decent work, it still tends to examine workers instrumentally, whose well-being represents an antecedent to retention or productivity (Soundararajan et al., 2021; Wiengarten et al., 2021). Moreover, recognizing workers' well-being as a multi-dimensional concept is useful for logistics contexts because operational and workplace conditions may support some dimensions while undermining others. For instance, warehouse interventions may improve performance or reduce physical effort while still eroding autonomy or satisfaction. Accordingly, studying logistics workers' well-being requires moving beyond single proxies and examining how different aspects of well-being are simultaneously enabled or frustrated by work design changes, such as the adoption of new technologies.

Adoption of automation and digital technologies and work experiences. LSCM research on the impact of automation and digital technologies on logistics workers' experiences has developed across transportation and warehouse operations. In warehouse settings, technology adoption has intensified under the industry 4.0 and industry 5.0 paradigms, yet human labor remains central (Holmström et al., 2019; Westphal et al., 2025; Winkelhaus et al., 2022). Winkelhaus et al. (2022) provide an account of how digital and automation technologies reconfigure work characteristics at varying maturity levels, finding that high automation reduces physical demands but simultaneously turns workers into passive performers, whose knowledge requirements and decision autonomy are reduced. Within the investigation of physical dimensions, a stream of research has examined how technology - from assisted-picking devices to collaborative robots - can reduce physical workload and fatigue (Grosse et al., 2023; Neumann et al., 2021; Pasparakis et al., 2023). While certain forms of digital transformation and automation adoption have been found to reduce physical effort and to improve performance, the evidence on their broader effects on workers' experiences remains fragmented (Pasparakis et al., 2023; Westphal et al., 2025). Beyond physical outcomes, job satisfaction has been the dominant proxy for well-being in LSCM research (Autry & Daugherty, 2003; Maloni et al., 2017), and it has also been explored under digitalization shifts (Bala, 2013; Winkelhaus et al., 2022). Winkelhaus et al. (2022) show that automation technology can indirectly have both positive and negative effects on workers' job satisfaction, depending on system design and employees' preferences. Westphal et al. (2025) sharpen this picture through a field study, showing that algorithmic task assignment suppresses self-determination needs to the point where workers develop informal coping strategies, and that even an intervention intended to restore autonomy can paradoxically reduce job satisfaction if it disrupts such coping responses. Collectively, these contributions reveal an important gap: while studies have individually examined outcomes such as physical effort and safety, job satisfaction, or productivity and performance of warehouse technologies, they have not jointly examined how multiple well-being dimensions are simultaneously – and potentially divergently - affected by a single technology implementation. Understanding these dynamics can yield a more comprehensive understanding of the impacts of technology adoption on a multi-dimensional conceptualization of well-being, while revealing whether trade-offs exist between productivity and workers' well-being perceptions.

Socio-technical systems theory. Socio-technical systems (STS) theory proposes that work system performance depends on the alignment of technical structures with the requirements of social actors and the external environment (Bostrom &

Heinen, 1977; Cooper & Foster, 1971). Early STS studies observed that employee behavior and work design were so intertwined that technical processes could not be understood without understanding social processes (Emery, 1959; Kull et al., 2013). The supply chain field has used aspects of STS theory to investigate, among others, social reactions to factory automation (Susman & Chase, 1986), logistics workers' resistance to the implementation of electronic log-book systems (Cantor et al., 2009), and the engagement of drivers on sharing economy platforms based on platform design attributes (Saunders et al., 2025). Overall, STS theory allows generating critical insights into the relationships among people, technology, and outcomes (Griffith & Dougherty, 2001; Kull et al., 2013).

Drawing on STS theory, we conceptualize digitally-transformed warehouses as socio-technical systems and examine how the alignment between technical (digital and automation technology integration) and social (pickers' preferences and behaviors) subsystems influences workers' perception of different dimensions of their well-being. By integrating structural elements of warehouse structures with pickers' preferences, we gain a more comprehensive understanding of the factors influencing logistics workers' job experiences.

Methodology. We will collect data through a series of complementary and sequential research methodologies. Following a three-step research design, we will first conduct semi-structured interviews with managers and logistics workers employed in a warehouse where a digitalization intervention is being introduced. Building on the insights obtained from the interviews, we will then conduct a scenario-based experiment to test the impact of the digitalization intervention on workers' well-being in a controlled environment and establish internal validity. Finally, drawing on the findings of the previous studies, we will conduct a field experiment to validate the findings and examine the external validity of the results in a real operational setting.

Semi-structured interviews with managers and logistics workers will help us gain a detailed understanding of warehouse working procedures before and after the digitalization intervention. The interviews will help identify the intended opportunities of the intervention as well as potential behavioral issues arising in the workplace. We expect to gain detailed insights into existing workflows and formal operational processes, allowing us to accurately capture the key perceptual and behavioral dimensions and design realistic experimental scenarios (Gioia et al., 2013; Grant et al., 2023; Salanova et al., 2004).

Next, we will conduct an online, scenario-based between-subject experiment with logistics workers as the target participants. The methodology provides a valuable approach for studying individual decision-making, in which varying versions of a scenario convey information about different levels of the manipulated variable to participants (Eckerd & Bendoly, 2011; Knemeyer & Naylor, 2011). It is particularly well-suited for isolating causal effects that may be difficult to observe in complex real-world environments. Participants will be presented with a warehouse work scenario describing either the presence or absence of the digitalization intervention in the warehouse. Participants will be randomly assigned to one of the treated conditions. Data will be collected via the Prolific Academic crowdsourcing platform, and the survey instrument will be developed in Qualtrics. Prior to the main experiment, we will conduct pretests to ensure scenario realism and to conduct manipulation checks (Bachrach & Bendoly, 2011). Respondents will receive a fixed compensation for their participation. In the experiment, respondents will be asked to imagine a warehouse work situation representing a simplified and controlled version of the real operational setting, which will later be examined in the field experiment.

Although scenario-based experiments provide strong internal validity, they primarily capture individuals' perceptions and behavioral intentions rather than actual behavior. To address this limitation and enhance external validity, we will therefore conduct a field experiment in a logistics warehouse. This study will examine whether the digitalization intervention affects logistics workers' well-being in a real operational context. Conducting field research allows us to observe behavior within existing systems of human interaction and operational processes. It offers a unique opportunity to uncover dynamics, such as interactions among workers, managers, and digital systems, that may not emerge from scenario-based data alone. Grounding the research in a real-world setting strengthens external validity (Ibanez & Staats, 2018) and enables us to identify operational and behavioral factors affecting worker well-being that might otherwise remain hidden and to analyze actual productivity data. In this study, we examine people-centric operations by analyzing how logistics workers interact with digitalized systems and adapt their behavior within warehouse processes. The field study will be conducted in the warehouse of a logistics service provider operating in Western Europe.

Measures of logistics workers' well-being and productivity. The dependent variables investigated in the scenario-based and field experiments will be workers' perceived well-being and productivity. Logistics workers' perceived well-being will be measured along the three dimensions proposed in the literature (Fisher, 2014; Martela, 2025): affective, evaluative, and conative well-being. Affective well-being (Van Katwyk et al., 2000) refers to the affective experiences employees have at work that tend to range along a continuum from positive to negative (Warr, 2013). The most common way to measure affective well-being is to examine how much positive affect and how much negative affect the worker is experiencing. Some workers might approach their work with excitement and joy; others may feel that their work gives rise to anxiety, frustration, and sadness. Evaluative well-being refers to general feelings and assessments employees make as regards how positively they evaluate their work, and is typically measured through job satisfaction and meaningful work (Rothausen & Henderson, 2019). Job satisfaction is defined as an overall evaluative judgment workers have about their job, focusing on its favorability. Meaningful work is conceptualized as the extent to which the employee finds their work personally significant and valuable. Conative well-being refers to the quality of the worker's motivation toward one's work, thus focusing on types of motivation felt as positive, where work feels attractive and intrinsically motivating,

and the employee feels drawn toward and excited about one's work (Deci et al., 2017). Conative well-being can be mainly measured by positive constructs, such as work engagement – defined as a motivational state of dedication and absorption – and negative constructs, such as job burnout, characterized by loss of energy and enthusiasm (Rivkin et al., 2018).

Logistics workers' job productivity measures will be defined consistently with KPIs adopted in the warehouse that represents the context of the study; such measures will be shared by the logistics service provider implementing the digitalization intervention.

Results. This research is conducted at the individual (worker) level of analysis to capture the little-known perspectives of logistics workers (specifically, pickers) and explore the influence of digital transformation and automation adoption in warehouses from a more micro perspective, thus contributing to a deeper understanding of how transformative phenomena such as Industry 5.0 might influence worker perceptions and behavior when conducting dynamic tasks.

Our expected results shed light on positive, negative, or counterintuitive changes of multiple dimensions of logistics workers' well-being (namely, job satisfaction, affective well-being, and meaning at work) as a result of a digital transformation intervention in a warehouse. Moreover, we expect to reveal whether trade-offs exist between productivity and well-being perceptions.

Our contribution to STS theory lies in demonstrating how the technical subsystem of a digitally-transformed warehouse interacts with the social subsystem (pickers' perceptions of their well-being at work). This interaction may shape the overall logistics system's effectiveness, particularly in terms of pickers' productivity. Moreover, well-being perceptions may have an impact on further job-related outcomes such as turnover intention, absenteeism, and motivation. By applying STS principles to a warehousing context, we highlight the importance of aligning technical platform design with the preferences of the workers.

Research limitations. This research presents some inherent limitations. First, from a methodological perspective, scenario-based experimental methods, while strong in internal validity, often suffer from lower external validity. We intend to assess this limitation by complementing the scenario-based experiment with a field study. Second, this study focuses on a single digital transformation intervention in a warehouse. This may limit the applicability of findings to other warehousing contexts, considering that a great variety of digital and automation technologies may be implemented and integrated. Further research may examine whether other human-technology interaction designs yield comparable results.

Managerial implications. This research aims to provide critical knowledge and timely guidance to managers in logistics and warehousing contexts, for increasing worker-related outcomes such as well-being, while maintaining operational productivity. Furthermore, increased perception of well-being may indirectly lead to a reduction of workforce turnover intention and absenteeism. Specifically, our results potentially provide insights into how firms can reduce negative job-related outcomes by aligning digital and automation technology design inside warehouses with the preferences of a heterogeneous logistics workers' population, in a way that fosters individual workers' perception of well-being.

Originality of the paper. This research contributes to LSCM literature by examining how digitalization and automation technologies shape multiple dimensions of workers' well-being in logistics operations, an outcome that remains underexplored despite its growing importance. Moreover, the research adds behavioral insights to the literature on digital transformation in logistics contexts. Finally, it extends the application of STS theory to digital transformation in the warehousing context.

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Designing Shock-Ready Agrifood Supply Chains

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Abstract. *Systemic shocks such as the pandemic, geopolitical conflicts, energy price volatility and climate-related disruptions have exposed structural weaknesses in agrifood supply chains. Traditionally configured according to cost-efficiency and lean management principles, these networks have proven fragile when confronted with simultaneous and prolonged disruptions. In this context, resilience must be embedded in the strategic design of supply chain networks rather than treated as a reactive capability. This study develops a network-oriented decision framework to identify the most critical resilience drivers in agrifood supply chains and to determine which strategic resilience approach should be prioritized under systemic shocks. An integrated Analytic Network Process (ANP) and Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS) methodology is adopted. ANP captures interdependencies among resilience drivers, while TOPSIS ranks alternative resilience strategies based on weighted criteria. Findings indicate that digital supply chain visibility, strategic logistics outsourcing governance, network diversification and dynamic business continuity planning are the most influential resilience drivers. Among strategic alternatives, agility emerges as the most appropriate resilience orientation in shock-prone environments. The study contributes to the supply chain management debate by integrating digitalization, logistics governance and network configuration into a structured decision-support framework for designing shock-ready agrifood supply chains.*
Keywords: *supply chain resilience; systemic shocks; agrifood logistics; ANP; TOPSIS; agility*

Framing of the research. *Over the past two decades, supply chain management (SCM) has progressively shifted from an efficiency-oriented paradigm toward a resilience-based perspective. Lean production, just-in-time practices, and global sourcing strategies were designed to reduce costs and increase competitiveness. At the same time, these configurations reduced slack and inventory buffers, increasing exposure to systemic disruptions (Durach et al., 2015). Recent shocks highlight this structural fragility. The COVID-19 pandemic disrupted labor mobility, transport capacity, and demand stability worldwide. The Russia–Ukraine conflict subsequently altered trade flows, restricted access to key agricultural inputs such as fertilizers and grains, and generated sustained volatility in energy prices affecting logistics networks (Zakeri et al., 2022; Mottaleb et al., 2022). Competition over critical minerals—including lithium, cobalt, and rare earth elements—has further concentrated supply chains in a limited number of producing countries, increasing strategic vulnerability across industries (Liu et al., 2025). Agrifood supply chains are particularly exposed to these risks. Perishability, seasonality, reliance on transport and cold-chain infrastructure, and fragmented primary production increase operational vulnerability (Koufteros and Lu, 2017). Because agrifood systems are closely linked to food security, disruptions in fertilizer markets or energy-intensive logistics can rapidly translate into food price volatility (Mehibel et al., 2025). Climate stress further amplifies commodity volatility (Marn-Rodríguez et al., 2025). In response, resilience has become a central concept in SCM research. It refers to the capacity of supply chains to anticipate, absorb, and recover from disruptions while maintaining operational continuity (Durach et al., 2015). Recent contributions emphasize agility and flexibility as key capabilities enabling adaptation to persistent shocks (Fayezi et al., 2017; Mishra et al., 2022; Mishra et al., 2024). Moreover, extant research has increasingly framed supply chain resilience as a systemic capability emerging from the interaction between network structure, governance mechanisms and information flows across interconnected actors (Ivanov, 2026). Rather than being interpreted solely as the ability to recover from disruptions, resilience is progressively conceptualized as a proactive capability embedded in supply chain design, enabling organizations to anticipate, absorb and adapt to systemic shocks through coordinated network responses (Faggioni et al., 2024). From this perspective, resilience does not depend exclusively on individual firm capabilities but on the configuration of the broader supply network, including the alignment of partners, the distribution of decision rights, and the availability of shared information infrastructures. Within such networked systems, scholars also identified intangible resources and forms of intellectual capital as crucial in enabling coordinated responses to disruption (Mubarik et al., 2022). Elements such as relational capital among supply chain partners, shared knowledge bases, trust-based governance mechanisms and collective learning processes contribute to strengthening adaptive capacity across the network (Yu et al., 2023). Consequently, resilience increasingly emerges as a knowledge-intensive and relational capability embedded in the intellectual capital of the supply chain ecosystem rather than solely in the operational assets of individual firms (Rossi et al., 2026). In complex sectors such as agrifood systems, where multiple actors interact under strong environmental and regulatory constraints, resilience therefore becomes an emergent property of the supply chain network rather than a firm-level attribute (Faggioni & Rossi, 2025).*

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Contemporary resilience literature identifies multiple interconnected drivers spanning technological, relational, and structural dimensions. Transport infrastructure endowment influences supply chain performance and adaptive capacity (Agnusdei et al., 2022a). Coordination mechanisms, information sharing, and social capital enhance relational resilience. Digital transformation has emerged as a foundational resilience enabler. IoT-enabled monitoring systems, blockchain traceability, predictive analytics, digital twins, and AI-driven risk forecasting strengthen real-time visibility and proactive disruption management (Agnusdei et al., 2022b; Belhadi et al., 2024; Adama et al., 2024; Gomaa, 2025).

Logistics outsourcing governance represents a critical resilience dimension. Outsourcing can either increase vulnerability through supplier concentration or enhance resilience through collaborative alignment and strategic integration (König and Spinler, 2016; Liu and Lee, 2018; Laari et al., 2024; Alsmairart, 2025). Third-party logistics providers increasingly serve as adaptive partners capable of reconfiguring routes and capacities under disruption.

Structural diversification strategies also contribute to resilience. Supplier dispersion and network diversification mitigate concentration risk and reduce dependency on single regions. Nearshoring and reshoring initiatives reflect deliberate strategic reconfigurations driven by geopolitical risk mitigation rather than cost optimization (Qureshi and Ali, 2025; Robinson and Dolfsma, 2025).

Dynamic business continuity planning frameworks further strengthen adaptive capacity. Rather than relying on static contingency manuals, organizations increasingly adopt scenario-based, data-driven, and analytics-supported planning systems to enhance preparedness (Kaneberg et al., 2025). Inventory planning systems and adaptive resource allocation mechanisms also influence resilience outcomes (Swink et al., 2025).

Given the multiplicity of resilience drivers and the presence of competing objectives, structured decision-support approaches have gained relevance. Multi-criteria decision-making (MCDM) frameworks provide systematic methods for integrating technological, relational, and structural dimensions. Hybrid ANP–TOPSIS models have been applied to supplier selection, risk prioritization, and strategic evaluation contexts (Chen, 2021; Abdel-Basset et al., 2018; Mukherjee et al., 2024; Kayouh and Dkhissi, 2025). These approaches allow modeling interdependencies among criteria while transparently ranking strategic alternatives under uncertainty.

Purpose of the paper. *Despite the substantial growth of the supply chain resilience literature over the past decade, several conceptual and methodological limitations persist.*

To illustrate, resilience drivers are frequently examined in isolation. Technological capabilities, relational governance mechanisms, and structural network configurations are often treated as separate analytical dimensions, without adequately accounting for their systemic interdependencies. However, supply chains increasingly operate as complex adaptive networks in which digital visibility influences coordination routines, outsourcing governance affects vulnerability exposure, and diversification strategies interact with business continuity mechanisms. Recent network-oriented perspectives explicitly call for resilience research that incorporates multiple stakeholders and interlinked system components rather than firm-level isolated factors (Hong et al., 2023). The absence of integrative analytical frameworks capable of capturing such feedback mechanisms therefore represents a significant limitation in current resilience research.

In addition, sector-specific resilience dynamics remain underexplored. Although general resilience frameworks provide valuable conceptual foundations, agrifood supply chains exhibit distinctive characteristics that challenge standard models. Biological production cycles, perishability constraints, regulatory compliance requirements, energy dependency in cold-chain logistics, and fragmentation of upstream actors generate resilience patterns that differ substantially from those observed in manufacturing or high-tech sectors. Empirical evidence from agri-food systems confronted with compounding shocks highlights the need for context-sensitive approaches capable of addressing sectoral particularities (Murphy et al., 2023; Coluccia et al., 2025). A contextualized analysis is therefore required to account for the structural and institutional peculiarities of agrifood networks.

Moreover, existing contributions often lack structured and transparent decision-support methodologies. While qualitative taxonomies and conceptual discussions are widespread, managers and policymakers frequently lack operational tools for prioritizing resilience investments under resource constraints. Recent contributions emphasize the urgency of developing structured frameworks to guide strategic choices in the face of global disruptions (Bamia and Bamia, 2025). However, few studies provide multi-criteria decision models capable of explicitly incorporating trade-offs among competing objectives, such as cost efficiency, service level, adaptability, and risk mitigation, within a coherent analytical structure. Fourth, the trade-off between resilience and efficiency remains insufficiently specified. Although resilience is widely recognized as desirable, its implementation entails tangible costs associated with redundancy, diversification, digital infrastructure and coordination mechanisms. The balance between adaptive capacity and operational efficiency is inherently context-dependent and may vary across industries and shock typologies. Recent analyses underline the need for more rigorous evaluation of resilience strategies capable of mitigating disruption while preserving competitiveness (Phukan and Kumar, 2025). Yet empirical clarification of how different strategic orientations perform under systemic shock conditions remains limited.

In light of these gaps, the objective of this paper is twofold.

First, it aims to identify and prioritize the most critical factors shaping agrifood supply chain resilience in the presence of systemic shocks. These factors include digital transformation, logistics outsourcing governance, network diversification, energy dependency management and dynamic business continuity planning.

Second, the study seeks to determine which resilience strategy should be prioritized among four alternative approaches: robustness, agility, flexibility and risk-oriented governance.

The research questions are therefore:

RQ1: Which factors most significantly influence resilience in agrifood supply chains under systemic shocks?

RQ2: Which resilience strategy best aligns with the prioritized resilience drivers?

By answering these questions, the study contributes to the ongoing debate on supply chain configuration under uncertainty and provides operational guidance for managers and policymakers responsible for agrifood logistics systems.

Methodology. *To ensure a rigorous and structured evaluation of resilience strategies in agrifood supply chains exposed to systemic shocks, the methodological framework was developed through a sequence of clearly defined steps (Figure 1).*

The methodological process was structured into four main phases:

1. *Identification and validation of resilience drivers.*
2. *Structuring of the ANP network and weighting of criteria.*
3. *Ranking of resilience strategies using Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS).*
4. *Sensitivity analysis.*

Each phase progressively refined the analytical framework and ensured alignment with the research objectives (Coluccia et al., 2024; 2025a).

Figure 1 – Methodological workflow



Source: Authors' Elaboration

Phase 1 – Identification of the criteria or resilience drivers. *The first phase focused on identifying the resilience drivers to be included in the evaluation framework.*

An initial list of potential drivers was derived from the literature on supply chain resilience, systemic shocks, agrifood logistics, digital transformation, and governance mechanisms. Particular attention was given to contributions addressing technological capabilities, network diversification, outsourcing governance, and adaptive planning mechanisms.

To ensure contextual relevance to agrifood systems, a structured expert consultation was conducted. The panel consisted of 18 experts, including university scholars in supply chain management and practitioners operating in agrifood logistics networks. Eligibility required at least five years of professional or academic experience in supply chain risk management, logistics coordination, or agrifood operations.

The identification process unfolded in two stages:

- *First, experts reviewed and refined the preliminary list of drivers derived from the literature.*
- *Second, overlapping constructs were consolidated and definitions were clarified to avoid redundancy.*

At the end of this process, eleven resilience drivers were validated and grouped according to technological, structural, and relational dimensions:

Table 1 – Criteria of the study

Code	*Resilience Driver*	*Description*
(C1)	***Digital supply chain visibility***	*Capability to monitor inventory flows, transport status, supplier performance and disruptions in real time through digital platforms, control towers and data-sharing systems, reducing information asymmetry and enabling rapid response.*
(C2)	***Advanced analytics and AI adoption***	*Use of predictive analytics, artificial intelligence and data-driven forecasting tools to anticipate disruptions, optimize routing decisions and support adaptive planning under uncertainty.*
(C3)	***Strategic logistics outsourcing governance***	*Ability to design and manage outsourcing relationships with logistics providers through collaborative contracts, performance-based agreements and joint contingency planning mechanisms.*
(C4)	***Network diversification and nearshoring***	*Structural configuration of supply networks through geographical dispersion of suppliers, multi-sourcing strategies and selective regionalization to reduce concentration and geopolitical risk exposure.*
(C5)	***Inventory buffer strategy***	*Adoption of safety stock policies and strategic inventory reserves to absorb short-term disruptions and mitigate supply volatility.*
(C6)	***Energy dependency management***	*Capability to reduce vulnerability to energy price volatility and supply constraints through diversification of energy sources, efficiency measures and renewable integration within logistics operations.*
(C7)	***Cybersecurity readiness***	*Implementation of cybersecurity protocols and digital risk protection systems to safeguard interconnected supply chain infrastructures from cyber threats and data breaches.*
(C8)	***Human capital coordination***	*Organizational capability to coordinate cross-functional teams, align decision-making processes and enhance adaptive behavior among supply chain actors during disruptions.*
(C9)	***ESG and regulatory integration***	*Alignment of supply chain strategies with environmental, social and governance standards, as well as regulatory compliance requirements, reducing institutional and reputational risks.*
(C10)	***Dynamic business continuity planning***	*Development of scenario-based, data-supported and continuously updated contingency plans designed to ensure operational continuity during systemic shocks.*
(C11)	***Relational trust and information sharing***	*Degree of collaborative trust, transparency and structured information exchange among supply chain partners to enhance collective resilience and coordinated response.*

Source: Authors' Elaboration

These drivers constitute the criteria of the multi-criteria evaluation framework.

Stage 2: Analytic Network Process (ANP). *Given the presence of interdependencies among resilience drivers, the Analytic Network Process (ANP) was adopted to determine their relative importance (Kumar and Pant, 2023; Chung et al., 2005).*
Unlike hierarchical approaches, ANP allows the modeling of feedback and reciprocal influence among criteria. A network structure was defined using SuperDecision software. The eleven resilience drivers were organized within interconnected clusters reflecting technological, structural, and relational dimensions. Interdependencies among drivers were explicitly modeled through pairwise comparisons. A panel of 20 experts (partially overlapping with the previous consultation phase) conducted pairwise comparisons using Saaty's 1–9 scale. The scale ranged from 1 (equal importance) to 9 (extreme importance) (Saaty, 2004).
The comparison process generated:

- *An unweighted supermatrix*
- *A weighted supermatrix*
- *A limit supermatrix*

The weighted supermatrix was raised to successive powers until convergence was achieved, producing the limit supermatrix. The values contained in the limit supermatrix represent the global weights of each resilience driver.
To ensure reliability, a Consistency Ratio (CR) was calculated for each pairwise comparison matrix (Chu and Liu, 2002). A threshold of $CR \leq 0.10$ was adopted. When this threshold was exceeded, experts were asked to revise their judgments. The resulting global weights were subsequently used in the ranking phase (Apostolou and Hassel, 1993).

Stage 3: TOPSIS. *After deriving the global weights of the resilience drivers through the Analytic Network Process (ANP), the TOPSIS method was applied to rank four alternative resilience strategies (Fayezi et al., 2017): A1 – Robustness; A2 – Agility; A3 – Flexibility; A4 – Risk-oriented governance.*
TOPSIS is a distance-based multi-criteria decision-making method that identifies the alternative which simultaneously maximizes performance across benefit criteria while minimizing its distance from the least desirable configuration (Yoon

and Hwang, 1981). In this study, the method was used to determine which resilience orientation best aligns with the prioritized resilience drivers identified through the ANP analysis (Krstić et al., 2022; Coluccia et al., 2025b).
A decision matrix was constructed in which each resilience strategy was evaluated against the eleven resilience drivers. The evaluation scores were obtained from the expert panel, reflecting the perceived contribution of each strategy to strengthening specific resilience dimensions within agrifood supply chains exposed to systemic shocks.
To ensure comparability across criteria, the decision matrix was normalized in order to eliminate scale effects. Since all resilience drivers were treated as benefit criteria, higher values indicated better performance. The normalized scores were subsequently multiplied by the global weights derived from the ANP analysis, generating a weighted performance matrix that integrates both the relative importance of each resilience driver and the effectiveness of each strategy.
Following this, a positive ideal solution and a negative ideal solution were identified. The positive ideal solution represents a hypothetical strategy that achieves the best possible performance across all resilience drivers, whereas the negative ideal solution represents the lowest performance levels across the same criteria.
The distance of each resilience strategy from both the positive and negative ideal solutions was then calculated. These distances measure, respectively, how close each strategy is to the optimal configuration and how far it is from the least desirable scenario.
Finally, a relative closeness coefficient was computed for each alternative. This coefficient expresses the extent to which a strategy approaches the ideal solution while distancing itself from the negative benchmark. The resilience strategies were ranked in descending order according to their closeness coefficients, with higher values indicating superior overall alignment with the prioritized resilience drivers.
The integration of ANP and TOPSIS ensures that interdependencies among resilience drivers are captured through the network-based weighting process, while the final ranking of strategic alternatives is obtained through a structured and transparent distance-based evaluation procedure.

Stage 4: Sensitivity analysis. *To verify the robustness of the ranking results, a sensitivity analysis was conducted (Miškić et al., 2023; Coluccia et al., 2025).*

Three alternative scenarios were developed. In each scenario:

- *The weight of the most influential resilience driver was reduced by 15%, 30%, and 50%, respectively.*
- *The reduced weight was proportionally redistributed among the remaining drivers to maintain the total weight equal to 1.*

For each scenario, the TOPSIS procedure was repeated and the ranking of alternatives was recalculated.

This approach allows verification of ranking stability under different weight configurations and assessment of the influence of dominant criteria on the final ordering of resilience strategies.

Results. *The ANP analysis indicates that digital supply chain visibility is the most influential resilience driver within the network structure. This result highlights the central role of real-time monitoring systems, data-sharing platforms, and integrated control mechanisms in enhancing responsiveness under systemic disruptions (Agnusdei et al., 2022b).*

Strategic logistics outsourcing governance ranks second, suggesting that the management structure of outsourced logistics relationships significantly affects resilience outcomes. Previous research has shown that outsourcing may either amplify vulnerability or strengthen adaptive capacity depending on the quality of coordination and information integration (König and Spinler, 2016; Liu and Lee, 2018).

Network diversification and nearshoring emerge as the third most relevant driver, confirming the importance of geographical dispersion and reduced concentration risk in shock-prone environments.

Dynamic business continuity planning and human capital coordination also receive relatively high global weights, indicating that organizational and managerial capabilities complement technological and structural dimensions in shaping overall resilience (Svensson, 2004).

Regarding the ranking of strategic alternatives, the TOPSIS results show that agility achieves the highest closeness coefficient. This suggests that strategies emphasizing rapid sensing, adaptive reconfiguration, and flexible response mechanisms exhibit the strongest alignment with the prioritized resilience drivers (Fayezi et al., 2017; Mishra et al., 2022).

Risk-oriented governance ranks second, reflecting the continued relevance of structured monitoring and mitigation systems. In contrast, robustness and static redundancy-based approaches obtain lower scores, indicating comparatively weaker alignment within the evaluated multi-criteria framework (Durach et al., 2015).

Research limitations. *This study is subject to limitations. First, the analysis relies on expert judgments rather than large-scale empirical or archival data. Although consistency ratios were verified within the ANP procedure and structured evaluation was applied in TOPSIS, subjective bias cannot be fully excluded.*

Secondly, the empirical focus on agrifood supply chains may limit the generalizability of the findings to other industrial sectors characterized by different structural configurations or demand dynamics.

Finally, the model adopts a cross-sectional perspective. Resilience, however, is inherently dynamic. Future research could incorporate longitudinal datasets, simulation-based stress testing, or system-dynamics modeling to evaluate how resilience drivers evolve under prolonged or sequential shocks.

Managerial implications. *The findings indicate that designing shock-ready agrifood supply chains requires a strategic shift from cost-centric optimization toward resilience-oriented network configuration.*

In particular, managers should prioritize investments in digital visibility infrastructures that enable real-time tracking of inventory levels, transport flows, and supplier performance. Enhanced information transparency reduces asymmetry and improves response coordination (Johnson et al., 2013). Logistics outsourcing arrangements should move beyond transactional cost efficiency and incorporate resilience-oriented performance indicators, collaborative governance mechanisms, and joint contingency planning structures (Liu and Lee, 2018). Moreover, geographical diversification strategies, including selective nearshoring, can mitigate exposure to geopolitical fragmentation and climate-related concentration risks. Finally, business continuity planning should evolve from static emergency protocols to dynamic, scenario-based frameworks supported by predictive analytics and continuous monitoring systems (Svensson, 2004).

Originality of the paper. *This study contributes to the supply chain management literature in three main respects. In particular, from the prior side, it updates the conceptualization of resilience drivers in light of recent systemic shocks, explicitly integrating digitalization, cybersecurity, energy dependency, and geopolitical fragmentation within a unified analytical framework.*

At the second stage, it applies a hybrid ANP–TOPSIS methodology that captures interdependencies among resilience drivers while simultaneously ranking alternative strategic orientations in a structured decision-support environment.

Finally, it reconceptualizes resilience not as a reactive buffer-based capability but as a strategic outcome of network configuration choices, offering a formalized decision framework for designing shock-ready agrifood supply chains within the Logistics and Operations domain.

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Human Judgment relevance for forecasting in time of AI: a cluster analysis of scientific papers

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Abstract. *This study reports the outcomes of a literature review aimed at depicting the state of the art of studies that adopt the human judgment perspective in contexts where AI-based solutions are implemented. Our analysis highlights three main clusters of papers. One adopts an industrial perspective to explore the role of quantitative forecasting methods and the way in which domain experts can interact with AI-based forecasting system. The second cluster is mostly based on studies that cope with retail environments and the features of markets, events and products. The third cluster is focused on quantitative forecasting techniques and specifically on AI and machine learning solutions, with the aim of unveiling the features of such methods that can drive their effectiveness, especially in comparison with domain experts.*
Keywords: *demand forecasting; artificial intelligence; judgmental forecasting; literature review; bibliometrix.*

Framing of the research. *Demand forecasting represents a critical process in supply chain management, involving the prediction of future customer demand to inform operational and strategic decisions. According to Hyndman e Athanasopoulos (2018), demand forecasting is defined as the estimation of future sales or consumption levels based on historical patterns, market trends, and external factors, serving as a foundational element for inventory control, production planning, and resource allocation. This definition aligns with the broader operations research perspective, where forecasting is not merely a statistical exercise but a mechanism to mitigate the uncertainty embedded in volatile markets (Hofmann and Rutschmann, 2018). Grando et al. (2021) emphasizes that effective demand forecasting integrates both internal data, such as past sales records, and external information, like economic indicators, to produce actionable insights that improve supply chain efficiency and effectiveness. Similarly, Lee et al. (1997) conceptualize demand forecasting as a challenging task that requires a synthesis of numerous and diverse data sources to improve accuracy, particularly in complex supply chain environments where demand fluctuations can disrupt logistics. These definitions emphasize the complex nature of demand forecasting, positioning it as an indispensable tool for balancing supply and demand while minimizing costs and risks (Feizabadi, 2022).*

The literature delineates a comprehensive spectrum of methods for demand forecasting, broadly categorized into quantitative, qualitative and mixed approaches, each suited to different contexts based on data availability and uncertainty. Quantitative methods dominate when historical data is abundant, relying on statistical and algorithmic techniques to extract patterns. For instance, statistical approaches such as time-series models, including exponential smoothing and ARIMA, are highlighted for their ability to decompose trends, seasonality and cycles in demand data (Box et al., 2015). Babai et al. (2022) provide an in-depth review of aggregation and hierarchical forecasting techniques within this category, noting that these methods aggregate data at various levels (e.g., individual product, product family, geographic region) to reconcile forecasts and reduce errors in hierarchical supply chain structures. Early studies demonstrated the applicability of machine learning (ML) as a powerful subset of quantitative methods, leveraging algorithms like neural networks and random forests to handle non-linear relationships and large datasets, showing competitive performance compared to traditional models. Feizabadi (2022) further explores how ML-based demand forecasting enhances supply chain performance by improving prediction accuracy and responsiveness to dynamic market conditions.

Qualitative methods, in contrast, are employed when historical data is scarce or unreliable, drawing on expert opinions, market research, and Delphi techniques to incorporate subjective insights. Goodwin and Fildes (2022) describe qualitative forecasting as essential in judgmental scenarios, where domain experts assess unstructured information to anticipate demand shifts driven by qualitative factors like consumer preferences or geopolitical events. Lawrance et al. (2006) go even further by advocating for structured qualitative approaches, such as the Delphi method, to aggregate expert judgments and mitigate biases in forecasting processes. These methods are particularly valuable in innovative or nascent markets where quantitative data is limited (Wright and Goodwin, 2009).

Mixed methods combine the rigor of quantitative models with the intuition of qualitative inputs, offering a hybrid framework. Grando et al. (2021) outlines how mixed approaches integrate statistical baselines with managerial adjustments to address gaps in purely data-driven predictions. Hofmann and Rutschmann (2018) extend this by proposing that mixed methods can incorporate big data analytics (BDA) alongside human insights, creating a synergistic process that refines forecasts through experts' validation.

The choice among these methods depends on factors like data quality, forecast horizon and organizational resources, with quantitative methods excelling in stable environments, qualitative in uncertain ones, and mixed providing flexibility

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across scenarios (Hyndman and Athanasopoulos, 2018; Petropoulos et al., 2022).

Judgmental forecasting, involving human adjustments to quantitative forecasts, plays a central role in enhancing accuracy, particularly in environments undergoing structural changes or presenting incomplete data. Goodwin and Fildes (2022) define judgmental forecasting as the application of human expertise to modify or generate predictions, emphasizing its benefits in capturing nuances that statistical models cannot capture, such as sudden market disruptions. Key methods include dampening adjustments, where forecasters reduce the impact of recent anomalies to prevent overreactions and analogical forecasting, which draws parallels from similar past events (Armstrong, 2006). Evidence from controlled experiments demonstrate that well-calibrated judgmental adjustments can substantially reduce forecast errors compared to unadjusted statistical models, especially in intermittent demand scenarios (Fildes et al., 2009), (Syntetos et al., 2010). Armstrong (2006) further its attention on the possible drawbacks of judgmental methods, advocating for rule-based adjustments to minimize common biases such as overconfidence or anchoring. Babai et al. (2022) further evidence the benefits in hierarchical contexts, where judgmental adjustments at aggregate levels spread to disaggregated forecasts, improving overall coherence and accuracy. However, challenges persist; Goodwin and Fildes (2022) warn of shortcomings like optimism bias, recommending training and software tools to standardize adjustments. Schoemaker (1995) highlights practical methods, such as scenario planning in judgmental forecasting, which allows forecasters to simulate demand under various conditions, thereby enhancing resilience in supply chains. Collectively, the literature demonstrates that judgmental forecasting not only increase quantitative outputs but also fosters organizational learning, with empirical studies showing sustained performance gains when integrated thoughtfully (Fildes and Goodwin, 2007

The advent of AI, machine learning, and big data analytics has revolutionized demand forecasting by enabling the processing of vast, unstructured datasets to uncover hidden patterns and improve predictive precision (Choi et al., 2018). Feizabadi (2022) explains how ML algorithms, including deep learning models, outperform traditional statistical methods in supply chain by adapting to real-time data streams, resulting in enhanced inventory turnover and reduced stockouts. Hofmann and Rutschmann (2018) offer a conceptual analysis of BDA's integration in the demand forecasting process, defining it as the application of advanced analytics to high-volume data from sources like IoT sensors, social media, and transaction logs. This framework illustrates how BDA enhances forecasting by fusing internal supply chain data with external signals, to create more granular predictions. Integration of AI/ML with existing processes requires notable technological investments, as noted by Hofmann and Rutschmann (2018), who emphasize that BDA initiatives must align with operational levels: tactical for short-term planning and strategic for long-term trends. They also suggest that AI-driven methods can automate bias corrections traditionally handled judgmentally, though human oversight remains crucial for interpretability. Babai et al. (2022) discuss hierarchical AI applications, where ML hierarchies reconcile top-down and bottom-up forecasts, minimizing discrepancies in multi-level supply chains. Grando et al. (2021) positions AI as a transformative force that scales forecasting capabilities, yet underscores the need for hybrid systems to incorporate domain knowledge. Overall, these advances promise greater efficiency, but their success hinges on data quality and infrastructural readiness (Hofmann and Rutschmann, 2018).

Purpose of the paper. *As AI proliferates across forecasting domains, the relevance of human judgment in forecasting has come under scrutiny. The tension between automation and human intuition underscores a research gap: how scientific literature clusters around themes of judgment's role in AI-augmented demand forecasting. As aforementioned, traditional demand forecasting encompasses quantitative methods (e.g., ARIMA, exponential smoothing), qualitative approaches (e.g., Delphi, expert surveys), and mixed techniques that integrate both. Recent advances in AI, ML and BDA have enhanced predictive power but often overlook human judgmental adjustments, which address biases, contextual events, and overconfidence in volatile markets.*

This study wants to address this condition by conducting a bibliometric literature review to map the evolution of research on the integration of these instruments (i.e., quantitative, qualitative, mixed methods, judgmental adjustments, AI/ML/BDA) in demand forecasting. Employing scientometric tools like Multiple Correspondance Analysis (MCA) and Cluster Analysis, we aim at identifying thematic clusters, tracing temporal shifts in literature and eventually reveal gaps to be addressed by future literature.

Methodology. *We retrieved the articles used in this study from the ISI Web of Science database, a reliable source for conducting literature reviews (Singh et al., 2021). The keyword combinations used to retrieve the articles were identified by surveying recent reviews on judgmental forecasting and artificial intelligence. The resulting search string comprised the following terms: artificial intelligence, AI, large language model, LLM, machine learn*, human-machine*, demand*, sale*, sales and operations plan, S&OP, judgment*, judgement*. To make sure to include only articles that were published in the best peer-reviewed journals with an impact factor, we selected the Social Sciences Citation Index (SSCI), Science Citation Index (SCI), and Emerging Sources Citation Index (ESCI) collections in Web of Science. This approach yielded 349 documents.*

Then we refined our search by filtering the documents by time period, categories, sources, and language. First, we included only documents published until 2025. Second, we filtered out the results to exclude articles published in journals not pertaining to the fields of business, management, and operations management. Third, we included only peer-reviewed journal articles (excluding books, book chapters, and conference proceedings) and we excluded literature reviews, in line

with previous studies (Marzi et al., 2025). Fourth, we filtered the documents by language (English). This process of refinement led us to exclude 30 documents.

The final search string can be summarized as follows: TS=(("artificial intelligence" OR AI OR "large language model" OR LLM* OR "machine learn*" OR "human-machine*") AND (demand* OR sale* OR "sales and operations plan*" OR S&OP) AND (judgment* OR judgement*)).*

The authors then examined each title and abstract to ensure that each article was pertinent to the topic of the use of AI for judgmental forecasting. Indeed, the keywords utilized to retrieve the documents from ISI Web of Science allowed us to broaden the spectrum of papers included in the search so as to be sure that every possible relevant article for our study was included. However, this approach also led us to a considerable number of papers which were actually unrelated to our topic. Thus we manually screened the dataset proceeding as follows. First, we examined article titles to identify those clearly aligned with the focus of our study. For the remaining papers, we proceeded by reviewing the abstracts. Those articles which presented a clear connection to our topic, were included in the final dataset while the rest were discarded. Following this procedure, we excluded a total of 172 articles, resulting in a final dataset consisting of 147 articles.

To identify the thematic areas of the articles, we performed a Multiple Correspondence Analysis (MCA) based on keywords plus co-occurrence, an approach that enables the reduction of the dimensionality of a large dataset and allows its visualization in a two-dimensional space. The reason MCA was performed using keywords plus is due to the capacity of keywords plus to represent the themes covered by the articles more effectively than the authors' keywords. They are generated by the Web of Science and are words or phrases that frequently appear in the titles of an article's references.

Compared with authors' keywords, keywords plus provide a better representation of the themes covered by the articles, as they are automatically generated to enhance the indexing and retrieval of articles. Factor analysis is a valid approach to cluster large datasets, as it reduces the dimensionality of the data and represents it in a low-dimensional space. The factorial analysis was performed on keywords plus co-occurrence. Given the size of our sample, we set the algorithm to obtain three clusters. The analysis was performed using Bibliometrix, an R package developed for the analysis of scientific knowledge structures (Aria and Cuccurullo, 2017).

Results. *We first report some descriptive statistics to provide an overview of the research field. Figure 1 reports the distribution of articles over time and, surprisingly, it shows that the first article appeared in 1994, although a continuous and growing interest in the field has begun in 2013, with significant increase after 2024.*

Figure 1 – Distribution of publications by year

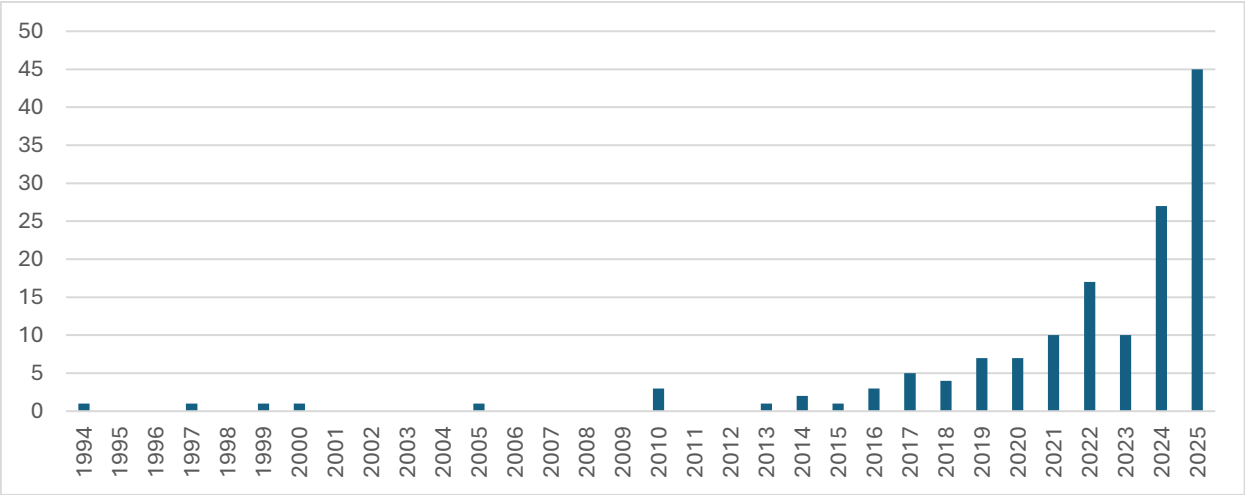


Table 1 shows the journals that have published more than one articles. The most attractive scientific journal is International Journal of Forecasting, which has published the highest number of articles (five articles), suggesting that forecasting and predictive analytics play a central role in the literature analyzed. This highlights the importance of predictive modeling approaches within the research domain. Both the European Journal of Operational Research and the International Journal of Production Economics contribute three articles each. These journals are strongly associated with operations research and production systems, indicating a significant methodological and applied orientation in the field. The inclusion of the Journal of Consumer Research (two articles) suggests that the topic is not limited to technical or engineering disciplines but also extends into behavioral and consumer research.

Table 1 - Distribution of articles by journal

Sources	Articles
INTERNATIONAL JOURNAL OF FORECASTING	5
EUROPEAN JOURNAL OF OPERATIONAL RESEARCH	3
INTERNATIONAL JOURNAL OF PRODUCTION ECONOMICS	3
BUILDINGS	2
ENGINEERING APPLICATIONS OF ARTIFICIAL INTELLIGENCE	2
EXPERT SYSTEMS WITH APPLICATIONS	2
INTERNATIONAL JOURNAL OF COMPUTATIONAL INTELLIGENCE SYSTEMS	2
JOURNAL OF CONSUMER RESEARCH	2

Figure 2 reports the distribution of citations by country. China shows the highest research impact in terms of total citations with more than 800 citations. The United States follows with over 400 citations, indicating another major contributor to the influence of the research field. Although China leads in total citations, Italy shows the highest average citations per article (41.8), suggesting that Italian publications tend to achieve particularly strong academic impact on a per-paper basis. Overall, the data reveals a geographically diverse distribution of research influence. While China and the United States dominate in total citation volume, several European countries such as Italy, Switzerland, and Slovenia achieve higher citation impact per article, highlighting differences between productivity and average research influence.

Figure 2 – Distribution of citations by country

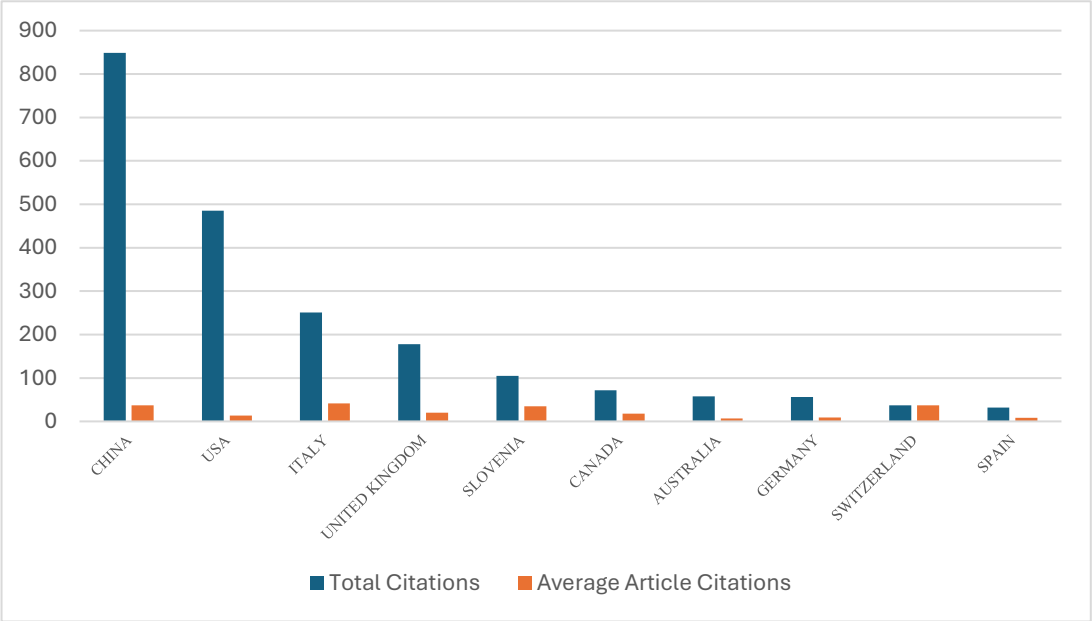
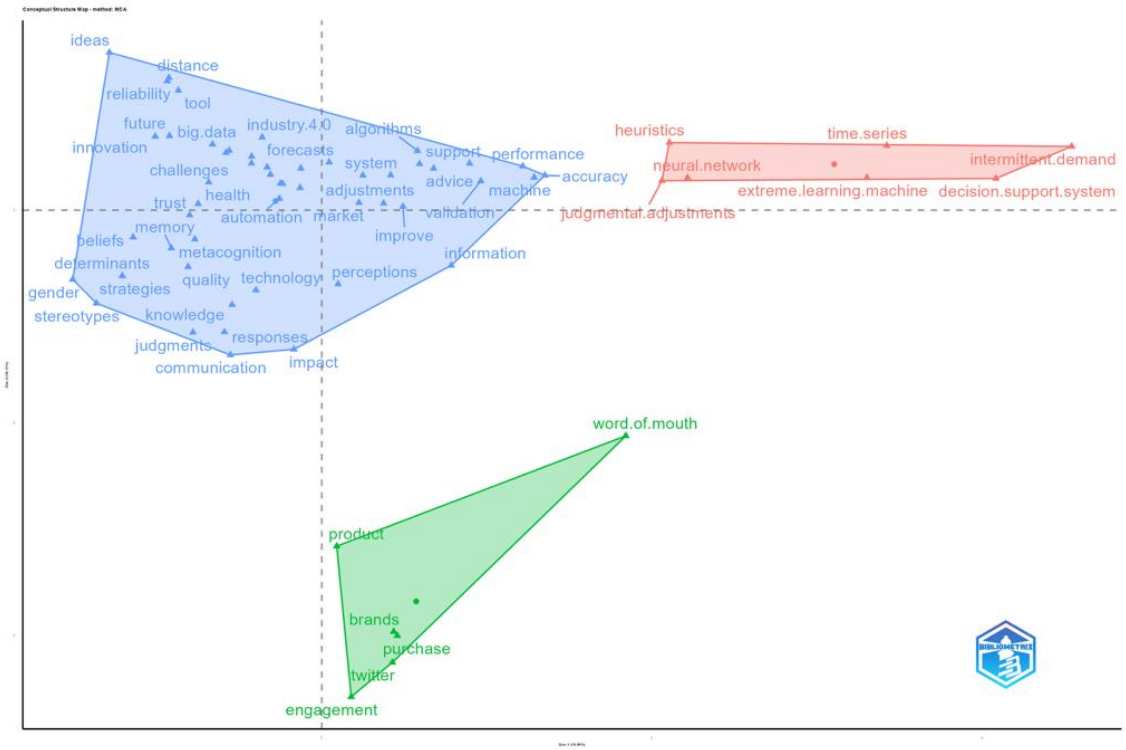


Figure 3 reports the results of the MCA. Keywords that are close to each other in the bi-dimensional plan, mean that they often appear together in same articles and, therefore, are similar. This means that similar words express the same concept. Their vicinity led to the definition of a specific number of clusters, which is automatically generated by the program, in our case Bibliometrix (Aria and Cuccurullo, 2017). The clusters of keywords plus represented in Figure 3 correspond to three distinct thematic areas in which Bibliometrix divided the literature on AI and judgmental forecasting.

The blue cluster (cluster 1) includes 75 articles that spread over a quite wide number of topics. One remarkable area refers to the traditional systems based on time series analysis, with a focus on data composition and on the management of seasonal or intermittent patterns. In this regard, scholars focus on the development of sound parameters enabling superior accuracy and on the comparison among different models, such as regressions or exponential smoothing (Boutselis and McNaught, 2019; Özden and Gürlek, 2020). An evolution of this stream refers to solutions able to cope with massive databases where traditional models fail to provide reliable forecasts. Literature in this regard mainly discusses model architectures computing capacity. Within this stream, Nikolopoulos (2010) compares the effectiveness of artificial neural networks, multiple linear regression and nearest neighbor in demand forecasting in case of special events. Nearest neighbor approaches are adopted also in studies concerning sporadic demand (Nikolopoulos et al., 2016), while bayesian networks are suggested to predict the demand of spare parts for machineries (Boutselis and McNaught, 2019).

Figure 3 – Clusterization of articles through MCA



Another remarkable feature of this cluster relies on its focus on demand forecasting mostly from B2B and industrial perspectives. Lauer et al. (2019) discuss industrial demand planning, providing insights on the factors that influence the human acceptance of algorithms. The case of forecasting in the car manufacturing industry is addressed by Salais-Fierro et al. (2020), while Boutselis and McNaught (2019) delve into the problem of forecasting of spare parts for machineries. Van Belle et al. (2021) study the problem of demand forecasting for manufacturers belonging to a multi-echelon supply chain.

This cluster also addresses the problem of human-machine interaction. Brau et al. (2023) present an experimental study dealing with such an interaction in forecasting and demonstrate that its effectiveness depends on the integration method. Empirical evidence shows that such an integration increases in the upstream sections of the supply chain, while at the retail level quantitative methodologies are more popular (Brau et al., 2024). Several other studies provide similar insights (Zajec et al., 2021; Abolghasemi et al., 2025; Cassenti and Hawkins, 2024); Nair and Huchzermeier, 2024).

The green cluster (cluster 2), including 21 papers, is mostly based on studies that cope with retail environments and the features of markets, events and products, which can affect the effectiveness of statistical methods and of judgmental ones. Moss and Edmonds (1997) discuss the relevance of the nature of the market, showing that quantitative context-dependent models can outperform traditional statistical ones, even though they require less data to be run. Hewage et al. (2025) delve into the specificities of developing countries, where the unavailability of extensive data and poor data quality, coupled with the need to predict the demand across multiple geographical and products hierarchies, can thoroughly hinder forecast accuracy. In these environments, hybrid models, based jointly on machine learning approach and on human expertise, seem to be more effective.

Another aspect that has gained remarkable attention in this cluster refers to the nature of the external events that can influence the demand from the market. Abolghasemi et al. (2020) distinguish between systematic (e.g., promotions) and non-systematic events (e.g., sudden climate change), maintaining that statistical models should incorporate the formers while the latter should be addressed by domain experts. This study further develops an earlier intuition, concerning the possibility to embed systematic events in prediction models that leverage artificial neural networks (ANNs), multiple linear regression and nearest neighbor approaches (Nikolopoulos, 2010).

The nature of the product has a great relevance to demand forecasting: industries affected by high product innovation rates cope with a considerable level of complexity of the forecasting task (Fildes et al., 2022). In this regard, Willcox et al. (2019) explore the topic of sales forecasts for new products, with a focus on the fashion industry, where the phenomena of product variety and variability pose serious challenges to demand planners. Their empirical evidence shows that sales forecasts developed by AI-based methods largely outperform the ones of human groups composed of fashion-conscious millennial women, even though the latter technique is commonly considered quite appropriate for these kinds of environments. Also Nair and Huchzermeier (2024) dive into the problem of predictions for fashion products and show that machine learning systems enjoy a high accuracy compared to domain experts; however, the best overall performance is achieved by a mixed human-machine approach. Focusing on the relevance of specific product features as driver of

forecasting accuracy, Khosrowabadi et al. (2022) have conducted a study on data provided by a European retailer concerning 30 million forecasts at the SKU-store-day level, showing that adjustments made by planners on an AI-based forecasting model are influenced by some product characteristics, namely price, freshness, and discounts, leading sometimes to a worse level of accuracy, especially when large positive adjustments are made.

The red cluster (cluster 3), including 16 papers, is more focused on quantitative forecasting techniques and specifically on AI and machine learning solutions, with the aim of unveiling the features of such methods that can drive their effectiveness, especially in comparison with domain experts. In this regard, Abolghasemi et al. (2025) have conducted an experiment with 123 human forecasters and five LLMs—namely, ChatGPT-4, ChatGPT3.5, Bard, Bing, and Llama2, to compare their accuracy in sales forecasting. The outcome of the study does not lead to a clear superiority of one system over the other. Feuerriegel and Gordon (2019) use machine learning on a large database of financial news to extrapolate information about the macroeconomic climate and predict the dynamics of macroeconomic indicators, showing a remarkable reduction of the forecast error compared to alternative forecasting approaches. An interesting perspective in this cluster concerns the features that an AI-based forecasting system must have to be considered trustworthy by the decision makers. In this regard Marusich et al. (2025) review such features, namely transparency, explainability and uncertainty visualization, and call for research to improve confidence measures in AI systems. Following this approach, Khosrowabadi et al. (2025) investigate about the role of supervisors who must choose between the AI-based forecast and the one adjusted by the planner. They outline the effect of providing information such as improvement probabilities of adjustments, direction and magnitude of the adjustment on the final choice of the supervisor. Hélie and Pizlo (2022) introduce a psychological perspective in the study of AI-based approaches, claiming that the analysis of the way in which humans develop heuristics could help in developing more parsimonious AI algorithms, characterized by lower computational complexity and shorter computation time, which could enable real-time feedback in case of complex problems.

Research limitations. *The literature review that we discuss in this study offers various perspectives from which the integration between human judgment and machine-based forecasts can be observed. This study can be improved through a higher focus on more specific perspectives, which could refer for instance to the level of the supply chain (e.g., manufacturer vs. retailer) where the forecasting process is carried out. Another interesting perspective refers to the nature of the papers under scrutiny, which could be divided into case-based, purely quantitative and based on experiments.*

Managerial implications. *This paper can help managers in getting an overview of the main techniques that can be used in demand forecasting, with specific attention to the factors that can drive the effective integration of experts' knowledge and AI-based systems. Based on the common traits highlighted by the clustering process performed, practitioners could adopt a contingent approach when deciding on the correct method. Aspects such as the occurrence of systematic or non-systematic events in the past, the availability of high quality data, the sporadic or continuous nature of the demand, the novelty of the product whose demand needs to be forecasted, should all be taken into consideration by management when choosing the right approach. All in all, there is no universally right or wrong approach; the correct approach depends on the specific situation.*

Originality of the paper. *This paper represents an attempt to describe the state of the art on the topic of integration between human judgment and AI in the sales forecasting process. The outcomes of this analysis can help in identifying future research directions in this field.*

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Innovative packaging solutions for sustainability across the supply chain: key themes and trade-offs in global firm experience. A text mining analysis.

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Abstract. *Sustainable packaging has become a strategic priority for firms facing increasing regulatory pressure and growing consumer demand for environmentally responsible solutions. However, existing research has provided limited large-scale empirical evidence on how firms frame packaging innovation for sustainability and how sustainability is embedded within corporate innovation narratives. This study addresses this gap by analysing a global corpus of packaging innovation projects submitted to the WorldStar Packaging Awards between 2023 and 2025. Using text-mining techniques combining Structural Topic Modeling and dictionary-based analysis, the study identifies the dominant thematic domains of packaging innovation and examines how sustainability is embedded across different strategic orientations. The results show that sustainability is more strongly embedded in logistics-oriented packaging innovations, while marketing-oriented projects place comparatively less emphasis on sustainability.*
Keywords: *packaging innovation; sustainability; supply chain; logistics; marketing; text-mining*

Framing of the research. *Environmental packaging sustainability has emerged as a strategic imperative, driven by regulatory frameworks such as the EU Packaging and Packaging Waste Regulation (PPWR, effective February 2025)[2] and growing consumer environmental awareness. The green packaging market demonstrates this momentum, projected to expand from USD 362.01 billion (2025) to USD 732.33 billion (2034), with Europe maintaining 32.08% market share[3].*

Despite this trajectory, firms struggle to manage packaging innovation toward sustainability due to inherent trade-offs between incompatible requirements—performance versus cost, economic versus environmental outcomes, operational efficiency versus market communication (Pålsson and Hellström, 2023). These tensions become particularly pronounced when considering packaging's fundamental strategic duality: it must simultaneously fulfil logistics functions (protection, transport efficiency, supply chain optimization) addressing primarily B2B stakeholders, and marketing functions (brand differentiation, consumer appeal, purchase influence) targeting end-consumers who process packaging information rapidly and heuristically at point-of-sale.

This duality generates what we conceptualize as a "Visibility-Integration Paradox" in sustainable packaging innovation. The trade-off emerges because sustainability appears to be more substantively integrated in logistics-oriented innovations—those less visible to final consumers—than in marketing-oriented innovations designed for maximum consumer visibility. This counterintuitive pattern reflects two competing integration mechanisms operating across different strategic orientations.

In logistics-oriented innovations, sustainability objectives exhibit structural alignment with operational performance goals. Material reduction simultaneously achieves environmental benefits (lower resource consumption) and economic advantages (reduced costs, improved transport efficiency). Mono-material designs enhance both recyclability and supply chain standardization. This alignment transforms sustainability from an additional constraint into a core performance dimension, rendering environmental vocabulary pervasive within innovation narratives as it describes functionally integrated improvements rather than separate attributes (Hellström & Nilsson, 2011; Pålsson, 2018).

Conversely, in marketing-oriented innovations, sustainability must compete with other attributes within severely constrained cognitive space. Consumer research demonstrates that shoppers dedicate merely 3-7 seconds to packaging evaluation, during which visual elements dominate textual environmental information (Rettie & Brewer, 2000). Sustainability communication competes with brand identity, aesthetic differentiation, premium positioning, and convenience signals for limited consumer attention.

From an institutional perspective (DiMaggio & Powell, 1983), logistics innovations face coercive pressures—regulatory compliance, B2B specifications, carbon targets—rendering sustainability a condition for operational legitimacy. Marketing innovations face normative pressures from consumers, weakened by the documented attitude-behaviour gap where environmental preferences inconsistently translate into purchase behaviour when conflicting with price, convenience, or aesthetics (Carrington et al., 2010). Signalling theory (Connelly et al., 2011) further suggests that logistics contexts generate

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credible sustainability signals verified through operational metrics, while marketing contexts lack immediate verification mechanisms, potentially enabling superficial environmental communication.

Building on this theoretical understanding, we examine whether logistics-oriented packaging innovations exhibit higher sustainability intensity than marketing-oriented innovations, reflecting the structural integration versus communicative competition mechanisms theorized

Purpose of the paper. *Packaging (primary, secondary and tertiary) affects the climate both directly—e.g., packaging material—and indirectly, e.g., via the amount of product waste and transport efficiency; minor changes in the design and material selection of consumer and transport packaging have major impacts on sustainable development and climate change, both positive and negative (Pålsson and Hellström, 2023). Despite this, businesses in all industries struggle to employ packaging improvement initiatives toward sustainability because it is difficult to manage the packaging innovation process and its trade-off. Trade-offs that are present between various incompatible requirements on packaging (Pålsson and Hellström, 2023; Pålsson, 2018): i.e. related to packaging performance, such as trade-offs between packaging cost and sales attributes, or between economic and environmental performance), as well as those related to the organisation of packaging development.*

Extant research has focused on packaging innovations and environmental sustainability (Danvers et al., 2026; Cozzolino and De Giovanni, 2023; de Koeijer et al., 2017; Niero and Hauschild, 2017). However, previous academic studies mainly focused on single cases (i.e. Dominic et al., 2015; Toniolo et al., 2013), and very few on multiple cases (i.e. Vernuccio et al., 2010) or larger data (i.e. Cozzolino and De Giovanni, 2023), but almost every of them consider only specific aspects of sustainable packaging for circularity at a time – specific practices (i.e. Zhang et al., 2015), specific performances (i.e. Ross and Evans, 2003), specific materials (i.e. Niero et al., 2016), specific sectors (i.e. Saraiva et al., 2016), specific countries (i.e. Cozzolino and De Giovanni, 2023), etcetera.

Prior research has so far not adequately explored at large empirical level and with a broad perspective how firms innovate effectively in packaging for the sustainability.

Considering the importance of the topic at the global level with its potential contribution to sustainable development targets for firms and considering the academic literature gap emerged from our analysis, this study investigates the following research questions (RQs).

***RQ1:** What thematic domains structure packaging innovation narratives globally, and how is sustainability embedded within these domains?*

***RQ2:** Do logistics-oriented innovations exhibit higher sustainability intensity (green density) than marketing-oriented innovations, consistent with the visibility-integration paradox?*

The objectives of this paper are investigated in the present research considering hundreds of awarded packaging innovation projects developed by firms operating at global level and included in the winners' initiatives selected by the World Packaging Organization (WPO).

Methodology. *The empirical analysis relies on a corpus of packaging innovation projects submitted to the WPO - WorldStar Packaging Awards between 2023 and 2025, covering all the five continents inhabited. The textual data were collected from the official website and consist of the innovation descriptions provided directly by the firms as part of their award applications. Because these texts are authored directly by the companies and accepted by the WPO website, they represent corporate narratives through which firms frame and communicate the innovative characteristics of their packaging solutions within the international competitive recognition context.*

In this study, text mining techniques were implemented in the R programming environment – Rstudio (Kwartler, 2017) to preprocess and analyse the textual data. Text mining techniques are widely used to extract knowledge from unstructured textual data (Talib et al., 2016). In line with this approach, the dataset used in this study was constructed by extracting textual information from the website. Similar methodologies have been adopted in previous research analysing company information available on corporate websites and on environmental topics through text mining techniques (Spinder et al., 2023).

Data referring to the last three years were imported and merged after harmonizing variable formats across years. The resulting dataset initially contained 690 project descriptions (details on the dataset in Appendix A[4]). In addition to textual descriptions of packaging innovations, the dataset includes structured information on the geographical location of the companies submitting the projects, and the industry categories to which the innovations belong. Descriptive statistics on the distribution of projects across countries and packaging categories are reported in the Appendix B[5]. Text preprocessing followed standard natural language processing procedures. The corpus was converted to lowercase, while punctuation, numbers and English stop words were removed. Stemming was not applied in order to preserve lexical interpretability and maintain semantic transparency. A custom stop words list was introduced to remove domain-generic terms frequently

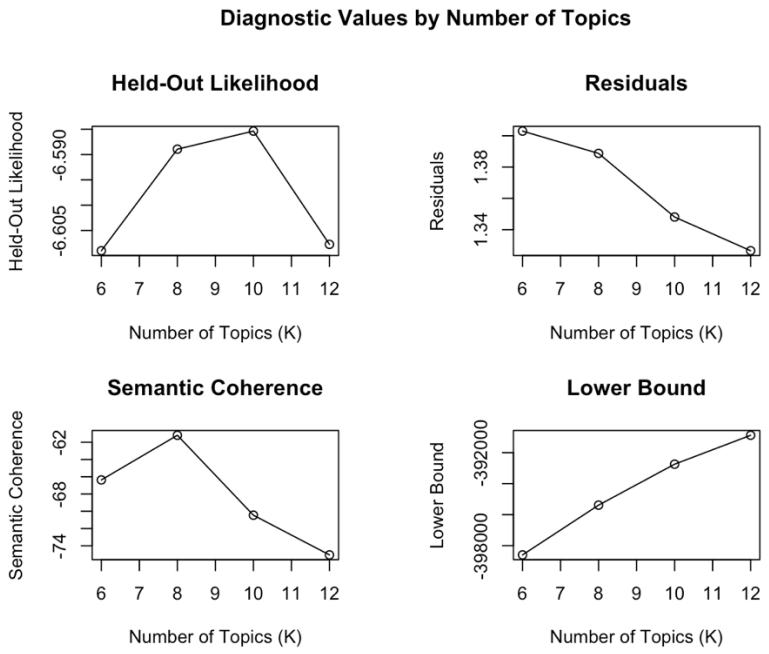
[4] The appendix can be requested to the authors.
[5] The appendix can be requested to the authors.

appearing in award descriptions but offering limited discriminative value, such as "packaging", "product", "innovation", "project" and "award". Low-frequency terms were filtered using a minimum occurrence threshold of 10. After preprocessing, the final corpus consisted of 685 innovative packaging projects, 1,378 unique terms and 45,846 tokens.

The empirical analysis is structured into two complementary studies.

Study 1 identifies the latent thematic architecture of packaging innovation narratives using Structural Topic Modeling (STM). Alternative topic solutions were estimated for different values of K (6, 8, 10 and 12) and evaluated using diagnostic statistics including held-out likelihood, residual dispersion, semantic coherence and lower bound. As reported in Figure 1, semantic coherence reaches its maximum at K=8, while higher values generate increasing thematic fragmentation (Mimno et al., 2011). The eight-topic specification was therefore selected as the optimal balance between statistical performance and interpretability.

Figure 1 – Topic model diagnostics for alternative numbers of topics



Source: our elaboration

These topic-level patterns provide an initial descriptive indication that sustainability discourse may be more structurally embedded in operational and logistics-related innovation domains. To examine whether this pattern also emerges when considering firms' strategic orientation, we next analyse sustainability intensity across logistics-oriented and marketing-oriented packaging innovations. Indeed, Study 2 examines how sustainability is embedded within these narratives across different strategic orientations. Sustainability intensity, operationalized as green density, is measured through a dictionary-based text analysis approach capturing the relative frequency of sustainability-related keywords within each project description, following established dictionary-based approaches to textual analysis (Loughran & McDonald, 2011). All supplementary material can be found in the Appendix C[6]. Specifically, for each project description i, green density is computed as:

$$GreenDensity_i = \frac{Green\ Hits_i}{Word\ Count_i}$$

Where:

- *$GreenHits_i$ denotes the number of matches to the predefined sustainability keyword dictionary in description i.*
- *$WordCount_i$ denotes the total number of words in the cleaned description*
- *$GreenDensity_i$ represents the relative frequency of sustainability-related terms in description i, obtained as the ratio between dictionary matches and total word count.*

[6] The appendix can be requested to the authors.

This proportional normalization ensures comparability across texts of varying length and captures the relative narrative emphasis placed on sustainability within each innovation description, as term frequencies are commonly normalized by document length in text analysis (Manning et al., 2008).

Strategic orientation is determined using a dictionary-based classification approach that compares marketing-related and logistics-related keyword densities within each description.

Projects are assigned to the orientation with the higher relative keyword density. Applying this classification procedure, 422 projects are classified as marketing-oriented, 193 as logistics-oriented, and 70 as balanced. Balanced cases, which represent approximately 10% of the corpus, occur when marketing-related and logistics-related keyword densities are equal. Because these projects do not display a clear strategic orientation, they are excluded from the regression analysis in order to avoid classification ambiguity. The final regression sample therefore consists of 615 observations. The distribution of projects across strategic orientations is reported in Table 1. Logistics orientation serves as the reference category in the regression models.

Table 1- Strategic orientation distribution

Orientation	***N***
Marketing - oriented	*422*
Logistics - oriented	*193*
Balanced	*70*

Source: our elaboration

To account for heterogeneity in packaging domains, the regression models include product-category fixed effects corresponding to the original WorldStar classification structure. Differences in sustainability intensity across orientations are estimated using the following ordinary least squares model:

$$GreenDensity = \beta_0 + \beta_1 Marketing_i + \gamma Category_i + \varepsilon_i$$

Where:

- $marketing_i$ *is a binary indicator equal to 1 if the project is classified as marketing-oriented and 0 if logistics-oriented,*
- $category_i$ *represents product-category fixed effects,*
- *and* ε_i *denotes the error term.*

Given the relatively small range and approximately continuous distribution of the dependent variable, ordinary least squares provide consistent and easily interpretable estimates for assessing differences in sustainability emphasis across strategic orientations.

Results. *The results are presented following the analytical sequence of the study, moving from the identification of the thematic architecture of packaging innovation narratives to the analysis of sustainability embeddedness across topics and strategic orientations.*

The STM analysis identifies eight interpretable macro-topics describing the thematic architecture of packaging innovation narratives submitted to the WorldStar Awards. The identified topics capture distinct technological and functional domains of packaging innovation, including rigid container-based packaging systems, circular and refill-based flexible packaging, regulated and multi-layer packaging systems, decorative and high-impact visual packaging, paper-based sustainable material engineering, logistics and transport efficiency systems, protective structural and secondary packaging systems, and food preservation and convenience packaging.

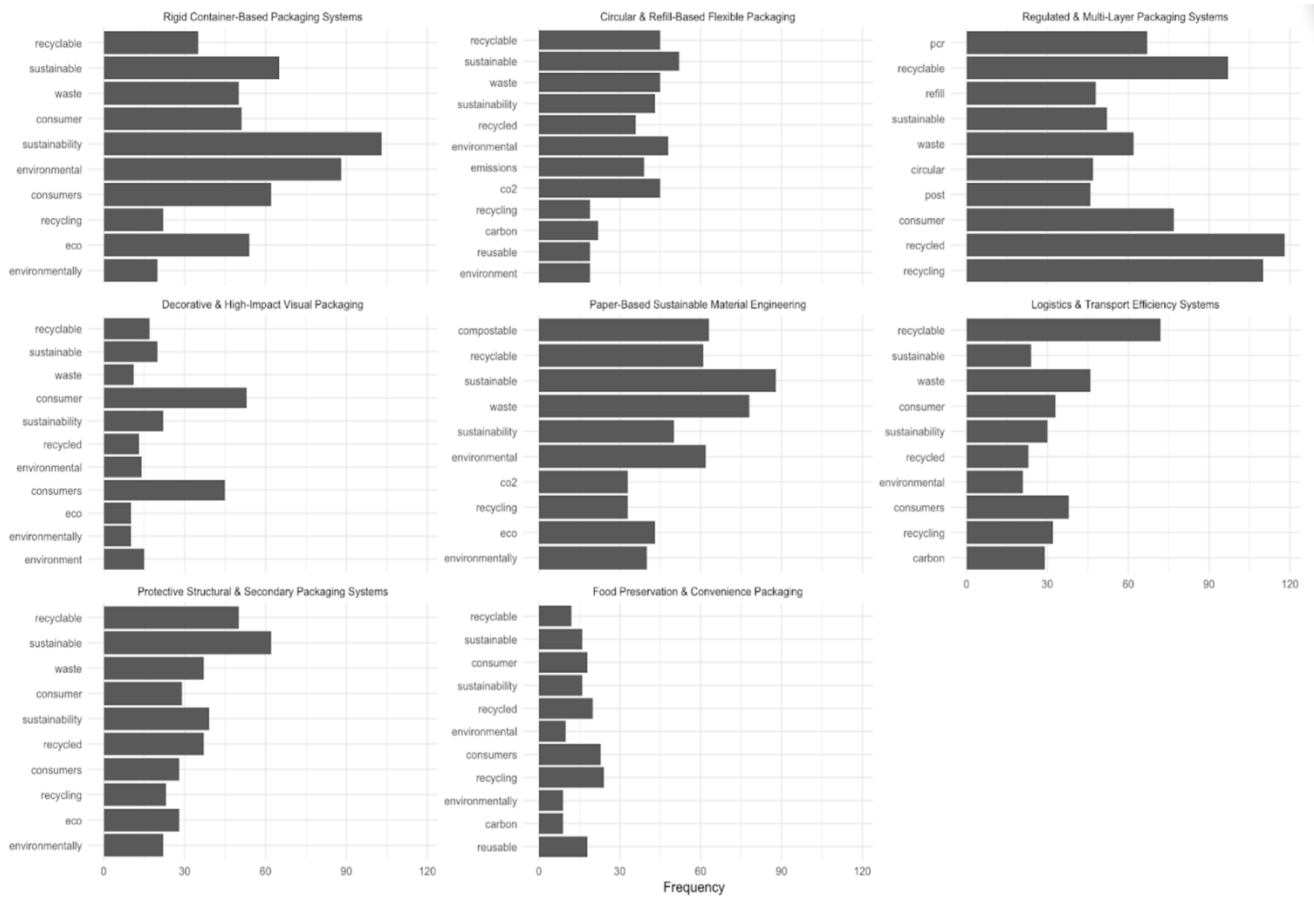
Topic prevalence analysis reveals a non-uniform thematic distribution across the corpus. Protective structural and secondary packaging systems represent the most prevalent domain (0.204), followed by decorative and high-impact visual packaging (0.171). Circular and refill-based flexible packaging accounts for 0.136 of the corpus, while paper-based sustainable material engineering represents 0.127. Regulated and multi-layer packaging systems and food preservation and convenience packaging each account for approximately 0.10 of the documents. Logistics and transport efficiency systems represent 0.092 of the corpus, while rigid container-based packaging systems appear as the least prevalent domain (0.069).

The identified thematic architecture provides initial empirical support for the visibility-integration paradox. Topics emphasizing logistics and operational functions—"logistics and transport efficiency systems," "protective structural and secondary packaging systems," and "paper-based sustainable material engineering"—collectively represent substantial portions of the corpus. These domains align with contexts where structural integration mechanisms predict higher sustainability embedding, contrasting with "decorative and high-impact visual packaging" where communicative competition mechanisms suggest sustainability faces trade-offs with aesthetic differentiation objectives.

Overall, the results indicate that packaging innovation narratives are primarily organized around functional and structural packaging configurations rather than abstract innovation paradigms.

To further investigate how sustainability is embedded within the thematic structure identified in Study 1, sustainability-related terms were mapped across the dominant topic of each document. Figure 2 illustrates the most frequent sustainability-related terms observed within each macro-topic.

Figure 2 – Distribution of sustainability-related vocabulary across STM topics



Source: our elaboration

Figure 2 reveals systematic variation in sustainability vocabulary distribution consistent with theoretical predictions. Paper-based sustainable material engineering and circular flexible packaging exhibit the highest density of sustainability-related terms, reflecting structural integration where material innovation inherently embeds environmental performance. Logistics and transport efficiency systems similarly demonstrate strong sustainability vocabulary presence, validating predictions that operational efficiency contexts facilitate sustainability integration. Critically, decorative and high-impact visual packaging exhibits markedly lower sustainability terminology, supporting the communicative competition mechanism where environmental attributes compete with aesthetic differentiation for limited discursive space.

The analysis reveals that sustainability discourse is unevenly distributed across technological domains. The strongest presence of sustainability-related vocabulary appears in the topics related to paper-based sustainable material engineering and circular flexible packaging, where terms such as recyclable, compostable, recycled, and environmental frequently occur. Sustainability language also emerges within logistics and transport efficiency systems, typically associated with carbon emissions reduction and material waste optimization. In contrast, sustainability-related terminology appears less frequently in visually oriented domains such as decorative and high-impact visual packaging, suggesting that environmental attributes in these cases may function more as complementary communicative elements rather than as core technological drivers.

The second part of the analysis examines differences in sustainability intensity across strategic orientations of packaging innovation. In particular, a lemma-based analysis of the keywords was conducted in order to reconstruct the thematic areas emerging from the analysed corpus. The associated terms were treated as weighted descriptors based on their frequency distribution and summarized through a word cloud representation (Figure 3).

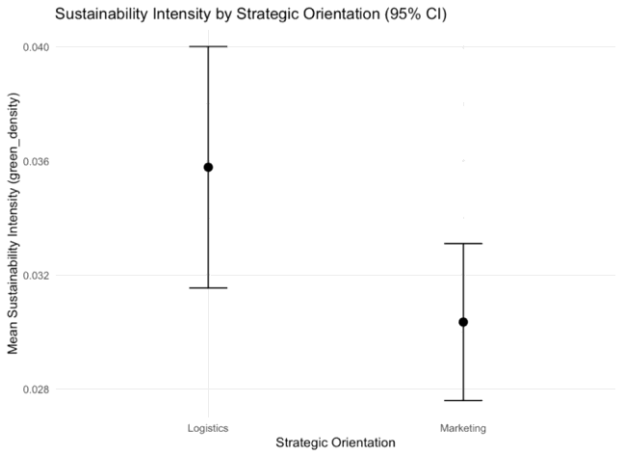
Figure 3 – Word cloud of keywords in packaging innovation narratives



Source: our elaboration

Sustainability intensity, measured as green density, ranges from 0 to 0.205 across the corpus, with an average value of 0.0321 (SD = 0.0293). Logistics-oriented innovations exhibit a higher mean sustainability density (0.0358, SD = 0.0303) compared to marketing-oriented projects (0.0304, SD = 0.0287). The regression results, illustrated in Figure 4, confirm that marketing-oriented innovations display significantly lower sustainability intensity than logistics-oriented ones when controlling for product category. The estimated coefficient indicates that marketing-oriented projects include approximately 0.83 percentage points fewer sustainability-related words relative to logistics-oriented innovations. Given the sample mean sustainability intensity, this difference corresponds to roughly a 26% reduction in sustainability emphasis. This difference indicates that sustainability language occupies a substantially smaller share of the narrative space in marketing-oriented innovations compared with logistics-oriented ones.

Figure 4 – Predicted sustainability intensity by strategic orientation (95% confidence intervals)



Source: our elaboration

The regression results provide strong empirical validation of the visibility-integration paradox. Marketing-oriented innovations exhibit significantly lower sustainability intensity, representing approximately 26% reduction in green density relative to logistics-oriented innovations when controlling for product category. This substantial effect confirms that sustainability is structurally integrated within logistics-oriented innovation narratives, where environmental vocabulary pervasively describes functionally integrated improvements, while marketing-oriented narratives exhibit lower sustainability intensity consistent with communicative competition constraints. The magnitude suggests fundamental rather than marginal variation in how firms frame environmental innovation across strategic orientations.

The empirical evidence therefore suggests that sustainability integration is not merely a communicative attribute but often emerges as a structural property of operational packaging innovation processes

The effect remains statistically significant in alternative model specifications without category controls. Figure 5 compares the estimated effect of marketing orientation across model specifications, showing that the negative association

persists even when category controls are excluded, indicating that the observed difference is not driven by sectoral composition.

Figure 5 – Effect of marketing orientation on sustainability intensity across model specifications



Source: our elaboration

Overall, these findings suggest that sustainability is not uniformly articulated across packaging innovation narratives. Instead, its discursive prominence varies systematically across strategic orientations, appearing more strongly embedded within logistics-oriented innovations than within marketing-oriented ones. This pattern is consistent with the visibility–integration paradox proposed in the theoretical framework.

Research limitations. *Although this study provides novel insights into packaging innovation and the role of sustainability within corporate innovation narratives, limitations should be acknowledged.*

First, the empirical analysis relies on textual descriptions of packaging innovation projects submitted directly by the companies to the WorldStar Packaging Awards. While these narratives represent valuable sources of information on how companies frame and communicate their innovation initiatives, they may reflect strategic communication choices rather than the full set of technical or environmental characteristics of the innovations themselves. Consequently, the analysis captures the discursive emphasis on sustainability, rather than directly measuring the actual environmental performance of the packaging solutions. Second, sustainability intensity and strategic orientation are operationalized through dictionary-based text analysis. Although this approach enables the systematic analysis of a large corpus of innovation narratives, dictionary methods may not fully capture contextual nuances in language use and may overlook implicit sustainability references that are not expressed through the selected keywords.

These limitations also suggest promising directions for future research, involving direct engagement with managers overseeing innovative packaging projects through interviews, focus groups, or more grounded analytical methods. Moreover, future studies could replicate the analysis using alternative innovation datasets, investigate sector-specific packaging innovations, or extend the concept of sustainability to include broader social and technological innovation dimensions within packaging systems.

Managerial implications. *The findings of this study offer several managerial implications for firms engaged in packaging innovation and sustainability initiatives.*

First, the results suggest that sustainability in packaging innovation is rarely framed as an isolated design objective, but rather emerges as an embedded component within broader technological and operational configurations. Managers involved in packaging development should therefore consider sustainability not only as a marketing attribute but as an integrated element of packaging systems, including material selection, logistics efficiency, and structural design.

Second, the evidence indicates that sustainability discourse is more strongly embedded in logistics-oriented innovation initiatives. Improvements in transport efficiency, packaging weight reduction, material optimization, and damage protection appear to generate innovation narratives where sustainability becomes structurally integrated. This suggests that supply chain and logistics managers can play a central role in advancing sustainable packaging strategies by aligning environmental objectives with operational performance improvements.

Third, the analysis highlights a potential tension between marketing-oriented packaging innovation and sustainability emphasis. While visually differentiated and brand-oriented packaging solutions may enhance consumer appeal and shelf

visibility, they appear to incorporate sustainability narratives less intensively. Managers should therefore carefully balance marketing objectives with environmental considerations, ensuring that packaging communication strategies remain aligned with substantive sustainability improvements.

Overall, the results indicate that effective sustainable packaging innovation requires cross-functional coordination between marketing, logistics, and product development functions. Firms that integrate environmental objectives into both operational design and market communication strategies are more likely to develop packaging solutions that simultaneously enhance sustainability performance and competitive positioning.

Originality of the paper. *The present study contributes to the literature on sustainable packaging innovation by providing a large-scale empirical analysis of corporate packaging innovation initiatives at the global level. While prior research has often relied on single case studies or focused on specific industries, materials, or practices, this research analyses hundreds of international awarded innovation projects. By examining firm-authored innovation narratives across a broad range of sectors and technological domains, the study offers a comprehensive perspective on how companies frame and communicate packaging innovation for sustainability.*

Methodologically, the paper utilises text mining techniques, combines structural topic modeling with dictionary-based text analysis, to investigate both the thematic architecture of packaging innovation narratives and the relative emphasis placed on sustainability within them. This approach allows the identification of latent innovation domains and the measurement of sustainability intensity within corporate innovation discourse.

Finally, the study provides novel insights into the relationship between strategic orientation and sustainability in packaging innovation. By distinguishing between logistics-oriented and marketing-oriented innovation narratives, the research highlights how sustainability is embedded differently across operational and market-facing innovation logics. In doing so, the paper advances understanding of the trade-offs and complementarities that characterize sustainable packaging innovation along the supply chain.

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Logistics Service Providers' Specialized Capabilities for Fine Art: Evidence from a Case Study.

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Abstract. *The logistics activities regarding the movement of fine art have grown considerably in value, volume and complexity at global level, confirming its strategic and economic importance. This "movement" is not simply a physical transfer, but a set of essential activities for the protection, promotion, and international presence of a nation's cultural and artistic heritage. Fine art logistics is increasingly emerging as an enabling activity for the functioning of the entire cultural and artistic ecosystem, both nationally and internationally. In this setting, the role played by logistics service providers offering fine art services is crucial. However, academic contributions studying this field remain very few and fragmented. This study addresses this gap by analysing how logistics service providers develop their capabilities to offer fine art specialized services. To address this research question, we built on the dynamic capabilities' theory, distinguishing among sensing, seizing, and reconfiguring processes. This research design relies on the action research approach and the empirical investigation, due to the exploratory context of this original study, is focused on a case study analysis. The selected case is an historical Italian leading logistics service provider that offers specialized fine art logistics services. The findings suggest that dynamic capabilities in fine art logistics are deeply embedded in micro-level practices and are continuously enacted throughout project-based operations. As such, this study contributes to the dynamic capabilities literature by highlighting how these capabilities unfold in highly customized, non-standardized environments, where traditional assumptions of routinization and sequential processes may not fully apply.*
Keywords: *fine art logistics; logistics service providers - LSPs; dynamic capabilities theory; case study; action research*

Framing of the research. *The evolution of the concept of cultural heritage – marking the transition from the static protection of the art object "per se" to the valorization of the asset through the broad and effective enjoyment of its value – determines a progressive expansion in the need for mobility of the works themselves (Cozzolino et al., 2021; Barile & Cozzolino, 2022). This need for mobility, in turn, impacts the derived demand for fine art logistics, which provides the practical implementation of such movement (Canali &, Puglisi 2005). Consequently, in recent decades, the role of logistics within the cultural and artistic sector has undergone a significant transformation (Barile & Cozzolino, 2024). It contributes not only to the preservation – through the protection – of unique and delicate assets during transport, but also to the valorization of cultural and artistic heritage and its wider accessibility to the public (Florian, 2023; Barile & Cozzolino, 2022). In this context, "valorization" refers to the potential to transform all assets so designated into instruments for increasing the social and economic well-being of a country, taking into account the direct and indirect spillover effects generated (Cerquetti & Montella, 2024; Montella, 2012, 2016, 2020; Golinelli, 2012; Belmondo, 2019; Montella & Petraroia, 2016).*

The logistics supporting cultural and artistic heritage constitutes a highly specialized, complex, and delicate activity. The assets involved in such movements possess exceptional characteristics that necessitate bespoke solutions throughout every phase of the logistical process: from specialized packing and crating to transit, storage, on-site installation at the destination facility, and potential de-installation for return shipment in the case of temporary exhibitions. Furthermore, each stage of the logistical chain must adhere to rigorous quality standards and, critically, to specific national and international regulatory frameworks. In comparison with general commercial logistics and freight transport, fine art logistics requires a superior degree of organizational and technological specialization. Consequently, these operations should be entrusted to industry specialists capable of ensuring seamless handling, thereby preserving the absolute physical integrity of the object and guaranteeing its optimal accessibility and fruition. This requirement is essential whether logistical activities are managed internally by the institution (e.g., a museum) or outsourced to external logistics providers (LSPs) dedicated to these specialized services.

In recent years, both the demand for and the supply of outsourced logistical services have experienced rapid growth in terms of market value and volume. Globally, the fine art logistics segment is experiencing modest but steady growth. According to MarketResearch.com estimates, the Fine Arts Logistics market is valued at $3.6 billion in 2024 and could reach $4.3 billion by 2030, with a compound annual growth rate of 2.6%. Art transportation represents the largest component of the sector, estimated at $3.1 billion by 2030, while specialized packaging is experiencing more modest growth rates[3]. In Italy in particular, art logistics is defined as a "precious niche" within the broader logistics sector[4].

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[3] https://www.marketresearch.com/Global-Industry-Analysts-v1039/Fine-Arts-Logistics-42698603/ (accessed on December 10, 2025).
[4] https://www.nomisma.it/il-valore-dellindustry-dellarte-in-italia/ (accessed on December 10, 2025).

According to Nomisma's research[5] conducted for the Apollo Group in collaboration with Intesa San Paolo, the art logistics market is expected to be worth €70 million in 2023 – stable compared to 2019 – with €51 million generated for clients such as museums and foundations, and €19 million for clients such as modern and contemporary art galleries, auction houses, and, to a lesser extent, antique dealers, art dealers, and private individuals (within the broader logistics sector, which is worth approximately €80 billion). For Italian art logistics the key numbers are: 1,200,000 movements/year, €40 billion in insured value, 500 direct employees, and 4,000 domestic clients, including museums and foundations[6].

These data highlight the economic and cultural importance of the circulation of works of art. This circulation is not simply a physical transfer, but a set of essential activities for the protection, promotion, and international presence of a nation's cultural and artistic heritage. Logistics for cultural and artistic assets is increasingly emerging as an enabling activity for the functioning of the entire cultural and artistic ecosystem, both nationally and internationally.

Purpose of the paper.

Research question. Despite the growth in volume and value of logistics for cultural and artistic heritage offered by logistics service providers and its crucial role in the entire cultural and artistic sector, academic contributions studying this field remain few and fragmented.

In fact, in most cases where the management of museums or art collections or the economics of culture is discussed, logistics activities are not explicitly referred to. Fine art logistics is only mentioned in a few articles on art or cultural management, and in these contexts, it is only briefly mentioned: for example, in the recent volume dedicated to the economics of art by Negri-Clementi (2023 p. 139), there is a short paragraph on "Packaging, transport, delivery, installation, handling"; in this contribution, logistics activities are only "ancillary" to the other topics presented.

There are few contributions that dedicate attention to fine art logistics, even proposing in the title itself evidence of the importance of this activity, albeit with a predominantly technical and less managerial approach: Fratelli (2017), Powell (2016), Carboni (2018), Kolakowski (2017), and Cannon-Brookes (1986), to name a few. Other contributions are extremely specific on certain aspects, such as the volume "Art in Transit: Studies in the Transport of Paintings" commissioned by the Smithsonian Institution, which focuses on paintings, or the contribution by Loddo et al. (2022), which focuses on movement in warehouses in the Netherlands. Studies that present fine art logistics from the perspective of LSPs within cultural heritage management volumes or journals are rarer. An early contribution is that of Canali and Puglisi (2005). A more recent stream of contributions in this direction is developed by Cozzolino et al. (2021), Barile et al. (2022), and Barile and Cozzolino (2024; 2022). In particular, these latest works highlight the contribution made by logistics service providers in this sector, not only for the protection function, but also and above all for the valorization of cultural heritage through their movement thanks to specific capabilities. But, how LSPs compose and propose their own value proposition specifically for this specific sector valorizing their specialized capabilities is not clearly explained.

Therefore, given the importance of logistics in the protection and, above all, valorization of cultural and artistic heritage and its concrete contribution to the actors in the supply chain, and the limited theoretical exploration of the topic in the existing academic literature, this study aims at addressing the gap and it examines the following research question (RQ):

RQ: How do logistics service providers develop their capabilities to offer fine art specialized services?

To address this research question, we built on the dynamic capabilities' theory by Teece et al. (1997), which considers the importance of organizations' ability to adapt to changing needs and environments by integrating and reconfiguring resources (Teece, 2007). The dynamic capabilities' theory seems to be the appropriate theoretical lens for the investigation of our research aims on specialized capabilities for fine art logistics because it allows to take into account the different needs of customers, the evolutionary changes in the sector, the new technological and digital challenges and even environmental sustainability goals. In particular, in the logistics industry, the dynamic capabilities' theory is increasingly adopted to explain and predict how firms confront technological advancements and evolving customer demands (Prataviera et al., 2026; Dovbischuk, 2022; Sandberg, 2021). The literature lacks research on dynamic capabilities for fine art logistics specialization.

Dynamic capability perspective as theoretical lens. Originally conceptualized by Teece and Pisano (1994), dynamic capabilities theory provides a framework for understanding how organizations navigate and thrive within dynamic conditions. Dynamic capabilities – deeply rooted in managerial expertise and ingrained organizational processes – can enable an enterprise to upgrade its ordinary capabilities and direct these, and the capabilities of partners, toward high-payoff endeavours and this requires developing and coordinating – or "orchestrating" – the firm's (and partner firms') resources to align with a changing business landscape or, even, to shape changes in the marketplace, or the business environment more generally (Teece, 2018; Teece et al., 1997). To better analyse these mechanisms, Teece (2007) categorizes dynamic capabilities into three core functions: sensing, seizing, and reconfiguring. Sensing involves the proactive identification and evaluation of market shifts and opportunities; seizing focuses on capitalizing on identified

[5] https://www.gruppoapollo.it/wp-content/uploads/2025/02/20241018_Industry-arte-2023-e-situazione-IVA-slim.pdf (accessed on December 10, 2025).

[6] https://www.nomisma.it/il-valore-dellindustry-dellarte-in-italia/ (accessed on December 10, 2025).

prospects or neutralizing potential risks; reconfiguring entails the ongoing synchronization of the organization's portfolio, so that firms can renew and ensure their resources are in line with the detected changes and sensed opportunities (Helfat et al., 2007).

Methodology.

Approach. *This research design relies on the action research (AR) approach (Näslund et al., 2010). This method fits best to respond to our research question, as it permits application in real settings to address real-world managerial and organizational challenges (Näslund, 2002). By addressing real-world organizations and managerial problems, AR increases the emphasis on relevance (Ellis & Kiely, 2000). Because of this qualitative methodology, both the researchers' team and organizational agents collaborate by sharing ideas and reflections. Moreover, due to the exploratory context of this original study, a case study is a useful instrument for the empirical part of the research, which facilitates an in-depth understanding of complex phenomena (Yin, 2003) and provides a better understanding of events with concrete context dependent knowledge (Ridder, 2017). The importance of this methodology in management and social science research has been widely recognized (Eisenhardt, 1989; Eisenhardt & Graebner, 2007). This recognition is also confirmed by logistics and supply chain management researchers as a method of approach in scientific investigations (Ellram, 1996; Aastrup & Halldorsson, 2008; Seuring, 2008).*

Data collection and analysis. *The selected case is an historical leading company in fine art logistics and belongs to the Italian logistics industry; it has been chosen because of its interest (Stake, 2005) and relevance for theoretical reasons (Eisenhardt & Graebner, 2007).*

We adopt a team-based approach, which is strongly encouraged to increase reliability, through investigator triangulation (Benbasat et al., 1987), with professionals as part of the case study. The top managers and professionals of the LSPs investigated actively participated during the discovery, descriptive, mapping and managing phases of the research. For some years, the research team collaboratively conducted multiple steps in the research process, in particular, refining a focus, conducting reconnaissance, reflecting on progress, planning for action, implementing and observing action, and reflecting and evaluating change (Townsend, 2013).

Data were collected through different initiatives that cover the entire research project along years (to present) – that is still in a work-in-progress phase – and rely on participants generating data through narratives, field notes, and for the next period also semi-structured interviews. This flexibility in data collection, typical of AR research, takes advantage of new emergent themes to improve resultant theory (Näslund, 2002; Eisenhardt & Graebner, 2007). The empirical investigation was based on meetings within the LSPs and their suppliers and customers; moreover, internal presentations and reports of the companies, external documents and participants' informal comments were tracked in the participants/observers notes and then examined to triangulate data and provide rigor to the study (Yin, 2003). A field analysis through active meeting participation was necessary because no other studies have specifically addressed the objective of this research project. We consider these documents and the meeting transcripts and participant notes to be sufficient because they are posed to those directly involved in the project.

Coding procedures followed the approach proposed by Gioia et al. (2013). We collected first-order concepts from the informants, aggregated them in more conceptual categories as second-order themes, and then grouped in the three dimensions of the Teece's (2007) categorization of the dynamic capabilities' theory: sensing, seizing, and reconfiguring.

In this short paper version, due to the limited space, we present only the results of arising from the public materials of the LSP investigated.

Results. *Fine art logistics is characterized by the peculiar focus on a special object to be moved, that is, works of art: delicate, unique, often of inestimable economic and cultural value, bound by ministerial practices of export/import authorization, accompanied by relevant loan/sale and insurance contracts. It is a "special" logistics, extremely critical and complex to carry out, which requires very high specialization, safety and competence to guarantee the necessary qualitative excellence of the service in coherence with the goods moved. Fine art logistics activities require extremely high competence, quality and specialization, with safety and integrity as priorities, both when they are managed internally and when they are entrusted to logistics service providers dedicated to such activities: transportation, packaging and storage management, as "core" activities, but with great relevance, also other activities of significant importance, such as insurance, customs procedures, loan agreement coordination, certifications, consultancy, armed bodyguards, appraisal management, emergency response services, etc. – which make up complete solutions for the needs of the actors involved in the cultural and artistic offering system.*

The basic services offered by logistics operators for art are, in general, those of (a) transport, which deals with moving the work from one point to another, (b) packaging, which takes care of the best way to store the work for handling and/or storage, and (c) storage, which involves the more or less permanent storage of the works in a warehouse/deposit location. Each of these basic services has specific characteristics peculiar for art and is composed of a series of other specialized activities - as well as resources and skills that are also specialized - that carry out the specific service and need specialized capabilities; furthermore, alongside these activities there are many others that make up the offer with complementary elements and/or accessories of primary importance. Just to name a few, below are some concrete examples that make up the basic services (Barile and Cozzolino, 2022).

With reference to transport activity (a), the informants consider the importance of insurance contracts and the related activity of assessing the value to be insured, or the completion of import/export customs procedures. The means of transport must, for example, be equipped with a system of adequate anti-shock shock absorbers, temperature-controlled interiors and with anti-theft alarm devices. The driving staff must have knowledge and experience in the movement of art; the permanent presence of a courier is often foreseen who follows the route of the works of art as they travel from the lending museum to the hosting one.

With reference to packaging activity (b), the informants consider the importance of the status-check of the conditions of the works of art and the design of custom-made crates (even the crate system). The packaging must, for example, be fireproof, permeable and shockproof. Packaging and logistics experts, but also chemists and physicists must study the environment appropriate to the risk profile and technical characteristics of the work for the entire duration of the journey.

In reference to the storage activity (c), the informants consider the importance of the cataloguing/compilation of the checklist of the goods and the sophisticated security systems. In the deposits there must be, for example, shelves, fixed boxes and air-conditioned vaults. Experts in the manipulation of the works take care of the storage and/or transit of the art works.

While the above activities describe the core and complementary services characterizing fine art logistics, they do not fully capture the underlying the complex of capabilities required to deliver such highly specialized operations. In particular, these services are enabled by a set of micro-level practices and decision-making processes through which logistics providers interpret complex contexts, mobilize resources, and adapt execution in real time.

To unpack these underlying mechanisms, we analyse the empirical evidence through the lens of the dynamic capabilities' framework, distinguishing among sensing, seizing, and reconfiguring processes. Following a Gioia-inspired approach, first-order evidence from the empirical material is interpreted into second-order themes (micro foundations), which are then aggregated into the three dimensions of dynamic capabilities.

In line with prior literature, our findings confirm that sensing involves the ability to identify relevant signals and anticipate potential risks, seizing reflects the capacity to mobilize and deploy resources effectively, and reconfiguring captures the continuous adaptation of processes and structures. However, unlike prior studies that often conceptualize these capabilities in relatively structured and repeatable environments, the fine art logistics context reveals a much higher degree of variability and uncertainty. In this setting, sensing is not limited to market or technological scanning, but extends to the detailed interpretation of physical, spatial, and human-related constraints. Similarly, seizing does not only involve resource allocation, but also the selective acceptance or rejection of projects to preserve service quality. Finally, reconfiguring emerges as a pervasive and continuous process, rather than an occasional adjustment, as operations must be constantly customized for each project and inside each project adjusted in real time and.

These findings suggest that dynamic capabilities in fine art logistics are deeply embedded in micro-level practices and are continuously enacted throughout project execution. As such, our study contributes to the dynamic capabilities literature by highlighting how these capabilities unfold in highly customized, non-standardized environments, where traditional assumptions of routinization and sequential processes may not fully apply.

The capabilities required in fine art logistics emerge from the continuous interaction of these micro foundations, rather than from standardized routines. In this context, sensing, seizing, and reconfiguring do not unfold as sequential phases, but rather as tightly intertwined processes that are activated simultaneously throughout project execution. This reflects the project-based and highly customized nature of fine art logistics, where each operation requires context-specific interpretation, tailored solution design, and ongoing adaptation under conditions of high uncertainty. As such, the dynamic capabilities perspective provides a useful lens to explain how logistics providers are able to ensure reliability and quality despite the absence of standardization.

The findings can be meaningfully interpreted in light of prior studies on dynamic capabilities in logistics service providers, particularly recent work by Prataviera et al. (2026). While this stream of research highlights how sensing, seizing, and reconfiguring capabilities enable logistics providers to respond to technological changes, our research shows how such capabilities operate in a context characterized by extreme asset specificity, non-standardization, and project-based operations.

Research limitations. *This paper is not free from limitations, but they also suggest promising directions for future research. The main limitation is that the paper is still at a work-in-progress step of development, even if at a good point for its finalization. Moreover, the empirical analysis relies on just one qualitative Italian case study, so that future research may consider multiple cases, or even develop the investigation into a quantitative direction, also mapping other countries in the overall analysis.*

Managerial implications. *The findings of this study offer several managerial implications for firms engaged in fine art logistics, for cultural entities and institutions, and for policy makers both in the cultural and logistical areas. In fact, the growth and development of the cultural heritage logistics sector, within an art market that is also growing and developing, highlights the strategic and economic importance of these services, with great current and prospective potential, with direct implications for the competitiveness of the individual players involved, their supply chains, and the entire cultural heritage system, as well as having repercussions on numerous other players and operational areas that represent a significant scope extension, such as tourism.*

Originality of the paper. *The present study contributes to the literature on dynamic capabilities in logistics service providers by providing an original focus on how such capabilities operate in a context characterized by extreme asset specificity, non-standardization, and project-based operations. Furthermore, the topic itself – fine art logistics – is a very original research area in academia even if the business context moves very high values and volumes in the area with concrete impact on economy, finance and social settings. Moreover, the research contextualises the dynamic capabilities theory for fine-art logistics services; and, methodologically, this paper adopts an action research approach focused on a case study: these elements are both original in the investigated field, there are no research references that use these typologies to analyse dual contributions for research and practitioners.*

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Opening the black box of Olympic logistics: a qualitative study of logistics management decision-making in a temporary mega-event

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Abstract. *Logistics plays a critical role in the Olympic Games; however, existing research has primarily focused on the key steps of planning and system design, leaving managerial decision-making only partially explored. This research aims to open the black box of Olympic logistics by examining how logistics managers make decisions within the complex organizational context of the Milan–Cortina 2026 Winter Games. Based on Temporary Organization Theory and research on strategic decision speed in high-velocity environments, this study investigates Olympic logistics as a time-bounded organizational system characterized by institutionalized termination, structural temporariness, and intense temporal pressure. Milan–Cortina 2026 represents a theoretically revealing case due to its geographically dispersed configuration, encompassing both urban and mountain venues and relying on heterogeneous, partially temporary infrastructures. In this context, logistics extends beyond the optimization of material flows to include the spatial and organizational coordination of flows of people, resources, athletes, and vehicles during the event. Furthermore, the finite duration of the Olympic organization, combined with fixed deadlines and limited opportunities for iterative learning, amplifies the role of decision speed and reshapes how managers balance urgency, resource coordination, sustainability, and security. The temporary nature of the Olympic organization and the absence of repeated learning cycles further imply that decisions are made under stringent material constraints, high uncertainty, and limited reversibility. Based on in-depth qualitative interviews with key informants from Fondazione Milano Cortina and Citec, this study investigates how managerial decision-making unfolds in Olympic logistics, with particular attention to the enabling factors, organizational barriers, and collaborative mechanisms that shape strategic decision speed and its implications for optimizing key performances.*

Keywords: *Logistics management; Olympic Games; Qualitative research; Urban context; Uncertainty*

Framing of the research. *Logistics has long been recognized as a critical component of Olympic mega-events, given the scale, complexity, and visibility of the operations required to stage the Games. Existing research has primarily conceptualized Olympic logistics from the perspective of system design, planning, and coordination, focusing on the optimization of flows, infrastructure deployment, and organizational arrangements (Minis et al., 2006; Pott et al., 2024). Most of the literature has emphasized strategic choices related to outsourcing, warehousing, transportation, security and venue logistics, often drawing on ex post evaluations of past Olympic editions (Essex and Chalkley, 1998, 2004; Minis et al., 2006; Pott et al., 2024; Preuss, 2004). While this body of studies has significantly advanced our understanding of how Olympic logistics can be planned and implemented, it has largely adopted a normative perspective. As a result, much of the literature in this field considers logistics as a technical and functional aspect, implicitly assuming that once appropriate systems, processes, and governance structures are in place, operations will unfold as intended (Christopher, 2016; Minis et al., 2006; Pott et al., 2024). However, this perspective fails to consider the opportunities related to a proactive optimization of logistics to achieve better performances in terms of efficiency, resilience, and sustainability. In particular, little attention has been paid to how logistics managers make strategic decisions under conditions of temporal pressure, structural constraints, and organizational complexity (Bonn and Rundle-Thiele, 2007).*

This gap becomes particularly salient when considering the organizational characteristics of the Olympic Games. The Games are organized through temporary organizational structures established for a limited duration, operating under fixed and non-negotiable deadlines and dissolving shortly after the event concludes. As Lundin and Söderholm (1995) argue, temporary organizations are characterized by time-boundedness, task orientation, team configuration, and transition, with action rather than decision serving as their organizing principle. These four dimensions are especially consequential for logistics: fixed and non-negotiable deadlines to take decisions; task orientation around delivery; team configurations focused on specialized actors; risk exposure toward knowledge discontinuity across different phases and organizational interfaces. The fixed temporary organizational structures fundamentally reshape managerial behavior, as actors cannot rely on long-term routinization. Bakker et al. (2016) further emphasize that temporary organizational structures engage in continuous negotiation with permanent institutions and public actors, generating potential tensions at the interfaces between short-term action and enduring institutional arrangements.

Within such temporary settings, decision-making cannot be understood solely as the outcome of formal planning structures. Instead, temporariness heightens the relevance of time and intensifies the potential consequences of delay (Bakker et al., 2016; Grabher, 2002; Lundin and Söderholm, 1995). Research on strategic decision speed in high-velocity environments further suggests that rapid decision-making is often associated with superior performance when

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organizations face dynamic and uncertain conditions (Baum and Wally, 2003; Judge and Miller, 1991). In such contexts, decision speed does not necessarily imply weak analysis; rather, it may reflect the ability to integrate real-time information, manage multiple alternatives simultaneously, and coordinate effectively under pressure (Eisenhardt, 1990).

The Milan–Cortina 2026 Winter Games amplify these theoretical concerns. Unlike many previous Olympic editions concentrated within a single metropolitan area, Milan–Cortina is geographically dispersed across urban and mountain venues spanning multiple regions and relying on heterogeneous and partially temporary infrastructures. This spatial dispersion increases coordination demands and limits the feasibility of incremental adjustments. In a temporary organization operating under non-negotiable deadlines, the speed of logistical decisions may directly affect not only operational reliability but also broader urban and inter-organizational coordination. Prior research on decision speed indicates that environmental dynamism and organizational structure shape both the pace and quality of strategic decisions (Baum and Wally, 2003; Judge and Miller, 1991). In the Olympic context, temporariness itself functions as a structural driver of urgency, potentially magnifying the impact of enabling factors and organizational barriers to rapid decision-making. Accordingly, Milan–Cortina offers a particularly suitable setting in which to examine how decision speed is conditioned by the interaction of temporariness (fixed deadlines and institutionalized termination) and spatial dispersion (multi-venue interdependence), rather than by environmental velocity alone.

Given these considerations, this study aims to address the following research question: "How do organizational and geographic characteristics impact logistics decision-making in an Olympic event?"

Purpose of the paper. *The purpose of this paper is to develop an empirical qualitative study that explains the mechanisms of logistics management decision-making in temporary mega-events. Specifically, the study adopts the lens of Temporary Organization Theory (Bakker et al., 2016; Lundin and Söderholm, 1995) with research on strategic decision speed in high-velocity environments (Baum and Wally, 2003; Eisenhardt, 1989; Judge and Miller, 1991) to examine how structural temporariness shapes the pace and configuration of logistical decisions. Hence, rather than positioning decision speed as an independent organizational attribute, the paper treats it as structurally conditioned by the temporal architecture of temporary organization.*

Temporary Organization Theory conceptualizes mega-events as organizations characterized by time-boundedness, task orientation, team configuration, transition. In such settings, time is not merely a constraint but a structuring dimension that shapes authority, coordination, and accountability (Bakker et al., 2016; Lundin and Söderholm, 1995). Time-boundedness compresses decision windows; task orientation sharpens goal-driven prioritization; team configuration intensifies cross-functional interdependence; and transition introduces risks of discontinuity in knowledge and responsibility. Rather than treating decision speed as a static organizational capability, the study conceptualizes Olympic logistics decision-making as evolving across temporally distinct phases: preparation, Games-time, and closure; each characterized by different configurations of constraints, enabling mechanisms, and performance implications in terms of efficiency, resilience, and sustainability. In particular, performance implications will be examined not only from the perspective of the Games' time cycle but also in relation to the post-event phase, investigating whether and how a legacy-oriented perspective influences logistics decision-making. Specifically, the study explores whether legacy considerations constitute a strategic priority in logistics decisions, for instance with regard to the potential reuse of logistics infrastructures after the conclusion of the Games.

While prior research on Olympic logistics has primarily focused on system design and operational planning, and decision speed research has largely examined corporate settings (Baum and Wally, 2003; Minis et al., 2006; Pott et al., 2024), little is known about how decision speed unfolds within geographically dispersed temporary organizations operating under institutionalized termination and non-negotiable deadlines. This study addresses that gap by conceptualizing Olympic logistics as a time-bounded organizational arena in which temporariness interacts with spatial dispersion and structural interdependence to condition the enactment of decision speed.

Hence, the study underlines the salience and determinants of decision speed vary across the life cycle of the event. During the preparation phase, structural arrangements and planning routines dominate; during Games-time, decision speed reaches peak criticality as spatial dispersion, real-time coordination, and material irreversibility converge; and during the closure phase, governance and knowledge transfer mechanisms reshape decision priorities. In this phase-contingent view, speed is not uniformly desirable; rather, its meaning and consequences shift with the configuration of constraints and coordination demands. In this perspective, temporariness is not simply a descriptive feature of mega-events but a structural dimension that actively configures managerial decision-making by compressing time horizons and limiting opportunities for revision

Therefore, the framework shifts attention from isolated antecedents to the temporal structuring of decision conditions, proposing that structural temporariness, environmental dynamism, and spatial dispersion interact differently during preparation, Games-time, and closure phases. In doing so, the study explores how urgency, coordination intensity, sustainability and security converge during the peak event phase, altering both the mechanisms enabling rapid decisions and the barriers constraining them.

The study explores these topics through qualitative interviews with several logistics decision-makers of the Milan–Cortina 2026 Winter Games, under the lens of Temporary Organization Theory. At the same time, it extends research on strategic decision speed by demonstrating that in geographically dispersed and dynamic mega-events, decision speed emerges not simply from organizational structure or environmental velocity, but from their interaction with temporariness as a funding characteristic. In this sense, the study positions temporariness as a moderating structural condition in the

relationship between environmental dynamism and decision speed, thereby advancing both literatures beyond their traditional empirical domains.

Methodology. *This study adopts a qualitative case study design (Yin, 2018) to investigate managerial decision-making in Olympic logistics within the temporary and geographically dispersed setting of the Milan–Cortina 2026 Winter Games. A single-case design is appropriate because Milan–Cortina constitutes a theoretically revelatory case: it embodies the defining characteristics of temporary organizations—time-boundedness, institutionalized termination, and task-based coordination (Lundin and Söderholm, 1995) while simultaneously exposing decision-makers to high environmental dynamism, structural interdependence, and immovable deadlines. In line with Temporary Organization Theory, the case also enables observation of how team configuration and transition dynamics unfold as the organization moves across phases. The case thus provides a unique opportunity to examine how temporariness and velocity interact in shaping decision speed.*

The data collection is still in progress. Data are collected through semi-structured, in-depth interviews with purposively selected key informants (Patton, 2002) occupying both strategic and operational roles within the Organizing Committee and partner organizations responsible for logistics functions (e.g., transport coordination, venue logistics, warehousing, cross-functional integration, security, sustainability, and all the associated services). The sampling strategy ensures heterogeneity in hierarchical position, functional responsibility, and phase involvement across the event life cycle (preparation, test events, Games-time, and closure). Recruitment proceeds until thematic saturation is reached with respect to phase-specific decision conditions and enabling mechanisms. The expected number of interviews is eleven.

The interview protocol is structured around phase-based logic consistent with the theoretical framework. Respondents are first invited to describe their role and responsibilities, followed by a reconstruction of their involvement across the preparation, test event, Games-time, and closure phases. Emphasis is placed on eliciting detailed accounts of concrete decision episodes characterized by urgency, high impact, interdependence, or constrained reversibility. Rather than focusing on abstract perceptions of speed, the protocol encourages respondents to reconstruct specific situations in which rapid decisions were required, how alternatives were evaluated, how coordination unfolded, and what constraints shaped the available courses of action. To strengthen comparability across interviews, respondents are prompted to locate each episode in time (phase), specify the decision arena, identify involved actors, and describe escalation pathways and coordination channels.

The protocol explicitly probes: 1) how temporal pressure was perceived and managed; 2) how structural arrangements (governance, reporting lines, planning routines) enabled or constrained decision speed; 3) how spatial dispersion across venues affected coordination intensity; 4) how trade-offs between speed, accuracy, and risk mitigation were handled; 5) how decision conditions differed across phases of the event life cycle, also considering the post-event perspective. This episode-based approach reduces retrospective bias by anchoring accounts to specific incidents and allows decision-making to be examined as embedded in temporally bounded organizing processes. Interviews are recorded and transcribed. All interviews follow informed consent procedures and are anonymized to protect respondents operating in a highly visible institutional setting.

To enhance construct validity, interview data are triangulated with documentary sources, including internal planning documents, organizational charts, governance guidelines, and publicly available reports concerning logistics preparation and venue coordination. These materials are used to corroborate timelines, structural arrangements, and decision responsibilities described by informants.

Data analysis follows an abductive strategy (Timmermans and Tavory, 2012), iteratively moving between empirical material and theoretical constructs derived from Temporary Organization Theory and strategic decision speed research. The coding process unfolds in multiple iterative stages and follows the principles of the Gioia methodology (Gioia et al., 2013). In the first step, we conduct open coding aimed at preserving informant-centric terms and expressions (first-order concepts), allowing managerial accounts of decision episodes to emerge without imposing theoretical structure. In the second step, these first-order concepts are progressively grouped into second-order themes that captured emerging patterns in how decision dynamics were described across phases of the event life cycle (preparation, Games-time, closure) and across different decision arenas. This stage involves iterative movement between data and theory in line with an abductive logic. In the third step, aggregate theoretical dimensions are developed by relating second-order themes to sensitizing constructs derived from Temporary Organization Theory and strategic decision speed research.

Expected Results. *Drawing on Temporary Organization Theory (Lundin and Söderholm, 1995), it is reasonable to anticipate that the time-bounded and task-oriented nature of the Olympic organization progressively reshapes authority structures, coordination patterns, and tolerance for risk as the event approaches Games-time (see Table 1). In the preparation phase, decision processes are likely to be more formalized, planning-oriented, and embedded in negotiated inter-organizational arrangements. Decision speed in this phase may be moderated by the need for alignment, consensus-building, and procedural legitimacy across multiple stakeholders. Here, temporariness manifests primarily through anticipatory structuring rather than immediate urgency, allowing decision speed to be balanced against coordination breadth and procedural robustness.*

As the organization transitions into Games-time, temporal compression and irreversibility are expected to intensify, shifting decision-making toward more rapid, centralized, and action-oriented processes, consistent with research on strategic decision speed in high-velocity environments (Eisenhardt, 1989; Judge & Miller, 1991; Baum & Wally, 2003).

Under these conditions, coordination is expected to rely on tighter integration mechanisms, reduced consultation cycles, and simplified decision frames, reflecting the increased costs of delay and heightened systemic interdependence. However, consistent with the decision speed literature, acceleration is anticipated to be effective only when supported by integrative mechanisms that sustain cross-functional coherence and prevent fragmentation across dispersed venues.

During the closure phase, decision priorities are expected to shift again, emphasizing accountability, demobilization, and knowledge transfer, thereby reconfiguring speed and risk considerations. Risk tolerance may decrease relative to Games-time, and decision processes may become more documentation-driven and compliance-oriented as institutional responsibilities come to the forefront. In this phase, the transition dimension of temporary organizing is expected to become salient, with decision speed subordinated to governance stabilization and formal knowledge codification.

Overall, the study is expected to support the development of a phase-contingent model of decision speed in temporary, geographically dispersed mega-events. Specifically, temporariness is anticipated not merely to increase urgency, but to alter the configuration of authority, coordination intensity, and risk orientation across phases. Decision speed in Olympic logistics is therefore expected to emerge from the interaction between institutionalized deadlines, spatial dispersion, and structural interdependence, rather than from environmental dynamism alone. In addition, the study is expected to contribute to the understanding of performance management and prioritization in Olympic logistics, considering both the Games' time cycle—measured in terms of efficiency, timeliness, and sustainability—and the post-event phase from a legacy-oriented perspective.

Table 1: Framework

Phase	***Organizational Characteristics***	***Spatial Configuration***	***Decision Speed Drivers***	***Performance***
Preparation	Formalization; centralization	Space as planned configuration (venue planning; macro-scale coordination)	Alternative generation	Efficiency
Games-Time	Institutionalized termination	Space as practiced coordination across scales (micro–meso–macro)	Real-time information; simultaneous alternatives	Resilience
Closure	Transition	Reconfiguration of spatial scales; re-embedding in permanent space	Integration across decisions	Sustainability

These expectations remain theoretically grounded but empirically open. The qualitative analysis will assess whether, and under what conditions, these anticipated phase-based shifts in decision dynamics are observable in managerial accounts.

Research limitations and future research. *This study presents several limitations that open avenues for future research. First, it relies on a single revelatory case, which enables in-depth exploration of decision-making within a temporary mega-event but limits statistical generalizability beyond the specific institutional and territorial configuration of Milan–Cortina 2026 (Yin, 2018). While the objective is analytical rather than statistical generalization, the findings remain embedded in a particular governance model and spatial architecture. Future research could adopt comparative designs across different Olympic editions or other large-scale temporary events to examine whether phase-contingent decision patterns remain stable across governance structures, degrees of centralization, and levels of spatial dispersion.*

Second, the study primarily draws on interview-based reconstructions of decision episodes, which may be affected by retrospective sensemaking and ex-post rationalization, particularly under high-pressure conditions. Future research could incorporate longitudinal or real-time observational methods during peak operational phases to capture decision speed dynamics as they unfold, thereby reducing reliance on retrospective accounts and strengthening causal inference regarding temporariness and temporal compression.

Third, although the framework emphasizes phase-contingent shifts in decision conditions, the empirical design does not allow for direct measurement of performance outcomes associated with faster or slower decisions. Subsequent studies could examine how variations in decision speed across phases affect operational reliability, coordination effectiveness, and risk exposure, thereby linking temporal dynamics to performance implications.

Finally, while the study focuses on managerial actors within the temporary organization, future research could explore multi-level dynamics by examining how political authorities, local institutions, contractors, and international governing bodies influence decision processes across phases. In particular, investigating how external institutional pressures interact with internal temporariness could further refine our understanding of how decision speed is structurally conditioned in mega-event settings.

Managerial implications. *This study offers several implications for organizers of temporary and geographically dispersed mega-events. First, the findings suggest that decision-making structures should not be designed as static arrangements but calibrated to the evolving temporal phases of the event. In temporary organizations, time-boundedness implies that coordination architectures must anticipate phase transitions rather than merely support steady-state operations. During preparation, managers should prioritize clarity in roles, escalation pathways, and inter-organizational coordination mechanisms, creating a stable architecture that can absorb future temporal compression. Formal governance design in this phase should reduce ambiguity before urgency peaks.*

As Games-time approaches, formal planning routines should be complemented with mechanisms that support rapid commitment to action and coordinated execution, such as cross-functional briefings, shared situational awareness tools, and pre-defined decision boundaries. Consistent with research on decision speed in high-velocity environments, organizations should simplify information flows, shorten consultation chains, and empower clearly defined decision authorities to avoid analysis paralysis under temporal compression.

Moreover, in geographically dispersed events, particular attention should be devoted to boundary-spanning roles and real-time communication infrastructures that connect spatially distant clusters. Given the structural interdependence across venues, mechanisms that ensure rapid vertical and horizontal alignment become critical during peak operations.

Finally, recognizing that temporariness limits the consolidation of routines, organizers should implement structured knowledge-transfer processes during the closure phase to avoid the loss of experiential learning and enhance preparedness for future editions. Because institutionalized termination disrupts organizational memory accumulation, formalized debriefing protocols and codification of decision logics are essential to mitigate the structural discontinuity inherent in temporary mega-events.

Originality of the paper. *This paper advances research on Olympic and mega-event logistics by moving beyond structural design and planning models toward a temporally grounded analysis of how decision speed unfolds within a temporary organizational form. While prior studies have conceptualized Olympic logistics primarily as a system-design problem (e.g., infrastructure deployment, process optimization, governance configuration), this study reframes it as a phase-contingent decision environment in which temporariness actively reshapes the conditions of managerial action.*

By integrating Temporary Organization Theory with research on strategic decision speed in high-velocity environments, the study proposes a novel theoretical synthesis. Rather than treating temporariness as a contextual backdrop and decision speed as a static capability, the paper conceptualizes their interaction as structurally generative: institutionalized termination, fixed deadlines, and spatial dispersion jointly configure the pace, coordination intensity, and risk orientation of decisions across phases.

Empirically, the study contributes by subjecting this theoretical integration to qualitative examination within the geographically dispersed configuration of Milan–Cortina 2026. Importantly, the framework does not assume that phase-based shifts in decision dynamics necessarily occur; rather, it advances theoretically grounded expectations that remain empirically open. The qualitative analysis assesses whether, and under what conditions, temporariness translates into observable shifts in authority structures, coordination mechanisms, and decision speed across the event life cycle.

In doing so, the paper contributes to Temporary Organization Theory by specifying how institutionalized termination influences not only coordination but the temporal logic of managerial decision-making. At the same time, it extends research on strategic decision speed beyond corporate high-velocity markets to the underexplored domain of geographically dispersed mega-events.

More broadly, the study demonstrates the value of combining organization theory and strategic decision research to illuminate decision dynamics in temporary, high-stakes, and spatially complex settings—an area that has remained theoretically fragmented and empirically underexamined.

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Returns Management in E-Commerce: The Role of Sustainability in Shaping Customer Satisfaction

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Abstract. *The rapid growth of e-commerce has led to a significant increase in product returns, making returns management a critical component of the customer experience and a major challenge for firms in terms of logistics efficiency and environmental sustainability. While reverse logistics has been widely investigated from an operational and environmental perspective, limited empirical research has jointly examined sustainable returns management and customer satisfaction from the consumer point of view.*

This paper investigates the relationship between sustainable returns management practices and customer satisfaction in the e-commerce context, focusing on consumers' return behaviors, sustainability perceptions, and post-purchase evaluations. Adopting a consumer-oriented perspective, the study aims to explore how sustainable initiatives implemented within the returns process, such as eco-friendly packaging, digital return labels, and product refurbishment, are perceived by consumers and how they influence satisfaction and behavioral intentions.

The research adopts a quantitative methodology based on a structured online questionnaire administered to consumers with prior experience in online shopping and product returns. Data collected from 250 respondents were analyzed using descriptive statistical techniques to examine purchasing and return behaviors, awareness of the environmental impact of returns, and attitudes toward sustainable return practices.

The results show that returns are perceived as a normalized component of the e-commerce experience and that convenience-related factors, such as ease of return and refund speed, remain the primary determinants of customer satisfaction. Sustainability emerges as a relevant but secondary driver, positively influencing satisfaction only when integrated into efficient and user-friendly return processes. Packaging-related sustainable practices and digital return labels are particularly valued, while willingness to accept economic or behavioral trade-offs for sustainability remains limited. The findings also reveal generational differences in sustainability awareness and acceptance of circular economy practices, such as refurbished products. In conclusion, the study contributes to the literature by providing empirical evidence on the sustainability–convenience trade-off in returns management and by highlighting the strategic role of sustainable returns as a lever for customer satisfaction and long-term value creation in e-commerce.

Keywords: *e-commerce; reverse logistics; returns management; sustainability; customer satisfaction; circular economy.*

Framing of the research. *The rapid expansion of e-commerce has profoundly reshaped consumption patterns and supply chain configurations, leading to a substantial increase in product returns. In online retailing, returns have become an intrinsic component of the overall customer experience and represent one of the most critical and complex reverse flows affecting logistics performance, operational efficiency, and customer satisfaction (Robertson et al., 2020). Therefore, reverse logistics and returns management have gained growing strategic relevance, moving from a purely operational concern to a key managerial issue for firms operating in digital markets.*

Recent industry evidence further confirms the scale and strategic relevance of this phenomenon. According to the National Retail Federation (2025), online return rates are expected to account for 19.3% of total e-commerce sales, corresponding to nearly $850 billion in returned merchandise, while recent industry analyses by Optoro (2024) further highlight the growing economic and environmental burden associated with returns processes. These data reinforce the need for firms to treat returns management as a strategic business issue rather than merely an operational cost.

From a literature perspective, this study is positioned within the stream of consumer-centric supply chain management, which recognizes consumers as active actors shaping logistics and post-purchase processes (Esper et al., 2020; Baldi et al., 2024). In this perspective, the focus is specifically on returns management in the post-purchase phase of e-commerce, rather than on broader end-of-use reverse logistics flows.

More specifically, the study considers consumer returns generated by dissatisfaction, product mismatch, damages, or change-of-mind decisions, consistently with the classification proposed by Abdulla et al. (2019). This focus allows the paper to investigate how sustainable return practices and return policy design influence customer satisfaction and behavioral intentions.

From an environmental perspective, the management of returns generates significant negative impacts, particularly in terms of transportation emissions, packaging waste, and resource consumption. These impacts are exacerbated in the e-commerce context, where consumers benefit from flexible return policies and the inability to physically inspect products prior to purchase, resulting in higher return rates and inefficient reverse flows (Frei et al., 2022). Accordingly, companies face increasing pressure to redesign returns processes to mitigate their environmental footprint while maintaining high service levels.

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In parallel, sustainability has emerged as a central paradigm in supply chain and logistics research. The growing emphasis on the Triple Bottom Line approach has encouraged firms to pursue economic, environmental, and social objectives simultaneously, fostering the adoption of sustainable and circular supply chain models (Nogueira et al., 2023). Within this framework, reverse logistics plays a pivotal role by enabling product recovery, reuse, refurbishment, and recycling, thus contributing to waste reduction and more efficient resource utilization (Biancolin et al., 2023).

At the same time, consumers are no longer passive recipients of products but active participants whose purchasing and return behaviors directly influence logistics flows and environmental outcomes (Robertson et al., 2020). Recent studies highlight that return behaviors are driven not only by product-related issues but also by psychological factors, expectations regarding convenience, and perceptions of risk, making returns management a multifaceted challenge for firms (Rintamäki et al., 2021; Lysenko-Ryba & Zimon, 2021).

In this context, return policies have become a critical determinant of customer satisfaction and loyalty. Transparent, simple, and flexible return procedures reduce perceived risk and enhance the overall shopping experience, positively influencing repurchase intentions. However, overly permissive return policies may generate excessive operational and environmental costs, creating a tension between customer-centric strategies and sustainability objectives (Zhang et al., 2023; Abdulla et al., 2025).

Despite the growing body of literature on reverse logistics and sustainability, empirical research jointly addressing sustainable returns management and customer satisfaction from the consumer perspective remains limited (Kiba-Janiak et al., 2024). Against this background, the present research adopts a consumer-centric supply chain management lens to explore how sustainable approaches to returns management can reduce environmental impacts while simultaneously enhancing customer satisfaction and supporting long-term value creation for firms.

Purpose of the paper. *The purpose of this paper is to investigate the relationship between sustainable returns management practices and customer satisfaction in the context of e-commerce. Specifically, the study aims to analyze consumers' return behaviors, their perceptions of the environmental impact generated by product returns, and the importance attributed to sustainable practices implemented within the returns process.*

By adopting a consumer-oriented perspective, the research seeks to identify which sustainable initiatives in returns management, such as eco-friendly packaging, digital return labels, and product refurbishment, are considered most relevant by consumers and how these practices influence customer satisfaction and behavioral intentions. In doing so, the paper addresses the trade-off faced by firms between offering convenient and flexible return policies and pursuing sustainability objectives.

Furthermore, the study aims to contribute to the existing literature by providing empirical evidence on the role of sustainability in shaping customer satisfaction in reverse logistics processes. Through the analysis of primary data collected via a structured questionnaire, the research offers insights into how sustainable approaches to returns management can simultaneously reduce environmental impacts and support customer-centric strategies, thereby fostering long-term value creation for e-commerce firms.

Methodology. *The study adopts a quantitative research design aimed at investigating the relationship between sustainable returns management practices and customer satisfaction in the e-commerce context, from the consumer perspective. Consistent with prior research on reverse logistics and consumer behavior, a survey-based methodology was chosen as the most suitable approach to capture perceptions, attitudes, and behavioral intentions related to online purchasing and product returns (Ball, 2019; Rintamäki et al., 2021; Robertson et al., 2020).*

Primary data were collected through an online questionnaire administered using Google Forms. The use of an online survey is particularly appropriate in e-commerce research, as it allows direct access to consumers who regularly engage in online shopping and returns activities (Nguyen et al., 2018). The questionnaire was distributed through digital channels, and participation was voluntary and anonymous.

The target population consisted of consumers with prior experience in online shopping and product returns. The final sample included respondents with heterogeneous socio-demographic characteristics in terms of age and gender, allowing for an exploratory analysis of different consumer profiles. This approach is consistent with previous empirical studies on customer returns and reverse logistics, which emphasize the importance of capturing diverse consumer behaviors and perceptions (Lysenko-Ryba & Zimon, 2021).

The questionnaire was structured into multiple sections: the first focused on respondents' general online shopping behavior, including frequency of online purchases, preferred e-commerce channels, and product categories most commonly purchased. This section aimed to contextualize respondents' familiarity with e-commerce environments. The second section investigated consumers' return behavior, examining the frequency of product returns, the main motivations for returning items (e.g., size issues, product mismatch, quality concerns), and prior experiences with return processes. These items are consistent with established literature identifying customer returns as a critical element of the post-purchase phase (Robertson et al., 2020). The third section addressed sustainability-related aspects of returns management. Respondents were asked to evaluate the perceived environmental impact of returns and to assess the importance of specific sustainable practices, such as reusable or right-sized packaging, digital return labels, and product refurbishment for resale. This section builds on previous studies highlighting the growing relevance of sustainability perceptions in reverse logistics processes (Zhang et al., 2023; Biancolin et al., 2023). The fourth section focused on customer satisfaction in relation to returns management. Respondents were asked to express their level of satisfaction

with return procedures and to indicate how sustainable practices influence their overall evaluation of the e-commerce experience. Five point likert-scale items were used to measure attitudes and perceptions, in line with common practice in customer satisfaction and logistics research (Rintamäki et al., 2021). The final section collected socio-demographic information, including age and gender, to support descriptive analysis and facilitate the interpretation of results across different consumer groups. The collected data were analyzed using descriptive statistical techniques. Frequency distributions and summary statistics were employed to examine consumers' purchasing and return behaviors, perceptions of sustainability, and satisfaction levels.

Results. ***Sample characteristics and online purchasing behavior.*** *The final sample consists of 250 respondents aged between 18 and 75 years. The majority belongs to Generation Z (18–27), representing 58.4% of the sample, followed by Millennials (28–43) with 24.8%, Generation X (44–60) with 13.6%, and Baby Boomers (61–75) with 3.2%. The sample is predominantly female (60.4%), while males account for 39.2%. In terms of education, 46% of respondents hold a high school diploma, while 44.8% have a university degree (bachelor's, master's, or postgraduate qualification), indicating a generally high level of education. Almost half of the respondents are students (46.4%), followed by employees (37.6%).*

Online shopping appears to be a consolidated habit among respondents. In fact, 43.6% report purchasing online "often" and 38.8% "sometimes", while only 14% purchase rarely. Younger generations show a significantly higher purchasing frequency: all respondents who declared purchasing online "always" belong to Generation Z or Millennials, whereas the few respondents who rarely shop online are from older age groups.

When evaluating the factors influencing online purchase decisions, product quality emerges as the most important element (mean = 4.30), followed by free shipping (mean = 4.24) and product price (mean = 4.21). Conversely, the company's environmental reputation ranks among the least influential factors (mean = 3.29), although with high variability, indicating heterogeneous attitudes toward sustainability. This pattern is consistent across age groups, except for Baby Boomers, who assign higher importance to environmental reputation (mean = 4.50).

Delivery preferences and sustainability in last-mile logistics. *Home delivery is by far the most frequently used delivery method (mean = 4.29), regardless of age. Alternative options such as pick-up points (mean = 2.34) and click-and-collect services (mean = 2.08) are used significantly less, despite their potential environmental benefits. This preference highlights a clear dominance of convenience over sustainability considerations in last-mile logistics choices.*

Regarding sustainable delivery practices, respondents attribute relatively high importance to order consolidation into a single shipment (mean = 4.13) and route optimization (mean = 4.02). Packaging-related initiatives, such as the use of recycled materials (mean = 4.02) and packaging reduction (mean = 3.82), are also positively evaluated. Conversely, delivery to parcel points to reduce traveled kilometers is considered less important (mean = 3.18), reflecting coherence with the widespread preference for home delivery.

Age-related differences emerge clearly: Baby Boomers consistently report higher average scores across all sustainable delivery practices, particularly route optimization (mean = 4.75), indicating greater environmental sensitivity compared to younger generations.

Return frequency and motivations. *Despite high online purchasing frequency, most respondents return products infrequently. Specifically, 64% declare that they return items "rarely", and only 4% report returning products "often" or "always". Younger consumers show slightly higher return frequency than older ones, although returns remain generally limited across all age groups.*

Women tend to return products more frequently than men, especially in the categories "often" and "always", while men are overrepresented among those who never return products.

The primary motivations for returning items are functional and product-related. The most relevant reason is receiving a damaged product (mean = 3.90), followed by incorrect delivery (mean = 3.48) and dissatisfaction with product quality (mean = 3.41). Opportunistic behaviors, such as returning products after finding a better price elsewhere or ordering items only to try them, are among the least important motivations (means below 2). These findings confirm that returns are largely driven by operational failures rather than strategic consumer behavior.

Older consumers, particularly Baby Boomers, attribute significantly higher importance to all return motivations, with extremely high scores for damaged products and need for repair (mean = 4.75), suggesting lower tolerance toward product defects.

Return policies and customer satisfaction

Return policies play a crucial role in shaping customer satisfaction and purchase decisions. Most respondents (57.2%) consider return conditions before completing an online purchase, highlighting the strategic relevance of transparent and customer-friendly policies.

The most important return policy attributes are full refund (mean = 4.66), free returns (mean = 4.61), and the possibility to return products online (mean = 4.33). These factors show very low variability, indicating strong consensus among consumers. Conversely, in-store returns (mean = 3.68) and the availability of a return label (mean = 3.94) are considered less critical.

A positive return experience strongly influences repurchase intentions: 88.8% of respondents state that they would purchase again from the same company after a satisfactory return process. This percentage is consistently high across genders, confirming the pivotal role of returns management in customer loyalty.

Awareness and evaluation of sustainable return practices. *Consumers' awareness of the environmental impact of returns is moderate and uneven. Only 38.4% declare full awareness, while 34.8% are partially aware and 26.8% are not aware at all. Awareness increases slightly with age, reaching 50% among Baby Boomers.*

Willingness to pay a higher price for sustainable return policies is limited and uncertain. While 30.4% of respondents are willing to pay more, 31.6% are not, and the largest group (38%) remains undecided. This uncertainty suggests insufficient knowledge about the environmental benefits of sustainable returns.

Nonetheless, almost half of the sample (46.8%) considers sustainable return practices "fairly important", and 10% consider them "very important". Younger consumers, especially Generation Z, show relatively higher sensitivity toward sustainability in returns. Among specific sustainable initiatives, packaging-related solutions receive the highest evaluations. Reusable packaging for returns (mean = 4.33), right-sized packaging (mean = 4.20), use of sustainable materials (mean = 4.19), and digital return labels (mean = 4.14) are the most appreciated practices. Conversely, peer-to-peer returns (mean = 3.26), refunds without returning the product (mean = 3.23), and returns without packaging (mean = 3.33) are perceived as less relevant.

Refurbished products and circular economy practices. *Half of the respondents (50.4%) are willing to purchase refurbished products originating from returns, while 27.6% remain uncertain and 22% are unwilling. Younger consumers show higher acceptance, whereas resistance increases with age. The main drivers of refurbished product adoption are price convenience (mean = 4.29), availability of all accessories (mean = 4.34), detailed information on product condition (mean = 4.34), warranty (mean = 4.26), and return possibility (mean = 4.15). Sustainability-related motivations, such as contribution to the circular economy, are considered moderately important (mean = 3.60), confirming that functional and risk-reduction factors prevail over environmental considerations.*

Research limitations. *Despite the contributions of this study, some limitations should be acknowledged. First, the composition of the sample represents a constraint, as the majority of respondents belong to Generation Z, while older age groups, particularly Baby Boomers, are underrepresented. This imbalance may limit the generalizability of the findings across different generational segments. Second, the sample size, although adequate for an exploratory analysis, does not allow for more advanced inferential or multivariate statistical techniques that could further strengthen causal interpretations. Third, the study relies on self-reported data, which may be affected by subjective biases and social desirability effects, particularly regarding sustainability-related perceptions. Finally, the analysis is based on descriptive statistics; future research could extend this work by employing larger and more balanced samples, longitudinal designs, or multivariate methods to further investigate the relationships between sustainable returns management, customer satisfaction, and behavioral intentions.*

Managerial implications. *From a managerial perspective, the results provide several actionable insights for e-commerce firms. First, companies should recognize that return policies and procedures represent a critical determinant of customer satisfaction and loyalty. The descriptive evidence suggests that satisfactory return experiences may support repurchase intentions, highlighting the importance of designing return processes that are simple, transparent, and reliable. Investments aimed at improving refund speed, clarity of procedures, and free return options are therefore likely to contribute positively to customer retention.*

Second, the findings suggest that sustainability initiatives in returns management should prioritize practices that are both environmentally effective and highly visible to consumers. Packaging-related solutions, such as reusable packaging, right-sized packaging, and the use of sustainable materials, emerge as particularly valued by customers. These initiatives not only contribute to reducing environmental impacts but are also easily perceived by consumers, increasing their potential to positively influence satisfaction and brand perception. Similarly, digital return labels represent a low-complexity intervention capable of delivering both environmental and experiential benefits.

Third, the results underline the importance of targeted communication strategies. The moderate and uneven level of consumer awareness regarding the environmental impact of returns indicates that many customers are not fully informed about the sustainability implications of their return behavior. Firms can address this gap by transparently communicating the environmental benefits of sustainable return practices, for example through dedicated sections on websites, during the return process, or via post-purchase communications. Improved awareness may enhance consumers' acceptance of sustainable solutions and reduce resistance to potential trade-offs.

Fourth, the evidence on refurbished products suggests the potential relevance of circular economy practices within returns management, although these findings should be interpreted with caution. While a substantial proportion of consumers express willingness to purchase refurbished products, uncertainty and perceived risk remain significant barriers. Moreover, prior literature shows that consumer perceptions of products derived from circular economy practices are often heterogeneous and context-dependent (Russo et al., 2019). Managers should therefore focus on risk-reduction mechanisms, such as warranties, certifications, detailed product condition information, and clear return options. In line with previous studies, these elements appear to play a relevant role alongside sustainability-related motivations, whose influence may vary depending on product category and perceived risk.

Finally, the observed differences across age groups suggest that a one-size-fits-all approach to sustainable returns management may be ineffective. Younger consumers tend to show higher sensitivity toward sustainability initiatives, whereas older consumers place greater emphasis on reliability, guarantees, and transparency. Managers may therefore

benefit from adopting differentiated strategies, tailoring communication and return solutions to specific target segments in order to balance sustainability goals with customer expectations.

Originality of the paper. *The originality of this paper lies in its integrated approach to reverse logistics in e-commerce, which jointly considers consumer behavior, service design, and environmental performance within the post-purchase phase. While existing studies have mainly examined operational efficiency or sustainability outcomes separately, this research positions reverse logistics as a customer-facing service experience, where environmental objectives and user acceptance are closely intertwined.*

By focusing on the post-purchase stage, the study addresses a critical yet underexplored moment in the customer journey, shedding light on how perceived effort, uncertainty, and risk shape consumers' willingness to engage with sustainable return solutions. In doing so, the paper explicitly conceptualizes the trade-off between sustainability and convenience, offering a theoretical framework that connects behavioral responses with service design choices.

Furthermore, by adopting a generational perspective centered on Millennials and Generation Z, the paper extends the literature on reverse logistics by highlighting the role of transparency, trust, and information quality in fostering sustainable behaviors among younger consumers.

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Slowing the loop: repair as a supply chain service or obligation?

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Abstract. *Central to the circular economy paradigm, repair represents a key strategy for delaying resource extraction and waste generation by "slowing" material flows and extending product lifecycles. This research investigates how firms can strategically design and communicate repair initiatives to encourage consumers to choose repair service over replacement. Drawing on Attribution Theory, we propose that internally driven repair strategies embedded in the supply chain configuration as a customer service are more effective in fostering consumer engagement than those positioned as compliance-driven responses to external pressures. This effect is expected to be particularly pronounced when repair services are delivered in-house, as internal service provision strengthens perceptions of service quality. Using a series of scenario-based experiments, this study contributes to the literature on circular supply chain management and the slowing loop debate, while also advancing research in service management. In doing so, it offers actionable managerial insights on how to structure and position repair initiatives to support circular economy objectives and consumer involvement.*
Keywords: *Product repair; Slowing the loop; Circular economy; Service; Experimental design*

Framing of the research. The circular economy (CE) has emerged as one of the most promising paradigms for redesigning business models in pursuit of sustainable development (Geissdoerfer et al., 2017; Ghisellini, Cialani, & Ulgiati, 2016; McPhail et al., 2022). It is widely regarded as a critical lever for achieving net-zero targets by 2050 (IEA, n.d.; Meseguer-Sánchez et al., 2021). Engaging in CE, however, requires capabilities that extend beyond incremental operational efficiencies. As Rovanto and Virtanen (2025) argue, firms must develop capabilities to slow resource loops—through reducing virgin material use, enhancing product durability, and promoting repair and refurbishment—and to close loops through recycling and energy recovery (Bocken et al., 2016; Kirchherr, Reike, & Hekkert, 2017). In line with the 4R hierarchy (reduce, reuse, recycle, recover), slowing resource loops should take precedence, as it directly addresses material throughput and resource intensity (Kirchherr et al., 2017). Unlike closing loops, which focus on end-of-life management, slowing loops entail systemic transformations in production and consumption patterns. In the slowing loop, the life of products can be extended through appropriate design for a longer lifespan or through life-prolonging procedures (Mrad et al., 2025).

The economic potential of the circular economy is substantial, with estimates suggesting up to $4.5 trillion in value creation by 2030 (Goldman Sachs, 2022). Central to this transition are business models that extend product lifespans through reuse, repair, regeneration, and recycling (European Commission, 2020). Among these strategies, repair plays a distinctive role: rather than reintroducing materials into the production cycle, repair delays resource extraction and waste generation, effectively "slowing down the loop" and extending products' life cycle (Bradley & Persson, 2022; Munten & Vanhamme, 2023).

Items that can be repaired are often thrown away. This results in 35 million tonnes of waste and 261 million tonnes of greenhouse gas emissions in the EU each year. The cost to consumers of replacing (rather than repairing) products is estimated at almost €12 billion per year (European Union, 2025). Ensuring product repairability has therefore become a cornerstone of sustainable consumption policy (Manwaring, 2024). Survey data indicate strong public support for repairability, with 79% of EU citizens advocating mandatory ease of repair and 77% preferring repair over replacement (European Parliament, 2022). In response, the European Commission's 2023 Proposal for a Right to Repair Directive introduces common EU rules aimed at strengthening consumer repair rights. The proposal includes obligations for manufacturers to repair certain product categories within reasonable time and cost conditions, ensure access to spare parts and repair information, provide loan replacements, extend liability periods after repair, and establish repair information platforms and financial incentives (European Commission, 2023; European Parliament, 2022). These measures signal a regulatory shift: repair is no longer solely a consumer responsibility but increasingly embedded within institutional and supply chain structures, which should be redesigned to offer the repair service as a strategy to prolong products' lifespan (Mrad et al., 2025; Roskladka et al., 2023).

Despite strong normative and policy support, repair practices remain constrained by significant barriers. Accessibility to repair services is often limited (Bridgens et al., 2018), and economic disincentives persist due to the relatively low price of new products, shortened product lifespans, complex designs, unavailable spare parts, and rising labor costs (Cooper & Salvia, 2018; Svensson-Hoglund et al., 2022). From an economic standpoint, repairing electronic household products may not always be rational despite environmental benefits (Bovea et al., 2017). Furthermore, consumer competence and confidence in repair are limited; only a minority reports prior experience repairing common household

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electronics (Hankammer et al., 2019). Time-related barriers and "mental depreciation" further diminish repair intentions as products age (Makov & Fitzpatrick, 2021).

At the same time, repair is not solely driven by economic logic. Altruistic and community-oriented motivations have been observed in grassroots repair initiatives such as Repair Cafés (Keiller & Charter, 2014; Terzioğlu, 2021), suggesting that repair can generate social and symbolic value beyond financial considerations. Legislative initiatives—such as France's repairability index, EU ecodesign standards, U.S. Federal Trade Commission enforcement, and local repair subsidies (Federal Trade Commission, 2021; Lechner et al., 2021; Right to Repair Europe, 2021)—further shape the institutional landscape of repair.

Nevertheless, research on repair behavior remains underdeveloped compared to studies on other circular economy strategies, such as recycling or remanufacturing (Roskladka et al., 2023), and mainly focuses on consumer "in-home" repair behavior rather than at producers' or retailers' places (Mrad et al., 2025). Although several brands across sectors—furniture (IKEA), luxury fashion (Louis Vuitton, Burberry), sportswear (Decathlon), and electronics (Apple, Samsung)—have invested in repair services, the effectiveness of these initiatives ultimately depends on consumer engagement (Godfrey, Price, & Lusch, 2022). Repair requires supply chain reconfiguration and after-sales integration, yet it may also enhance repurchase intentions, positive word-of-mouth, and customer loyalty (Mashhadi et al., 2016).

Right to repair: Toward a Product-Service-System. A crucial conceptual distinction emerges: should repair be framed as a producer duty within a sustainable paradigm, or as a service embedded within business models? Recent scholarship suggests that the European Right to Repair may function not only as a normative instrument but also as an infrastructural catalyst for service-based models, particularly Product-Service Systems (PSS), which structurally integrate maintenance and repair into their value proposition. Within such models, repair is shifted from an individual burden to a provider-managed function.

Rooted in access-based consumption (Bardhi & Eckhardt, 2012) and the functional economy (Mont, 2002), PSS redefine value creation by emphasizing performance over ownership. Consumer adoption of such models depends on perceived value, understood as the trade-off between benefits and sacrifices (Zeithaml, 1988). Benefits or gains may include economic savings, functional reliability, emotional reassurance, and symbolic alignment with sustainability (Sweeney & Soutar, 2001; Tukker, 2004; Kim & Hwang, 2021). However, PSS also entails multiple forms of perceived risk or losses—performance, financial, psychological, social, privacy-related, and dependency risks (Dowling & Staelin, 1994; Catulli, 2012; Lutz et al., 2017)—which may undermine adoption if not mitigated through trust (Mayer et al., 1995; Gefen et al., 2003; Chen & Chang, 2012).

From a behavioral standpoint, the well-documented intention–behavior gap (Ajzen, 1991; Sheeran, 2002) suggests that pro-repair attitudes alone are insufficient. Convenience—defined as the reduction of time and effort required for acquisition, use, and maintenance (Brown & McEnally, 1993; Berry et al., 2002)—becomes pivotal. By embedding maintenance, repair, and end-of-life management within contractual arrangements, PSS can reduce cognitive and physical burdens, potentially making sustainable behavior the most convenient option. Yet this transformation introduces new relational and systemic risks associated with service performance, loss of ownership, and data governance.

Purpose of the paper. This research seeks to answer the following question: ***"How can companies incentivize individuals to choose repair services for their products rather than purchasing new ones?"***

Specifically, we examine how firms should design and communicate repair initiatives, focusing on (1) producers' approach to repairability strategies based on service offering (internal driven) versus a law-oriented duty (external driven) and (2) supply chain configurations for repair service provision, comparing in-house versus externalized repair services, via online platforms (internal vs external).

Drawing on Attribution Theory (Kelley, 1973; Weiner, 1985), this paper argues that consumers evaluate corporate repair initiatives by inferring the underlying motives that drive such actions. Attribution theory suggests that individuals seek to determine whether an observed behavior is caused by internal dispositions or external situational pressures. In the context of repair strategies, when a company frames repair as an internally motivated service strategy, consumers are more likely to form dispositional attributions, interpreting the initiative as a reflection of the firm's intrinsic commitment to customer value and sustainability. In contrast, when repair is framed as compliance with external obligations or regulatory requirements, consumers are more likely to generate situational attributions, perceiving the initiative as driven primarily by external pressure rather than genuine organizational intent.

These differing attributional processes have important behavioral implications. Dispositional attributions, which signal authentic commitment and long-term orientation, are expected to foster more favorable consumer responses. Consequently, we posit that consumers will be more inclined to repair rather than replace a product when the repair strategy is framed as a proactive service offering rather than as a reactive form of duty compliance. Hence, the first hypothesis we aim to investigate is the following one:

H1. Consumers' willingness to repair rather than replace a product will be higher when the producer's repair strategy is framed as a service offering rather than as duty compliance.

Furthermore, the attribution process is expected to influence consumers' perceptions of service quality. When repair initiatives are interpreted as internally driven, the stronger commitment attributed to the company should enhance perceived service quality. In turn, higher perceived service quality is likely to strengthen consumers' engagement and

behavioral intentions toward repair. Thus, perceived service quality is proposed to function as an underlying psychological mechanism linking repair strategy framing to consumers' willingness to repair.

We posit that:

H2. Perceived service quality positively mediates the relationship between the producer's repair strategy and consumers' willingness to repair rather than replace the product.

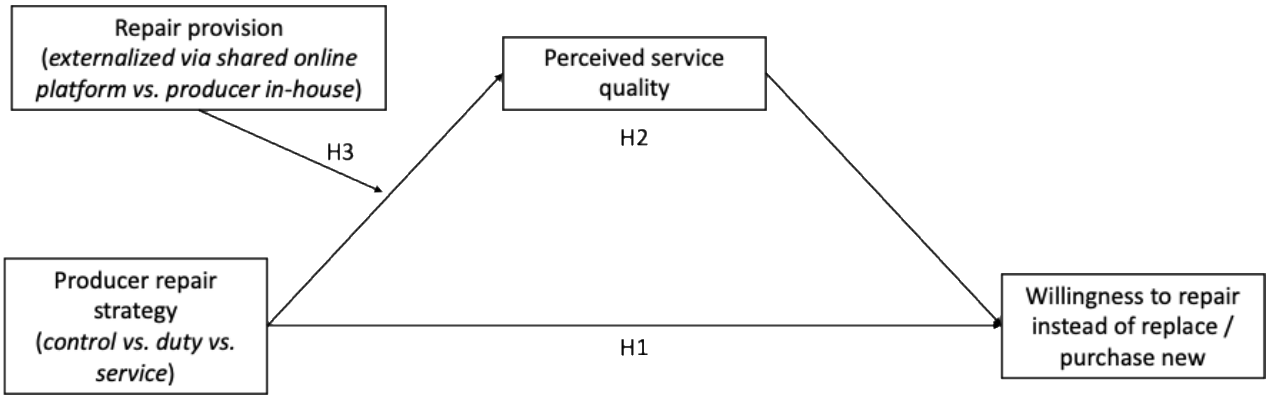
In addition, we propose that the configuration of the repair supply chain acts as a diagnostic cue that shapes consumers' attributional reasoning. Specifically, in-house repair provision may strengthen dispositional inferences by signaling organizational investment, control, and long-term commitment—consistent with Kelley's (1973) augmentation principle, whereby the presence of additional effort reinforces internal attributions. Conversely, externalized repair provision may introduce alternative explanations, such as cost efficiency or risk transfer, thereby weakening intrinsic motive attributions—consistent with the discounting principle.

Because dispositional attributions convey stability, authenticity, and genuine intent, they are expected to translate into stronger behavioral intentions toward repair. Accordingly, supply chain configuration should moderate the effect of repair strategy framing on perceived service quality. Hence, our last hypothesis reads as follows:

H3. Supply chain configuration for repair service provision positively moderates the relationship between the producer's repair strategy and perceived service quality, such that in-house repair provision strengthens the positive effect of repair-as-a-service framing on perceived service quality.

Figure 1 summarizes our hypotheses in a conceptual model.

Figure 1. Conceptual model.



Methodology. We test the causal relationship proposed in our conceptual model by using a series of between-subjects scenario-based survey experiments (Rungtusanatham et al., 2011). The methodology provides a valuable opportunity to investigate consumers' decision-making, in which varying versions of a scenario convey information about different levels of the manipulated variable to participants (Eckerd & Bendoly, 2011; Knemeyer & Naylor, 2011). It is particularly well-suited for isolating effects that are difficult to observe in noisy environments. Study 1 will employ a 3 (producer repair strategy: control vs. duty vs. service) x 1 full factorial between-subjects design to investigate the causal effects of producers' approaches to repair strategy on individuals' willingness to repair their product instead of replacing it. Study 2 will employ a 3 (producer repair strategy: control vs. duty vs. service) x 2 (repair provision: externalized via shared online platform vs. producer in-house) full factorial between-subjects design to investigate the moderating role of repair provision design. The industry sector will be electronics. Study 3 will validate the findings by testing the relationship in the field across different industry sectors, such as fashion and sports gear.

Data for the scenario-based survey experiments will be collected via the Prolific Academic crowdsourcing platform, where consumer participants will receive a flat compensation for their participation. The survey will be developed in Qualtrics. Before the main experiment, pretests will be conducted to ensure scenario realism and to conduct manipulation checks (Bachrach & Bendoly, 2011).

Beyond the variables and relationships specified in the conceptual model, additional constructs will be measured to capture individual personality traits and other relevant characteristics. These variables will allow for the examination of potential alternative explanations, serve as control variables, and help rule out competing accounts of the observed relationships. Incorporating these supplementary constructs will strengthen the internal validity of the study and provide a more comprehensive understanding of the mechanisms underlying the proposed model.

Expected results. We will test the hypothesized direct relationship using one-way ANOVA, while the mediating and moderating effects will be tested using the PROCESS macro for SPSS (Hayes, 2018). We expect the findings to suggest that positioning repair not as an obligation but as a well-structured, consumer-oriented service offering can significantly

enhance consumers' acceptance and engagement with this circular initiative. We expect this relationship to be explained by perceived service quality, which serves as a mediator, coherently with the attribution theory. Moreover, we expect the in-house repair provision to strengthen the effect of repair strategy positioning on perceived service level, such that the perceived service level will be higher when repair is offered as a service and the provision is internally offered by the producer.

Research limitations. This research is not without limitations. First, the study is currently in the early stages of design and development, which provides opportunities for further refinement prior to data collection. Second, the use of a scenario-based experimental methodology entails inherent limitations, particularly its reliance on measuring consumers' stated intentions rather than observed behavior. To mitigate these concerns, we plan to complement the scenario-based experiments with a field study aimed at assessing external validity and examining whether the findings generalize across different industry contexts. This additional step will strengthen the robustness of the results and enhance their practical relevance.

Managerial implications. From a managerial standpoint, this research offers practical insights into how firms can strategically design and communicate repair offerings to increase the likelihood that consumers will repair their products rather than replace them. Specifically, by shifting the narrative of repair strategy from moral obligation to value-creating service provision, the study seeks to clarify the organizational and communicative conditions under which slowing-loop supply chains can be successfully operationalized in pursuit of circular economy objectives. Moreover, the insights regarding repair service provision will inform managerial decisions about supply chain configurations. In particular, we expect the results to provide guidance on whether firms should internalize repair activities to signal commitment and service quality, or rely on external repair solutions facilitated through shared online platforms.

Originality of the paper. This ongoing research aims to contribute to the circular economy practices in the supply chain management literature by examining consumer participation in slowing-loop initiatives. It contributes to this literature in three main ways. First, it contributes to the literature on slowing-the-loop approaches by investigating different firm-side factors (i.e., producer repair strategy, repair provision, and product type) that affect the design of circular processes. Moreover, it extends the literature on the drivers of consumer participation in circular economy initiatives (Mrad et al., 2025; Terzioğlu et al., 2021). Second, it contributes to the literature on the strategic approach to circular economy initiatives, focusing on repair-as-a-service rather than a duty approach. Our findings will potentially extend and integrate the literature on service-based models, particularly Product-Service Systems, which structurally integrate maintenance and repair into companies' offerings. Third, it expands the literature on circular supply chain management by adopting a consumer-centric approach via an empirical investigation of our circular economy loop (Baldi et al., 2024). It then examines supply chain repair service configurations, extending the synergies between marketing and supply chain practices to enhance the effectiveness of circular supply chain initiatives.

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Unpacking Circular Supply Chains: A Systematic Review and Research Agenda of SCM Processes and Actors in Circularity

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Abstract. *Research on the circular economy (CE) in supply chain management has accelerated in recent years, driven by the increasing need to transition to circular supply chains. Supply chains have increasingly become complex as we move towards a circular supply chain, especially in an era of post-globalization and a multi-actor dependent economy. Existing reviews on the topic commonly organize evidence by practices (such as recycling, manufacturing) or sectors. This may obscure the logic of the loop being enabled (e.g., closing, slowing, narrowing), the core SCM processes being configured or those that still remain unconfigured, and which the actors in the supply chain (especially beyond the focal firms) drive or may constrain circular transition and outcomes. Thus, we propose to conduct a systematic literature review from a supply chain management perspective, treating the CE transition and circular supply chain management as an organizational and inter/intra-organizational transformation problem where firms must redesign the supply chain processes across multiple actors in the supply chain in order to reduce resource dependencies and to enable scalable circular loops. This short paper presents the preliminary findings from an ongoing systematic literature review that maps circular supply chain management (CSCM) studies across three core lenses (loops, processes, and actors). Using Scopus and Web of Science search databases, restricted to leading SCM/OM/logistics journals and a structured coding procedure, we identified a final sample of 166 papers (both empirical and conceptual papers) published till 2026. The preliminary results show a dominance of closing-loop strategies in closed-loop supply chain research, a methodological concentration in qualitative case studies and underexplored intersections clusters and will propose a process-oriented research agenda that will guide future empirical and managerial work.*
Keywords: *Circular economy*; *circular supply chain management; Circular economy loops actors; supply chain processes and governance; systematic literature review*

Framing of the research. The circular economy has become central in organizing processes and mechanisms for the grand challenge of sustainability transitions. CE rather than treating production and consumption as classically linear, it aims to keep products, components, materials, and other resources in use through multiple value retention loops, and thereby reducing virgin resource extraction and waste generation. Within supply chain management (SCM), this ambition has translated into growing attention to circular supply chain management (CSCM), closed-loop supply chains (CLSC), open-loop configurations (where recovered resources flow into different value chains), and emergent circular ecosystems (Farooque et al., 2019; Zhang et al., 2021). Early CLSC scholars provided a business oriented foundation for profitable value recovery and emphasized that this domain evolved from narrow operational problems to a recognized SCM subfield (Guide & Van Wassenhove, 2009). More recent work highlights that circularity is not limited to the dominant reverse logistics and that it requires redesigning the supply chain structures, the relationships, and decision processes across the product life cycle (Govindan & Hasanagic, 2018).

Despite these advances in literature, CSCM research still encounters a synthesis challenge. This is due to circularity being multifaceted, and reviews often group studies by specific practices (like recycling, remanufacturing, reverse logistics) (e.g., Mahmoudi & Parviziomran, 2020; Suzanne et al., 2020; Wang et al., 2017), specific sectors (such as food, apparel, electronics, and batteries) (e.g., Denizel & Schumm, 2024; Do et al., 2021; Zhu et al., 2025), or looking at drivers and barriers (e.g., Gebhardt et al., 2022; Govindan & Hasanagic, 2018). Although this approach helps organize a rapidly expanding CE field, it can also obscure the underlying loop logic that links circularity strategies to the relevant supply chain processes and actor configurations involved in this evolution. This short paper frames three main constitutive elements of CE in supply chain management: loop logic, SCM process reconfiguration, and multi-actor circularity; and uses them jointly as the organizing lenses (three-dimensional perspective) for the review.

On the Loop logic. The Loop logic is a widely used CE lens which distinguishes between: (1) close loops (e.g., take-back, remanufacturing, recycling), (2) slow loops (e.g., repair, refurbishment, aftermarket services, rental and product-service systems), and (3) narrow loops (e.g., reducing material intensity, increasing recycled content, process efficiency), (4) intensifying loops (intensive product usage, maximizing value from materials), (5) dematerializing loops (e.g., reducing physical products to reduce raw material use, software implementation and service systems as substitutes) (Bocken et al., 2016; Geissdoerfer et al., 2018). In reality, these CE strategies are not interchangeable because they carry different operational requirements and trade-offs in performance. For instance, closing loops tends to emphasize reverse flows, acquisition/sorting/disposition decisions, and recovery operations (Dukovska-Popovska et al., 2025; Batista et al.,

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2019; Sgarbossa & Russo, 2017). Slowing loops tend to depend on product durability, service design, and distributed repair or refurbishment networks (Gatenholm et al., 2021; Nilsson & Hazen, 2025). While narrowing loops appears to strongly rely on design for circularity, procurement of secondary inputs, and process innovations (Cozzolino & De Giovanni, 2023; Danvers et al., 2026).

The SCM processes reconfiguration. In order to make the loop choices systematically tractable within the SCM, Hazen et al. (2021) propose a process-based perspective and connect CE loops (e.g., closing, slowing, intensifying) with eight core SCM processes (supplier relationship management, customer relationship management, demand management, customer service management, order fulfillment, manufacturing flow management, product development and commercialization, and returns management) (Hazen et al., 2021; Lambert, 2008). This process view is valuable because it indicates that, in practice, circularity is not confined to a single SCM process, such as returns management, but that it can be enabled or constrained by more mainstream SCM processes, such as procurement, demand management, and product development.

The multi-actor nature of circularity. In reality, circular systems are rarely controlled by a single firm. These circular systems depend on multiple actor coordination among manufacturers, suppliers, customers/consumers, logistics service providers, repair networks, recyclers/manufacturers, intermediaries, digital platforms, public actors (such as policy makers and municipalities), and many others (Elnourani et al., 2026; Farooque et al., 2019). However, orientation towards the focal firm still remains very common in empirical papers (Dadsena et al., 2026; Hung Lau & Wang, 2009). Whenever they consider actor heterogeneity, they are mostly treated as context rather than as theoretical variables that shape circular outcomes through governance, incentives, legitimacy, standards, capacity building, and information sharing (Bressanelli et al., 2019; De Vass et al., 2023).

In the present systematic literature review, we map CSCM research simultaneously by (a) loop logic and configuration, (b) the SCM processes being reconfigured, and (c) the actors who enact, coordinate, or resist these changes. The remainder of this short paper will report the research aim, preliminary findings of our ongoing research from such a mapping, and propose an initial research agenda.

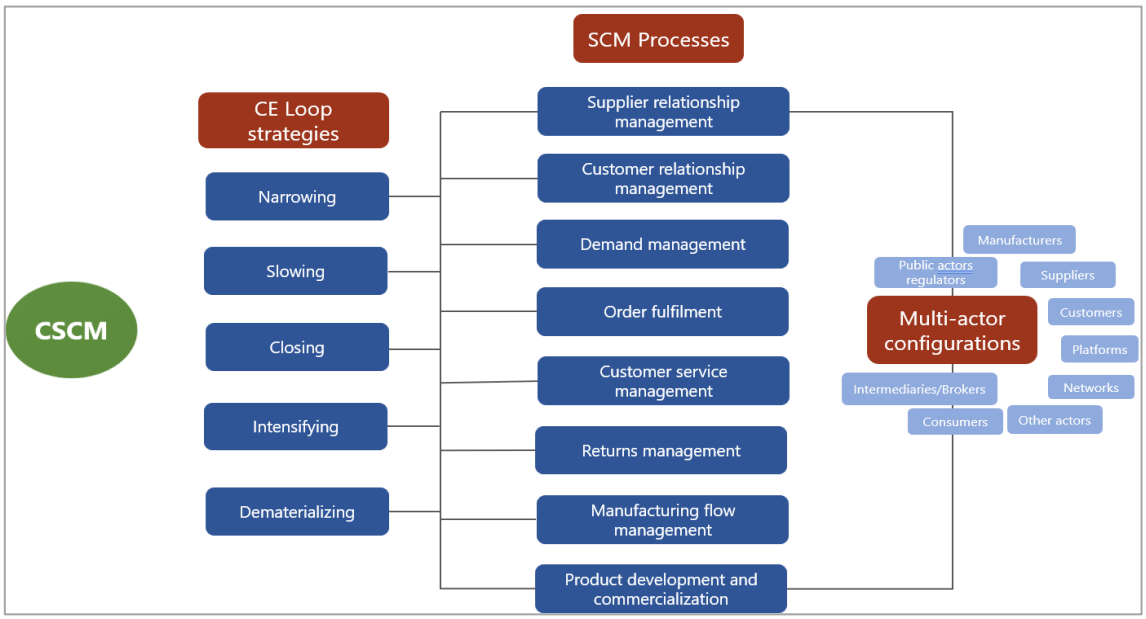
Working definitions of the CE loop logics used in this review (from Bocken et al., 2016; Geissdoerfer et al., 2018), with their potential associated SCM processes (from Lambert, 2008), are presented in Table 1. For further clarity, indicative practices and some exemplary studies have also been outlined.

Table 1. CE Loops and SCM Processes

CE Loop logic	Definition	Exemplar activities enabling CE loop	SCM processes potentially involved	Exemplar studies combining CE loops with SCM processes
Closing loops	Returning products, materials, or components back into the supply chain through recovery operations	Take-back, remanufacturing, recycling, sorting	Returns management, manufacturing flow management, supplier relationship management	Dukovska-Popovska et al. (2025); Batista et al. (2019); Insanic & Gadde (2014); Östlin et al. (2008)
Slowing loops	Extending the product life cycle and the product usage life cycle	Repair, refurbishment, aftermarket services, rental, and product-service systems	Customer service management, customer relationship management, product development & commercialization, order fulfilment	Gatenholm et al. (2021); Werner-Lewandowska et al. (2025); Nilsson & Hazen (2025)
Narrowing loops	Reducing material or resource intensity in production and consumption	Increasing recycled content in products, redesign of packages and products, and process efficiency	Product development & commercialization, manufacturing flow management, supplier relationship management	Cozzolino & De Giovanni (2023); Danvers et al. (2026); Field & Sroufe (2007)
Intensifying loops	The more intensive use of products or assets in order to get the maximum value	Enabling sharing or access models, resource pooling, and rental models	Demand management, customer relationship management, order fulfillment	Nilsson & Hazen (2025); Laukkanen et al. (2026)
Dematerializing loops	Reducing physical products or components in products through digital or software substitution	Software implementation and service systems, digital traceability infrastructures	Customer relationship management, product development & commercialization	Do & Stevenson (2026)

An overview of the conceptual framework for mapping CSCM research is shown below (Figure 1). Circular economy loops are expected to be applied within different SCM processes that involve different actors/actor.

Figure 1: Preliminary conceptual framework



Source: Extended from Hazen, B. T., Russo, I., Confente, I., & Pellathy, D. (2021). Supply chain management for circular economy: conceptual framework and research agenda. The International Journal of Logistics Management, 32(2), p. 527

Purpose of the paper. The ongoing literature review aims to describe the evolution of the CSCM research field across leading SCM/OM/logistics journals in terms of methodological and theoretical profiles, and to offer a preliminary overview of thematic clusters in the literature. Moreover, the research aims at presenting a synthesizing framework organized by loop type, SCM process, and actor, and to identify underexplored research areas and translate them into a structured research agenda.

In accordance with this purpose, the review aims to address the following research questions:

RQ1: Which themes are most frequently investigated and what research methods and theoretical lenses are most frequently adopted?

RQ2: Which circular economy loop types (closing, slowing, narrowing, intensifying, dematerializing), SCM processes reconfiguration, and actors dominate the CSCM research?

RQ3: What future research opportunities emerge from the gaps identified in the existing CSCM literature?

These research questions guide this ongoing systematic literature review.

Methodology. The systematic review process follows established SCM and operations systematic literature review guidelines (Denyer & Tranfield, 2009; Durach et al., 2017; Tranfield et al., 2003). Consistent with these guidelines, we structured the review in four steps: (i) framing our review and research questions, (ii) locating the studies through database searching, (iii) screening and eligibility assessment, and (iv) analysis and synthesis through structured coding (Seuring & Gold, 2012).

In the second step of locating the studies, we conducted searches in Scopus and the Web of Science Core Collection database. The search string combined CE and circularity terms with SCM and logistics terms. In order to ensure disciplinary comparability, the search was restricted to a predefined list of 15 core SCM and logistics journals: Journal of Supply Chain Management; Journal of Business Logistics; International Journal of Logistics Management; International Journal of Production Research; Journal of Purchasing and Supply Management; International Journal of Operations and Production Management; Journal of Operations Management; International Journal of Physical Distribution and Logistics Management; Supply Chain Management; Transportation Research Part E: Logistics and Transportation Review; European Journal of Operational Research; Production and Operations Management; International Journal of Production Economics; Decision Sciences; Operations Research.

After the journal restriction, the search was conducted applying the abstract and keywords search query using: ("circular economy" OR "circular*" OR "closed*loop" OR recycl* OR repair* OR reus* OR refurbish* OR remanufactur* OR recover*) AND ("supply chain*" OR "supply chain management" OR "SCM" OR logistics OR operations OR procurement OR manufacturing). The search was run across all published papers through February 2026 in order to capture a comprehensive representation of CLSC work. The results were then limited to peer-reviewed articles, and we excluded papers such as editorials, conference papers, and commentaries. This resulted in 2091 articles from Scopus and 2321 from Web of Science Core Collection. After removing all the duplicates, the first sample comprised 2663 articles.

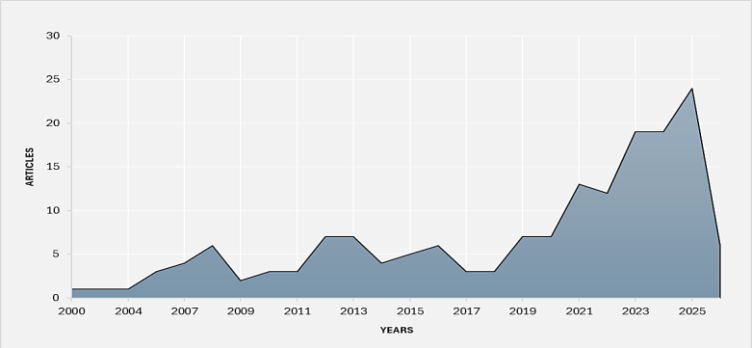
For the third step, several screening processes were conducted on each of the articles to ensure they fit with the purpose of the research. The first process involved title and abstract screening, which resulted in 353 papers. The second screening process involved a full-text screening that was conducted on the remaining articles to ensure suitability and a relevant scope for the review. The inclusion criteria applied for the screening were: first, papers must engage substantively with CE-related circularity (not just using its elements as a background), and secondly, the papers must address SCM, its decisions, relationships, or processes. The exclusion criteria removed purely technical optimization or algorithm studies, studies that were outside SCM, and conceptual papers outside the scope of CSCM were also excluded. After the second screening process, the final sample resulted in 166 papers, consisting of 32 conceptual papers and 134 empirical papers.

The fourth step of coding and synthesis involved coding the papers involved capturing bibliographic information (year and journals), methods (e.g., case study and surveys), and stated theoretical lens. The content coding will focus on primary variables strictly related to CSCM, including the loop types, the SCM process, actors involved, and the themes that emerge. This coding scheme will be refined during preliminary coding to ensure clarity and consistency. The results of the bibliographic information and preliminary findings of this ongoing work are reported in the following section.

Preliminary Results. Initial descriptive patterns of our final sample are presented along with a preliminary summary and findings.

Overview of descriptive patterns. From Figure 2, the annual trend of publications is presented (from 2000 to February 2026). The sample shows a strong growth over time, with a significant increase after 2019, which is consistent with the sure of CE as a strategic and policy priority. Despite the sharp growth, the annual publication of CSCM-related studies stays below 30. The top 5 journals in which the articles were published included International Journal of Production Economics, International Journal of Logistics Management, International Journal of Production Research, Journal of Purchasing and Supply Management, and International Journal of Physical Distribution and Logistics Management.

Figure 2. Annual publications



Additionally, the main research methods applied in the articles were identified and grouped accordingly. The other category emerged from papers that used methods such as conceptual discussions with empirical illustrations, secondary use of the grey-DEMATEL technique. The findings are summarized in Table 2. Case studies account for 40.7% of the research methods used in our final sample and are the most dominant (especially qualitative case studies). This is followed by survey-based studies (often analyzed via SEM) and mixed-methods designs. Archival/secondary data studies (analyzing, for instance, national databases and sustainability reports) are also frequent in the final sample, accounting for 10.4%.

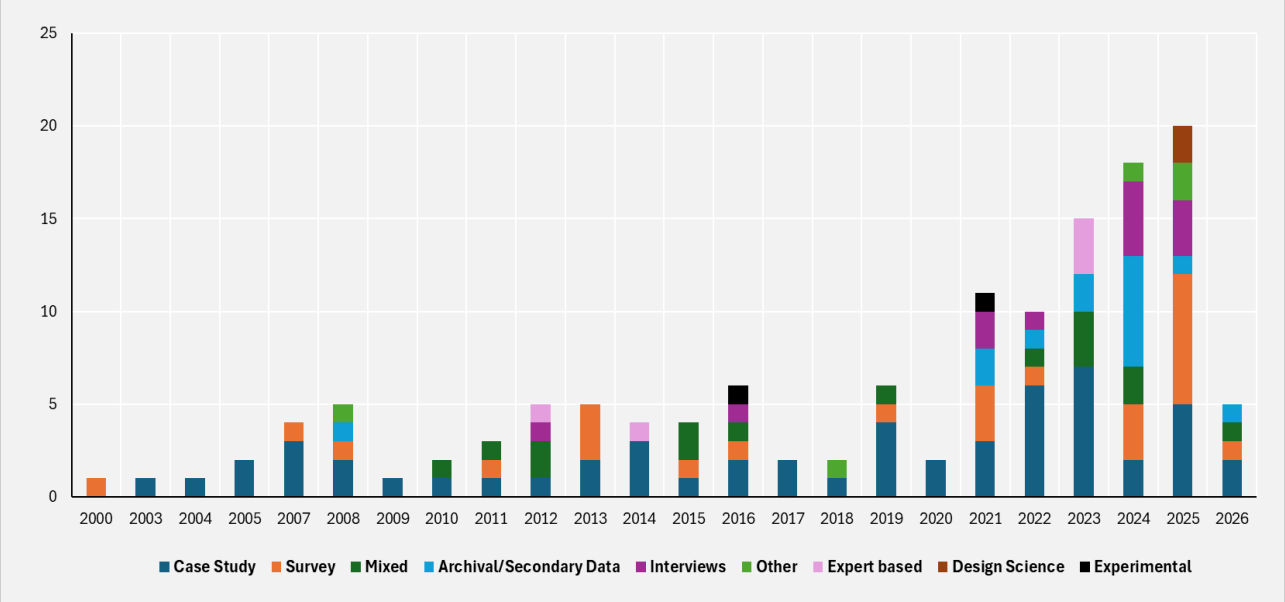
Table 2. Frequency of research methods applied

Methods	Frequency	%
Case Study	55	40.7
Survey	25	18.5
Mixed	15	11.1
Archival/Secondary Data	14	10.4
Interviews	12	8.9
Expert based	5	3.7
Other	5	3.7
Experimental	2	1.5
Design Science	2	1.5
Total	**135**	**100**

Figure 3 below provides insights into trends in the research methods used over the years, from 2000 to 2026. Case studies have remained the dominant research method, especially before 2011 with limited evidence of surveys and other

methods, and this reflects the exploratory nature of early CSCM research. After 2010, publications increased modestly and the research methods also began to widen. We observe that mixed methods and secondary data approaches started to appear more frequently, and a notable transition occurred after 2019, where there were sharp increases in annual publications and a more balanced portfolio of research methods. Although case studies remained the backbone, surveys have expanded significantly and archival/secondary data studies become more visible, especially from 2023 onwards. In addition, most of the research methods, such as interview focused studies and expert based research methods, that were largely absent in earlier years have become more noticeable in the most recent years (from 2012). Experimental and design science methods appear only from 2016 and sporadically. The chart indicates that although case studies (especially qualitative case research) continue to dominate, CSCM field is progressing toward more methodological pluralism with surveys and archival studies gaining momentum. Furthermore, newer approaches, such as design science and experimental, are beginning to enter the mainstream.

Figure 3. Research methods used over the years



Theoretical lenses. The theory use is uneven in the sample. A total of 34 theories were found, with a total frequency count of 76. Table 3 presents the top 10 theories that were used across our final sample. Among the papers that explicitly stated a theoretical lens, the frequently used theories include the resource-based view (RBV)/natural resource-based view (NRBV), which together account for 11.3%, followed by the dynamic capabilities theory, institutional theory, and the contingency theory. Additionally, some papers applied two or more theories in their studies.

Table 3. Top 10 theories used

Theory	Frequency	Percentage
Dynamic capabilities theory	8	10.7
Institutional theory	8	10.7
Contingency theory	7	9.3
Resource dependence theory	5	6.7
Resource-based view	5	6.7
Stakeholder theory	5	6.7
Natural resource-based view	4	5.3
Theory of planned behavior	4	5.3
Relational view theory	2	2.7
Signaling theory	2	2.7
Total (top 10)	**50**	**66.7**

Preliminary findings on the three-dimensional perspective. Preliminary coding shows that closing loops dominates the CSCM research, which is consistent with the historical trajectory of CLSC research (Guide & Van Wassenhove, 2009). Studies have investigated return flows, acquisition and sorting challenges, and relationship structures for collecting cores (e.g., Insanic & Gadde, 2014; Östlin et al., 2008). On the other hand, there is less research on slowing loops as phenomena such as repair and refurbishment appear less frequently and are often studied as standalone phenomena, and this suggests

an emerging but fragmented stream in CSCM (Gatenholm et al., 2021; Golinska-Dawson et al., 2025; Nilsson & Hazen, 2025). Another visible loop is narrowing loops, but studies on it tend to be concentrated in very specific contexts, such as materials packaging redesign, material efficiency, and integration of recycled content (e.g., Cozzolino & De Giovanni, 2023; Danvers et al., 2026).

Also, most upstream and downstream processes mapped by Hazen et al. (2021) are less consistently examined as circularity measures. And when these upstream and downstream processes, such as customer service management and customer supplier relationship management, do appear, they are mostly treated as supporting elements (such as collaboration, information sharing and standards) rather than as the main object of analysis, although recent papers have begun to address them explicitly (e.g., Elnourani et al., 2026; Laukkanen et al., 2026). Additionally, there is a domination of focal firms and dyadic perspectives, with multi-actor configurations being less systematically theorized. Intermediaries and platforms are slowly emerging as actors that play a role in CSCM (e.g., Do & Stevenson, 2025; Ratsimandresey & Miemczyk, 2024; Shi & Zhu, 2024). Public actors appear in many papers as regulatory pressures or infrastructural constraints, but very few studies examine the micro-mechanisms through which they co-design circular systems (e.g., Atasu & VanWassenhove, 2012; Rahman & Subramanian, 2012). These perspectives will be further coded and synthesized and will result in a final framework.

Preliminary thematic clusters. A set of thematic clusters are expected to emerge from the ongoing synthesis. From a preliminary reading of the existing research, we expect that there will be clusters which include intersection among closed-loop with returns management practices and partners such as collectors/remanufacturers/recovery partners. Another expected cluster may capture slowing loops with customer service processes and different actors involved, such as retailers and consumers. Additionally, an expected cluster may focus on narrowing loops. Additionally, an expected cluster may focus on narrowing loops with product development/redesign and procurement processes, and actors such as suppliers of recycled packaging and regulatory agencies to ensure compliance.
The clusters that would emerge after the full coding and synthesis will allow us to systematically compare where CSCM research is concentrated across the different loops, SCM processes, and actor configurations. Lastly, they will pinpoint the most underexplored clusters and combinations to inform a framework and a future research agenda.

Research limitations. This paper is a work-in-progress and thus presents preliminary findings. The corpus has been finalized through screening; however, the comprehensive coding of all texts is ongoing. The distribution and cluster boundaries will be further refined. Additionally, restricting the sample to a core journal list strengthens disciplinary coherence, nonetheless, it may underrepresent related circularity research within engineering and environmental domains. The exclusion of studies focused solely on algorithms or optimization aligns with our intended syntheses, though this may omit operational insights that are relevant for specific recovery and remanufacturing challenges. Lastly, the classification of theories is limited to what the authors explicitly state, and we acknowledge that some papers may implicitly employ theoretical assumptions without explicitly labelling them.

Managerial implications. For practitioners, our proposed three-dimensional perspective (loops*process*actors) helps avoid a narrow approach to circularity. Managers can use the synthesizing framework we expect to propose to make explicit which loop strategy is prioritized, to align the SCM processes that must change, and to anticipate which actors must be engaged and governed (for instance, platforms, intermediaries, and consumers). The implications underscore that circularity is a supply chain design and governance challenge, and that it requires decisions about which loops to enable, which processes need to be reconfigured, and which actors must be mobilized in order to make these changes happen and be durable.

Originality of the paper. This ongoing research contributes a process-oriented and actor-aware framing for CSCM, which to our best knowledge remains scarce. While prior studies synthesize practices or sectors, our approach explicitly maps the literature across circular loop types, core SCM processes, and actor configurations. The full review will provide a consolidated coding scheme usable by researchers in the field, an evidence-based identification of underexplored loop-process-actor combinations. Lastly, it will provide a research agenda oriented towards theory building and empirically testable propositions that can inform both scholarship and circular transition practice.

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Società Italiana di MANAGEMENT

Short papers

Track: Sustainability



A conceptual framework for assessing HSE culture within the client-contractor relationship

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Abstract. *In recent decades, contracting arrangements have become increasingly widespread across industries, yet their growing use has also introduced significant health, safety, and environmental (HSE) challenges due to the complexity of managing risks across organizational boundaries. In such settings, the role of the client organization extends beyond formal monitoring and contractual control, encompassing the need to actively shape relationships with contractors and to influence the development of a shared HSE culture. However, despite the recognized importance of HSE culture in improving safety performance, previous research has provided limited insight into the specific dimensions through which HSE culture is formed, enacted, and systematically assessed within client-contractor relationships. To address this gap, this study develops a conceptual framework for assessing HSE culture in client-contractor settings. The framework is developed through an action research approach within the HSE Lab, a collaborative initiative between industry and academia aimed at co-designing and testing innovative tools to strengthen HSE management capabilities. The development process integrates a systematic review of academic and grey literature with iterative consultations involving HSE experts and practitioners from participating companies. The resulting framework conceptualizes HSE culture as a multidimensional construct composed of six interrelated dimensions (i.e., coordination and control; communication and engagement; HSE management system; anomaly management; work pressure; training and competence). It further embeds a processual perspective, capturing how HSE culture evolves across the different phases of the client-contractor relationship (i.e., before, during, and after service execution). In addition, the framework emphasizes HSE culture as a shared responsibility between the client organization and contractors. Although the framework has not yet been empirically validated in operational contexts, it provides a structured foundation for the development of practical assessment tools. By enabling a systematic understanding of HSE culture across organizational boundaries, the study contributes to both theory and practice, supporting more effective, process-oriented, and culturally informed contractor management.*

Keywords: *Client organization; Contractors; HSE culture; Framework*

Framing of the research. *In recent decades, the use of contracting arrangements, i.e., defined as situations in which an organization outsources specific activities or services to external companies through formal contractual agreements, has expanded significantly across many industries (Nunes 2012). This trend is driven by several factors, including organizations' focus on core business activities, the need to access specialized expertise and equipment, the flexibility required to address temporary operational needs and market fluctuations, cost efficiency considerations, the externalization of less profitable or more hazardous activities, and the opportunity to leverage local knowledge when operating in specific geographical contexts (Alary 2006; Manu et al. 2009).*

However, while contracting arrangements can provide important organizational and economic advantages, they also introduce some managerial and operational challenges. The involvement of multiple contractors within the same operational environment increases the complexity of coordination and oversight (Alary 2006; Dale et al. 2020). Contractors often bring their own operational practices, processes, and risk profiles, which interact with those of the client organization and other contractors operating on the same site (Bahn 2012). Managing such complex arrangements is further complicated by the structure of contracting networks: contractors may not be clearly identified, sometimes they provide services intermittently, and operate with limited visibility (Alary 2006). This fragmentation can make it difficult for client organizations to maintain a comprehensive overview of contractor activities and may lead to duplication of monitoring efforts in order to ensure adequate service quality and compliance with organizational requirements (Alary 2006).

These challenges become particularly critical when considering health, safety, and environmental (HSE) issues (Lingard and Oswald 2020; Todaro et al., 2023), due to several reasons. Contractual arrangements often rely on payment systems linked to the completion of specific tasks rather than the time spent performing them (Manu et al. 2009). As a result, contractors may face strong incentives to complete work as quickly as possible, sometimes leading to excessive working hours or the reduction of safety precautions when these are perceived as slowing down production (Manu et al.

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2009; Lingard and Oswald 2020). Contractors' employees usually work in unfamiliar situations and may be exposed to unknown hazards (Nunes 2012). The involvement of smaller firms within subcontracting chains can create resource constraints, limiting the ability of some contractors to invest in adequate HSE management systems (Dale et al. 2020; Dale et al. 2021). Moreover, complex contracting arrangements may generate ambiguity regarding roles and responsibilities for HSE management, particularly when multiple organizations operate simultaneously on the same site (Manu et al. 2009; Nunes 2012). Fragmented communication, limited collaboration among contractors, and differences in safety culture between the client organization and contractors can further complicate the effective management of HSE risks (Manu et al. 2009).

As the entity that finances and commissions the project, the client organization occupies a strategic position that enables it to influence the commitment of contractors toward HSE (Lingard et al. 2020). By defining key project requirements (e.g., schedule, budget, and performance expectations), the client organization establishes operational constraints that can directly affect both occupational HSE conditions and the occurrence of safety incidents (Smallwood 2017; Harvey et al. 2018). For this reason, the client organization should assume greater responsibility for HSE in the projects it procures (Winkler 2006; Smallwood 2017). Indeed, a careless or indifferent attitude by the client organization can negatively influence safety standards across all organizations involved in the project (Lingard et al. 2020). Conversely, active client involvement is associated with improved HSE performance: when the client organization demonstrates genuine interest and concern for HSE issues, contractors are more likely to maintain high standards, even if only to meet client expectations (Wu et al., 2015; Lingard et al. 2020).

The client organization's influence can manifest across multiple phases of the relationship with contractors. In the early stages, such as prequalification and contractor selection, the client organization can contribute to risk prevention by selecting contractors with strong safety records, verifying technical competence, and ensuring adequate resources for safety management (Nunes 2012; Abdul Razak et al., 2021; Umeokafor, 2017). Contractor evaluation may combine lagging indicators, which measure outcomes of past events (e.g., injuries or fatalities), and leading indicators, which capture proactive elements of safety management that can signal potential weaknesses before accidents occur (Liang et al., 2018). The client organization may also include service-specific HSE annexes in contractual agreements to clearly define requirements and expectations (Alary, 2006). Finally, the client organization can conduct analyses of contractors' capabilities or plan activities in advance (Karakhan et al. 2018). During later phases of the relationship, the client organization can classify contracted services according to risk level, prioritize control measures, and implement standardized audits to monitor contractors' compliance and performance (Alary, 2006). In addition, the client organization may require specific HSE procedures, define safety objectives, provide guidelines, and promote the integration of HSE considerations throughout operational activities (Umeokafor, 2017). In these activities, both output and process controls can be used. Output controls involve defining performance targets, such as injury or incident frequency rates, and monitoring contractors' achievement of these targets (Lingard et al. 2020). Instead, process controls involve direct intervention in organizational practices by specifying the procedures and management systems contractors must adopt to achieve project objectives (Eriksson and Laan, 2007).

However, the effectiveness of control mechanisms is limited if they are not complemented by activities that promote trust, collaboration, and a shared commitment to HSE (Lingard et al. 2020; Umeokafor 2017). The client organization seeking to influence HSE performance must operate across organizational boundaries, foster collaborative relationships with contractors, and influence their employees' safety-related behaviors (Lingard and Oswald 2020; Lingard et al. 2020; Ajayi et al. 2022). To this end, the client organization can engage in relationship-building activities (Lingard et al. 2020; Umeokafor 2017) and support the development of contractors' HSE management systems (Dale et al. 2021). In addition, the client organization can intervene at the level of HSE culture, defined as the shared perceptions of workers regarding safety policies, procedures, and practices within an organization at a given point in time (Zohar 2003; Casey et al. 2017). Previous research highlights the role of HSE culture in improving both HSE management and performance in contractor-based projects (Wu et al. 2012; Zhang and Chen 2015; Dale et al. 2020). In particular, the client organization's HSE culture has been found to have an indirect positive effect on overall project HSE performance, mediated through the HSE performance of contractors (Musonda et al. 2012).

Overall, the literature suggests that the client organization's role extends beyond formal oversight; it is central not only to shaping a positive HSE culture within the client-contractor relationship but also to actively promoting and sustaining it. By collaborating closely with contractors, the client organization can cultivate an HSE culture that permeates all levels of contractor operations while simultaneously strengthening HSE practices within both the contractors and the client organization itself.

Purpose of the paper. *Managing HSE in contractor-based and multi-actor settings remains a critical challenge, as recurring and interrelated issues (e.g., fragmented responsibilities, heterogeneous practices, and coordination difficulties) increase the likelihood of ambiguity, unsafe behaviors, and inadequate risk control. These challenges are particularly relevant because contractors' HSE practices directly affect not only project-level safety outcomes but also the overall performance and risk exposure of the client organization. In response, prior research has emphasized the need to move beyond compliance-based approaches toward more integrated and proactive forms of HSE management, highlighting the importance of interactions, coordination, and alignment of behaviors across organizational boundaries. Within this perspective, HSE culture has been increasingly recognized as a key lever for improving HSE performance in contractor-based projects (Wu et al., 2012; Zhang and Chen, 2015; Dale et al., 2020).*

However, despite this growing recognition, existing research has paid limited attention to how HSE culture can be systematically understood, assessed, and managed within the client-contractor relationship. In particular, there is still a lack of conceptual and operational frameworks that identify the key dimensions through which HSE culture manifests across organizational boundaries and that support organizations in actively strengthening it. This represents both a research gap and a managerial gap, as client organizations currently lack structured tools to evaluate and improve their ability to influence HSE culture beyond their own organizational boundaries.

Against this background, the purpose of this study is to advance the understanding of HSE culture in client-contractor settings by identifying its key dimensions and developing a structured framework to support its assessment and management. The resulting framework is designed to capture both the perceptions of the client organization and those of contractors, enabling a comprehensive evaluation of how HSE culture is promoted, perceived, and enacted across organizational boundaries. In doing so, the study provides a foundation for the development of practical tools aimed at strengthening HSE practices throughout the project supply chain.

Methodology. *This study adopts an action research approach, as it is particularly suitable for investigating complex, practice-based phenomena that unfold across organizational boundaries and require close interaction between researchers and practitioners. In the present study, the aim is not only to conceptualize HSE culture in the client-contractor relationship but also to ground this conceptualization in real organizational practices and challenges. Action research is therefore appropriate as it enables the co-development of context-sensitive knowledge while simultaneously addressing a relevant managerial problem, namely, how to understand and strengthen HSE culture across organizational boundaries (Bradbury, 2015; Brydon-Miller & Coghlan, 2014).*

To ensure methodological rigor, the study was designed in line with the four key elements of action research identified by Shani and Pasmore (2016):

1. *Context is critical because action research generates localized theory through localized action. Understanding the context in which action takes place (e.g., external business and social environment, internal organizational setting) is therefore essential;*
2. *Quality of relationships represents a fundamental condition for effective action research. Productive collaboration between researchers and practitioners depends on various factors, such as the development of trust, open dialogue, and a shared language;*
3. *Quality of the action research process concerns the integration of action and inquiry. The research process should be both rigorous and reflective, enabling participants to engage in systematic analysis while simultaneously addressing practical organizational challenges. This process supports the development of deeper understanding and meaning around the issues under investigation;*
4. *Outcomes represent a defining feature of action research, which includes improved organizational practices, the development of capabilities, and the generation of new knowledge.*

These four key elements of action research were explicitly operationalized in this research setting.

First, context was addressed by embedding the study within the Health, Safety and Environment Laboratory (HSE Lab), a collaborative initiative between companies and academia aimed at co-designing, developing, and testing innovative approaches and tools to strengthen organizations' managerial and organizational capabilities in addressing HSE challenges. The HSE Lab involves 37 HSE practitioners, mainly middle- and senior-level managers, from 16 large Italian companies operating across different economic sectors and frequently relying on contractors in their operational activities. This setting provided access to diverse organizational contexts characterized by complex contractor networks, allowing the framework to capture challenges and practices that are common across industries while remaining grounded in real-world conditions.

Second, the quality of relationships was actively fostered through sustained interaction between researchers and practitioners over time. Rather than assuming trust as a given, the research design relied on repeated engagement through formal workshops, joint discussions, and iterative feedback sessions. The long-term participation of several companies (some involved since the establishment in 2017) facilitated the progressive development of trust, a shared language around HSE issues, and openness in discussing critical practices and challenges. This relational continuity enabled participants to provide candid insights and contributed to the depth and reliability of the data collected.

Third, the quality of the action research process was ensured through a structured and iterative combination of data collection and analysis activities. The study followed three main steps.

- *(i) A literature review was conducted using the Web of Science database with keywords such as "HSE", "safety culture", "safety climate", "supply chain", and "contractors". This search resulted in 18 relevant academic contributions, which were complemented by eight documents from the grey literature, including reports and guidelines produced by governmental organizations, consulting bodies, and industrial associations (e.g., the European Agency for Safety and Health at Work, Health and Safety Executive). These sources were used to identify initial themes and dimensions related to HSE culture in multi-actor settings.*
- *(ii) To integrate and contextualize these insights, five HSE experts (i.e., HSE consultants and specialists from companies participating in the HSE Lab) were interviewed for a total of 2.5 hours. The interviews were semi-structured and focused on identifying critical factors influencing HSE culture in client-contractor relationships, as well as practical challenges in managing such relationships.*

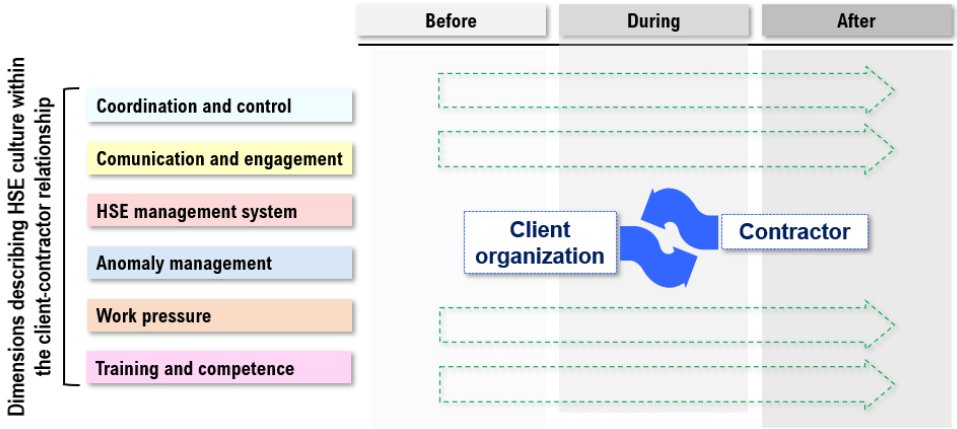
(iii) The collected materials (literature and interview transcripts) were analyzed to identify recurring themes and clustering them into conceptual dimensions. This process led to the identification of 12 preliminary dimensions, i.e., evaluation and control, coordination and cooperation, communication, engagement, awareness, HSE management system, documentation system, complexity management, anomaly management, work pressure, training and competence, and work stability and continuity.

These dimensions were then refined through a validation phase involving a second consultation with seven HSE experts and further discussions within the HSE Lab. During this phase, participants were asked to assess the relevance, clarity, and completeness of each dimension, as well as to identify potential overlaps. Based on this feedback, some dimensions were merged and redefined.

Finally, outcomes were ensured by producing both theoretical and practical contributions. The main outcome of the research is a conceptual framework that integrates multiple dimensions of HSE culture within the relationship between client organizations and contractors, and considers their evolution across different phases of the client-contractor relationship. At the same time, the framework provides the basis for the development of operational tools to support organizations in assessing and improving HSE culture in practice. The resulting framework is presented in the Results section.

Results. *The preliminary framework for assessing HSE culture within the client-contractor relationship is presented in Fig 1.*

Fig 1. Framework describing the relationship between client organizations and contractors



Source: Our elaboration

The framework is characterized by three main elements.

First, the HSE culture within the client-contractor relationship is conceptualized as a multidimensional construct. This approach acknowledges the inherent complexity of managing HSE across organizational boundaries and recognizes that multiple dimensions interact to collectively influence HSE performance. For this reason, six dimensions are identified to capture the various manifestations of a positive HSE culture in the client-contractor relationship (Table 1). These dimensions regard coordination and control mechanisms, communication and engagement processes, the effectiveness of HSE management systems, the management of anomalies, work pressure, and the development of training and competencies.

Second, the framework highlights the temporal dimension of the client-contractor relationship, suggesting that a positive HSE culture develops throughout the entire lifecycle of the relationship. In particular, three main phases are identified. The "before" phase includes activities and practices that characterize the preliminary relationship between the client organization and the contractor prior to the start of the work, such as supplier qualification processes, the definition of tender criteria, the inclusion of HSE clauses and technical specifications in contracts, and preliminary controls. The "during" phase refers to the manifestations of HSE culture during the execution of the service, including monitoring activities, training initiatives, awareness-raising actions, and coordination among the different actors involved in the operational process. The "after" phase concerns the manifestations of a positive HSE culture following the completion of the service and the conclusion of the contractual relationship, such as post-project feedback, final evaluation reports, recognition of good performance, and the development of long-term partnerships.

Finally, the framework emphasizes that HSE culture should be understood as a shared responsibility between the client organization and contractors. In contractor-based settings, HSE outcomes are not determined solely by the actions of a single organization *but emerge from the interactions, coordination mechanisms, and shared practices established between the parties. For this reason, both the client organization and contractors are expected to actively cooperate in promoting safe and environmentally responsible practices, each contributing according to their respective roles,*

responsibilities, and competencies. Through continuous collaboration, both parties can strengthen HSE culture across organizational boundaries and contribute to improving overall HSE performance.

Tab 1. Dimensions *describing HSE culture* within the client-contractor relationship

Dimension	Description
Coordination and control	This dimension assesses the quality and effectiveness of the evaluation, control, and monitoring activities carried out toward contractors, as well as the coordination and cooperation initiatives established between the parties. These initiatives aim to clarify the objectives of the relationship, expected outcomes, operational procedures, timelines, and tools, thereby reducing risks associated with uncertainty, misunderstandings, operational interferences, and limited knowledge of site-specific activities.
Communication and engagement	This dimension captures the quality and effectiveness of communication processes and initiatives aimed at engaging and raising awareness among contractor personnel on HSE issues. It concerns the exchange of information between client organizations and contractors, including openness to communication, the ease of transmitting and receiving information, and the potential presence of barriers such as linguistic, cultural, or organizational differences.
HSE management system	This dimension examines the quality and effectiveness of the systems adopted by both client organizations and contractors in ensuring positive HSE performance. In particular, it considers the ability of these systems to address interference risks, emergencies, unexpected events, and organizational changes, as well as the quality, completeness, clarity, and accessibility of the relevant HSE documentation.
Anomaly management	This dimension evaluates the quality, effectiveness, and timeliness of HSE safeguard actions implemented in response to regulatory or contractual non-compliance, as well as accidents or near-miss events. This dimension includes the processes of identifying and analyzing non-conformities or incidents, defining corrective actions, implementing them, and assessing their effectiveness through follow-up activities.
Work pressure	This dimension captures the pressure exerted on contractors' HSE performance by additional operational requirements linked to production objectives, such as cost containment, tight deadlines, and demanding work rhythms in the presence of complex tasks.
Training and competence	This dimension evaluates the presence of the technical and soft skills required to improve HSE performance, as well as the quality and effectiveness of training initiatives beyond mandatory requirements aimed at developing the competencies needed to raise awareness of HSE issues among contractor personnel.

Source: Our elaboration

Research limitations. *While the proposed framework for assessing HSE culture within the client-contractor relationship has been rigorously developed and preliminarily validated through consultations with HSE experts, some limitations should be acknowledged. First, the framework has not yet been empirically tested in real-world operational settings. Therefore, its practical applicability and reliability in capturing the quality of HSE culture within the client-contractor relationship remain to be assessed. Moreover, although the framework was developed based on academic literature, grey literature, and expert input, it remains possible that additional dimensions of HSE culture relevant to the client-contractor relationship have not yet been captured. To address these limitations, three complementary instruments are currently being developed within the HSE Lab: (i) a questionnaire to be administered to a sample of workers from both client organizations and contractors, (ii) a checklist to support the assessment of HSE culture during audits, and (iii) an interview protocol designed to guide discussions between client organizations and key contractor personnel (e.g., employee safety delegates). The application of these instruments in real contexts will enable the empirical validation of the framework. In particular, it will allow the assessment of its applicability, reliability, and robustness, while also providing the opportunity to address current limitations and, if necessary, further refine the model based on evidence emerging from real-world practices.*

Managerial implications. *The proposed framework provides a conceptual map of the key dimensions through which HSE culture is shaped within client-contractor relationships. It enables organizations to better understand, monitor, and enhance HSE culture in contractor management, offering a lens to identify strengths and weaknesses in how HSE is promoted across organizational boundaries.*

When combined with the operational tools currently under development (i.e., a questionnaire, an audit checklist, and an interview protocol), the framework enables organizations to systematically evaluate the practices, actions, and initiatives implemented within the client-contractor relationship and to identify which dimensions of HSE culture require further strengthening. In this way, the framework can support organizations in promoting HSE culture beyond their own organizational boundaries and across the contractor network, offering guidance for continuous improvement and more informed strategic decision-making in contractor management. Once developed, the operational tools will facilitate the practical application of the framework and enable more structured and evidence-based assessments.

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informed strategic decision-making in contractor management. Once developed, the operational tools will facilitate the practical application of the framework and enable more structured and evidence-based assessments.

The framework and the operational tools are designed to be complementary to existing normative, managerial, and organizational instruments used for contractor selection, management, and oversight. By integrating them into routine management practices, the client organization can move beyond compliance-focused interventions toward a more proactive and culture-oriented approach that promotes shared responsibility for HSE performance within the client-contractor relationship. In particular, the framework and its tools can support auditing processes by complementing existing monitoring and control mechanisms.

Moreover, the framework and the operational tools enable both vertical and horizontal assessment approaches of HSE culture. A vertical approach allows managers to conduct in-depth diagnostics of HSE culture within a specific site, operational area, or business unit by engaging a representative sample of contractor personnel. This approach helps reveal local practices, potential bottlenecks, and areas for improvement that may not emerge from aggregated performance indicators. Conversely, a horizontal approach provides a broader overview of HSE culture across multiple sites or business areas, typically by surveying a limited set of respondents or key informants (e.g., HSE officers or employee safety representatives). This perspective is particularly useful for identifying systemic patterns and benchmarking HSE culture across different organizational contexts. The possibility of applying the framework through these two complementary assessment approaches enhances its usefulness as a tool for both detailed diagnostics and strategic oversight, enabling a more comprehensive understanding of HSE culture across the client-contractor relationship.

Originality of the paper. *This study develops a conceptual framework for assessing HSE culture within client-contractor relationships, addressing a relevant but still underdeveloped area in the literature. While previous research has widely recognized the importance of HSE culture in improving safety performance in contractor-based and multi-actor projects (Wu et al., 2012; Zhang and Chen, 2015; Dale et al., 2020), it has largely focused on its general relevance, without sufficiently unpacking how such culture is actually structured, operationalized, and enacted across organizational boundaries. As a result, there is still limited understanding of the specific dimensions through which HSE culture emerges in inter-organizational settings and of how it can be systematically assessed within supply chain relationships.*

The framework proposed in this study addresses this gap by conceptualizing HSE culture as a multidimensional and relational construct embedded in client-contractor interactions. By identifying six interrelated dimensions, it offers a structured analytical lens to capture how HSE culture is shaped. In doing so, the framework moves beyond a monolithic view of HSE culture and provides a more granular understanding of its multiple manifestations in contractor-based environments.

In addition, the framework introduces a processual perspective by explicitly considering the temporal development of HSE culture across the lifecycle of the client-contractor relationship. This allows for a more dynamic interpretation of how cultural influences are established before work execution, enacted during operations, and consolidated (or weakened) after project completion.

Finally, the framework advances a relational and supply chain-oriented view of HSE culture, emphasizing that safety performance does not originate within a single organization but emerges from interdependencies between clients and contractors. In this sense, it reframes HSE culture as a cross-boundary phenomenon shaped through ongoing interaction, rather than an internal organizational attribute.

Although the framework has not yet been empirically validated in operational contexts and further dimensions may emerge through future applications, it provides a necessary conceptual foundation for moving from general claims about the importance of HSE culture to its structured assessment in real client-contractor systems. By doing so, it offers both a research agenda for future empirical work and a practical basis for developing tools aimed at improving HSE management across supply chains.

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A demand and supply analysis of environmental externalities and firms' zero debt policy

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Abstract. *Zero-leverage firms remain a puzzle in business studies. Traditional views focus on demand factors like financial flexibility or credit constraints, often conflating these elements (Strebulaev & Yang, 2013; Morais, Serrasqueiro & Ramalho, 2020). This research presents a supply-side mechanism linking environmental externalities to access to debt. Based on the 'brown premium' in equity markets (Bolton & Kacperczyk, 2021), creditors favor firms with high negative externalities because of strong cash flows, whereas they discount sustainable firms with high initial costs. This creates a supply constraint that precludes leverage for environmentally friendly firms. Using a bivariate probit model on 1,022 firms across 54 countries from 2011-2022, the results show that environmental impacts significantly reduce debt availability, especially for firms with low externalities. The study highlights the importance of joint demand-supply estimation to mitigate bias (Saona, San Martín & Vallelado, 2024), suggesting that capital markets may penalize green firms through debt rationing.*

Keywords: *Environmental externalities; zero-leverage firms; panel data; bivariate probit model; brown premium*

Framing of the research. The persistent and economically significant presence of firms with zero debt on their balance sheets—the so-called "zero-leverage puzzle"—remains a challenging anomaly in business research. Traditional theories of capital structure have difficulty explaining why many publicly traded companies forgo the tax benefits of debt (Strebulaev & Yang, 2013). Research offers explanations based on a dual-perspective framework that includes both firm-demand perspectives (such as managerial conservatism or high profitability) and creditor-supply reasons (including information asymmetry or a lack of collateral) (Morais, Serrasqueiro & Ramalho, 2020; Ebrahimi, Gupta & Ozkan, 2020). In these studies, the zero-debt scenario is a corner solution representing the joint equilibrium of a firm's desire to borrow and the financial system's willingness to lend.

Building on this dual-perspective framework, we introduce a novel supply-side mechanism centered on environmental externalities. Evidence of a "brown premium" shows that firms with significant negative externalities exhibit stronger short-term performance (Bolton & Kacperczyk, 2021). We argue this creates a temporal mismatch in credit risk assessment. For creditors with short-term horizons, "brown" firms appear appealing due to robust current cash flows, which signal high debt-servicing capacity—even if their activities entail higher future transition risks. Conversely, sustainable firms incur high upfront costs that depress short-term profitability, making them seem riskier under conventional assessment, despite lower long-term vulnerability. Consequently, a firm's environmental profile may act as a powerful filter, reducing debt supply for sustainable firms and pushing them toward zero leverage.

This mechanism creates a counterintuitive supply-side incentive: activities that increase future transition risks—such as exposure to carbon pricing, regulatory tightening, and asset stranding—can enhance short-term creditworthiness and, simultaneously, raise the potential profitability of lending. By contrast, firms that invest in sustainable practices typically incur high upfront costs, which depress short-term profitability and make them appear riskier under conventional credit assessments, even though they are less vulnerable in the long run. We therefore hypothesize that firms with lower environmental impacts are substantially less likely to obtain debt, increasing their probability of operating with zero leverage.

It is important to distinguish our approach from existing literature on ESG and debt financing. Recent studies find that higher ESG performance increases debt supply, concluding that creditors view high ESG scores favorably as signals of lower risk and better management (Morais, Ferreira, Marques & Ramalho, 2025). This presents a puzzle when contrasted with the evidence of a "brown premium" in equity markets (Bolton & Kacperczyk, 2021). We argue this apparent contradiction stems from a fundamental measurement disconnect: ESG scores measure corporate sustainability ratings, disclosure efforts, and policies, whereas our study relies on the concept of monetized environmental externalities, which quantifies the actual negative societal cost of a firm's operations (Freiberg, Park, Serafeim & Zochowski, 2021; Saona, Renzi, Vagnani & Taragoni, 2025). A firm can have a high ESG score while still generating significant negative environmental externalities, and conversely, a "green" firm might have a lower ESG score due to poor disclosure but create minimal actual damage. Our study tests the debt market's response to actual environmental impact, not sustainability signaling.

Purpose of the paper. This study investigates the zero-leverage puzzle through the lens of environmental externalities, employing a theoretical model and, empirically, a bivariate probit model to disentangle debt demand from supply. Our

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objective is to test whether environmental impact acts as a supply-side constraint that pushes sustainable firms toward zero leverage.

Testing this supply-side hypothesis requires a methodology that disentangles latent demand and supply decisions, which are conflated in the observed zero-leverage outcome (Meng & Schmidt, 1985). Moving beyond single-equation approaches that risk conflation (Saona, San Martín & Vallelado, 2024), we employ a bivariate probit model with partial observability (Poirier, 1980). This method is critical: as our results demonstrate, the environmental impact variable is statistically insignificant in a standard univariate probit model but emerges as a strong negative determinant of debt supply in the bivariate framework.

We test our hypotheses using a global sample of 1,022 non-financial firms from 54 countries over the period 2011-2022, comprising 4,471 firm-year observations. Our analysis reveals three key findings that resolve the empirical conflation problem. First, environmental externalities exert a strong, statistically significant negative effect on debt supply—a result that is masked by conventional univariate probit models. Firms with lower environmental impact (higher sustainability) are substantially less likely to obtain debt, directly increasing their probability of zero leverage. Second, this supply-side constraint is moderated by firm maturity: the negative effect of environmental sustainability on credit access is significantly more pronounced for younger, growth-oriented firms (Lefebvre, 2021; Lundberg & Lotfaliei, 2020). Third, we disentangle conflicting forces in the leverage decision, showing that while high market valuation (Tobin's Q) reduces a firm's demand for debt (consistent with financial flexibility), it simultaneously increases creditors' supply of debt.

Our contribution is twofold: methodologically, we enhance the capital structure literature by employing a model that directly addresses identification issues associated with corner solutions (Morais, Serrasqueiro & Ramalho, 2020). The bivariate probit model allows us to explicitly distinguish between the determinants of the firm's decision associated with the demand for debt and those that restrict access to debt (Saona, San Martín & Vallelado, 2024). Theoretically, we advance a more nuanced understanding of the zero-leverage policy by disentangling the debt decision into demand- and supply-side considerations. Specifically, we propose and test a supply-side mechanism that links environmental transition risks to core financing results, with important implications for understanding how capital markets can both support and impede the shift to a sustainable economy.

Methodology. Our empirical approach employs a bivariate probit model with partial observability, as developed by Poirier (1980). This method is particularly appropriate for addressing the issue of partial observability, which arises because the observed debt outcome reflects the joint decision made by both fund suppliers and firms seeking external financing (Morais, Serrasqueiro & Ramalho, 2020). Unlike a standard univariate probit model, which cannot disentangle whether the observed debt outcome results from demand-side or supply-side factors, the bivariate probit model captures both decision processes.

We define two binary outcomes: y1 = 1 if the firm seeks debt and 0 otherwise; y2 = 1 if the creditor grants credit and 0 otherwise. The probability that a firm carries debt is Pr[y = 1] = Pr[y1* > 0, y2* > 0]. The model is estimated via maximum likelihood, and identification requires that at least one variable in the demand equation is excluded from the supply equation, or vice versa (Poirier, 1980).

The dependent variable, NZL, is a dummy that equals one if the firm carries debt and zero if it is completely unleveraged, consistent with Ramalho, Rita and da Silva (2018) and Strebulaev and Yang (2013). As a robustness check, we also define an alternative dummy variable, NZL5, for firms with debt levels below 5% (Huang, Li & Gao, 2017).

Environmental impact is measured as the monetized value of corporate environmental externalities from the Impact-Weighted Accounts dataset (Harvard Business School), scaled by total assets (EI1) (Freiberg, Park, Serafeim & Zochowski, 2021; Serafeim, Zochowski & Downing, 2019). As alternative specifications, we compute environmental impact relative to sales (EI2) and to operating income (EI3) (Saona, Renzi, Vagnani & Taragoni, 2025). These variables when positive (negative) imply positive (negative) environmental impact.

Firm value is proxied by Tobin's Q (FV), calculated as the sum of market capitalization and total liabilities divided by total assets according to Chung and Pruitt (1994). The firm's life-cycle stage is constructed following Anthony and Ramesh (1992) and Saona, San Martín and Vallelado (2024) as LifeCycle = (1 + Div)*(1 + SalesGrowth)*(1 + CAPEX), where lower values indicate mature firms and higher values characterize growth-oriented firms.

Firm size (Size) is measured as the natural logarithm of total assets. Asset tangibility (Tang) is net property, plant, and equipment divided by total assets. Profitability (ROA) is net income over total assets. Default risk is captured using the Altman Z-Score (Altman, 1968). The non-debt tax shield (NDTS) is measured as annual depreciation over total assets (Graham, 2000). Financial reporting quality is proxied by the StarMine earnings quality score (Transp) (Cline, Williamson & Xiong, 2021; Saona, Muro & López-Quesada, 2025). Liquidity (Liquid) is measured using the current ratio. External governance and information environment quality are proxied by the number of sell-side analysts covering the firm's stock (Analysts), following He, Ren and Taffler (2020).

For model identification, we include PrivateCreditGDP—a country-level measure of financial development—only in the supply equation (Morais, Serrasqueiro & Ramalho, 2020; Saona, San Martín & Vallelado, 2024). This exclusion restriction is theoretically grounded: while national credit market depth affects lenders' willingness to lend, it does not directly influence an individual firm's desire for debt once other firm-level characteristics are controlled for.

The sample consists of 1,022 non-financial firms from 54 countries over the period 2011-2022, resulting in 4,471 firm-year observations. A minimum of four consecutive annual observations per firm is required, with an average of 4.37

observations per firm (Arellano & Bond, 1991; Baltagi, 2013). Financial institutions are excluded because of their regulatory status and divergent financial reporting standards. Financial and accounting data are sourced from the LSEG Workspace database, and environmental impact valuation metrics are drawn from the Impact-Weighted Accounts Project.

Results. The descriptive statistics reveal that approximately 9% of firms in the sample operate with zero debt. The average value of environmental impact scaled by total assets (EI1) corresponds to a monetized externality equivalent to 7.25% of total assets, with negative values reflecting adverse environmental externalities. The average Tobin's Q is 1.50, indicating generally positive market valuation. Firms exhibit comfortable liquidity positions, with current assets exceeding current liabilities by approximately 48% on average. Tangible assets account for nearly 32% of total assets, while average profitability is 5.20%. Mean-difference tests show that unlevered firms tend to exhibit lower environmental impact, higher market valuation, greater liquidity and profitability, lower default risk, and higher earnings quality than levered firms. They are also younger on average, consistent with Lefebvre (2021) and Lundberg and Lotfaliei (2020).

The bivariate probit model reveals a positive and statistically significant estimated correlation coefficient ($\rho = 0.696$, $p < 0.01$) between the error terms of the demand and supply equations, confirming the presence of correlated unobserved factors and justifying the joint estimation framework (Poirier, 1980). The estimated intra-class correlation coefficient in the standard univariate probit results ($\rho = 0.794$) suggests that nearly 80% of the total variance in the latent propensity to maintain zero leverage is attributable to firm-specific unobserved heterogeneity.

The comparison between the two approaches reveals substantial differences. In the bivariate probit model, firms with higher environmental impact (EI1) are significantly less likely to be zero-leverage from the supply side, with a coefficient of -7.112 ($p < 0.01$). This finding is consistent with the "brown premium" documented in equity markets (Bolton & Kacperczyk, 2021): firms that generate higher negative externalities tend to exhibit stronger short-term cash flows, making them more attractive to creditors. In contrast, firms investing in sustainability face higher upfront costs, which depress short-term profitability and reduce their appeal under conventional credit assessments (Chava, 2014). Importantly, this effect is not detected in the conventional univariate probit model, where EI1 is statistically insignificant, illustrating the limitations of standard models and confirming the importance of the bivariate approach (Meng & Schmidt, 1985).

The marginal effects analysis shows that a one-standard-deviation increase in EI1 (0.148) is associated with a statistically significant decrease of 0.894 percentage points in the probability of obtaining debt when sought. Firms with lower environmental externalities face a 6.04 percentage point higher probability of being credit-constrained (Pr(y1=1, y2=0)), while the probability of successful debt financing (Pr(y1=1, y2=1)) decreases by a corresponding 6.04 percentage points.

The firm life cycle exhibits consistent effects across both modeling approaches. Younger and early-stage firms are more likely to remain debt-free, reflecting limited reputation, weaker collateral, and greater reliance on internal financing (Berger & Udell, 1998; Diamond, 1989). The marginal effects indicate that a one-standard-deviation increase in LifeCycle (0.337) reduces the probability of having debt by 0.452 percentage points.

Firm value exhibits asymmetric effects. From the demand side, firms with higher market valuation are less likely to shift from a debt-free to a debt-financed structure (coefficient -0.511, $p < 0.01$), consistent with financial flexibility motives. From the supply side, however, creditors are more willing to extend credit to high-valuation firms (coefficient 1.339, $p < 0.01$). The marginal effects show that high-valuation firms are 0.69 percentage points more likely to obtain debt when sought, yet simultaneously 1.18 percentage points less likely to demand it. This dual effect is not observable in univariate models and supports the financial flexibility hypothesis (Morais et al., 2021).

Firm size positively affects the likelihood of holding debt (coefficient 0.341, $p < 0.01$), driven primarily by supply-side factors, consistent with the greater ease with which larger firms access credit markets (Gregory, Rutherford, Oswald & Gardiner, 2005). Capital expenditure, treated as a demand-side variable, positively affects leverage with a coefficient of 20.264 ($p < 0.01$), indicating that expanding firms are more likely to use external financing. Default risk also plays a significant role: as firms become safer (higher Z-scores), the likelihood of remaining debt-free increases (coefficient -0.081, $p < 0.01$), suggesting a substitution of equity for debt. Non-debt tax shields influence debt demand rather than credit supply (coefficient 22.031, $p < 0.01$), with firms having higher depreciation reducing their reliance on debt tax shields, consistent with Graham (2000). The proxy for credit rationing, PrivateCreditGDP, enters positively and significantly on the supply side (coefficient 0.011, $p < 0.01$), indicating that firms in more developed credit markets face fewer financing constraints (Faulkender & Petersen, 2006).

Robustness checks using alternative environmental impact measures confirm these findings. When environmental impact is scaled by sales (EI2), the supply-side coefficient is -26.033 ($p < 0.01$), and when scaled by operating income (EI3), it is -0.113 ($p < 0.05$). Interaction analyses reveal that the effect of environmental externalities is heterogeneous by firm maturity (Brambor, Clark & Golder, 2006). The positive coefficient on EI2 × LifeCycle (8.381, $p < 0.01$) indicates that the negative effect of environmental impact on debt supply is attenuated for younger firms. For early-stage companies, strong cash flows associated with higher environmental impact may partially offset the "liability of newness," making them relatively more attractive to short-term oriented creditors (Diamond, 1989).

When using ESG environmental scores instead of monetized externalities, firms with stronger environmental disclosure are more likely to obtain financing from the supply side (coefficient 0.890, $p < 0.05$), consistent with creditors offering more favorable conditions to firms with better ESG Environmental performance (Morais, Ferreira, Marques & Ramalho, 2025). This result seems to contrast with our main findings. However, ESG environmental scores capture

disclosure and management quality rather than actual environmental impact, providing complementary insights. Thus, while creditors are more prone to give money to firms with high ESG scores, they are less prone to do so for firms that invest in sustainable activities, but such investments do not necessarily are not reflected in higher ratings scores.

Industry heterogeneity analysis following Patten (2002) and Bansal and Clelland (2004) shows that the brown premium is stronger in environmentally sensitive industries (basic materials, energy, industrials, utilities). The interaction term EI1 × High (for high-impact industries) has a coefficient of -4.935 ($p < 0.05$), and the combined marginal effect for these firms is -0.083, compared to -0.036 for non-sensitive industries (Sanches Garcia, Mendes-Da-Silva & Orsato, 2017). This suggests a clear preference in credit markets for financing firms in environmentally intensive sectors.

Institutional environment also matters. The interaction between environmental impact and environmental policy stringency (EI2 × EPS) is negative and statistically significant (coefficient -31.664, $p < 0.05$), indicating that the association between lower environmental impact and lower probability of debt is amplified in stricter regulatory environments. The marginal effect of this interaction is -0.325 ($p < 0.05$), suggesting that regulatory stringency significantly conditions how environmental performance translates into credit market outcomes.

Research Limitations. The sample excludes private firms and smaller enterprises (Berger & Udell, 1998). Impact-Weighted Accounts data may not capture all environmental dimensions. Identification relies on exclusion restriction that PrivateCreditGDP affects only supply (Morais, Serrasqueiro & Ramalho, 2020). The bivariate model cannot distinguish all zero-leverage cases (Meng & Schmidt, 1985). Environmental measures may not capture temporal dynamics. The study period includes economic events potentially affecting results. We cannot directly observe creditor decision processes (Stiglitz & Weiss, 1981).

Managerial implications. Our findings carry important implications for managers, particularly those leading sustainable or transitioning firms. First and foremost, managers should recognize that zero-leverage policies may often be imposed constraints rather than voluntary choices (Devos et al., 2012). The evidence suggests that sustainable firms face systematic barriers in debt markets, with creditors favoring "brown" firms that generate stronger short-term cash flows (Bolton & Kacperczyk, 2021). This implies that managers of green firms need to proactively address creditor perceptions by developing alternative financing strategies.

For managers of sustainable firms, our results indicate a need to cultivate relationships with creditors who have longer-term horizons or specialized expertise in sustainability finance. Green banks, impact investors, and development finance institutions may have different risk assessments that better align with the long-term value proposition of sustainable business models. Additionally, managers should strengthen communication of long-term risk profiles to traditional creditors, emphasizing how sustainability investments reduce vulnerability to transition risks such as carbon pricing, regulatory tightening, and reputational damage (Chava, 2014).

The heterogeneous effects by firm life cycle suggest that younger sustainable firms face particularly acute financing constraints (Lefebvre, 2021; Lundberg & Lotfaliei, 2020). Managers of early-stage green companies should prioritize building track records and collateral that can signal creditworthiness to traditional lenders (Berger & Udell, 1998; Diamond, 1989). Alternative financing sources such as venture capital, private equity, or green bonds may be more accessible during early growth stages before conventional bank financing becomes available.

For managers of firms in environmentally sensitive industries, our findings suggest that current credit market conditions remain favorable, but this may change as transition risks materialize and environmental regulations tighten (Patten, 2002; Bansal & Clelland, 2004). These managers should consider whether current access to debt based on short-term cash flows adequately accounts for mounting long-term transition risks. Proactive environmental investments could help maintain credit access as regulatory frameworks evolve and creditor preferences shift.

At the strategic level, our results highlight the importance of considering financing implications in environmental strategy formulation. The finding that environmental disclosure (ESG scores) and actual environmental impact have opposite effects on credit access suggests that managers cannot rely solely on sustainability reporting to overcome financing constraints (Morais, Ferreira, Marques & Ramalho, 2025). Creditors respond to tangible short-term financial implications of environmental externalities, not just disclosure quality. This calls for integrated strategy that simultaneously addresses actual environmental performance and communication of long-term value.

For financial managers, the conflicting effects of firm value on debt demand and supply underscore the importance of sophisticated capital structure planning (Strebulaev & Yang, 2013). High market valuation reduces the desire for debt while increasing its availability, creating opportunities for strategic financing decisions that balance financial flexibility with optimal capital structure (Graham, 2000).

Finally, the moderating role of environmental policy stringency suggests that managers operating in countries with strong environmental regulations face amplified credit market responses to environmental performance. This institutional context should inform both environmental strategy and financing plans, with particular attention to regulatory trends that may reshape creditor assessments over time.

Originality of the paper. This study makes several original contributions to the corporate finance and sustainability literature. First, we introduce a novel supply-side mechanism linking environmental externalities to debt access, extending the "brown premium" documented in equity markets (Bolton & Kacperczyk, 2021) to credit markets. While previous research has examined how ESG performance affects financing (Morais, Ferreira, Marques & Ramalho, 2025), we are

the first to distinguish between sustainability disclosure (ESG scores) and actual monetized environmental externalities (Freiberg et al., 2021), showing that these have opposing effects on debt supply.

Methodologically, we advance the capital structure literature by employing a bivariate probit model with partial observability (Poirier, 1980) that explicitly disentangles demand-side financial flexibility from supply-side financial constraints (Morais, Serrasqueiro & Ramalho, 2020). Our demonstration that the environmental impact variable is insignificant in conventional univariate probit but highly significant in the bivariate framework provides compelling evidence of the importance of this methodological approach. This contributes to resolving identification issues associated with corner solutions in corporate finance (Meng & Schmidt, 1985; Saona, San Martín & Vallelado, 2024).

We also provide a theoretical foundation for our empirical findings by extending Tirole's (2010) continuous-investment model to incorporate environmental externalities. The model demonstrates formally that debt capacity decreases as positive environmental externalities increase, with a threshold effect producing zero leverage when collateral value is fully eroded. This theoretical contribution bridges corporate finance theory and environmental economics.

Fourth, our analysis of heterogeneity across firm life cycles (Lefebvre, 2021; Lundberg & Lotfaliei, 2020), industry sectors (Patten, 2002; Sanches Garcia, Mendes-Da-Silva & Orsato, 2017), and institutional environments provides a deeper understanding of how environmental considerations shape capital structure decisions. The finding that the environmental impact effect is more pronounced for younger firms and in environmentally sensitive industries, and amplified by regulatory stringency, offers a more complete picture than previous studies.

By using monetized environmental externalities from the Impact-Weighted Accounts dataset (Serafeim, Zochowski & Downing, 2019) rather than self-reported ESG scores, we provide a more objective measure of actual environmental impact. This allows us to test creditor responses to tangible environmental damage rather than sustainability signaling, revealing a potentially problematic misalignment between short-term creditor incentives and long-term societal climate goals.

Our global sample of 1,022 firms across 54 countries further provides broad external validity and enables analysis of how institutional context moderates the relationship between environmental impact and debt access. This international perspective is particularly valuable given cross-country variation in environmental regulations and financial market development (El Ghoul et al., 2018; Bessler et al., 2013).

Finally, our findings have important policy implications by highlighting a critical friction in the transition to a sustainable economy: capital markets may inadvertently penalize sustainability front-runners while continuing to fund environmentally damaging activities. This suggests that policy interventions addressing creditor time horizons or internalizing environmental externalities in credit assessments could help align financial markets with sustainability objectives.

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A Review of Sustainable Business Models for Earth Observation-based Climate Services

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Abstract. *The rapid expansion of downstream space activities in the New Space era is reshaping how economic, environmental and social value is created from space infrastructures. Commercial applications of Earth observation (EO), satellite navigation and communication increasingly drive sectoral growth and redefine value chains (Bousedra, 2023; Baber & Ojala, 2024). Concurrently, downstream data-intensive services – particularly EO based climate monitoring and environmental applications – face growing expectations to contribute to sustainable and responsible business practice, integrating environmental stewardship, social justice and economic resilience.*

However, despite the acknowledged potential of satellite data to support climate adaptation, mitigation and sustainable development goals, we know relatively little about how sustainable business model innovation (SBMI) concepts and frameworks are applied to downstream space value chains. The mechanisms through which downstream intermediaries, platforms and service providers configure their value propositions, creation & delivery architectures and value capture logics to deliver triple-bottom-line outcomes remain fragmented and under-synthesised.

This work-in-progress paper presents the protocol of a planned literature review that aims to systematically map and critically synthesise existing knowledge on SBMI as applied to the downstream space economy, focusing on EO based climate and environmental applications. Building on the triadic conceptualisation of SBMI as sustainable value proposition innovation (SVPI), sustainable value creation & delivery innovation (SVCDI), and sustainable value capture innovation (SVCI) (Shakeel et al., 2020; Bashir et al., 2022), the review will examine business model configurations that transform satellite data into value added services for public and private users engaged in climate mitigation, adaptation and territorial management.

Methodologically, this work-in-progress outlines an initial plan to conduct a systematic literature review following Xiao and Watson (2019), using Web of Science and Scopus as primary databases. Recognising the emergent nature of New Space and downstream literatures, the design explicitly acknowledges possible methodological adaptation: depending on volume, diversity and maturity of identified evidence, the protocol may be refined toward a scoping review (Peters et al., 2020; Tricco et al., 2016) or an integrative review (Toronto & Remington, 2020).

The paper concludes by articulating expected theoretical and practical contributions – including development of a taxonomy of sustainable business models for downstream EO services – and detailing how the review will be further developed prior to and following the SIMA 2026 conference.

Keywords: *sustainable business model; downstream space economy; earth observation; literature review*

Framing of the research. *Over the last decade, the global space sector has undergone profound transformation associated with New Space: the liberalisation of space activities, entry of private actors and investors, adoption of novel business models oriented toward profit generation, and reorientation of space agencies toward market-oriented policies (Bousedra, 2023; Parrella et al., 2022). This shift has coincided with the digital evolution of the economy, fostering convergence between space technologies and data-intensive industries such as ICT, finance, agriculture and environmental monitoring (Bousedra, 2023). The downstream segment – encompassing value-added goods and services derived from space infrastructures including satellite communication, navigation and Earth observation (EO) – has experienced particularly rapid expansion. Opposed to the upstream segment (rocket and satellite manufacturing), downstream is where most economic value and societal impact can still be generated, interfacing directly with end-users across diverse sectors (Bousedra, 2023; Valente et al., 2025).*

Recent work on space business model value chains highlights that New Space is characterised by complex, multi-actor ecosystems where firms co-create value through interconnected data, hardware and intellectual property chains (Baber & Ojala, 2024). Intermediaries and platforms play crucial orchestration roles, bridging abundant but technically complex satellite data with operational needs of non-specialist users. In parallel, Sustainable and Responsible Business scholarship underlines the urgency of business models that simultaneously tackle climate change, social inclusion and economic resilience, leveraging data infrastructures to support sustainability transitions.

Within this context, downstream EO based services for climate adaptation and mitigation – precision agriculture, flood early-warning, infrastructure monitoring, forest management – offer promising yet under theorised arenas for sustainable business model innovation (SBMI). How value is proposed, created, delivered and captured sustainably across diverse public and private users, remains an open question. This working paper therefore designs a literature review protocol bridging SBMI scholarship with emerging work on the downstream space economy.

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SBMI sits at the intersection of business models (BM), business model innovation (BMI) and sustainable business models (SBM), emphasising joint creation of economic, environmental and social value for multiple stakeholders (Geissdoerfer et al., 2018; Shakeel et al., 2020). Geissdoerfer et al. (2018) define SBMI as the conceptualisation and implementation of sustainable business models, including creation of new models, diversification or transformation of existing ones to reduce negative impacts or generate positive ones. Shakeel et al. (2020) define SBMI as the transition from a conventional business model to a sustainable business model through modifications to its components to explicitly address sustainability issues and build durable competitive advantage, emphasising radical, systematic and holistic reconfiguration.

Shakeel et al. (2020) propose a triadic framework:

- *Sustainable Value Proposition Innovation (SVPI): redefining what value is offered, integrating economic, environmental and social benefits.*
- *Sustainable Value Creation and Delivery Innovation (SVCDI): reconfiguring how value is produced and distributed – resources, processes, partnerships, technologies – to minimise negative externalities.*
- *Sustainable Value Capture Innovation (SVCI): redesigning how value is monetised – pricing models, revenue streams – aligning financial sustainability with broader goals.*

Bashir et al. (2022) empirically validated this triadic structure, demonstrating that SBMI is a measurable organisational capability positively associated with economic performance and competitive advantage, even in high-uncertainty contexts. Complementary tools include sustainable business model archetypes (Bocken et al., 2014), the Triple-Layered Business Model Canvas (Joyce & Paquin, 2016), and a taxonomy of 45 SBM patterns (Lüdeke-Freund et al., 2018). Baldassarre et al. (2017) bridge SBMI and user-driven innovation through an iterative talking–thinking–testing process, particularly relevant for data-intensive services where user involvement in prototyping is essential.

The space economy spans upstream (launch, satellites) to downstream (applications/services) and enabling sectors. New Space represents a structural transformation: (1) entry of private firms and venture capital, (2) adoption of commercial business models, and (3) reorientation of space agencies toward market-enabling policies and public-private partnerships (Bousedra, 2023). A fundamental driver is convergence with the digital economy. Digital giants and start-ups now produce vast quantities of navigation, geolocation and imagery data in near-real-time. Downstream growth is driven by three domains: communications, Earth observation and satellite navigation (Bousedra, 2023). New actors – often not branding as "space companies" – provide space-based services across agriculture, transport, finance and other sectors. Baber and Ojala (2024) conceptualise emerging business model value chains in New Space, identifying distinct chains for data, hardware and intellectual property. The data value chain runs from satellite-based generation, through ground-station reception, to value-added processing and delivery to end-users. Intermediaries and platforms bridge the gap between technically complex satellite data and operational user needs.

Purpose of the paper. *Despite recognition that many downstream EO applications contribute to multiple Sustainable Development Goals (Valente et al., 2025), the SBMI and space economy literatures have remained separate. Valente et al. (2025) document substantial work linking space to sustainability outcomes but note that explicit engagement with SBMI frameworks is rare. Conversely, SBMI scholarship has proliferated across manufacturing, energy, mobility and food systems but has paid limited attention to data-intensive, multi-actor ecosystems characteristic of downstream space. Questions such as how sustainable value propositions are co-designed with public/private users, how usage-based pricing aligns value capture with accessibility, or how sustainable value creation is configured along complex data-hardware-IP chains remain largely unexplored. This constitutes a clear research gap: we lack consolidated understanding of (1) whether/how SBMI concepts apply to downstream space, (2) how SVPI–SVCDI–SVCI manifest in EO-based services, (3) which SBM archetypes/patterns are relevant, and (4) what sustainability outcomes are associated with different configurations. Addressing this gap is both theoretically and practically relevant. Theoretically, downstream space offers a novel empirical setting for SBMI research. Practically, insights could inform design of more effective, equitable business models for EO services, helping policymakers, agencies and platforms navigate the "paradox of abundance" – vast satellite data availability but limited utilisation due to accessibility, interpretability and affordability barriers.*

The overarching aim is to systematically map and critically synthesise existing scholarly knowledge on how SBMI and related SBM concepts have been applied to the downstream space economy, focusing on EO-based climate and environmental services. Hence, our Research questions are:

RQ1a: How has SBMI (and related SBM concepts) been applied to downstream space and EO-based service business models? RQ1b: How are SVPI, SVCDI and SVCI configured in business models transforming satellite data into value-added services for public/private end-users?

RQ2a: Which SBM archetypes, patterns or design tools are most used to design/analyse business models in downstream EO contexts? RQ2b: What sustainability outcomes – economic, environmental, social – are associated with different business model configurations in downstream space applications?

Methodology. *At this stage, the review is planned as a systematic literature review (SLR) following Xiao and Watson (2019), appropriate for assessing extent, patterns, quality and gaps in emerging knowledge transparently and rigorously. However, both New Space and SBMI literatures are characterised by disciplinary heterogeneity and rapid evolution, spanning management, policy, engineering, earth sciences and geography. The initial protocol starts with systematic*

search and screening but remains flexible in synthesis stages. Given this uncertainty, this work-in-progress explicitly acknowledges possible methodological adaptation:

- *If evidence is mature, homogeneous and amenable to quality appraisal, proceed as full systematic review.*
- *If evidence is fragmented, conceptually rich but empirically sparse, a scoping review may be more appropriate (Peters et al., 2020; Tricco et al., 2016).*
- *If substantial work exists across multiple paradigms, an integrative review could enable interpretive synthesis (Toronto & Remington, 2020).*

Table 1. Databases and search strategy

Core databases	*Web of Science and Scopus, chosen for comprehensive coverage across management, innovation, sustainability and applied sciences. Supplementary searches may include Google Scholar for grey literature*
Search strategies *(three pillars)*	*1. SBMI/SBM concepts: "sustainable business model*", "business model innovation", "sustainable value proposition", "sustainable value creation/capture", "triple bottom line", etc.* *2. Space/downstream terms: "space economy", "New Space", "downstream space", "Earth observation", "EO", "satellite data/service*", "geospatial service*", etc.* *3. Climate/sustainability domains: "climate service*", "climate adaptation/mitigation", "environmental monitoring", "precision agriculture", "water management", "disaster risk", "SDG*", etc.*
Example search *string (to be refined)*	*("sustainable business model*" OR "business model innovation" OR "sustainable value") AND ("space economy" OR "New Space" OR "Earth observation" OR "satellite data") AND ("climate" OR "environment*" OR "sustainab*")*

The review will follow a multi-stage screening process designed to ensure rigour and transparency. In the first stage, two reviewers will independently screen all retrieved records based on titles and abstracts, applying the predefined inclusion and exclusion criteria. Any disagreements between reviewers will be resolved through discussion or, if necessary, consultation with a third reviewer to reach consensus. Studies that pass the initial title and abstract screening will proceed to full-text screening, where they will be assessed in detail against the final inclusion criteria. At this stage, reasons for exclusion will be systematically documented to maintain a transparent audit trail and support future replication of the review. For studies meeting all inclusion criteria, data will be extracted using a structured form designed to capture key information including bibliographic details, type of downstream application (e.g., agriculture, water management, climate services), business model components discussed, SBMI frameworks or concepts employed, research methodology, reported sustainability outcomes, and principal findings. If the review proceeds as a full systematic literature review, quality appraisal will be conducted using adapted checklists appropriate for qualitative studies, case studies or conceptual papers. The synthesis phase will combine multiple approaches to maximise insight. A narrative synthesis will organize findings thematically according to the research questions, while a configurational synthesis will develop a taxonomy of sustainable business models for downstream EO services, mapping relationships among value proposition, creation, delivery and capture mechanisms. Additionally, descriptive statistics will be generated to identify publication trends over time, geographic distribution of research, and methodological approaches employed across the corpus.

Table 2. Inclusion and exclusion criteria

Inclusion	• *Peer-reviewed articles, conference papers, book chapters in English.* • *Studies discussing/analysing business models in downstream space economy, particularly EO services.* • *Studies engaging with sustainability, SBMI, SBM or related frameworks.* • *Climate-related or environmental applications.*
Exclusion	• *Exclusively upstream space (launch, manufacturing) without downstream perspective.* • *Space exploration/astronomy without business model focus.* • *Purely technical studies without business model/sustainability discussion.* • *Non-English publications.*

Results. *This research is a work-in-progress, hence we theorize expected contribution rather than results. First, our first expected contribution is to provide the first systematic map of SBMI/SBM use in downstream space and EO-based services. Organising findings along SVPI–SVCDI–SVCI will clarify which aspects have received attention and where blind spots remain. Second, we are willing to contribute to conceptual integration between SBMI scholarship and New Space/downstream space literature. Juxtaposing SBMI categories with space value chains (Baber & Ojala, 2024) will advance understanding of sustainable value creation in complex, multi-actor, data-intensive ecosystems. Third, lay groundwork for a theoretically grounded taxonomy of sustainable business models for downstream EO services, organising configurations by:*

- *Target user segments (public/private; large/small).*
- *Value proposition focus (monitoring, analytics, decision-support, predictive).*
- *Value creation mechanisms (in-house/platform; open-source/proprietary; cloud/on-premise).*
- *Value capture models (subscription, pay-per-use, freemium, outcome-based).*

- *Sustainability levers (SDG alignment, environmental impact, social inclusion, governance).*

Research limitations. *As a work-in-progress, this paper will undergo substantial development before and after the Sinergie-SIMA 2026 conference. In the pre-conference phase (March–May 2026), the research team will finalise the review protocol and search strategy, conduct systematic searches in Web of Science and Scopus, and complete initial screening by two independent reviewers with inter-rater reliability checks. Based on preliminary findings, the review type will be confirmed or adapted toward scoping or integrative approaches. A structured coding framework aligned with the SVPI–SVCDI–SVCI triad will be developed and piloted, enabling preliminary mapping of studies by year, geography, application domain and methodology, as well as identification of early thematic patterns and archetypes.*

Conference presentation will provide opportunities to share the protocol and preliminary findings, receive critical feedback on conceptual boundaries and coding choices, and refine the emerging taxonomy through discussion with the Sinergie-SIMA community. Post-conference, the team will complete full data extraction and in-depth synthesis, develop a final taxonomy integrating SBMI dimensions with space value chains, and prepare a journal manuscript targeting innovation and sustainability outlets. The taxonomy will subsequently serve as conceptual foundation for empirical research on the Italian EO ecosystem (IRIDE, ASI, e-GEOS/CLEOS), involving qualitative case studies and interviews with public and private users, ultimately contributing to both scholarship and practice in sustainable space business.

Managerial implications. *We expect the following practical implications:*

- *For policymakers and space agencies (ESA, ASI, Copernicus, IRIDE), offer evidence-based insights into which configurations support successful uptake and sustainability outcomes, informing procurement, subsidies, capacity-building and partnerships.*
- *For downstream intermediaries and platforms (e-GEOS/CLEOS, Planet Labs, ICEYE), provide structured overview of sustainable value proposition/capture strategies, helping navigate trade-offs between accessibility and economic viability.*
- *For end-user sectors (agriculture, water, civil protection, urban planning), clarify available/emerging sustainable business models and their benefits/risks.*
- *For impact investors and venture capital, provide conceptual roadmap of SBM archetypes supporting due diligence and portfolio strategy.*

Finally, In the EO context – and many other settings – a paradox of abundance exists: vast high-quality satellite data (For EU/Italy: Copernicus, COSMO-SkyMed, IRIDE) but limited utilisation due to awareness, technical complexity, costs and capacity gaps. By reviewing SBMI frameworks for downstream EO, this work will contribute to understanding how intermediaries and platforms can bridge the gap between data abundance and effective use, designing business models that democratise access, lower barriers, provide user-friendly analytics and align incentives.

Originality of the paper. *To the best of our knowledge, no reviews are currently available on the topic of Sustainable Business Models for Earth Observation-based Climate Services. Therefore, this paper offers an original contribution by addressing this gap and providing new evidence from the literature, useful both for academia, policymakers and practictioners.*

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AI & Sustainability: analysis of the dual relationship, possible risks and focus on the Italian context

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Abstract. *In a severely degraded global context, where the crossing of planetary boundaries, climate change, environmental contamination, and the indiscriminate use of resources are no longer news, the concept of sustainability is becoming increasingly central and important, even at the corporate level. It is vital for companies to imbue their strategic lines with sustainability so they can account for (and therefore mitigate) their environmental, economic, social, and governance impacts. At the same time, another topic that is assuming strategic importance is the adoption and exploitation of artificial intelligence: this new tool represents a new paradigm capable of transforming companies, allowing them to increase their productivity, efficiency, and therefore competitiveness.*

These two themes intersect in a synergistic and dual relationship that deserves careful analysis: it is interesting to both evaluate how artificial intelligence can serve sustainability through various applications (for example, in the field of environmental or technical sustainability) and the distinctive features of sustainable AI, for example in the fields of ethics and privacy, without neglecting considerations related to risks and negative impacts.

It is also interesting to analyse these issues within the Italian context, to understand the rate of AI adoption within the Italian corporate fabric, its level of maturity, and how internal sustainability professionals are involved, thus providing useful insights regarding the need for funding and training, for example.

It is essential to conduct research in this field to provide policymakers with a strong information base that allows them to correctly direct political and regulatory strategies, enabling a correct and equitable integration between sustainability and AI for effective, optimized, and sustainable business development.
Keywords: *AI; sustainability; sustainable AI; AI ethics; sustainability professionals; green AI*

Framing of the research. *In terms of research framing, this ongoing work is clearly connected to two main research streams: sustainability, which, as confirmed by the significant growth in the number of specific publications, represents a hot, widely explored, and well-researched topic and artificial intelligence, which, despite being relatively new, is monopolizing interest even in the corporate sphere as a truly game-changing topic.*

The specific theme of this research project therefore takes shape through their combination, seeking to analyse the specifics and characteristics of this dual and synergistic relationship, attempting to fill the gap in the literature: indeed, it is recognized that analysing the applications of AI for corporate sustainability, as well as the characteristics of sustainable AI (along with the associated risks and impacts), is essential to better understand its characteristics and provide useful information at the corporate level (and thus to policymakers); it is also considered essential to limit the analysis to the Italian context to provide specific and detailed guidance and to assess the role and level of involvement of internal sustainability professionals.

The research, like all sustainability-related research, is part of the equally well-known ESG framework (which in turn is connected to global socio-environmental issues and is inextricably linked to recent European and national regulatory provisions requiring companies to pay greater attention to the impacts associated with their activities), a factor capable of influencing aspects such as reputation, competitiveness, financing possibilities, and business continuity.

The ongoing work ultimately aims to explore the connection between AI and sustainability, with a specific focus on the Italian business context to unravel the skein within a heterogeneous and poorly harmonized research landscape, seeking to offer interesting insights, especially of a practical nature.

Purpose of the paper. *The paper, after a brief introduction that separately contextualizes the concepts of AI and sustainability to dispel any doubts, primarily aims to investigate the relationship between artificial intelligence and sustainability within the corporate context and specifically to evaluate two aspects: how artificial intelligence can work for sustainability in terms of possible concrete applications (for example, in the field of social sustainability by improving inclusiveness, in the field of environmental sustainability by increasing energy efficiency, in the field of economic sustainability by optimizing the supply chain, in the field of technical sustainability by incentivizing automation and innovation) and what the characteristics of sustainable AI are in terms of ethics, transparency, responsibility, and privacy.*

The research also aims to assess the risks and potential negative impacts of AI in the ESG context, seeking to move beyond an overly simplistic, positive narrative; specifically, the aim is to assess its potential ecological risks (AI footprint), socioeconomic and ethical risks, as well as those related to data and algorithms, while also considering how these risks can often be intertwined, simultaneously affecting multiple spheres.

The possible mitigations that companies can implement to reduce the potential negative impacts associated with unsustainable use of AI are also assessed.

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The final section, through meticulous analysis of statistical surveys at the Italian company level, will investigate in more detail the level of AI adoption and the degree of involvement of sustainability departments, precisely analysing the most frequent barriers and obstacles that lurk behind full and committed implementation (e.g., lack of skills, inadequate financial resources).

All these considerations are intended to provide an interesting source of information for assessing the current state of the relationship between AI and sustainability and its level of maturity in the Italian business context. This will provide a clear and comprehensive framework that can serve as a source of information for policymakers and regulatory bodies: it is hoped that this will shape a broader framework for fully exploiting the great potential this tool has to offer, while always keeping sustainability in mind.

This work is ongoing, so further developments or insights may be considered later in the research process.

Methodology. *Methodologically, this ongoing work is characterized by a qualitative approach. A review of the scientific literature and detailed reports from institutions working on these topics has been exploited to analyse in detail the connection between AI and sustainability, assessing how artificial intelligence can contribute to sustainability through specific applications and the distinctive characteristics of sustainable AI. Issues such as risks and potential negative impacts in this context were not overlooked, thus evaluating potential mitigation measures. Statistical surveys in the Italian business context were also evaluated to assess the state of the art, level of maturity, and adoption rate, and thus draw valuable insights (for policymakers and regulatory bodies).*

In terms of temporal context, the analysis is inevitably tied to the most recent findings, given that the topic is constantly and rapidly evolving (analysing older data would obviously undermine the reliability and usefulness of the research). Regarding the geographical context, aside from the more general considerations that have a more universal value, it has been decided to focus the analysis on the Italian context to better define the results and thus provide specific and useful insights.

It would then be interesting to expand the analysis with a quantitative phase, again within the Italian context, to better analyse and update the actual connection between AI and sustainability within the Italian business context.

Results. *In order to initially dispel any doubts, the ongoing analysis began with an analysis of the actual meaning of the concepts of sustainability and artificial intelligence to fully understand their characteristics and nuances while analysing their interconnected relationship.*

The concept of sustainability is a multidimensional concept whose meaning has evolved and continues to evolve over time. To find a starting point, one can refer to the definition dated 1987 achievable from the report of the World Commission on Environment and Development titled Our Common Future (known as the Brundtland Commission) which refers to the «development that meets the needs of the present without compromising the ability of future generations to meet their own needs» that inevitably takes into account a strong intragenerational and intergenerational balance that transcends environmental impacts integrating economic and social dimensions: indeed, it is these three pillars (environmental, social, and economic) that have paved the way for all sustainable strategies, representing the compass to follow to ensure a truly sustainable approach. Specifically, respecting the considerations associated with the three pillars, which must be considered in conjunction with one another and not separately, ensures equitable development aligned with global needs and planetary health. The environmental sphere refers to issues such as resource conservation, ecosystem integrity, safeguarding biodiversity protection, and reducing the climate-altering impacts of anthropogenic gases and environmental contamination; the social sphere refers to equity, inclusion, social justice, education, ensuring equal access to resources and strengthening community cohesion; the economic sphere refers to the vision of a long-term economic prosperity that is resilient and inclusive and it has to be underlined that, the United Nations (UN), in order to operationalize these concepts, adopted the 2030 Agenda for Sustainable Development in September 2015, which includes 17 Sustainable Development Goals (SDGs).

The concept of artificial intelligence has gained particular traction in recent years, but it is a well-established concept considering that already in 1950, Alan Turing introduced the concept in his article titled "Computing Machinery and Intelligence"[2]; simply put, artificial intelligence (AI) today is a multidisciplinary field of computer science characterized by a set of technologies that allows a machine to emulate human capabilities through algorithms that learn from information available and/or collected directly by the machine to improve their performance over time.

There are different types of AI: the first one is Machine Learning (ML) that represents the fundamental branch of AI characterized by algorithms capable of automatically learning from existing data (that must be structured and labelled) and making predictions about future data; then there is the Deep Learning (DL) that exploits deep artificial neural networks[3] (that have hidden layers between the input and output) allowing them to learn complex representations from data (complex and unstructured as images, text, audio, or video, without manual preprocessing); another type can be represented by Generative AI in which, algorithms, trained on large amounts of data (structured or unstructured), can generate new outputs similar to the original data; finally there is Agentic AI, mainly deployed since the second half of

[2] Turing questioned whether machines could emulate human thinking and proposed the famous "Turing Test", in which a human interrogator attempts to distinguish the textual responses provided by a computer from those of a human.

[3] For example, can be considered Convolutional Neural Networks (CNNs) that are effective for analysing satellite imagery to monitor land changes and Recurrent Neural Networks (RNNs) that are instead used for tasks involving time-series data like weather forecasting.

2024, designed to pursue specific goals autonomously within a specific context with capabilities to make decisions, take actions, and adapt strategies based on environmental feedback and increasingly used in software and computer engineering or interfaces, in robotics and autonomous vehicles, or in decision-support systems (Casper et al., 2025). These AI technologies offer fundamental opportunities for addressing sustainability challenges with a precision unattainable through old methods allowing the transition from a reactive to a predictive and proactive approach in environmental and resource management.

Once the two different definitions have been clarified, it is useful to move on to the analysis of the dual relationship between sustainability and AI: artificial intelligence can represent a boost for all those activities that are linked to achieving sustainability in various business fields but at the same time it must itself take on sustainable connotations in order to be implemented without contraindications so it is important to consider how AI can contribute to sustainability in terms of possible applications and which are the main characteristics of a sustainable AI. Starting from the first aspect the AI can contribute to four types of sustainability: environmental sustainability[4], social sustainability[5], economic sustainability[6], technical sustainability[7] and individual sustainability[8] thus representing a truly key factor in the sustainable transition path for companies; as regards the characteristics of a sustainable AI, it can be stated that there are four main areas to focus on: ethics and fairness[9], accountability and responsibility[10], data privacy and security[11], transparency and explainability[12]; all these issues have to be taken into account to avoid the risk of an unsustainable AI.

These considerations related to the possible AI's unsustainability are clearly linked to the risks and the negative impacts associated to AI; starting from the assumption that, for Vinuesa et al. (2020)[13], AI has the potential to have both positive and negative impacts on corporate sustainability (AI could support the achievement of 134 of the 169 SDG targets but also notes that 59 of the 169 SDG targets could be negatively impacted), it has to be remarked that three types of risks can be considered: ecological risks (AI footprint)[14], socio-economic and ethical risks[15], data and algorithm-related risks[16] (which can also intersect with each other). In this context of analysis, the concept of "AI green paradox" comes into play, that is, that the benefits of ecological solutions implemented by AI are outweighed by the environmental costs[17] that arise from the use of AI itself: this aspect must be addressed through a clear, careful, proactive and strategic direction aimed at adopting a "green AI" taking into account the above mentioned risks; to achieve this, governance frameworks and international cooperation, funding and incentive policies (for green AI), international collaboration, open-source platforms and training programs are also needed.

An interesting insight into these issues in the Italian context can be deduced from the recent study dated 2025 by Sustainability Makers[18] where state of art, risks, barriers, and involvement of sustainability professionals are evaluated; in particular, in this work, what can be deduced is that AI is permeating companies (45.4% of companies are using AI, of which 30.9% with an extensive use, mainly exploited to improve operational efficiency (97.2%) and only partially for product and/or service innovation (50.2%)), 85% of large companies and 50% of SMEs have established units dedicated to AI implementation, the main obstacles are lack of skills[19], resistance to change (37% of companies during the implementation), lack of financial resources (23% of SMEs), difficulty in finding profitable areas of application. A critical

[4] For example, in terms of energy efficiency, waste management, climate modelling, resource management and disaster management.
[5] For example, in terms of cultural diversity, inclusion and poverty alleviation.
[6] For example, in terms of supply chain optimization, business operations, financial services and labour market.
[7] For example, in terms of process optimization, automation, research and innovation.
[8] For example, in terms of work efficiency, career development and knowledge accessibility.
[9] For example, in terms of bias mitigation, equity and responsible data use.
[10] For example, in terms of traceability and auditing.
[11] For example, in terms of privacy preserving algorithms and data anonymization techniques.
[12] For example, in terms of stakeholder engagement and explanations for IA decisions.
[13] VINUESA ET AL. (2020), *The role of artificial intelligence in achieving the Sustainable Development Goals*. Nature communications, 11(1), 1-10.
[14] For example, in terms of energy consumption (training AI models, especially large ones like deep learning models, requires a significant amount of energy), water consumption (some data centers use water cooling systems, which can consume significant amounts of fresh water), e-waste management (the rapid obsolescence of hardware technologies used for AI contributes to the growing amount of e-waste). All these factors can be summarized in the concept of digital pollution.
[15] For example, in terms of potential job losses (AI-powered automation can replace human jobs, especially in some sectors), technology dependence (the increased use of AI in various areas of daily life can lead to an overdependence on technology), security (AI can be used for malicious purposes), unequal access to technology (risk that AI will become the privilege of a few, accentuating inequalities).
[16] For example, in terms of 'black box' responsibility, erosion of digital trust, systemic digital bias (AI algorithms can reflect and amplify biases present in the data they are trained on thus leading to discriminatory decisions).
[17] In terms of energy consumption (and so carbon footprint), water consumption, e-waste. The concept of "green debt" refers exactly to the risk that the short-term AI benefits toward sustainability are outweighed by the long-term ecological of its development, resulting in overall net ecological deficit.
[18] Italian association that brings together professionals dedicated to defining and implementing sustainability strategies and projects in businesses and other organizations. The study is titled "Intelligenza artificiale al servizio della sostenibilità" and it is based on technical literature review and online survey administered to a sample of Italian companies (large, medium and small manufacturing and service companies).
[19] Companies experience a lack of skills during the phase of project initiation (36.1%) and project implementation (39.7%).

point in the Italian context is that social and environmental risks[20] related to AI are not properly under control (only 50% of companies have trained employees on these risks, and 64.1% of companies are not actively managing these risks); finally regarding the link with sustainability departments, the study reveals that sustainability managers are only occasionally involved in implementation processes (54.4% of large companies and 75.0% of small companies) and primarily in defining objectives (59.5%), the majority of sustainability departments have adopted AI initiatives (56.8%), AI adoption initiatives in the sustainability field are primarily focused on data analysis (85.0%) and reporting (63.0%), sustainability units feel the need to further develop skills and do not perceive themselves as prepared (62.2%).

The analysis conducted so far within this ongoing work has obtained interesting results in the evaluation of the dual relationship between AI and sustainability especially within the Italian business context, which will need to be increased with further developments in the continuation of the research to further explore these issues.

Research limitations. *The main limitations concern the data, methods, and theoretical framework used to analyse the relationship between AI and sustainability.*

Starting from the data, it is noted that the limited availability and transparency of data (often non-public or incomplete) on energy consumption, emissions, water use, and hardware throughout the entire life cycle of AI systems (training, inference, infrastructure, supply chain), along with the inevitable difficulty in defining standard and comparable metrics for the environmental and social impact of AI, undoubtedly pose challenges to the reliability of studies in this area. Regarding methodological issues, it should be clarified that the AI ecosystem is inevitably highly heterogeneous (different models, data centers, cloud providers, national energy mixes), making it difficult to properly isolate the specific contribution of AI from other digital factors. Furthermore, indirect effects such as the "rebound effect", in which AI-generated efficiencies stimulate new demand and consumption, are complex to quantify and generalize (it is difficult to generalize results from individual models, companies, or data centers to the entire AI ecosystem beyond specific sector studies). Furthermore, forecasting models with many assumptions (on energy scenarios, AI adoption, future regulation) introduce uncertainty and potential biases.

Conceptually, it is important to pay attention to the chosen scope of sustainability: many studies are characterized by a reductionist vision, focusing primarily on environmental aspects (CO_2, water resources, e-waste) with a view to optimization, dangerously neglecting potential social (inequality, job losses) and ethical (governance, green rights) dimensions. It has also to be highlighted that large AI companies control key technical data and can limit access to it for competitive or security reasons, generating information asymmetry; furthermore, it has to be remarked that, currently, there is a sort of positive narrative surrounding AI that can, however, distort research and funding agendas, pushing people to overemphasize benefits and underestimate sustainability impacts and risks.

Managerial implications. *An in-depth analysis of the delicate relationship between two such timely and important topics as AI and sustainability inevitably has managerial implications. First and foremost, evaluating the potential applications of AI in the service of sustainability, as well as the specific characteristics of sustainable AI, allows companies, and particularly internal professionals responsible for optimization, innovation, and sustainability, to find interesting insights to apply within their corporate contexts, ensuring competitiveness and innovation through this essential dual and synergistic relationship. This work also allows companies to become aware (if they have not already done so) of all the risks and potential negative impacts associated with AI, enabling them to immediately address them by adopting mitigation strategies and reconfiguring operations and strategic decisions.*

These insights can thus serve as a compass within a tremendously evolving and decisive context, one in which it is difficult to keep pace, both in terms of skills and resources. This work should act as a driving force for companies, within the limits of their operating margins, to invest in this direction to ensure business continuity, regulatory compliance, improved reputation, and mitigation of socio-environmental impacts.

Finally, the analysis of the Italian context aims to shed light on the current maturity of the Italian business landscape, highlighting the increasingly urgent need for investment, training and well-calibrated political and regulatory decisions.

Originality of the paper. *This work represents an interesting opportunity to investigate the relationship between AI and sustainability (focusing specifically on the Italian business context) in its dual conception, analysing both how AI can impact sustainability and what constitutes AI's sustainability. This analysis is increasingly crucial in the current business environment, characterized by the hypertrophic and disruptive growth of the use of artificial intelligence and where sustainability is an imperative that cannot be overlooked if resilience, competitiveness, and growth are to be ensured within an ecosystem shaken by well-known socioeconomic and environmental challenges (global warming, conflicts, environmental contamination, social tensions).*

The originality lies in the desire to analyse all the characteristics of this relationship between sustainability and AI without overlooking the negative aspects associated with the risks and negative impacts that may arise and which clearly must be adequately managed.

The goal is to provide a comprehensive overview that allows for accurate and adequate information while recognizing the complexity of the issue and the potentially significant impact it could have on corporate strategic decisions (and thus, on business continuity). The focus on the Italian context, which needs to be strengthened in the future, also serves as a

[20] Mainly identified as privacy, technology dependency and energy consumption.

magnifying glass for a deeper understanding of the level of maturity and awareness surrounding these issues, thus enabling to correctly guide future national political and regulatory decisions.

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Authenticity, Skepticism, and Trust Formation in Corporate Social Responsibility actions

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Abstract. *Corporate social responsibility (CSR) initiatives are attracting growing attention from stakeholders, making perceived authenticity a critical determinant of their effectiveness. This study investigates how CSR perceived authenticity shapes two distinct dimensions of consumer trust — cognitive and affective — both directly and indirectly through the mediating role of situational skepticism. Using a between-subjects experimental design administered via the Prolific platform and PLS-SEM estimation, we exposed participants to either high- or low-authenticity CSR scenarios and measured their perceptions, skepticism, and trust responses. Results indicate that CSR perceived authenticity directly and positively influences both cognitive trust and, to a greater extent, affective trust. Moreover, authenticity significantly reduces situational skepticism, which in turn partially mediates the relationship between authenticity and cognitive trust, but not affective trust. Dispositional skepticism, included as a control variable, does not significantly affect either form of trust or situational skepticism. These findings suggest that cognitive and affective trust operate through partially distinct psychological mechanisms: cognitive trust is shaped by a skepticism-filtered process, while affective trust may respond more directly to emotional and relational cues in firms' authentic CSR practices. Theoretical and managerial implications are discussed.*
Key words: *CSR; authenticity; skepticism; cognitive trust; affective trust; mediation*

Framing of the research. *It is well-established that corporate social responsibility (CSR) initiatives have become increasingly prominent in companies' agendas. However, the motivations behind these initiatives can be traced back either to a public-oriented rationale or to a more self-serving one (Mantovani et al., 2017). While the former reflects a genuine concern for social welfare, the latter is more closely associated with internal motives, such as the pursuit of private benefits. Suspicions of rent-seeking may lead stakeholders to view CSR initiatives with skepticism a priori (Wagner et al., 2009). This may dampen positive responses or even trigger negative reactions. Stakeholder responses may therefore depend on the impression these initiatives create, particularly in relation to perceptions of the firm's genuine commitment to the supported cause (Joo et al., 2019).*

In this respect, the extent to which stakeholders perceive CSR efforts as authentic becomes particularly important. Prior research, indeed, suggests that value-driven motives underlying CSR initiatives tend to reduce skepticism, whereas selfish, strategic, or stakeholder-driven motives are more likely to trigger skeptical reactions (Skarmeas and Leonidou, 2013).

Despite the relevance of the relationship between perceived authenticity and skepticism, and its potential implications for stakeholder-related outcomes, empirical research on this topic remains limited. A notable exception is the study by Virkus and Klein (2026), who examine the role of the authenticity perceived in brand activism in shaping skepticism and several important consumer-based responses.

Purpose of the paper. *Given the relevance of perceived authenticity, some studies, such as those by Alhouti et al. (2016) and Joo et al. (2019), have developed and validated scales to measure CSR perceived authenticity. The adoption of such scales is then used by Alhouti et al. (2016) to investigate several antecedents of CSR authenticity, and by Joo et al. (2019) to conceptualize the construct of authenticity as comprising multiple dimensions. Furthermore, subsequent studies have suggested that higher levels of perceived authenticity may mitigate stakeholders' skepticism toward firms' social initiatives (Schmidt et al., 2021).*

In this regard, prior literature has distinguished between different forms of consumer skepticism. Forehand and Grier (2003) and Skarmeas and Leonidou (2013) differentiate between dispositional and situational skepticism. Dispositional skepticism refers to a relatively stable personality trait that predisposes individuals to doubt firms' motives and is therefore largely beyond firms' control. Situational skepticism, by contrast, emerges in response to specific corporate initiatives – such as CSR campaigns or brand activism – and may be shaped by how these initiatives are perceived by stakeholders. In this sense, perceptions of authenticity may play a key role in either fuelling or attenuating situational skepticism.

Beyond its role in shaping skepticism, perceived CSR authenticity has also been associated with a range of relevant stakeholder-related outcomes. For instance, Alhouti et al. (2016) show that perceived authenticity can positively influence outcomes such as customer loyalty and purchase intentions, while Virkus and Klein (2026) identify purchase intention and willingness to engage in word-of-mouth as key consequences in the context of brand activism. Among the possible outcomes of authenticity perceptions, trust may represent a particularly relevant construct. Johnson and Grayson (2005) distinguish between cognitive trust, which is grounded in rational evaluations of a firm's competence and reliability, and

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affective trust, which reflects emotional bonds and feelings of care or concern. This distinction may provide useful insights into whether the effect of perceived authenticity – through its influence on situational skepticism – primarily operates through a cognitive mechanism or through a more affective pathway.

Accordingly, this study investigates whether the construct of CSR perceived authenticity fosters cognitive trust differently from affective trust, both directly and indirectly through situational skepticism. By distinguishing between cognitive and affective trust – an approach that has not yet been explored in the CSR context – this study contributes to the literature by examining whether the expected reduction in situational skepticism resulting from higher CSR perceived authenticity operates primarily within a cognitive or an affective sphere.

In particular, using PLS-SEM we test the following set of hypotheses:

H1a: CSR perceived authenticity impacts positively and directly on stakeholders' cognitive trust

H1b: CSR perceived authenticity impacts positively and directly on stakeholders' affective trust

H2a: CSR perceived authenticity impacts positively and indirectly on cognitive trust, mediated by decreasing stakeholders' situational skepticism

H2b: CSR perceived authenticity impacts positively and indirectly on affective trust, mediated by decreasing stakeholders' situational skepticism

Methodology. *This study employs a between-subjects experimental design with two conditions: high-authenticity versus low-authenticity corporate social responsibility. Participants will be randomly assigned to one of the two conditions via an automated randomisation procedure embedded in the survey platform. The survey will be administered via LimeSurvey and consists of several sections described below. All respondents will be asked to provide informed consent prior to participation.*

Participants will be recruited via the Prolific online research platform, aiming to obtain at least 300 completed responses from a nationally representative sample in the United Kingdom. After providing consent and entering their Prolific ID, participants will complete the survey sequentially. Three attention-check items will be embedded throughout the survey to ensure data quality; responses from participants who fail the attention checks will be excluded from the final analysis.

Prior to the experimental manipulation, participants will complete a 6-item measure of general consumer skepticism (e.g., "Most people will tell a lie if they can gain by it"; "Most people are not really honest by nature"). Items are rated on a 4-point scale ranging from 1 (low agreement) to 4 (high agreement). This scale was included as a pre-manipulation covariate to control for individual differences in dispositional skepticism and was taken from Mohr et al. (1998).

At this point, participants will be provided with standardised definitions of CSR and CSR authenticity — operationalised as the perceived genuineness, sincerity, and transparency of CSR actions. They will be then assigned to either the high-authenticity or the low-authenticity condition. In both conditions, participants will be presented with a list of six CSR practice categories (donations to charities, environmental sustainability programs, workplace inclusion and diversity, ethical supply chain policies, employee volunteering, and eco-friendly products/packaging) plus an open "Other" option. Critically, the behavioural examples illustrating each practice differ systematically across conditions: high-authenticity examples depict substantive, ongoing, and transparent commitments, whereas low-authenticity examples represent superficial, performative, or misleading implementations (i.e., greenwashing or social washing) (e.g., "A company consistently donates a fixed percentage of its annual profits to social or environmental charities that align with its mission, ensuring ongoing support for initiatives that reflect its contribution to meaningful community development" versus "A company makes a one-time, highly publicised donation after a scandal but does not maintain an ongoing commitment or report on the outcomes of the donation").

Participants will be required to select the CSR practice category most consistent with their own experience and will then be asked to identify a real company engaging in that practice at the assigned level of authenticity. If no real company can be recalled, participants may proceed with a hypothetical one. At the end of the survey, participants will indicate whether the company they had in mind was real or hypothetical; this information will be used as a robustness check in analyses.

Upon completing the manipulation, participants will respond to a series of self-report measures designed to capture their perceptions of, and reactions to, the target company's CSR practices and the company more broadly. Each instrument is described in turn below.

CSR Practice Perceptions: Participants' perceptions of authenticity of the identified company's CSR practice and of the company more broadly are assessed across multiple dimensions using an established scale developed by Joo et al. (2019). All items are measured on a 7-point Likert scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree).

CSR Skepticism (situational): CSR-specific skepticism is assessed using four bipolar items rated on a 7-point scale. Each item presented two opposing anchors (e.g., 1 = "It is doubtless that the CSR practice is socially responsible" vs. 7 = "It is doubtful that the CSR practice is socially responsible"). Items were reverse-coded where applicable so that higher scores reflect greater skepticism. This scale was developed by Skarmeas and Leonidou (2013).

Willingness to Pay: A single item assesses participants' willingness to pay more for a product from a company known for genuinely practicing CSR, compared to a competitor engaging in CSR for marketing purposes only. Response options were: "Not willing to pay more", "Up to 5% more", "6–10% more", "11–20% more", "More than 20% more".

Consumer Trust: Trust in the identified company was measured using seven items (e.g., "I have no reservations about acting on the company's advertising"; "If I share my concerns with the company, I feel it would respond caringly") rated

on a scale from 1 (not at all) to 7 (very much). The scale was adapted from Johnson and Grayson (2005) and captures both the affective and cognitive dimensions of trust.

Consumer Satisfaction: Satisfaction with the product or service received from the identified company was assessed using three semantic differential items (Sad/Happy; Contented/Disgusted; Dissatisfied/Satisfied), each rated on a 7-point scale. Given that satisfaction presupposes direct consumption experience, this measure was administered only to participants who identified a real — rather than a hypothetical — company.

Individual Importance of Social and Environmental Issues: A single item assessed the personal salience of social and environmental issues to participants in their daily lives, rated on a 10-point scale ranging from 1 (not at all important) to 10 (extremely important).

A pilot experiment has already been conducted via Prolific to test the survey instrument, the effectiveness of the manipulation, and procedural clarity. Based on pilot results, item wording was refined, instructions were clarified, and the option to proceed with a hypothetical company was introduced, as several pilot participants found it challenging to identify a real company. Pilot participants will not be included in the final sample.

Results. *We estimated our conceptual model using PLS-SEM approach (in particular the estimates were carried out through the software SmartPLS version 4 (Ringle et al., 2024)). The CSR perceived authenticity (which serves as our exogenous latent construct) and situational skepticism, cognitive trust and affective trust (which serve as our endogenous latent constructs) were all measured using a reflective approach, considering as indicators and scales those presented in the previous (Methodology) section. Our mediating construct is situational skepticism, which reflects stakeholders' skepticism toward specific CSR initiatives characterized by high (or low) authenticity. However, we also included dispositional skepticism in the model as a control variable. In our conceptual framework, dispositional skepticism influences the endogenous mediating latent construct (i.e. situational skepticism) as well as the two outcome variables, cognitive trust and affective trust. This reason is that skepticism as a personality trait may carry over to situational skepticism and, also, negatively affect both forms of trust.*

We first checked for reliability and validity of the constructs in our model (using Cronbach's alfa, Composite Reliability (CR) indices, Average Variance Extracted (AVE) and Heterotrait-Monotrait (HTMT) statistics). The indicators of CSR perceived authenticity appear to exhibit some degree of redundancy (CR > 0.95). Nevertheless, the Average Variance Extracted (AVE) exceeds the recommended threshold of 0.5, suggesting that the construct retains adequate convergent validity. Furthermore, the indicator loadings on the respective latent constructs are almost entirely above the recommended threshold of 0.7. This suggests that the indicators exhibit satisfactory indicator reliability, as they share a substantial proportion of variance with their underlying constructs (see Hair et al. (2012) and Hair et al. (2017) for details on PLS-SEM).

Subsequently, we turned to the main focus of the analysis, namely the estimation of the structural model's path coefficients, using 5,000 bootstrap replications. As the results in Table 1 indicate, the CSR perceived authenticity improves cognitive trust (0.523, $p < 0.01$) and, to a larger extent, the affective trust (0.786, $p < 0.01$), thus confirming hypotheses H1a and b. The evidence of a stronger direct effect of CSR perceived authenticity on affective trust highlights its ability to foster an emotional connection between firms and stakeholders scrutinizing CSR practices. However, CSR perceived authenticity contributes to a reduction in situational skepticism (−0.721, $p < 0.01$), which represents the part of individuals' skepticism that can adapt based on observation of CSR actions. This reduction, in turn, contributes to an increase in cognitive trust, as indicated by the negative coefficient (−0.250, $p < 0.01$), whereas its impact on affective trust is not significant. This gives rise to the consideration that a mediation (indirect) effect of situational skepticism in the relationship between CSR perceived authenticity and cognitive trust occurs. As outlined in Table 2, this relationship is partially mediated (adopting the description of the mediation effect provided by Zhao et al., 2010) thus conforming hypothesis H2a. However, no mediation appears in the relationship between CSR perceived authenticity and affective trust. Therefore, hypothesis H2b does not find support.

Overall, these results suggest that (1) stakeholders' perception of authenticity in the scrutiny of firms' CSR practices directly fosters the development of affective trust, and (2) situational skepticism introduces a mediating pathway that operates exclusively within the cognitive domain. The main insight is that while cognitive trust tends to develop more cautiously in a direct way, it benefits from the mitigation of the skepticism filter. This filter appears to operate primarily at the deliberative level of the trust-formation process toward the firm. In other words, when individuals harbour skepticism, the development of cognitive trust is hindered, whereas reducing such skepticism facilitates the attribution of trust.

Interestingly, persistent skepticism does not significantly influence situational skepticism nor the two forms of trust. This finding suggests that stakeholders' evaluations of CSR initiatives are primarily shaped by situational cues rather than by stable individual predispositions toward skepticism. In particular, the perception of authenticity in firms' CSR practices appears to play a more central role in shaping stakeholders' reactions than general skeptical tendencies. This finding highlights the importance of authenticity cues in shaping stakeholders' trust judgments, as such cues may attenuate the influence of pre-existing skeptical orientations.

Table 1. Path analysis

	VIF	*β*	*t*	*CI [2.5% – 97.5%]*
CSR perceived authenticity (CSRPA) → Cognitive trust (CTRUST)	*2.087*	*0.523****	*7.848*	*[0.386 – 0.646]*
CSR perceived authenticity (CSRPA) → Affective trust (ATRUST)	*2.087*	*0.786****	*16.818*	*[0.686 – 0.868]*
CSR perceived authenticity (CSRPA) → Situational skepticism (SSKP)	*1.001*	*-0.721****	*19.743*	*[-0.785 – -0.640]*
Situational skepticism (SSKP) → Cognitive trust (CTRUST)	*2.090*	*-0.250****	*3.467*	*[-0.389 – -0.106]*
Situational skepticism (SSKP) → Affective trust (ATRUST)	*2.090*	*-0.014*	*0.265*	*[-0.125 – 0.087]*
Persistent skepticism (PSKP) → Situational skepticism (SSKP)	*1.009*	*-0.108*	*1.686*	*[-0.191 – 0.065]*
Persistent skepticism (PSKP) → Cognitive trust (CTRUST)	*1.009*	*-0.014*	*1.219*	*[-0.128 – 0.031]*
Persistent skepticism (PSKP) → Affective trust (ATRUST)	*1.001*	*0.063*	*1.280*	*[-0.047 – 0.146]*

**** statistically significant at 1% level*

Table 2. Mediation analysis

CSR perceived authenticity (CSRPA) → Cognitive trust (CTRUST)						
Indirect effect			*Direct effect*			*Mediation type:*
β	*t*	*CI [2.5% – 97.5%]*	*β*	*t*	*CI [2.5% – 97.5%]*	
*0.181****	*3.269*	*[0.076 – 0.294]*	*0.523****	*7.848*	*[0.386 – 0.646]*	*Partial mediation (complementary)*
CSR perceived authenticity (CSRPA) → Affective trust (ATRUST)						
Indirect effect			*Direct effect*			*Mediation type:*
β	*t*	*CI [2.5% – 97.5%]*	*β*	*t*	*CI [2.5% – 97.5%]*	
0.010	*0.263*	*[-0.060 – 0.093]*	*0.786****	*16.817*	*[0.686 – 0.868]*	*No mediation (only direct effect)*

Research limitations. *Despite its contributions, this study is subject to limitations that should be acknowledged and addressed in future research. Firstly, the sample is drawn exclusively from the United Kingdom via the Prolific platform. While Prolific panels tend to provide nationally representative samples along key socio-demographic dimensions, the findings may not generalise to other cultural or institutional contexts where norms around CSR, corporate transparency, and consumer trust differ substantially. Cross-cultural replications would strengthen the external validity of the results. Secondly, the study relies entirely on self-reported measures collected at a single point in time. This cross-sectional approach precludes any causal inference about the temporal dynamics of trust formation. Longitudinal designs could shed light on how authenticity perceptions and trust evolve as stakeholders accumulate experience with a company's CSR behaviour over time. Moreover, the study focuses on stakeholders as consumers, considering them the primary audience of CSR communication. The mechanisms identified here — particularly the differential pathways to cognitive versus affective trust — may operate differently among other stakeholder groups, such as employees, investors, or community members, whose relationships with the firm are governed by distinct motivational and relational logics. Finally, although the present model focuses on situational skepticism— given the key role it may play in shaping stakeholder responses to CSR initiatives —the trust-formation process is likely shaped by additional variables not captured in the present framework, such as brand familiarity, prior CSR associations, or issue involvement. Incorporating these factors in future models could enrich our understanding of the boundary conditions under which authenticity perceptions translate into stakeholder trust. At the same time, beyond the mechanisms explored here, other psychological processes may also shape stakeholders' reactions to CSR initiatives. Future research could explore additional mediating variables (e.g., moral evaluation or identification with the firm) in order to deepen our understanding of the processes through which CSR authenticity influences stakeholder attitudes and behaviors.*

Managerial implications. *From a theoretical standpoint, this study makes several contributions to the CSR literature. First, by adopting a multidimensional conceptualisation of trust, it demonstrates that cognitive and affective trust are not interchangeable outcomes. While cognitive trust develops through a deliberative, skepticism-filtered process, affective trust appears to be more directly activated by authenticity perceptions, suggesting that emotional and rational pathways to trust formation operate differently in the CSR context. Second, the finding that situational skepticism mediates only the cognitive pathway contributes to a more refined understanding of the role of skepticism in CSR research, clarifying that it acts as a barrier to trust. Third, the non-significant role of dispositional skepticism suggests that stable individual predispositions may be overridden by contextual authenticity cues. These theoretical insights also carry meaningful practical implications for managers.*

The finding that the mediation mechanism operates only through the cognitive pathway, via the reduction of situational skepticism, while affective trust is influenced solely through a direct effect, suggests that different dimensions of trust are activated through distinct psychological mechanisms. This provides several meaningful managerial implications. First, cognitive trust appears to emerge from evaluative and rational processes in which individuals assess the credibility and reliability of the information they receive. In this context, situational skepticism functions as a critical filter that shapes whether individuals accept or question organizational messages or practices. Consequently, reducing skepticism becomes a key managerial goal for fostering cognitive trust. Secondly, affective trust appears to be generated more directly through relational and emotional cues, such as shared values and empathy. This implies that managers

seeking to cultivate affective trust should complement informational transparency with communication approaches that emphasize value alignment and empathy.

Taken together, these findings highlight the importance of adopting a dual strategy in trust-building initiatives. On the one hand, organizations should actively reduce situational skepticism by providing credible and substantiated information in order to support the development of cognitive trust. On the other hand, they should simultaneously invest in communication practices that foster emotional connection and identification, which can directly strengthen affective trust. By recognizing that cognitive and affective trust rely on partially distinct mechanisms, managers can design more nuanced communication strategies that address both the rational and emotional dimensions of stakeholder trust.

Furthermore, the results highlight a lack of significance in the dispositional skepticism on situational skepticism and on the two forms of trust. One possible interpretation is that persistent skepticism reflects a broad dispositional orientation, whereas situational skepticism is activated through the evaluation of specific organizational actions. When stakeholders observe concrete CSR practices, their judgments may rely more heavily on contextual signals, such as perceived authenticity, than on generalized attitudes. In this sense, situational skepticism appears to function as a context-sensitive response rather than as a simple extension of dispositional skepticism and CSR authenticity signals may therefore override stakeholders' dispositional skepticism.

Originality of the paper. *The main contribution of this paper lies in adopting a multidimensional perspective on trust as an outcome associated with stakeholders who closely monitor corporate social responsibility (CSR) initiatives. Trust can be conceptualized as comprising both cognitive and affective dimensions, allowing for a more nuanced investigation of the mechanisms through which it is formed. By distinguishing between these two facets, the study explores whether different psychological processes underlie the development of cognitive versus affective trust. Adopting this multidimensional lens thus provides deeper insight into how stakeholders (such as, in particular, consumers) interpret and respond to CSR actions, highlighting that distinct mediating mechanisms may influence the formation of trust along its cognitive and affective dimensions.*

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Crossing the borders: How Digital Transformation enables Social Value Co-Creation

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Abstract. *This preliminary study explores the critical intersection of digital transformation, social sustainability, and business relationships—a nexus currently under-represented in literature, which predominantly emphasizes environmental and economic dimensions. The research aims to investigate how firms embedded within specific networks can leverage advanced technologies to pursue social sustainability objectives. Adopting a qualitative methodology based on a single case study, the paper analyzes the evolution of corporate social commitment from traditional philanthropy toward an integrated digital strategy. The findings reveal that the application of Industry 4.0 technologies enables the co-creation of relational value with stakeholders. The study highlights that social sustainability is not merely an internal output but a collaborative result of network expansion and technological convergence that bridges competence gaps and generates systemic benefits for the extended community composed by several actors.*
Keywords: *social sustainability; innovation; strategic marketing; business relationships; digital transformation.*

Framing of the research. *Sustainability has emerged as a paramount objective for companies and society at large. Greenland (1997) characterizes sustainability as a strategic approach to optimizing current resource allocation to meet future demands. A seminal shift occurred with Elkington's (1998) "Triple Bottom Line" (TBL) framework, which requires organizations to balance economic, environmental, and social dimensions. These pillars remain central to modern corporate sustainability discourse (Khan et al., 2023; Elkington, 2013). The literature underscores sustainability's importance for contemporary business models, with these three pillars being integral to financial decisions and corporate investments (Gregory, 2024). Moreover, the United Nations 2030 Agenda, through its 17 Sustainable Development Goals (SDGs), has provided clear guidelines for addressing global challenges, highlighting the importance of balancing economic growth with social and environmental concerns. Consequently, sustainability is now regarded not merely as an ethical choice, but as an essential condition for long-term success and competitiveness across many industries.*

Research tends to interpret sustainability broadly, with an emphasis on reducing environmental impact and optimizing economic performance, while frequently underexploring the social dimension of business operations (Girdhar and Punia, 2026). Social sustainability is defined by Sanders and Wood (2024) as a holistic approach aimed at environmental protection, enhancing quality of life, and preserving social capital. Although the social dimension of sustainability is receiving increasing scholarly attention, it still lacks a unique, coherent, and strategic understanding (Khan et al., 2026). This theoretical gap hinders the provision of adequate tools for managers and entrepreneurs to fully comprehend the discipline. As a consequence, firm-led initiatives often appear limited, episodic, and poorly structured, leaving the field fragmented (Girdhar and Punia, 2026; Hogrefe and Bohnet-Joschko, 2023; Öberg, 2012). Furthermore, this issue can be linked to the widespread application of Corporate Social Responsibility (CSR) practices which, while extensively examined at the firm level, often lack a broader perspective (Girdhar and Punia, 2026).

Parallel to this necessity, digital transformation (DT) is fundamentally restructuring industrial paradigms. DT has garnered increasing attention as a significant external force impacting both businesses and society (Matt et al., 2023), encompassing all changes brought about by the deployment of digital technologies (Majchrzak et al., 2016). To successfully navigate this transition, firms must adopt comprehensive digital strategies that enhance operational performance and organizational agility (Hess et al., 2016). Furthermore, DT serves as a catalyst for business model innovation, enabling firms to redefine how value is created, delivered, and captured (Teece, 2010; Zott and Amit, 2008). By leveraging core competencies through technological adoption (Liu et al., 2011), organizations can implement new business logics to secure a competitive advantage (Casadesus-Masanell & Ricart, 2010).

The convergence of digitalization and sustainability—often discussed within the context of Industry 4.0—presents fertile ground for innovation (Rahman et al., 2023; Upadhyay et al., 2021). However, while the economic and environmental ramifications of Industry 4.0 are well-documented, the social dimension remains under-researched. This scholarly gap is particularly evident regarding the impact of Industry 4.0 on social sustainability. As stakeholders increasingly demand demonstrable social engagement, there is a critical need for empirical research—especially within B2B contexts—to explore how technologically-mediated relationships enhance a firm's social commitment (Rahman et al., 2023).

Business markets are based on networks of actors that interact and exchange resources: these exchange systems (Shashi et al., 2025) are interconnected, as interactions within a specific relationship impact all other interactions (Håkansson and Snehota, 1995). These mutual influences form the foundation of a value-added chain, where value is co-created by all actors involved in the network (Re and Magnani, 2026; Lacoste, 2016). Value creation is a dynamic process

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embedded in specific contexts where conditions continuously evolve in time and space (Dziubaniuk and Aarikka-Stenroos, 2025; Grönroos and Voima, 2013). Möller (2013) describe the network as a relational system of interconnections among entities. Due to its inherent dynamism, the network undergoes a dual evolution: key interdependencies become institutionalized and difficult to alter, yet the network remains fluid through the entry or exit of members. Consequently, business networks exhibit a dualism between stability and change (Håkansson and Snehota, 1995) directed toward a common aim: the co-creation of value. This concept is based on the premise that network actors establish relationships not only for the value of exchanged goods but for mutual value creation (Lindgreen and Wynstra, 2005). The idea that network actors collaborate to produce higher value than providers can deliver alone is fundamental to B2B marketing (Lacoste, 2016). Therefore, understanding the network context is crucial. Investigating how actors react to their surrounding networks—impacted by forces such as social sustainability and DT—is essential (Re and Magnani, 2026).

To structure the empirical investigation, this study adopts the Activities–Resources–Actors (ARA) model (Håkansson and Snehota, 1995) as its conceptual lens, complemented by recent contributions on sustainable value co-creation in business networks (Lacoste, 2016; Re and Magnani, 2026). The ARA framework allows social sustainability to be analyzed as the joint outcome of three interdependent layers: the activity layer (how firms organize and connect social, technological, and operational practices); the resource layer (which tangible and intangible assets—including digital infrastructures—are mobilized and combined with those of partners); and the actor layer (which heterogeneous parties are progressively included in the network and how their bonds evolve). This framing positions digital transformation not as an external variable, but as an enabling infrastructure that reshapes activity links, resource ties, and actor bonds within the network, providing the conceptual scaffold for the analytical dimensions developed in the Results section.

Purpose of the paper. *The present research is designed to address the aforementioned gaps by investigating the intersection of DT, social sustainability, and business relationships. By positioning this study at the nexus of these three domains, we aim to explore how companies embedded in specific networks can pursue social sustainability goals by leveraging advanced technologies.*

Methodology. *This research is currently positioned at the initial, exploratory stage of a larger, ongoing research project. The investigation was primarily executed using a qualitative approach, grounded in a single case study design. This methodological choice was predicated on three core rationales—exploratory suitability, the uncovering of complex dynamics, and theoretical depth—directly addressing the novelty and complexity of the research objective. Firstly, qualitative methodologies are optimally suited for initial exploratory inquiries, particularly within specialized and dynamic industry contexts like the smart building ecosystem (Yin, 2013; Ellram, 1996). Secondly, a deep qualitative analysis focused on a single successful case is essential for uncovering intricate, underlying organizational and collaborative dynamics that may remain inaccessible through structured, quantitative instruments (Yin, 2009). This methodology is also highly appropriate for contexts defined by multi-subject relationships and interactions, which represent a core theme of digital platform collaboration (Mantere and Ketokivi, 2013). Lastly, the case study approach is employed here to provide theoretical depth by examining a contemporary phenomenon within its native, real-world context, particularly where the boundaries between the technological phenomenon and the organizational system are ambiguous (Yin, 2013).*

The selected case study is Florim, a company founded in 1962 in the Sassuolo district (Italy), which is a leader in the ceramic industry and engages in the production of ceramics for various purposes, from household furnishings to industrial applications. Florim was chosen for this research due to its notable commitment to sustainability principles. Indeed, the company has received the prestigious B Corp certification, demonstrating its tangible dedication to having a positive impact on both the environment and society.

Florim is treated here as a revelatory case (Yin, 2009) rather than a merely illustrative one. Three features support this status. First, the firm operates in a traditional, asset-heavy manufacturing sector—ceramics—where social sustainability is rarely problematized at network level, making the observation of a structured social-digital strategy theoretically informative beyond the single firm. Second, Florim hosts the first medical training centre embedded within a private Italian company to be certified by the American Heart Association, an empirical configuration that allows the observation of dynamics—the convergence of digital infrastructure, social purpose, and inter-organizational competence integration—that are typically inaccessible or fragmented in more conventional settings. Third, the firm's status as a B Corp combined with a long-standing investment in Industry 4.0 makes visible the joint unfolding of digital and social transformation processes that, in most companies, occur in separate organizational silos. Following the logic of theoretical sampling (Eisenhardt and Graebner, 2007), the case is therefore selected for its capacity to extend rather than test theory, providing analytical generalization (Yin, 2013) toward a more systemic understanding of social value co-creation in business networks.

Data collection involved a triangulation of primary and secondary sources to ensure the robustness of the findings. Secondary data encompassed a comprehensive review of publicly available documents, including market analyses, corporate reports, company presentations, official websites, and conference materials, which were used to establish the context and define the firm's strategic positioning and platform capabilities (Dubé and Paré, 2003; Eisenhardt, 1989; Miles and Huberman, 1984). Primary data were gathered via 5 semi-structured interviews conducted with key organizational figures, ensuring their credibility as reliable sources capable of providing valuable insights for this research (Alvesson and Ashcraft, 2012). A semi-structured interview guide was employed to afford participants the

flexibility to introduce other relevant topics they considered important. The interviews were conducted either face-to-face or via Microsoft Teams in Italian between September 2023 and November 2025. These sessions lasted approximately one hour and a half, were recorded, and subsequently transcribed for analysis. It should be noted that data collection is currently ongoing, with further interviews already scheduled with the company to deepen the empirical evidence. The iterative nature of data collection is consistent with the systematic combining logic adopted in this study, in which fieldwork and theoretical framing co-evolve. The empirical base presented here, however, is already considered sufficiently saturated with respect to the three analytical dimensions discussed in the Results section, as the most recent interviews produced no new first- or second-order themes. Additional interviews will serve to extend the network perspective beyond the focal firm rather than to consolidate the within-case interpretation.

Data analysis followed an abductive logic consistent with the systematic combining approach (Dubois and Gadde, 2002), which is particularly suited to qualitative inquiry within the IMP tradition, where empirical material and theoretical framework are progressively refined in parallel. Interview transcripts and secondary sources were analyzed through coding activity. Open coding was applied to the full corpus, generating first-order concepts that remained close to the language of the informants (e.g., "giving back to the territory", "training healthcare professionals", "step outside our network"). This helped identifying three aggregate analytical dimensions presented in the Results section (network-embedded social sustainability; digital technologies as relational enablers; network expansion as a precondition for social value creation), explicitly mapped onto the Activities–Resources–Actors (ARA) model (Håkansson and Snehota, 1995) to ensure consistency with the broader theoretical conversation.

Data triangulation was implemented across primary interviews, corporate sustainability reports, B Corp documentation, and public communications, allowing convergent evidence on the same phenomenon to be cross-checked. Moreover, a member checking was conducted by sharing preliminary findings with the firm's Sustainability Manager, who confirmed the plausibility of the analytical interpretation and provided clarifications on contested points.

Results. *Florim distinguishes itself from its peers through an advanced perspective on social sustainability that transcends traditional corporate philanthropy. This preliminary single case study analysis highlights three emerging analytical dimensions that link DT, network dynamics, and social value creation: (1) network-embedded social sustainability, (2) digital technologies as relational enablers, and (3) network expansion as a precondition for social value creation.*

First, the findings suggest that social sustainability evolves from an internal, firm-centric activity into a network-embedded process of value co-creation. Beyond standard environmental practices, the company has adopted a strategic social approach that extends well beyond employee training. Florim is committed to giving back to its local territory by leveraging the resources and human capital generated within its production processes, prioritizing the well-being of its workforce, their families, and the wider community. This shift indicates that social sustainability outcomes are not produced in isolation, but emerge through continuous interaction with multiple stakeholder groups, supporting a relational interpretation of the social pillar of sustainability.

The first key stakeholder group is Florim's workforce. With 1,432 employees worldwide, the company invests heavily in professional development, delivering over 13,000 hours of training in 2024. This includes the launch of Florim Learning, a digital platform that contributed 3,000 hours of specialized education. Programs focusing on leadership, cybersecurity, and the internal Master's degree demonstrate a commitment to lifelong learning. Furthermore, workplace safety remains a central pillar; in 2024, accidents decreased by 38% compared to the previous year, supported by prevention programs and free medical screenings in partnership with Sassuolo Hospital. These initiatives exemplify how internal stakeholders are integrated into a broader system of social value creation, where digital tools (e.g., learning platforms) facilitate continuous capability development and relational engagement.

The second stakeholder is the local community. Florim promotes public health through vaccination campaigns and blood donation drives, alongside welfare initiatives such as childcare support and flexible work arrangements. This engagement is formalized through the Ing. Giovanni Lucchese Foundation—named after the founder of Floor Gres and current Florim patriarch—which was officially registered in the National Third Sector Register in 2024. The Foundation provides scholarships, supports local hospitals, and funds social projects, including Red Cross initiatives and autism support programs, thereby strengthening the social fabric of the ceramic district. From an analytical perspective, these activities highlight how firms can act as orchestrators of local network, reinforcing the idea that social sustainability is co-produced at the territorial level rather than delivered unilaterally.

The third stakeholder group comprises voluntary associations. On a global scale, Florim contributes to the Water is Life project in collaboration with Rock No War. This voluntary organization has been active for many years in international solidarity, aiming to provide concrete aid and relief in regions where conflict or underdevelopment have caused significant hardship. To date, the Water is Life project has completed 88 interventions across 29 countries, delivering clean water to marginalized populations. This evidence further supports the interpretation of social sustainability as a multi-scalar phenomenon, extending beyond local boundaries and enabled by network linkages that connect geographically dispersed actors.

The fourth stakeholder category is represented by cultural entities. Through initiatives such as the Florim Gallery, partnerships with the Peggy Guggenheim Collection, and the Art to Share project, the company pursues a holistic vision that integrates innovation, culture, and solidarity to generate a positive global impact. These collaborations illustrate

how non-traditional partners contribute to the co-creation of social value, expanding the conceptualization of relevant actors within business networks.

Second, the findings show that DT acts as a relational infrastructure that enables and amplifies social value co-creation. The final and most critical stakeholder group consists of healthcare institutions. This dimension represents the core of the present research, as it provides a clear empirical illustration of how a company can address social sustainability gaps by operating at the nexus of DT and strategic business relationships. In 2014, Florim launched the "Florim Health & Training Center" at its Fiorano headquarters, a project that transcends traditional corporate philanthropy by integrating advanced technology into the company's social value proposition. By allocating over 600 square meters of its industrial facility to medical training, research, and advanced simulation, Florim established the first center within a private Italian company to be certified by the American Heart Association. This initiative is not merely a social project but a sophisticated application of DT to the public welfare sector. The center is equipped with high-fidelity medical humanoids capable of replicating complex human physiological functions. These humanoids are managed via a state-of-the-art control room, utilizing Internet of Things (IoT) and digital monitoring systems to provide real-time feedback during medical simulations. This technological infrastructure allows healthcare professionals—not only from the local district but from across Italy—to refine their life-saving skills in a risk-free, technologically advanced environment. Analytically, this case demonstrates that digital technologies function as boundary-spanning mechanisms that connect heterogeneous actors and enable the creation of shared value even outside the traditional core business environment. Rather than being limited to efficiency improvements, digital tools become central elements in structuring and sustaining inter-organizational relationships oriented toward social outcomes.

Third, the findings highlight that pursuing social sustainability requires the intentional expansion and reconfiguration of business networks. The development of this project highlights the critical role of inter-organizational relationships in navigating unfamiliar strategic domains. As the Sustainability Manager emphasized, the realization of the Health & Training Center required Florim to step outside its established industrial network. The company faced a significant competence gap, as the resources required for medical simulation were entirely foreign to its core business of ceramic production. To bridge this gap, Florim had to cultivate a new network of experts, medical equipment providers, and healthcare institutions. This process of network expansion demonstrates that social sustainability is often a collaborative outcome: the company leveraged its physical facilities and financial strength, while its new partners provided the specialized knowledge and technological standards required for medical certification. This finding suggests that value co-creation in the context of social sustainability is not only a matter of interaction among existing actors within the same core business environment, but also of actively incorporating new ones, thereby extending current network boundaries and redefining the locus of value creation.

Furthermore, this case underscores how technologically-mediated relationships can act as a catalyst for social performance. Florim did not simply apply Industry 4.0 logic to its manufacturing lines (e.g., its automated factory); it extended this digital mindset to its social initiatives. The center functions as an automated hub of excellence where the convergence of digital tools and professional networks creates a unique form of relational value that benefits the entire network of actors involved. Overall, the findings move beyond a purely descriptive account by demonstrating how DT, network reconfiguration, and social sustainability are jointly intertwined, offering a basis for theoretical generalization toward a more systemic and relational understanding of social value co-creation.

Read through the ARA lens, the three analytical dimensions can be synthesized into an emerging interpretive proposition: social sustainability in B2B networks is co-produced through digitally mediated activity links that mobilize heterogeneous resource ties and progressively reconfigure actor bonds beyond the focal firm's industrial network. Three theoretical implications follow from this proposition. First, the locus of social value creation shifts from the firm to the network: social outcomes are not delivered, but emerge from interaction patterns that the firm orchestrates but does not own. Second, digital technologies operate as boundary-spanning resources, whose function is not primarily efficiency-related but relational, enabling activity links between actors that would otherwise lack a shared technical language (e.g., a ceramic manufacturer and healthcare institutions). Third, social sustainability appears to require an intentional asymmetry in network structure: the focal firm contributes physical and financial resources, while non-traditional partners contribute legitimacy and specialized competence, generating a form of relational value that none of the actors could produce in isolation. These insights move the discussion beyond the descriptive account of the case toward a more general theoretical contribution to the IMP tradition and to the literature on digital-enabled sustainability.

Research limitations. *This study represents the preliminary, exploratory phase of a broader, ongoing research project aimed at mapping the complex synergies between digital innovation and social sustainability in business networks. Consequently, the findings presented must be interpreted within the context of several inherent limitations that provide fertile ground for future scholarly inquiry.*

A primary constraint lies in the research's current reliance on a single case study within the Italian ceramic district. While this approach offers exceptional depth, it limits the broader generalizability of the results across different industrial sectors or geographical regions with diverse institutional frameworks. To address this, future research should adopt a multiple-case study design or cross-sectoral analysis.

Furthermore, the exploratory nature of this initial phase focuses heavily on strategic intent and the qualitative description of technological integration. There is currently a lack of longitudinal quantitative data to measure the long-term impact of these digital social initiatives. Future investigations could therefore employ longitudinal methodologies

providing a more robust empirical basis for the exploration of the synergy between digital maturity and social performance.

Lastly, as data collection is still in progress, the current evidence is primarily reflective of the focal firm's internal perspective. While this provides a clear view of corporate vision, it may overlook the nuances of how external partners perceive and extract value from these technologically-mediated relationships. To resolve this limitation, future research directions should include a multi-actor perspective, gathering primary data from the wider network, such as healthcare institutions. This panoramic approach would allow for a more comprehensive understanding of how value is truly co-created at the nexus of DT and social sustainability, ensuring that the benefits are systemic rather than merely organizational.

Managerial implications. *The findings of this research offer several critical insights for practitioners and strategic leaders aiming to synchronize digital innovation with social responsibility. In addition to their practical relevance, these implications are grounded in the empirical evidence and directly connected to the theoretical dimensions emerging from the analysis (i.e., network embeddedness of social sustainability, digital technologies as relational enablers, and network reconfiguration).*

Primarily, the study suggests that managers must evolve their perspective from traditional, episodic corporate philanthropy toward a Social Sustainability 4.0 model. In this framework, DT is not merely an internal tool for optimizing manufacturing efficiency but a core component of the firm's social value proposition. By integrating advanced technologies—such as IoT-driven medical simulation or dedicated digital learning platforms—into social initiatives, managers can transition from being passive donors to becoming active architects of high-value social networks. This shift requires a digital mindset that views technological assets as versatile instruments capable of generating measurable impacts far beyond the factory borders.

Furthermore, the research underscores the necessity for managers to proactively navigate and bridge competence gaps when pursuing ambitious social objectives. The case of the Florim Health & Training Center demonstrates that radical social innovation often necessitates stepping outside established industrial networks. For management, this implies a need for high relational agility: the ability to identify, cultivate, and orchestrate partnerships with non-conventional actors, such as healthcare institutions, medical equipment providers, and scientific experts. Successful social performance, therefore, becomes a collaborative outcome of network expansion, where the focal firm leverages its financial and physical resources while its partners provide the specialized knowledge and certifications required for credibility. Empirical findings indicate that this process is not spontaneous but requires intentional network reconfiguration, reinforcing the managerial need to develop capabilities in partner selection, coordination, and long-term relationship management across domains.

Finally, the study highlights that investments in digital infrastructure for social purposes can serve as a powerful relational catalyst. By providing shared technological assets that benefit the broader community—such as national healthcare systems or local educational districts—firms can significantly enhance their legitimacy and territorial embeddedness. Managers should recognize that these technologically-mediated relationships create a unique form of relational value that transcends financial returns, ultimately strengthening the firm's competitive positioning by aligning corporate success with systemic social progress. This suggests that social sustainability initiatives, when digitally enabled, should be strategically designed as open and participatory platforms rather than closed, firm-centric programs related to the traditional core business of the company.

Originality of the paper. *The originality of this research lies in its integrated positioning at the nexus DT, social sustainability, and B2B relationship, addressing some gaps in current literature. The paper articulates three specific theoretical contributions, which advance the conversation on social sustainability, digital transformation, and business networks beyond a restatement of existing positions.*

While research has traditionally focused primarily the attention on environmental and economic sustainability, leaving the social dimension underexplored and strategically fragmented (Girdhar and Punia, 2026; Khan et al., 2026), this study addresses this specific gap by providing a coherent and strategic exploration of social sustainability. Specifically, the research does not simply reaffirm this gap, but critically problematizes it by highlighting the lack of a network-oriented and technology-enabled understanding of social sustainability. The paper argues that prior literature has treated the social pillar either as an internal firm outcome or as a CSR extension, overlooking its relational and systemic nature. By analyzing how Florim integrates its social commitment into its core operational logic, this study conceptualizes social sustainability as a network-embedded and co-created process, moving beyond the episodic and poorly structured initiatives (Hogrefe and Bohnet-Joschko, 2023; Öberg, 2012).

Furthermore, while the ramifications of Industry 4.0 are well-documented in manufacturing, their implications on social sustainability have been only marginally theorized, particularly within B2B contexts (Rahman et al., 2023). This research extends existing knowledge by showing how DT acts not only as an operational enabler but as a relational infrastructure that supports new forms of social value co-creation. The study highlights the use of high-fidelity humanoids and IoT-driven monitoring not as mere industrial tools, but as mechanisms through which heterogeneous actors (firms, healthcare institutions, and communities) interact and jointly generate social outcomes. In doing so, it responds to the call for research into how technologically-mediated relationships enhance a firm's social commitment (Rahman et al.,

2023), providing an empirically grounded interpretation of digital technologies as boundary-spanning devices in social sustainability processes.

Finally, the paper contributes to network theory by refining the concept of value co-creation in light of social sustainability objectives. While literature suggests that value is co-created by all actors in a network (Lacoste, 2016; Lindgreen and Wynstra, 2005) and that businesses must recognize objectives beyond financial interests (Re and Magnani, 2026), this research advances this perspective by demonstrating that the pursuit of social sustainability requires intentional network reconfiguration and expansion beyond traditional industry boundaries. It shows that the convergence of digital tools and professional networks generates a distinct form of relational value—social-systemic value—that is not fully captured by existing co-creation frameworks. This is particularly evident when firms enter unfamiliar domains and mobilize new competencies through digitally enabled collaborations, thereby extending current theory on value co-creation toward a more systemic and socially oriented interpretation.

The study introduces the notion of social-systemic value as a distinct outcome of digitally mediated network reconfiguration: a form of relational value that (i) is socially oriented in its purpose, (ii) is systemic in its scope, as it accrues to the network and the surrounding community rather than to dyadic exchange, and (iii) is digitally enabled in its mode of production, since high-fidelity digital infrastructures are constitutive—not merely supportive—of the relational ties that generate it. This construct is offered as a preliminary theoretical contribution to be tested and refined in subsequent stages of the research project.

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CSR Behaviour and Perceived Relevance in Micro and Small Family Businesses: Evidence from the Italian Context

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Abstract. This paper adopts an inductive approach based on empirical research conducted in Italy by Universitas Mercatorum and Federterziario within the LAMP Observatory activities. The study examines 139 micro and small firms to analyse the level of knowledge and implementation of sustainability practices, CSR and ESG behaviours, and their perceived relevance, while exploring the latent influence of the temporal dimension. On this premise, the empirical context is characterised by micro and small enterprises, predominantly family-owned and managed.

To address this issue, the study draws on the literature on sustainability and ESG issues in micro and small family businesses. Furthermore, it analyses sustainability orientation using a Perceived Relevance–Implementation matrix that captures the relationship between perceived relevance and CSR/ESG behaviours.

The matrix enables an integrated interpretation of the degree of consistency or misalignment between the cognitive and operational dimensions of sustainability. The findings reveal heterogeneous patterns across firms and suggest that the temporal dimension may play a relevant role in explaining the evolution of sustainability practices.

The study contributes to the literature on CSR and ESG in micro and small family firms by providing exploratory empirical evidence and proposing an interpretative framework for analysing the alignment between perceived relevance and organisational implementation.

Keywords: sustainability; ESG; micro and small firms; family business; CSR practices; perceived relevance – implementation matrix.

Framing of the research. The rapid growth of socially responsible investment (SRI) and the publication of international standards for CSR reporting, such as the GRI guidelines, have laid the foundation for reporting to play a significant role in the disclosure of corporate performance (Cho, 2013).

Therefore, since CSR information is not directly reflected in traditional financial statements, in recent years, many stakeholders increasingly seek information on firms' CSR and ESG performance in order to evaluate corporate behaviour and sustainability commitments (Cohen et al., 2011; Esposito De Falco et al., 2021). This matter is a relevant fact for investors, stakeholders, and market decision-making (Sehrish et al., 2024), thereby improving the firm's reputation (An et al., 2011) and reducing uncertainty about the firm's value (Izadi et al. 2025).

In this vein, voluntary disclosure regarding CSR aspects reduces the problems of asymmetric information between different stakeholders and market agents, which is especially important in economic contexts, such as those populated by micro and small firms, that are characterised by a strong focus and commitment to stakeholders (Ferrero et al., 2015).

Regarding CSR applications, Dahlsrud (2008) and Mariani et al. (2023) argued that behaviours and strategies might vary across organisational settings, and that business families characterise the global economy. Therefore, many researchers, such as Chrisman et al. (2012) and De Massis et al. (2014), have sought to define this type of firm. Drawing on existing research, this study defines a family business as any firm characterized by transgenerational intent, a distinct family identity, and unique social and human capital, where the founder retains ownership and holds a seat on the board of directors (Chrisman et al., 2012; Habbershon et al., 2003; Miller et al., 2011; Gjergji et al., 2021).

In this context, the specific characteristics of family businesses, such as simpler management structures, limited financial and human resources, and stronger social relations influenced by the desire to preserve the socioemotional wealth (SEW), may affect the effectiveness of CSR disclosure (Berrone et al., 2012; Dey et al., 2022).

Regarding that, a lot of researchers such as Kolk & Perego (2010) argue that family business firms act according to the community's component status in the society in which they operate, for this reason they are considered stakeholder-oriented and expected to fulfil certain social responsibilities and observable behaviours, such as waste management, welfare, gender equity, that produce their impacts in short terms and in communitarian tangible manner (Banerjee, 2002; Schuler and Cording, 2006).

Factors such as business size, increasing market competition, globalisation, and the temporal dimension are interrelated. Therefore, firms, predominantly large companies, with financial resources, develop more ethical procedures and/or substantial investments to achieve long-term goals. Rather than micro and small businesses, which are prevalently involved in overcoming local competitive challenges, are local stakeholder-oriented, have limited financial resources and focus their responsible efforts on the sustainable short-term objective.

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Regarding this, family members feel a strong sense of identification with the company, which is seen as an extension of it, and through which it also develops social ties with a wide range of stakeholders, such as employees, suppliers, customers, lenders, and the community at large (Fuetsch, 2022).

According to the signaling theory this condition shows how a given pattern of action might signal particular hidden attributes, provide benefits to both signaler and observers, and meet the conditions for observable CSR behaviours that contribute to Institutional theory objectives.

According to Ericson and Laibson (2019), agents are more likely in the present to choose an action that generates immediate experienced utility. Because many ESG investments are long-term oriented and pay off far into the future, they may be perceived as having less financial, social, or emotional utility than projects with more immediate benefits. To reinforce this trend, psychologists, sociologists, and economists have argued that people favour generosity towards those with whom they are socially close rather than mere acquaintances or strangers. This approach allows firms to evaluate immediate effects while reducing perceived investment risks (Van Boven et al., 2010).

Despite the growing literature on CSR and ESG disclosure, existing studies have mainly focused on large corporations and listed firms (Esposito De Falco et al. 2024; Martins et al., 2022). Much less is known about how sustainability is perceived and operationalized within micro and small family businesses. Notably, the relationship between the perceived relevance of sustainability and the effective implementation of CSR practices remains largely unexplored, especially in light of firms' temporal orientation (Cantele & Zardini, 2020). This paper aims to address this gap by analysing the alignment between perceived relevance and CSR behaviour in Italian micro and small family firms.

Purpose of the paper. This paper aims to analyze the implementation and perceived relevance of CSR and ESG practices, while considering the temporal dimension as a latent variable that may influence these factors.

This study is theoretically grounded in a scientific framework that highlights two key and interconnected dimensions, drawing on Institutional and Signaling theories.

Regarding that, the research questions is:
What is the relationship between the perceived relevance of sustainability and the implementation of CSR behaviours in micro and small family firms?

Methodology. *3.1 Research design.* This study adopts an exploratory, inductive research design to investigate whether and how a specific temporal orientation influences CSR behaviours and Perceived relevance in micro and small family firms. Given the limited availability of structured, comparable data on sustainability practices among Italian micro and small enterprises, a survey-based methodology was considered the most appropriate for capturing both the cognitive and operational dimensions of sustainability.

The research follows a cross-sectional design and focuses on the biennium 2023–2024, thereby enabling a homogeneous temporal reference for evaluating firms' sustainability practices. The aim is not to test causal relationships through advanced econometric modelling, but rather to identify patterns of coherence or misalignment between what firms declare about sustainability and what they actually implement.

3.2 Data collection and sample characteristics. Data were collected through a structured questionnaire administered online to firms affiliated with FederTerziario, a national Italian employers' association representing micro, small and medium-sized enterprises. The survey was conducted exclusively within the FederTerziario network. This bounded organizational context is relevant to the interpretation of the findings, as the firms surveyed are embedded in a shared representative system that may shape informational flows, normative orientations and managerial awareness, particularly regarding sustainability-related issues.

The sampling strategy follows a non-probabilistic approach, consistent with the exploratory purpose of the research and with the association-based access to respondents. While the sampling strategy does not allow statistical generalization, it is appropriate for exploratory research aimed at identifying emerging patterns within a specific organizational context. Out of an initial sample of 139 firms, 136 valid questionnaires were collected and included in the final analysis.

The sample is predominantly composed of micro and small enterprises, reflecting the typical composition of the FederTerziario network. A significant proportion of firms employ fewer than five employees and report annual revenues below €500,000. From a governance perspective, more than 70% of the firms declare family ownership or management, and over half are directly managed by the entrepreneur or principal shareholder. The vast majority have not experienced a generational transition in the last decade, suggesting relatively stable ownership and control structures. Overall, the profile of respondents is coherent with the structural characteristics of the Italian productive system, in which micro and small family firms represent a dominant organizational form.

3.3 Structure of the questionnaire. The questionnaire was designed to align with a coherent analytical architecture that links firm structural characteristics to sustainability orientation and behavioural outcomes. Rather than being a purely descriptive tool, the instrument reflects the theoretical framework underpinning the study, particularly the relationship among governance configuration, stakeholder embeddedness, and CSR behaviours.

The survey included multiple sections covering firm profile, ownership and governance, human resource management, territorial embeddedness and sustainability practices. Sections A and B focus on structural and governance characteristics, which are particularly relevant in the context of micro and small family firms, where ownership concentration and

managerial centralization may influence strategic orientation and temporal horizon. Section C explores human resource policies and organizational practices, capturing internal relational dynamics and investment orientation. Section D investigates the firm's embeddedness within its territorial and institutional environment. Section E concentrates on sustainability and ESG issues and constitutes the empirical core of the present contribution.

The overall structure of the questionnaire is summarized in Table 1.

Table 1 – Conceptual structure of the questionnaire

Section	Analytical Dimension	Theoretical Relevance	N° of Questions
A–B	Structural and governance configuration	Ownership concentration, managerial centralization, generational continuity	12
C	Organizational and relational dynamics	Human capital investment, internal stakeholder orientation	13
D	Territorial and institutional embeddedness	Origins and Interactions among Firms, Territory, and Institutions	10
E	Sustainability and ESG orientation	Perception, implementation and formalization of CSR practices	12

3.4 Construction of the Perceived Relevance–Implementation Matrix. To interpret the configuration of sustainability within the sampled firms, a materiality-inspired matrix was developed. The matrix conceptually maps the selected ESG themes across two analytical dimensions, perceived relevance to the firm (horizontal axis) and CSR behaviour (vertical axis), thereby providing a structured framework for their interpretation. The ESG themes in the matrix were derived from questionnaire items on environmental practices, human capital management, occupational safety, and governance mechanisms. The positioning of themes within the matrix is based on the relative distribution of the perception and implementation indices rather than on predefined thresholds.

The aim of this analytical framework is not to assess materiality in a normative reporting sense, but to examine the level of internal coherence between the cognitive framing of sustainability and its effective organizational embedding. The perceived relevance dimension reflects the managerial perception expressed by the respondents, primarily entrepreneurs or owner-managers, regarding the importance attributed to specific ESG themes. The CSR behaviour dimension captures the extent to which CSR practices and formal governance mechanisms are effectively adopted.

The horizontal axis integrates evidence from three survey items: spontaneous associations with sustainability (E1), perceived benefits linked to sustainable behaviour (E2), and the extent to which sustainability is considered a guiding value (E3). For each theme *t*, a Perception Index (PI_t) was constructed as the arithmetic mean of the relevant percentage values:

$$PI_t = \frac{\sum_{i=1}^{m_t} P_{it}}{m_t}$$

where P_{it} represents the perception proxies associated with theme *t*, and m_t denotes the number of perception variables considered.

The vertical axis synthesizes environmental and social practices (E4–E5), disclosure tools (E6), and ESG-linked remuneration systems (E8). For each theme, an Implementation Index (II_t) was calculated as:

$$II_t = \frac{\sum_{i=1}^{n_t} I_{it}}{n_t}$$

where I_{it} denotes the implementation proxies associated with theme *t*, and n_t represents their number.

Given the exploratory nature of the study, the indices were constructed as simple arithmetic means of selected proxies, without applying weighting or standardization procedures. The objective is interpretative rather than predictive. In this study, the temporal dimension is not directly operationalized through specific survey items. Instead, it is used as an interpretive analytical lens to explain the patterns of alignment and misalignment observed between perceived relevance and CSR behaviour. The matrix therefore, provides a structured reading of patterns of coherence and misalignment between perceived relevance and organizational embedding, rather than a statistically generalizable measurement.

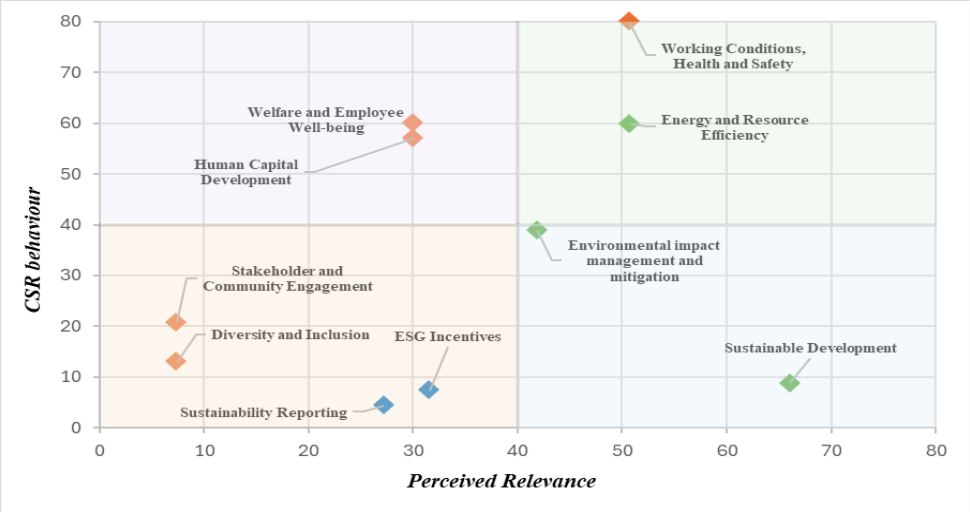
Results. The empirical findings are presented through the Perceived Relevance–Implementation matrix, which operationalizes the relationship between CSR behaviours and firms'orientation. By comparing declared importance and actual implementation of ESG themes, the analysis identifies patterns of coherence and misalignment that help explain how sustainability is embedded within micro and small family firms. Table 2 reports the values of the and the Implementation Index (II) for the ESG themes considered in the analysis, providing the empirical basis for their positioning within the matrix. The positioning of ESG themes according to the Perception Index and the Implementation Index is illustrated in Figure 1.

Table 2 - Perception and Implementation Indices by ESG Theme

ESG Themes	*Perception Index (PI)*	*Implementation Index (II)*
Environmental impact management and mitigation	41,9	39
Energy and Resource Efficiency	50,7	60
Sustainable Development	66	8,9
Working Conditions, Health and Safety	50,7	80
Human Capital Development	30	57
Welfare and Employee Well-being	30	60
Diversity and Inclusion	7,4	13
Stakeholder and Community Engagement	7,4	20,8
Sustainability Reporting	27,2	4,4
ESG Incentives	31,6	7,4

Source: Authors' elaboration based on survey data (2023–2024)

Figure 1. Perceived Relevance – CSR behaviour matrix



Source: Authors' elaboration based on survey data (2023–2024)

The matrix provides an integrated representation of sustainability within the sampled firms, highlighting the degree of alignment, or misalignment, between the cognitive and operational dimensions of ESG themes. The intersection between perceived relevance and CSR behaviour reveals differentiated patterns across environmental, social and governance domains, suggesting an evolutionary trajectory that remains incomplete.

Environmental dimension: operational convergence under normative pressure. Environmental protection emerges as the most pivotal theme at a perceptual level. In response to E1, 60.3% of respondents spontaneously associate sustainability with environmental protection. In E2, 50.7% identify cost savings from energy efficiency as a key benefit, while 23.5% cite climate risk reduction. At the operational level, environmental practices are relatively widespread. Approximately 70% of firms report waste separation practices, 68% declare the use of recycled or low-impact materials, and around 60% monitor energy consumption. However, more advanced practices show significantly lower diffusion: only about 10% monitor greenhouse gas emissions and approximately 15% have adopted a structured environmental management system. This configuration places environmental issues in the quadrant characterized by relatively high perceived relevance and moderate implementation. Nonetheless, implementation remains concentrated in basic and efficiency-oriented practices rather than in systematic impact measurement and structured environmental governance. These issues require structural investments and changes in organizational culture that could produce reputational and economic effects in the long term.

Occupational health and safety: strong alignment. Decent and safe working conditions are cited by 50.7% of respondents as a core aspect of sustainability. At the implementation level, approximately 80% of firms report adopting a health and safety management system. This represents the strongest alignment between perception and implementation within the matrix. The coherence observed in this area reflects the presence of well-established regulatory frameworks that make

the adoption of such practices almost mandatory and produce immediate impacts on reputation, considering that employees could be community components.

Human capital and welfare: implementation exceeding explicit ESG framing. Training and human capital development display a distinct configuration. Around 30% of respondents associate sustainability with employee-related aspects at the perceptual level, while implementation rates for structured training plans reach approximately 55–60%. Welfare initiatives show similar levels of adoption, around 60%. In this case, operational practices exceed explicit ESG framing. Firms invest in internal social initiatives for organizational and relational reasons, employee retention, skill development and workplace climate, yet these initiatives are not always conceptualized as part of a formal sustainability strategy. This pattern reflects an inward-looking sustainability embedded in daily management rather than in an articulated ESG paradigm, producing, in the temporal dimension view, the same effects described before.

Governance and formalization: structural weakness. Governance-related themes occupy the quadrant characterized by both low perceived relevance and low implementation. Although 27.2% of respondents associate sustainability with transparency in management, only 4.4% of firms have produced a sustainability report in the 2023–2024 biennium. Likewise, only 7.4% have introduced remuneration systems linked to ESG objectives, and the adoption of recognized standards such as GRI or SDGs remains marginal. The broader theme of sustainable development reveals a particularly pronounced gap. While 66% of respondents place sustainability in the upper levels of the Likert scale when asked whether it represents a guiding value, structured implementation tools remain extremely limited: reporting at 4.4%, ESG incentives at 7.4%, and environmental management systems at approximately 15%.

Differentiated Signaling Mechanisms Across ESG Domains. Beyond the alignment between perceived relevance and CSR behaviour, the matrix also reveals differentiated signaling patterns across ESG domains. Practices that are directly observable by internal and local stakeholders, such as occupational health and safety or basic environmental initiatives, display relatively high levels of implementation, as visible CSR initiatives can influence stakeholder perceptions and behaviours and reinforce the credibility of sustainability commitments (Wu et al., 2025). These behaviours are visible within the community and can function as relational signals of responsibility and reliability, consistent with recent interpretations of signaling processes in sustainability contexts (Connelly et al., 2011). Conversely, formal disclosure mechanisms, such as sustainability reporting (4.4%) or ESG-linked remuneration systems (7.4%), remain marginal. These instruments are typically directed toward more distant stakeholders, including financial actors and institutional investors, and require higher organizational and informational investments. Recent European evidence supports the view that structured sustainability and ESG disclosure help reduce information asymmetries and strengthen credibility in capital markets. For instance, sustainability reporting has been shown to be negatively associated with information asymmetry in UK-listed firms, although the relationship is moderated by family control (Al Natour et al., 2022). Complementary evidence on European SMEs indicates that ESG disclosure is associated with a lower cost of capital, with family business status influencing this relationship (Gjergji et al., 2021).
These findings reinforce the interpretation that formal ESG disclosure mechanisms operate not only as transparency instruments but also as strategic devices aimed at enhancing credibility and mitigating uncertainty in capital markets and within communities where the firms operate. Therefore, the limited adoption of such mechanisms among the sampled firms suggests that their communication strategies are not primarily oriented toward distant financial stakeholders. Instead, sustainability practices function predominantly as relationally embedded forms of accountability, rooted in proximity-based stakeholder interactions rather than in structured disclosure systems designed to address broader market-level information asymmetries. The matrix highlights a sustainability configuration characterised by selective operational consolidation and limited formalisation of governance, indicating structural gaps in the strategic integration of ESG practices.

Discussion. The Perceived Relevance–Implementation matrix provides a theoretically grounded interpretation of sustainability within micro and small family firms. The findings reveal an uneven integration of sustainability across ESG domains, with stronger consolidation in regulated and operational areas and weaker formalization in governance mechanisms.

From an Institutional Theory perspective, firms operate within environments shaped by regulatory frameworks and normative expectations that influence organizational behaviour (Campbell, 2007). The strong alignment observed in occupational health and safety and basic environmental practices can therefore be interpreted as the result of coercive and normative pressures that encourage the adoption of practices that ensure compliance and social legitimacy. Conversely, governance-related mechanisms such as sustainability reporting, ESG-linked remuneration systems and standardized disclosure frameworks remain weakly institutionalized within micro and small enterprises. Their limited diffusion suggests that formal ESG disclosure has not yet become a consolidated expectation for this segment (Setyaningsih et al., 2024). As a result, sustainability practices tend to develop primarily in areas with stronger regulatory pressure (Tyler et al., 2024) and where benefits are more immediate and observable, such as cost savings or improved resource efficiency (Mohammadi et al., 2026). In family firms, sustainability may also serve as a symbolic resource, through which organisations signal conformity with socially desirable norms and values (Rehman & Hamdan, 2023). The high

proportion of respondents who declare sustainability as a guiding value indicates strong symbolic endorsement, consistent with the reputational and socioemotional considerations that often characterise family-controlled firms (Mariani et al., 2023). However, the gap between this symbolic commitment and the limited adoption of governance mechanisms suggests that legitimacy is often pursued through visible operational practices rather than through formal accountability systems (Esposito De Falco & Cucari, 2025). The findings can also be interpreted through the lens of temporal orientation. Practices associated with immediate economic benefits or regulatory compliance are widely implemented, whereas mechanisms requiring medium- to long-term investments, such as sustainability reporting systems or certified environmental management frameworks, remain marginal. The temporal dimension therefore helps explain why micro and small family firms tend to prioritize CSR practices characterized by immediate, observable benefits over long-term governance investments. In organizational contexts characterized by centralized decision-making and limited managerial specialization, such investments may be perceived as disproportionate to the firm's scale (Spence, L. J. 2016). Consequently, firms appear more inclined to adopt sustainability practices that produce visible outcomes within local stakeholder networks, such as employees, customers and community members, while governance tools directed toward more distant stakeholders remain less frequently adopted (Ernst et al., 2022).

Overall, sustainability in the analysed firms appears socially legitimized but organizationally only partially institutionalized. It is widely recognized at the symbolic level and operationally embedded in selected domains, yet only partially institutionalized within governance structures. The matrix, therefore, suggests that sustainability in micro and small family firms is situated in a transitional stage, where cognitive awareness precedes full systemic integration and where temporal orientation shapes the translation of sustainability values into structured governance practices.

Research limitations. Despite the theoretical and empirical contributions of this study, several limitations should be acknowledged. First, the research uses a cross-sectional survey design, which captures sustainability perceptions and practices at a single point in time. This approach constrains the ability to infer causal relationships and to fully assess the dynamic evolution of sustainability integration within micro and small family firms. Given the relevance of temporal orientation and evolutionary trajectories highlighted in the analysis, longitudinal studies would be particularly valuable in capturing how CSR behaviours and governance mechanisms develop over time and in response to changing institutional pressures.

Second, the empirical evidence relies on self-reported data collected through questionnaires. While this method enables access to a broad sample of firms, it may introduce response bias, particularly regarding socially desirable constructs such as sustainability and CSR. The strong symbolic endorsement of sustainability values observed in the findings may partly reflect normative expectations rather than actual operational commitment. Consequently, future research could integrate qualitative methods, such as in-depth interviews or case studies, and objective performance indicators to triangulate responses and strengthen construct validity. Third, the sample is geographically and institutionally bounded to the Italian context and is further shaped by Federterziario's role as the distributing body. While this setting allows for a focused investigation of micro and small family firms operating within a specific macro-institutional environment, it limits the generalizability of the results. Institutional pressures, regulatory frameworks, and cultural norms differ substantially across countries, potentially leading to divergent sustainability trajectories. Comparative cross-country studies would therefore be useful for assessing the robustness of the proposed interpretations and exploring the contextual embeddedness of CSR behaviours.

Managerial implications. The findings of this study underscore the inherent limitations of generalizing the ESG practices of micro and small family firms. (Le Breton-Miller & Miller, 2024). Nevertheless, this work offers several salient managerial implications for such enterprises, as well as for professional advisors, external consultants, trade associations, and policymakers supporting sustainability transitions in this peculiar business segment.

The Perceived Relevance–Implementation matrix highlights a configuration characterized by selective operational consolidation and limited formal governance, suggesting that sustainability remains largely embedded in daily practices rather than strategically integrated into organizational systems. First, the results indicate that environmental sustainability is primarily interpreted through the lens of efficiency and regulatory compliance. While basic practices such as waste separation, energy monitoring, and the use of recycled materials are relatively widespread, more advanced tools, such as greenhouse gas accounting and structured environmental management systems, remain marginal. Managers should therefore consider shifting from a cost-saving and compliance-driven logic toward a more strategic environmental orientation. Introducing simplified environmental performance measurement systems and progressive monitoring tools can enable firms to better understand their environmental impact, support continuous improvement, and prepare for increasingly stringent regulatory and market requirements. Tailored advisory services and scalable environmental management frameworks could facilitate this transition without imposing excessive organizational burdens. Second, the strong alignment observed in occupational health and safety reflects the effectiveness of regulatory enforcement in shaping managerial behaviour. This suggests that regulatory clarity and institutional support play a crucial role in fostering the adoption of sustainability practices among micro and small enterprises. Managers can leverage this alignment by extending compliance-based approaches to other ESG domains, progressively embedding sustainability routines into formal procedures. In this perspective, regulatory compliance can serve as a gateway toward more comprehensive ESG integration rather than remaining an isolated operational requirement. Third, the results on human capital and employee welfare indicate that many socially oriented practices are already in place but are not explicitly framed as part of a

sustainability strategy. Managers may benefit from reinterpreting training, welfare, and employee engagement initiatives within an integrated ESG framework, thus enhancing internal coherence and external communication. By formalizing these practices, firms can improve organizational learning, strengthen employer branding, and reinforce relational trust with employees and local stakeholders, while also increasing awareness of sustainability as a strategic driver rather than merely an operational necessity.

Originality of the paper. This paper offers contributions to the literature on sustainability, ESG, and family business by advancing both conceptual understanding and empirical evidence on micro and small family enterprises, a segment that remains significantly underexplored in sustainability research. The study provides novel empirical evidence on the cognitive–operational gap in sustainability and ESG practices within micro and small family firms. By systematically contrasting perceived relevance and actual implementation, the research uncovers a structural misalignment across ESG domains, revealing that sustainability is recognized as a guiding value yet only partially institutionalized in governance mechanisms. This nuanced perspective advances existing scholarship, which has predominantly focused either on large corporations or on observable CSR practices, by explicitly addressing the interpretative and behavioural dimensions of sustainability at the micro-enterprise level.

Moreover, the introduction and application of the Perceived Relevance–Implementation matrix represent a methodological innovation. The matrix enables an integrated, theory-informed assessment of sustainability maturity, allowing the identification of differentiated ESG trajectories and the detection of evolutionary patterns. This analytical framework provides a scalable, adaptable tool for future empirical studies to examine sustainability integration in heterogeneous organizational contexts, particularly where formal governance structures are weak or underdeveloped.

Besides, the paper advances theoretical understanding by linking Institutional Theory with the concept of temporal bias to explain selective ESG adoption. While prior research has emphasized regulatory and normative pressures as drivers of CSR behaviour, this study demonstrates that short-term temporal orientation interacts with institutional forces, leading firms to prioritise low-risk, immediately beneficial practices over long-term strategic investments. This combined perspective provides a more dynamic explanation of sustainability behaviour in resource-constrained family firms and extends existing models of CSR adoption by incorporating intertemporal decision-making logic. Finally, the focus on micro and small family enterprises operating in the Italian institutional context constitutes a significant contextual contribution. By examining firms characterized by concentrated ownership, centralized decision-making, and limited managerial specialization, the study sheds light on how family logic, proximity-based stakeholder relationships, and informal governance structures shape sustainability pathways. This contributes to the family business literature by moving beyond large and listed family firms and addressing the dominant yet understudied population of micro and small family businesses.

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Customer satisfaction and repurchase intention in the Italian and Swedish e-mobility markets

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Abstract. *Despite strong governments' support, the EV adoption rate in many European countries remains slow to meet the EU targets. The transition to e-mobility requires not only increasing adoption rates but also ensuring positive user experiences that encourage continued use. While prior research has largely focused on the purchase intention of potential adopters, less attention has been given to post-purchase behavior, including user satisfaction and repurchase intention. This study aims to investigate factors affecting customer satisfaction and repurchase intention among EV users in Italy and Sweden. Data were collected through an online survey administered to Italian and Swedish users and analyzed using Partial Least Squares (PLS) regression models. The analysis investigates the impact of EV attributes, contextual factors, usage patterns, use motivations and individual characteristics on customer satisfaction and repurchase intention for the entire sample, as well as for subsamples stratified by country and by engine type (BEV and PHEV). Furthermore, the relationship between satisfaction and repurchase intention was also explored. Results highlight that specific EV attributes, such as battery life and brand reputation, the availability of charging points, the individuals' openness to changes and their propensity to renewable energy, the opportunity to save charging costs and the EV suitability for the users' typical route exert a cross-cutting influence on satisfaction regardless of the country and the type of engine. Some differences emerging across national contexts and between BEV and PHEV users suggest that consumption patterns can vary according to the country and the specific type of engine. Furthermore, results indicate that neither customer satisfaction nor other analyzed factors significantly influence the repurchase intention. Beyond focusing on those factors that drive cross-cutting satisfaction, manufacturers and policymakers should implement tailored actions according to the type of engine and the country to ensure the user retention.*
Keywords: *e-mobility; electric vehicles; satisfaction; repurchase intention; regression analysis; multicollinearity.*

Framing of the research. *Electric vehicles (EVs) are identified as successors to internal combustion engine vehicles (ICEVs), as they are expected to contribute to the reduction of greenhouse gas emissions (Lee et al., 2026). Despite strong government support, the EV adoption rate in many countries remains too slow to meet the EU targets (ACEA, 2026). Scholars have extensively examined the EV purchase intention of potential consumers, identifying several factors influencing the switch from ICEVs to e-mobility. While literature has primarily focused on potential consumers and the introduction of EVs focusing on drivers and barriers, usage and post evaluation have received considerably less attention (Ivanova & Moreira, 2023; Lee et al., 2026). Addressing this gap is important as the analysis of the post purchase stage, which includes the usage, the user satisfaction and the repurchase, can provide useful findings to address the EV uptake. The issue of EV repurchase is particularly relevant considering that a significant share of EV users would consider returning to gasoline or diesel cars (McKinsey, 2024)[2]. Nonetheless, the understanding of user satisfaction is also crucial for the EV uptake as satisfied adopters are more likely to repurchase the product and influence the public through their opinions (Rogers, 2013). Finally, available studies indicate that users tend to adapt to EVs and develop new behaviors, suggesting that the EV experience can change favorably the overall perception of e-mobility making users more willing to replace their current EV with another electric one (Bühler et al., 2014; Labeye et al., 2016).*

Although the literature on satisfaction and repurchase intention concerning EVs remains relatively limited, there has been a slight increase in the number of publications in recent years, particularly concerning satisfaction.

Studies examined both satisfaction with specific aspects and overall user satisfaction. The range of the vehicle and the adequacy of charging networks affect positively user satisfaction with driving range and charging infrastructure, respectively (Hardman and Tal, 2021; Song et al., 2022). It is worth noting that range satisfaction tends to increase over time as users adapt to EVs and develop new usage behaviors, leading to a reduction in perceived barriers after adoption (Franke et al., 2017). Regarding overall satisfaction, factors affecting it can be grouped in the following categories: attributes, contextual factors and individual factors. Among the EV attributes, concerns about life battery and high purchase costs were proved to decrease overall satisfaction (Chu et al., 2019; Kwon et al., 2020; Hamed et al., 2021; Song et al., 2022; Rehman et al., 2024) whereas the environmental performance of vehicles, its innovativeness, and the driving pleasure were found to affect positively the overall satisfaction (Okada et al., 2019; Song et al., 2022). Likewise, the EV equipment such as safety devices and in-vehicle information systems—which diminish range anxiety—were found to increase the overall user satisfaction (Franke et al., 2017; Hamed et al., 2021). Scholars largely evidenced that contextual factors such as the adequateness of charging infrastructures and the presence of governmental support to e-mobility—tax benefits, exemption from traffic restriction– positively affect the overall satisfaction (Sun et al., 2017; Chu

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[2] https://www.mckinsey.com/features/mckinsey-center-for-future-mobility/our-insights/new-twists-in-the-electric-vehicle-transition-a-consumer-perspective

et al., 2019; Okada et al., 2019; Kwon et al., 2020; Song et al., 2022; Cruz-Jesus et al., 2023). Finally, individual factors—such as environmental concern and usage patterns—emerge as further drivers of overall satisfaction, although less explored (Hamed et al., 2021; Cruz-Jesus et al., 2023).

Research on factors influencing the repurchase intention of EV users is even more limited. According to Kim et al. (2024) and Feng et al. (2025) the more the consumers are satisfied with aspects such as operating costs, charging infrastructure, range, and driving experience, the more they are likely to purchase another EV. However, Hasan (2021) found no evidence of a direct impact of overall satisfaction on repurchase intention, also observing that EV attributes—such as driving range, cost, and environmental performance—do not directly influence repurchase intention but instead affect it indirectly through user satisfaction or attitudes toward EVs.

Regarding individual aspects, environmental concern was found as a strong motivator to the repurchase (Lee et al., 2026). Some demographics such as age, number of electric vehicles owned, and household income (monthly) had a significant positive effect on repurchase intention in the study by Kim et al. (2024).

Purpose of the paper. *The scarcity of literature on EV post-purchase behavior led us to conduct an analysis of the factors affecting satisfaction and repurchase intention among a sample of Italian and Swedish EV users.*

The existing literature suggests that attributes, contextual factors, usage variables, and individual characteristics should be considered when analyzing customer satisfaction and repurchase intention.

We chose to conduct the investigation through a cross-country analysis. The cross-country approach is an emerging methodology in e-mobility research and allows scholars to explore how country-specific factors influence EV adoption and usage (Chu et al., 2019; Song et al., 2022). Previous studies suggest that national context, policies, and infrastructure conditions may significantly shape user satisfaction and usage patterns (Chu et al., 2019; Song et al., 2022; Augurio et al., 2025).

In this study, we perform a comparative analysis of the Swedish and Italian e-mobility markets, which are currently at different stages of development in the EV adoption. In Sweden, the e-mobility market has been steadily growing for several years. In 2025, EV sales accounted for 63.2% of all passenger cars sold[3], and the total EV stock represented 13.5% of all circulating vehicles (ACEA, 2026). In contrast, EVs still struggle to gain traction in Italy, where they represent only 7% of the circulating car fleet (ACEA, 2026). In 2025, EV sales accounted for just 12.6% of all passenger cars sold[4].

In addition, we decided to conduct the analysis by powertrain type (BEV and PHEV), as the literature provides no evidence on whether different EV technologies influence the post-purchase stage.

Methodology. *The research was performed by administering an online questionnaire to Italian and Swedish users of EVs who were at least 18 years old and who reported currently driving a BEV or PHEV. Given the low prevalence of EV users within the panel (estimated at approximately 2–5%), traditional quota-based stratification by sociodemographic variables was not feasible; therefore, a best-effort recruitment strategy was adopted. The random extraction of the respondents' selection and the dissemination of the online survey link were carried out by a qualified research service of the Toluna corporation, which uses an online platform for this purpose. Prior to data collection, the questionnaire was pilot tested on a subsample of 20 respondents to assess item clarity and survey flow. The results led to some minor amendments to the questionnaire. Data were collected in June 2023 via CAWI (Computer-Assisted Web Interviewing), with each session lasting approximately 25 minutes. The final achieved sample consisted of 320 complete responses, of which 164 were from Italy and 156 from Sweden. With regard to the type of EVs, 155 users reported to use a BEV whereas 165 a PHEV.*

In line with the empirical nature of the research, literature served as a source of inspiration for the formulation of the items. Items belong to 7 conceptual dimensions, identified based on extant literature: EV attributes, contextual factors, usage patterns, use motivations, individual characteristics (sociodemographics and psychographics), satisfaction and repurchase intention.

***EV attributes**—concerning price, technological features, equipment, and performance—were operationalized by asking respondents to rate the importance of each EV attribute on a scale ranging from 1 (lowest importance) to 9 (highest importance). **Contextual factors** were about the characteristics and adequateness of the charging infrastructure and the presence of governmental measures. Respondents were asked to rate the importance of each item on a scale ranging from 1 (lowest importance) to 9 (highest importance). As to **usage patterns**, respondents were asked about the number and types of cars owned, the brand of their main current EV and the EV range, their drive time per day, the annual average of kilometers driven and long trips, and the charging modality. **Use motivations** were measured by asking respondents to rate their agreement with sentences on a scale ranging from 1 (lowest agreement) to 9 (highest agreement). Sentences are related to functional, symbolic, and hedonic motivations to use an EV. **Individual characteristics** include both sociodemographics and psychographics. Sociodemographic elements refer to users' characteristics such as age, gender, household composition, education, etc. Psychographics were measured by asking respondents to rate how a list of statements regarding environmental concern and consumer innovativeness conform to the individual's personal beliefs and opinions using a score from 1 to 9, with 1 means "not compliant at all", 9 on the other hand, indicates "totally*

[3] https://www.acea.auto/pc-registrations/new-car-registrations-1-8-in-2025-battery-electric-17-4-market-share/
[4] https://www.acea.auto/pc-registrations/new-car-registrations-1-8-in-2025-battery-electric-17-4-market-share/

*compliant." **Customer satisfaction** was operationalized looking at the overall satisfaction of the individual and the satisfaction related to specific features such as price, VFM (value for money), maintenance and charging costs, technological equipment, reliability, electric range, and design. Respondents were asked to rate their satisfaction on a scale from 1 to 9. Finally, respondents were asked to rate their **repurchase intention** on a range from 1 to 100.*

Overall, the analysis includes a number of 93 items.

This study was performed by applying several linear regression models. The analysis poses important methodological challenges due to the presence of multicollinearity. Multicollinearity occurs when some explanatory variables are linear combinations of others. In such cases, these variables do not contribute significant additional explanatory power to the model and may sometimes be removed. However, reducing the number of variables through selection is not always desirable. An alternative approach to addressing the negative effects of multicollinearity involves the use of biased estimators. By accepting a small degree of bias, it is possible to achieve a substantial reduction in the estimator's variance. This principle underlies a class of methods known as shrinkage estimators (Camminatiello et al., 2024). Some studies suggest that partial least squares (PLS) regression (Wold, 1985) outperforms other methods in many cases by providing simpler and more parsimonious models (Frank and Friedman,1993). Therefore, in this research we consider PLS, as it has been increasingly developed in recent years and has proven effective in preventing overfitting.

In the first step, PLS constructs uncorrelated latent variables, called components, which are linear combinations of the original regressors. The number of latent variables A to be retained in the model can be selected using different criteria, the most common being cross-validation. A least squares regression is then performed on the subset of extracted latent variables.

To evaluate the performance of the models, we focus on the coefficient of determination (R^2) and the predicted residual error sum of squares (PRESS) criterion. The first criterion measures the goodness of fit of the model, while the second evaluates its predictive ability.

Results. *The empirical strategy is based on the construction of several linear regression models.*

Determinants of Customer Satisfaction. EV attributes, contextual factors, usage patterns, use motivations and individual characteristics were analyzed in relation to customer satisfaction for the entire sample, as well as for subsamples stratified by country (Italy and Sweden) and by engine type (BEV and PHEV). PLS regression was implemented using the R functions developed by J. F. Durand[5].

Overall, the goodness of fit and predictive ability is moderate and relatively similar across the five models (entire sample, 2 subsamples stratified by country—Italy and Sweden—and by engine type—BEV and PHEV).

In particular, the optimal dimension of the model carried out on the entire sample is A=2 components, which explain 45% of the variability in the dependent variables (R2). The predictive ability of the model is moderate with a PRESS=5.15. The optimal dimension of the model estimated:

- *on the Italian sample is A=1 component which explains the 40% of variability in the responses (R2), with PRESS=5.47;*
- *on the Swedish sample is A=2 component which explains the 50% of variability in the responses (R2), with PRESS=4.86;*
- *on the BEV engine sample is A=1 component which explains the 44% of variability in the responses (R2), with PRESS=5.08;*
- *on the PHEV engine sample is A=1 component which explains the 42% of variability in the responses (R2), with PRESS=5.28.*

The most influential variables are identified based on the magnitude and sign of the estimated coefficients. A higher absolute value of β indicates a stronger influence of the variable on the dependent variable. A positive coefficient indicates a direct relationship, meaning that an increase in the independent variable leads to an increase in customer satisfaction. Conversely, a negative coefficient indicates an inverse relationship, where an increase in the independent variable leads to a decrease in customer satisfaction.

Customer Satisfaction and Repurchase Intention. The relationship between customer satisfaction and repurchase intention was analyzed for the entire sample and for subsamples stratified by country (Italy and Sweden) and by engine type (BEV and PHEV). Across all five models, the goodness of fit and predictive ability appears to be relatively low, suggesting that customer satisfaction alone may not be sufficient to explain repurchase intention.

Determinants of Repurchase Intention. EV attributes, contextual factors, usage patterns, use motivations and individual characteristics were also examined in relation to repurchase intention, considering the entire sample as well as the subsamples stratified by country and engine type. The results indicate that the goodness of fit and predictive performance remain low and relatively similar across the five models, suggesting that additional variables or alternative modeling approaches may be necessary to better explain repurchase intention.

[5] https://jf-durand-pls.com/

In the remainder of this work, we focus exclusively on customer satisfaction, as the goodness of fit and predictive ability of all five models are discrete. Therefore, we avoid an in-depth analysis of the relationship between customer satisfaction and repurchase intention, as well as the determinants of repurchase intention, whose predictive ability is only acceptable and whose goodness of fit is poor.

Tables 1, 2, 3, 4, and 5 illustrate the most influential variables affecting customer satisfaction for each one of the 5 models, i.e., for the entire sample, 2 subsamples stratified by country (Italy and Sweden) and 2 subsamples stratified by engine type (BEV and PHEV).

In line with previous studies, our work shows that both satisfaction with specific EV aspects and overall user satisfaction are part of the post-adoption experience.

EV attributes, contextual factors, use motivations and individual characteristics have an impact on satisfaction in all 5 models. Usage patterns do not appear to be strongly relevant except for model 3, i.e., Swedish EV users, where the long trip frequency and the usage of public charging both have a negative impact on VFM satisfaction, while home charging positively affects it.

The 5 models have some differences but also common points. The most influential variables in model 1 are also influential in almost all the other models: brand reputation, battery life, the availability of charging points, fit between the EV's characteristics and the route requirements, saving charging cost, seeking reliable products, belief in the need for renewable energy sources, openness to radical changes. However, they have an impact on different types of satisfaction and are joined by different variables in the 5 models, thus according to the different country and adopted EV engine type.

Few variables have a relevant impact on overall satisfaction.

Overall, it is possible to observe that in each of the 5 models there are some main impacted types of satisfaction:

- *in model 1 (entire sample), VFM and reliability satisfaction;*
- *in models 2 and 4 (Italian and BEV users), technology and performance satisfaction;*
- *in model 3 (Swedish users), VFM and technology satisfaction;*
- *in model 5 (PHEV users), technology, performance and range satisfaction.*

When we stratify the sample by country (models 2-Italy and 3-Sweden), it is possible to observe some differences between Italian and Swedish users.

The regression coefficients of the model estimated for Sweden are generally higher than those for Italy. As the variables are standardized, this may indicate a stronger impact of the explanatory variables on customer satisfaction in the Swedish sample. This supports what already observed in literature, namely that satisfaction might increase over time as users become accustomed to EVs and adapt their usage behaviors accordingly (Franke et al., 2017).

Moreover, in model 3 (Sweden) two demographic variables are relevant, i.e., age and insecure income, where the first exerts a positive and the second a negative impact on VFM satisfaction.

Technical attributes (model, accessories, quietness, acceleration and onboard instrumentation), innovation elements, and governmental benefits—such as for example tax advantages and free parking—are more relevant for Italian users.

Overall, the comparison between Italian and Swedish users, in line with previous studies, supports that national context, policies, and infrastructure conditions contribute to shape user satisfaction (Chu et al., 2019; Song et al., 2022; Augurio et al., 2025).

When distinguishing by engine type (models 4-BEV and 5-PHEV), both similarities and differences in the attributes can be observed, some of which are related to the specific characteristics of the engine (e.g., charging time for BEVs). The attributes design and model indicate greater attention to aesthetics among PHEV users, which is also accompanied by a stronger concern for driving range. For BEV users, charging time appears to be a central attribute. Furthermore, BEV users seem to display greater environmental sensitivity.

Research limitations. *To improve the performance of the models, several methodological extensions can be considered. First, future analyses could account for nonlinear relationships between explanatory variables and dependent variables. Second, it would be useful to apply regularization techniques, such as the Least Absolute Shrinkage and Selection Operator (LASSO) developed by Tibshirani (1996), as well as its extensions, including Elastic Net regularization. These methods perform both regularization and variable selection, allowing the model to penalize less informative predictors and potentially eliminate variables that do not contribute significantly to the response variable. This approach may lead to more parsimonious and interpretable models. Finally, it would be advisable to estimate separate models for each dependent variable, allowing a more precise identification of the determinants of customer satisfaction and repurchase intention.*

Managerial implications. *The findings of the study provide several insights for managers and practitioners in the EV industry. First, customer satisfaction is influenced by a combination of EV attributes, contextual factors, usage patterns, use motivations and individual characteristics across different countries and engine types. This suggests that a holistic approach to product development and marketing is essential, addressing not only the technical specifications of the vehicle but also the contextual and motivational factors that drive satisfaction.*

For Italian users, technical attributes—such as model, accessories, quietness, acceleration and onboard instrumentation—along with innovation elements and governmental benefits (e.g., tax advantages and free parking) play a particularly relevant role. This implies that manufacturers targeting the Italian market should emphasize technological innovation, the quality and variety of features, and incentive programs to enhance perceived value.

Swedish users demonstrate a high sensitivity to environmental factors, with age and income insecurity also influencing satisfaction. Importantly, usage patterns are particularly relevant for this group. Managers should therefore consider how charging infrastructure, trip planning support, and incentives for home charging can improve user satisfaction in the Swedish market. Communication strategies should also highlight the environmental benefits of EV adoption, which are especially valued by Swedish users.

When considering engine type, both similarities and differences emerge. PHEV users tend to prioritize aesthetics and driving range, suggesting that design and range optimization should be key considerations for this segment. BEV users, however, place central importance on charging time and display higher environmental awareness. Thus, infrastructure improvements and strategies to reduce charging time are likely to enhance satisfaction among BEV users.

Across all markets and engine types, certain attributes consistently drive satisfaction, including brand reputation, battery life, availability of charging points, alignment between vehicle characteristics and route requirements, cost savings in charging, reliability of products, belief in the need for renewable energy, and openness to radical changes. Managers should consider these core factors as foundational elements in product development, customer experience, and communications strategies.

Finally, the results indicate that customer satisfaction alone does not fully explain repurchase intention, suggesting that additional factors—such as long-term cost considerations, and evolving personal motivations—should be investigated to better predict loyalty. Practitioners should adopt a comprehensive approach that integrates both product-related and contextual variables to foster not only satisfaction but also long-term customer retention.

Originality of the paper. *This study contributes to advancing the existing knowledge on e-mobility by focusing on the post-purchase stage, which has received limited attention from scholars. Furthermore, the study performs an exploratory analysis of factors affecting customer satisfaction and repurchase intention among EV users, adopting a cross-country comparative perspective between Italy and Sweden, two e-mobility markets characterized by different levels of EV diffusion. Moreover, the analysis distinguishes between BEV and PHEV users, highlighting that consumption dynamics in the post-adoption experience are also related to the type of engine. More specifically, the analysis by powertrain type (BEV and PHEV) contributes to existing literature by showing that different EV technologies can influence user satisfaction. By integrating EV attributes, contextual factors, usage patterns, motivations, and individual characteristics, the paper provides an extensive overview of elements that shape EV consumption providing valuable insights to manufacturers and policymakers to ensure the e-mobility uptake.*

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Table 1. Model 1_Regression results_Most influential variables

	Model 1 (entire sample)								
	Sat_price	Sat_VFM	Sat_cost	Sat_tec	Sat_reliability	Sat_range	Sat_design	Sat_performance	Overall_Sat
Brand_reputation		0.045			0.042			0.038	
Battery_life		0.047			0.044			0.039	
Charging_point_availability		0.039							
Saving_charging_cost		0.039							
Fitness_route		0.040			0.038				
Searching_reliability		0.042			0.04				
Renewable_energy_sources		0.046			0.043			0.039	
Radical_changes		0.040			0.038				

Table 2. Model 2_Regression results_Most influential variables

	Model 2 (Italy)								
	Sat_price	Sat_VFM	Sat_cost	Sat_tec	Sat_reliability	Sat_range	Sat_design	Sat_performance	Overall_Sat
Brand_quality			0.020	0.022		0.021	0.020	0.023	
Brand_reputation			0.020	0.022		0.021	0.020	0.023	
Model				0.020				0.021	
Accessories				0.021		0.02		0.022	
Onboard_instrumentation				0.020				0.021	
Acceleration				0.020				0.021	
Quietness			0.020	0.022		0.021	0.020	0.023	
Charging_time			0.020	0.022		0.020	0.020	0.022	
Customer_support				0.021				0.021	
Charging_point_availability				0.020				0.021	
Tax_exemption				0.021		0.020		0.021	
Environmental_impact			0.021	0.023		0.021	0.021	0.023	
New_technologies			0.020	0.022		0.020	0.020	0.022	
Saving_charging_cost			0.021	0.023		0.021	0.021	0.023	
Free_parking				0.021		0.020		0.021	
Driving_comfort				0.021		0.020		0.022	
Fitness_route		0.020	0.022	0.024	0.020	0.023	0.022	0.025	0.020
Advaced_technologies			0.021	0.023		0.022	0.021	0.023	
Innovative_features				0.021		0.020	0.020	0.022	
Tax_adavantages			0.020	0.022		0.021	0.020	0.022	
Fewer_restrictions_movement			0.020	0.022		0.021	0.020	0.022	
Experimentation_of_new_products				0.020				0.021	
Personal_responsability_enviroment				0.021		0.020		0.021	
Renewable_energy_sources			0.020	0.022		0.021	0.020	0.023	
Radical_changes			0.020	0.022		0.021	0.020	0.022	

Table 3. Model 3_Regression results_Most influential variables

	Model 3 (Sweden)								
	Sat_price	Sat_VFM	Sat_cost	Sat_tec	Sat_reliability	Sat_range	Sat_design	Sat_performance	Overall_Sat
Age		0.041							
Insecure_income		-0.039							
Annual_trip_frequency		-0.037							
Public_Charging		-0.040							
Brand_reputation		0.040							
Security_system		0.037							
Spare_parts		0.038							
Battery_life		0.050	0.040	0.043	0.039	0.038		0.037	
Charging_point_availability		0.044	0.036	0.039					
Home_charging		0.036							
Saving_charging_cost		0.042		0.038					
Searching_reliability		0.046	0.037	0.040	0.036				
Climate_change_threat		0.041		0.036					
Renewable_energy_sources		0.053	0.042	0.045	0.041	0.039		0.039	
Radical_changes		0.036							

Table 4. Model 4_Regression results_Most influential variables

	Model 4 (BEV users)								
	Sat_price	Sat_VFM	Sat_cost	Sat_tec	Sat_reliability	Sat_range	Sat_design	Sat_performance	Overall_Sat
Brand_quality				0.022					
Brand_reputation				0.022					
Security_system		0.023		0.024				0.023	
Onboard_instrumentation		0.022		0.023				0.022	
Battery_life		0.023		0.024				0.023	
Charging_time		0.022		0.022					
Charging_point_availability		0.023	0.021	0.024	0.022		0.021	0.023	
Tax_exemption				0.022					
Saving_charging_cost		0.023			0.024			0.023	
Driving_comfort		0.022		0.023				0.022	
Fitness_route				0.022					
Advaced_technologies		0.023		0.024				0.023	
Innovative_features				0.022					
New_driving_style		0.022		0.023				0.022	
Maintenance				0.022					
Pros_cons		0.022		0.023				0.022	
Habits_environment				0.022					
Searching_reliability		0.022		0.023				0.022	
Climate_change_threat		0.025	0.023	0.026	0.023	0.022	0.022	0.025	
Experimentation_of_new_products		0.023		0.023				0.022	
Renewable_energy_sources		0.023		0.024				0.023	
Radical_changes		0.024	0.022	0.025	0.022			0.024	

Table 5. Model 5_Regression results_Most influential variables

	Model 5 (PHEV users)								
	Sat_price	Sat_VFM	Sat_cost	Sat_tec	Sat_reliability	Sat_range	Sat_design	Sat_performance	Overall_Sat
Brand_quality	0.020		0.020	0.021		0.021	0.020	0.021	
Brand_reputation	0.021		0.022	0.023		0.022	0.022	0.023	0.020
Model			0.020			0.020	0.020	0.020	
Design				0.020		0.020		0.020	
Range	0.020		0.020	0.021		0.021	0.020	0.021	
Security_system				0.020				0.020	
Accessories				0.020		0.020		0.020	
Onboard_instrumentation			0.020	0.021		0.020	0.020	0.021	
Acceleration				0.020					
Quietness	0.020		0.020	0.021		0.021	0.020	0.021	
Customer_support			0.020	0.021		0.020		0.020	
Charging_point_availability				0.020		0.020		0.020	
Ztl_access				0.020				0.020	
Environmental_impact			0.020	0.021		0.020	0.020	0.021	
New_technologies	0.020		0.021	0.022		0.021	0.021	0.022	0.020
Saving_charging_cost	0.021		0.021	0.022		0.022	0.021	0.022	0.020
Driving_comfort	0.020		0.020	0.021		0.021	0.020	0.021	
Fitness_route	0.021		0.022	0.023	0.020	0.023	0.022	0.023	0.021
Performance_acceleration	0.020		0.020	0.022		0.021	0.020	0.021	
Advaced_technologies			0.020	0.021		0.021	0.020	0.021	
Innovative_features				0.020				0.020	
New_driving_style				0.020				0.020	
Tax_adavantages	0.020		0.021	0.022		0.021	0.020	0.021	
Fewer_restrictions_movement			0.020	0.021		0.021	0.020	0.021	
Searching_reliability				0.020		0.020		0.020	
Searching_new_model				0.020				0.020	
Experimentation_of_new_products	0.020		0.021	0.022		0.022	0.021	0.022	0.020
Renewable_energy_sources	0.020		0.021	0.022		0.021	0.021	0.022	0.020
Radical_changes				0.020		0.020		0.020	

Digital Nudging and Online Second-Hand Consumption: An Experimental Comparison of Green, Social and Fair Price Nudges

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Abstract. This study investigates the effectiveness of digital nudges in promoting purchase intentions towards second-hand products in online marketplaces. Drawing on behavioural economics and digital nudging theory, a between-subjects experimental design was employed with 206 participants randomly assigned to one of four conditions: a green nudge (environmental benefits), a social nudge (descriptive norm), a fair price nudge (economic savings), or a control condition (no nudge). Results from a one-way ANOVA revealed that all three nudge types significantly increased purchase intention compared to the control condition ($F(3,202) = 19.80$, $p < .001$, $\eta^2 = .23$), with no significant differences among the three nudge types. Hierarchical multiple regression further demonstrated that environmental motivations, economic savings, and platform trust were the strongest predictors of purchase intention, while perceived barriers (hygiene concerns and social stigma) showed no significant association. Age significantly moderated purchase intentions ($F(3,190) = 6.34$, $p < .001$), with younger consumers (18–39) expressing greater willingness to buy second-hand goods. Gender differences were in the expected direction but did not reach statistical significance. These findings contribute to the emerging literature on digital nudging applied to sustainable consumption, offering both theoretical insights and practical implications for e-commerce platforms seeking to promote circular economy behaviours.

Keywords: *digital nudging; second-hand consumption; sustainable consumption; behavioural economics; choice architecture; purchase intention*

Framing of the research. The growing diffusion of second-hand consumption represents one of the most significant transformations in contemporary consumer behaviour. Platforms such as Vinted, Depop, and Wallapop have fundamentally reshaped the marketplace for used goods, contributing to the consolidation of what scholars describe as the sharing economy, a socio-economic paradigm centred on access, redistribution, and peer-to-peer exchange rather than ownership (Grieco, 2024). Within this framework, second-hand consumption is understood not merely as an economic alternative to new purchases, but as a practice embedded in values of sustainability, authenticity, and community belonging (Fors et al., 2023). Global resale markets have expanded dramatically, with second-hand apparel alone projected to grow at a rate eleven times faster than the traditional retail sector (Hristova, 2019), driven by digitalisation, environmental awareness, and generational shifts in consumption norms.

The motivations underpinning second-hand purchase behaviour are multidimensional. Roux and Guiot (2008, 2009) identified a structured set of drivers including economic motivations (price fairness, bargain hunting, budget optimisation), hedonic and recreational motivations (treasure hunting, originality, nostalgia, social contact), symbolic and identity-related motivations (self-expression, anti-ostentation, authenticity-seeking), and ethical motivations (environmental concern, reduction of waste, support for circular economy principles). More recent syntheses confirm the continued relevance of these dimensions while extending them to include emerging drivers such as resale value awareness, self-care through responsible consumption, and competence demonstration, particularly among younger generations (Frahm et al., 2025a, 2025b).

Despite this positive trend, the adoption of second-hand consumption remains constrained by a set of persistent barriers. These include hygiene concerns and contamination fears, particularly salient for products in close bodily contact such as clothing (Koay et al., 2023), functional and quality risk perceptions, social stigma associated with used goods, and a deficit of trust in peer-to-peer digital platforms (Jang & Kim, 2023; Moriuchi & Takahashi, 2022). Theoretical frameworks such as perceived risk theory (Bauer, 1960, as cited in Koay et al., 2023) and the Extended Self Theory (Belk, 1988, as cited in Frahm et al., 2025a) help explain why second-hand objects may provoke avoidance responses rooted in symbolic contamination, identity threat, or social disapproval. Generational and gender differences further modulate these dynamics: older consumers tend to express greater hygiene sensitivity and functional risk concerns, while younger consumers, particularly Generation Z and Millennials, show greater openness to second-hand practices, integrating them into a sustainable identity (Dua, 2025; Harantová & Mazanec, 2025; Koay & Cheah, 2025).

These findings point to a well-documented gap between pro-environmental attitudes and actual purchasing behaviour, what the literature terms the attitude-behaviour gap (Prashar & Kaushal, 2025). Bridging this gap requires interventions that operate at the level of the decision-making process itself, rather than relying solely on attitude change or information provision.

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This is precisely the contribution of behavioural economics and, more specifically, of nudge theory as developed by Thaler and Sunstein (2008, 2021). Building on evidence of bounded rationality (Simon, 1955), dual-process cognition (Evans & Stanovich, 2013), and systematic cognitive biases documented in Prospect Theory (Kahneman & Tversky, 1979), nudge theory proposes that behaviour can be predictably steered towards more desirable outcomes through carefully designed choice architectures, modifications to the decision environment that preserve individual freedom of choice while facilitating more rational or prosocial decisions. A nudge is defined as "any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives" (Thaler & Sunstein, 2021). This approach operates primarily on System 1, the fast, automatic, and heuristic-driven mode of cognition, reducing the cognitive load associated with sustainable choices and making preferred options more salient, accessible, and socially legitimate (Kahneman, 2011).

The application of nudging to digital environments, digital nudging, has emerged as a distinct and rapidly growing field (Weinmann et al., 2016). Digital nudges leverage interface design elements such as default settings, visual salience, framing, and social proof messages to orient user behaviour within online platforms, apps, and e-commerce sites (Mirsch et al., 2017). Empirical evidence supports the effectiveness of digital nudges across multiple domains of sustainable consumption, from energy saving (Beermann et al., 2022) to sustainable fashion (Prashar & Kaushal, 2025; Schürmann et al., 2023). Notably, Prashar and Kaushal (2025) found that combined verbal and visual nudges increased purchase intention for sustainable fashion items by 27.8% compared to control conditions.

Three specific nudge typologies are of particular relevance to the present research. Green nudges operate by making the environmental benefits of a choice more salient, activating pro-environmental values and fostering a sense of personal efficacy in contributing to sustainability (Amiri et al., 2024; Beermann et al., 2022). Social nudges leverage descriptive social norms, communicating what the majority of similar others do, to induce conformity and reduce the perceived social risk of non-conventional choices such as buying second-hand (Cialdini, 2003; Goldstein et al., 2008; Schultz et al., 2018). Fair price nudges act on the economic dimension of perceived value, rendering the cost advantages of second-hand purchases more cognitively accessible, thereby activating perceptions of fairness and rational utility maximisation (Cai, 2020; Mertens et al., 2022).

The literature further suggests that the effectiveness of these nudge types may vary as a function of individual differences, particularly gender and age. Women have been found to be more responsive to environmental and social norm appeals (Amiri et al., 2024; Demarque et al., 2015), while younger consumers show greater receptivity to digital nudges in general (Mirsch et al., 2017; Söderström et al., 2019). However, systematic comparative evidence on the differential effectiveness of green, social, and fair price nudges within the specific context of online second-hand consumption remains scarce (Gottselig et al., 2023). The present study addresses this gap directly.

Purpose of the paper. Despite the growing body of research on digital nudging and sustainable consumption, the specific application of nudge interventions to online second-hand marketplaces remains largely underexplored (Gottselig et al., 2023). Existing studies have examined nudging in contexts such as energy conservation (Beermann et al., 2022), financial decision-making (Cai, 2020; Mertens et al., 2022), and sustainable fashion retail (Prashar & Kaushal, 2025; Schürmann et al., 2023), yet no study to date has systematically compared the effectiveness of three distinct nudge typologies, environmental, social, and economic, within a single experimental framework applied to second-hand e-commerce.

The primary purpose of this paper is to examine whether and to what extent digital nudges increase consumers' intention to purchase second-hand products online, and whether different nudge types, green, social, and fair price, differ in their relative effectiveness. A secondary purpose is to explore how individual-level characteristics, specifically gender and age, and psychological variables, namely motivations, perceived barriers, and platform trust, interact with nudge exposure to shape purchase intentions.

To these ends, the following research hypotheses were formulated:

H1: The presence of a nudge (green, social, or fair price) increases purchase intention for second-hand products compared to a no-nudge control condition.

This hypothesis is grounded in the core tenet of nudge theory, according to which even minimal modifications to the choice architecture can reduce decision inertia and facilitate behaviours aligned with individuals' underlying values and goals (Thaler & Sunstein, 2021). In the context of second-hand consumption, where purchase decisions are often inhibited by uncertainty and perceived risk (Koay et al., 2023), an informational nudge is expected to provide a cognitive anchor that simplifies the decision and renders the sustainable option more salient and justifiable.

H2a: Female participants will show higher purchase intention for second-hand products than male participants.

This hypothesis draws on consistent evidence that women tend to exhibit stronger pro-environmental attitudes and greater sensitivity to ethical consumption appeals (Amiri et al., 2024; Zelezny, Chua, & Aldrich, 2000), and are reported to engage more frequently with second-hand platforms (Harantová & Mazanec, 2025).

H2b: Younger participants will show higher purchase intention for second-hand products than older participants.

This hypothesis is supported by research indicating that Generation Z and Millennials are the primary drivers of second-hand market growth, displaying greater familiarity with peer-to-peer digital platforms, stronger identification with sustainability values, and reduced sensitivity to the stigma traditionally associated with used goods (Dua, 2025; Koay & Cheah, 2025; Mazanec & Harantová, 2024).

H3a: Environmental, economic, and uniqueness-seeking motivations are positively associated with purchase intention for second-hand products.

This hypothesis follows from the motivational framework established by Roux and Guiot (2008, 2009) and subsequently confirmed in more recent literature (Frahm et al., 2025a, 2025b), which identifies environmental concern, economic savings, and the search for original or distinctive items as the principal drivers of second-hand purchase behaviour.

H3b: Perceived barriers, specifically hygiene concerns and social stigma, are negatively associated with purchase intention for second-hand products.

This hypothesis is grounded in perceived risk theory (Bauer, 1960, as cited in Koay et al., 2023) and empirical evidence documenting the inhibitory role of contamination fears and social disapproval on second-hand consumption (Koay et al., 2023; Mobarak et al., 2025).

H3c: Trust in second-hand platforms is positively associated with purchase intention for second-hand products.

In digital peer-to-peer marketplaces, trust functions as a prerequisite for purchase behaviour by reducing perceived transactional risk and increasing perceived platform reliability (Gammoudi & Saied Ben Rached, 2025; Jang & Kim, 2023). This hypothesis is therefore expected to receive strong empirical support.

Taken together, these hypotheses aim to provide an integrated account of the psychological, demographic, and situational determinants of second-hand purchase intention, with particular attention to the role of digital nudging as a low-cost, ethically grounded tool for promoting sustainable consumption behaviours.

Methodology. The present study adopted a between-subjects experimental design, in which each participant was randomly assigned to one of four conditions: a green nudge condition, a social nudge condition, a fair price nudge condition, or a no-nudge control condition. This design was chosen to prevent contamination effects that could arise from repeated exposure to similar stimuli, which might induce social desirability biases or demand characteristics in subsequent responses (Shadish, Cook, & Campbell, 2002).

Participants and procedure. A total of 206 participants completed an online questionnaire distributed through digital channels including social networks, university mailing lists, and broadcast messaging groups. Participation was voluntary and anonymous, and the survey required approximately 8–10 minutes to complete. The sample comprised 120 women (58.3%) and 86 men (41.7%), distributed across four age groups: 18–24 years (n = 62, 30.1%), 25–39 years (n = 46, 22.3%), 40–54 years (n = 49, 23.8%), and 55–73 years (n = 49, 23.8%). A chi-square test confirmed that gender distribution was homogeneous across age groups ($\chi^2(3) = 3.51$, $p = .319$). The vast majority of participants (92.7%) reported prior experience purchasing second-hand products, confirming the ecological relevance of the sample for the research objectives. Random assignment to the four experimental conditions yielded balanced group sizes: control (n = 54), fair price nudge (n = 48), social nudge (n = 53), and green nudge (n = 51).

Experimental Stimuli. The experimental stimuli consisted of a simulated e-commerce product page displaying a unisex white t-shirt available for purchase on a second-hand platform. The product description and visual presentation were held constant across all conditions; the only variation was the informational message, the nudge, displayed below the product description. The three nudge messages were developed on the basis of established frameworks in the digital nudging literature (Cialdini, 2003; Beermann et al., 2022; Cai, 2020):

- Green nudge: a message highlighting the positive environmental impact of purchasing a used item rather than a new one (e.g., reduction in CO_2 emissions and resource consumption);
- Social nudge: a descriptive norm message stating that "8 out of 10 people purchased this t-shirt second-hand rather than new," designed to activate social conformity mechanisms (Cialdini, 2003; Schultz et al., 2018);
- Fair price nudge: a message emphasising the economic savings associated with purchasing the used item compared to its new retail equivalent (Cai, 2020; Mertens et al., 2022);
- Control condition: no additional message beyond the standard product description.

Measures. All constructs were measured using validated scales adapted to the Italian context through a back-translation procedure (Brislin, 1970, as cited in Frahm et al., 2025a), and assessed on five-point Likert scales (1 = strongly disagree, 5 = strongly agree).

Environmental motivation was measured using the six-item Green Scale (Haws, Winterich, & Naylor, 2014; $\alpha = .921$), assessing the degree to which participants value environmental sustainability in their consumption choices.

Economic motivation (savings) and uniqueness motivation were each measured with two items drawn from the second-hand shoppers' motivation scale (Roux & Guiot, 2008; $\alpha = .887$ and $\alpha = .815$, respectively).

Perceived hygiene barriers and social stigma barriers were each assessed with four items adapted from Koay et al. (2023), originally developed by Kim et al. (2021) and Lang (2018) respectively ($\alpha = .872$ and $\alpha = .945$).

Platform trust was measured using an eleven-item scale articulated across three dimensions, credibility, integrity, and benevolence, adapted from Chouk and Perrien (2005) and validated in the second-hand online context by Gammoudi and Saied Ben Rached (2025; $\alpha = .925$).

Purchase intention was assessed with four items developed in accordance with the Theory of Planned Behavior (Ajzen, 1991, 2006), administered after exposure to the experimental stimulus. Internal consistency was high across all conditions (control: $\alpha = .866$; fair price: $\alpha = .899$; social: $\alpha = .917$; green: $\alpha = .945$).

A manipulation check item was included at the end of the questionnaire to verify that participants had correctly perceived the presence or absence of the informational box. A one-way ANOVA confirmed that the manipulation was successful: participants in the three nudge conditions reported significantly higher awareness of the informational message than those in the control condition ($F(3, 202) = 108.28$, $p < .001$), with no significant differences among the three nudge groups.

Analytical strategy. Data were analysed using IBM SPSS Statistics (Version 27). Following preliminary descriptive and reliability analyses, inferential analyses were conducted in three stages. First, a one-way ANOVA tested H1 by comparing mean purchase intention scores across the four experimental conditions, with Bonferroni post-hoc corrections applied for pairwise comparisons. Second, two factorial ANOVAs (2×4 and 4×4) were conducted to test H2a and H2b, examining the main effects of gender and age respectively, as well as their interactions with nudge type. Third, a three-step hierarchical multiple regression was conducted to test H3a, H3b, and H3c, entering sociodemographic variables in Block 1, psychological motivations and barriers in Block 2, and experimental condition dummies in Block 3. Effect sizes are reported as partial η^2 throughout. The significance threshold was set at $\alpha = .05$.

Results. Descriptive statistics and Pearson correlation analyses were conducted prior to hypothesis testing. Purchase intention was positively and significantly correlated with environmental motivations ($r = .35$, $p < .001$), platform trust ($r = .33$, $p < .001$), and economic savings motivations ($r = .31$, $p < .001$). A weak but significant positive association was observed with uniqueness motivation ($r = .15$, $p = .031$). By contrast, neither hygiene concerns ($r = -.09$, $p = .188$) nor social stigma ($r = .01$, $p = .942$) showed significant associations with purchase intention, a finding that diverges from conventional expectations in the second-hand literature and is discussed further below.

H1: Effectiveness of Nudges on Purchase Intention

A one-way ANOVA was conducted to test whether the presence of a nudge, regardless of type, increased purchase intention relative to the control condition. The analysis revealed a significant main effect of experimental condition on purchase intention, $F(3, 202) = 19.80$, $p < .001$, $\eta^2 = .23$, indicating that approximately 23% of the variance in purchase intention was explained by nudge exposure, a medium-to-large effect size according to Cohen's (1988) criteria.

As shown in Table 1, mean purchase intention scores were markedly higher in all three nudge conditions compared to the control. The control condition yielded the lowest mean ($M = 2.65$, $SD = 0.70$), while the fair price nudge ($M = 3.66$, $SD = 0.70$), social nudge ($M = 3.61$, $SD = 0.91$), and green nudge ($M = 3.70$, $SD = 0.91$) all produced substantially higher scores. Bonferroni post-hoc comparisons confirmed that each nudge condition differed significantly from the control (all $ps < .001$), while no significant differences emerged among the three nudge types (all $ps > .05$). H1 is therefore fully supported: the presence of a nudge, irrespective of its specific content, significantly increased second-hand purchase intention. This finding suggests that the mechanism of nudge effectiveness in this context resides primarily in the cognitive salience of the informational message rather than in the activation of any specific motivational pathway.

Table 1. Descriptive statistics of purchase intention by experimental condition

Condition	n	M	SD
Control	54	2.65	0.70
Fair price nudge	48	3.66	0.70
Social nudge	53	3.61	0.91
Green nudge	51	3.70	0.91

H2a: Gender Differences

A 2 (gender) × 4 (condition) factorial ANOVA revealed a significant main effect of experimental condition, $F(3, 198) = 16.18$, $p < .001$, $\eta^2 = .20$, consistent with the one-way ANOVA results. The main effect of gender did not reach statistical significance, $F(1, 198) = 2.49$, $p = .116$, $\eta^2 = .01$, indicating that male and female participants did not differ significantly in overall purchase intention. A marginally significant interaction trend between gender and nudge type was observed, $F(3, 198) = 2.32$, $p = .077$, $\eta^2 = .03$, suggesting that the effectiveness of specific nudge types may vary partially as a function of gender. Descriptively, women reported higher purchase intention than men across all nudge conditions, with the most pronounced differences observed in the green and fair price nudge conditions, a pattern consistent with evidence that women tend to respond more strongly to environmental and ethical consumption appeals (Amiri et al., 2024; Zelezny et al., 2000). H2a is not statistically confirmed, though the observed trend is theoretically coherent and warrants further investigation with larger and more balanced samples.

H2b: Age Differences

A 4 (condition) × 4 (age group) factorial ANOVA revealed a significant main effect of experimental condition, $F(3, 190) = 22.74$, $p < .001$, $\eta^2 = .26$, and a significant main effect of age, $F(3, 190) = 6.34$, $p < .001$, $\eta^2 = .09$. The interaction between age and nudge type was not significant, $F(9, 190) = 0.76$, $p = .654$, $\eta^2 = .04$, indicating that nudge effectiveness was broadly consistent across age groups. Mean purchase intention scores followed a clear decreasing pattern with age: participants aged 25–39 years reported the highest intentions ($M = 3.73$, $SD = 0.93$), followed by those aged 18–24 ($M = 3.56$, $SD = 0.97$), 55–73 ($M = 3.23$, $SD = 0.78$), and 40–54 ($M = 3.06$, $SD = 0.93$). Bonferroni pairwise comparisons confirmed significant differences between the 25–39 group and both the 40–54 ($p = .001$) and 55–73 groups ($p = .015$), and between the 18–24 group and the 40–54 group ($p = .007$). H2b is supported: younger participants expressed significantly higher second-hand purchase intentions than older participants, independently of nudge type.

H3: Motivations, Barriers, Trust, and Purchase Intention

A three-step hierarchical multiple regression was conducted to examine the joint predictive role of sociodemographic, psychological, and experimental variables on purchase intention.

Block 1 (sociodemographic variables: gender, age, second-hand experience, purchase frequency) was significant, $F(4, 201) = 12.02$, $p < .001$, $R^2 = .193$. Gender ($\beta = -.22$, $p < .001$) and purchase frequency ($\beta = .38$, $p < .001$) emerged as significant predictors, with women and more frequent buyers reporting higher purchase intentions.

Block 2 (motivations and barriers: environmental motivation, economic savings, uniqueness, platform trust, hygiene concerns, social stigma) produced a significant increment in explained variance, $\Delta R^2 = .098$, $p < .001$, bringing the total to $R^2 = .291$. Environmental motivation ($\beta = .22$, $p = .021$), economic savings motivation ($\beta = .22$, $p = .034$), and social stigma ($\beta = .22$, $p = .018$) emerged as significant predictors. Notably, social stigma showed a positive, rather than negative, association with purchase intention, a counterintuitive finding discussed in Section 6.

Block 3 (experimental condition dummies: fair price, social, green) produced a further significant increment, $\Delta R^2 = .201$, $p < .001$, yielding a final model explaining 49% of the total variance in purchase intention, $F(13, 192) = 14.32$, $p < .001$, $R^2 = .492$. All three nudge conditions were significant positive predictors: fair price ($\beta = .45$, $p < .001$), social ($\beta = .45$, $p < .001$), and green ($\beta = .50$, $p < .001$). Environmental motivation ($\beta = .32$, $p < .001$) and platform trust ($\beta = .11$, $p = .047$) retained independent predictive significance in the full model. H3a is partially supported: environmental and economic motivations significantly predicted purchase intention, while uniqueness motivation did not. H3b is not supported: perceived barriers showed no significant negative associations with purchase intention. H3c is fully supported: platform trust emerged as a consistent and significant positive predictor across model specifications.

Research limitations. Despite the relevant findings, this study presents several methodological and conceptual limitations that should be acknowledged. First, the sample, while numerically adequate, is not fully representative of the general population, with an overrepresentation of younger adults and female participants. Future studies should employ more heterogeneous and stratified samples across age, gender, and geographic provenance to enhance the generalisability of results.

Second, the study relied on hypothetical scenarios and self-reported purchase intention measures. Although the Theory of Planned Behavior (Ajzen, 1991) identifies intention as a reliable predictor of actual behaviour, the use of simulated stimuli reduces ecological validity. Future research would benefit from field experimental designs conducted directly within real second-hand e-commerce platforms, or from the analysis of actual behavioural data, to verify whether stated intentions translate into effective purchases.

Third, the cross-sectional design does not allow causal inferences regarding the directionality of relationships between psychological variables and purchase intention. Longitudinal or more complex experimental designs would be better suited to clarify the temporal dynamics through which motivations, barriers, and trust influence second-hand consumption behaviour over time.

A specific theoretical consideration concerns the counterintuitive finding regarding social stigma, which in the regression model showed a positive rather than negative association with purchase intention, contrary to H3b and prevailing literature (Koay et al., 2023). This result may reflect the progressive normalisation of second-hand consumption, particularly among younger consumers for whom stigma has ceased to represent a meaningful deterrent (Dua, 2025; Fors et al., 2023), or it may indicate that consumers more aware of stigma are simultaneously those most actively engaged in the second-hand market. This finding warrants cautious interpretation and further investigation in future research.

Finally, the study tested nudge effectiveness on a single product category — a unisex white t-shirt — which limits the generalisability of conclusions across different merchandise types. Replication across categories such as electronics or furniture would allow assessment of whether the observed effects hold across varying motivational profiles and perceived barriers (Frahm et al., 2025b).

Managerial implications. The findings of this study carry concrete and actionable implications for managers, marketers, and designers operating within the second-hand e-commerce ecosystem, as well as for policymakers interested in promoting sustainable consumption at scale.

For second-hand platform managers and e-commerce designers, the most immediate takeaway is that the simple inclusion of an informational nudge, regardless of its specific content, can increase consumers' purchase intention by a

meaningful and statistically robust margin. This represents a low-cost, scalable, and ethically grounded intervention: unlike discount-based incentives or advertising campaigns, nudges require no modification of prices, product assortment, or platform infrastructure. A brief message positioned below a product listing, whether emphasising environmental impact, social norms, or economic savings, is sufficient to shift the decision architecture in favour of the sustainable option. Platform designers should therefore treat informational nudge integration as a standard feature of product page design, rather than an optional or experimental add-on.

More specifically, the comparable effectiveness of green, social, and fair price nudges suggests that platforms need not commit to a single communication strategy. Instead, a dynamic or personalised nudge approach, in which the type of message displayed is adapted to the user's profile, browsing behaviour, or demographic segment, may maximise overall effectiveness. Given evidence that younger users respond well to social norm appeals and environmental framing (Mirsch et al., 2017), while older consumers tend to prefer transparency and economic clarity (Söderström et al., 2019), segmented nudge delivery represents a promising direction for personalisation strategies. Similarly, given the trend, observed in this study, though not statistically significant, for women to respond more strongly to green and fair price nudges, gender-responsive communication design may further enhance nudge impact.

For sustainable marketing practitioners, the results reinforce the strategic value of framing second-hand consumption as simultaneously environmentally responsible, socially normalised, and economically rational. The finding that all three nudge types produced equivalent effects suggests that the key mechanism is not the specific motivational lever activated, but rather the act of providing an explicit, salient justification for the purchase. Marketing communications should therefore prioritise clarity, immediacy, and relevance, making the benefit of buying second-hand immediately visible at the point of decision, without requiring consumers to engage in elaborate cognitive deliberation.

The central role of platform trust in predicting purchase intention, retained as a significant predictor even after controlling for nudge exposure and motivational variables, further indicates that trust-building is a prerequisite for nudge effectiveness. Platforms should invest in credibility signals such as verified seller ratings, transparent return policies, authenticity guarantees, and clear data protection standards. Without a foundation of perceived trustworthiness, even well-designed nudges may fail to convert browsing into purchasing, particularly among older or less digitally experienced consumers.

For policymakers and sustainability advocates, this study demonstrates that behavioural interventions grounded in nudge theory can meaningfully contribute to the promotion of circular economy behaviours without resorting to regulatory mandates or financial incentives. Digital nudges represent a form of soft policy, transparent, non-coercive, and scalable, that aligns with the libertarian paternalism framework advocated by Thaler and Sunstein (2021). Governments and public bodies collaborating with e-commerce platforms could mandate or incentivise the inclusion of environmental impact information at the point of sale, in line with emerging EU digital sustainability disclosure requirements. Such policies would not only promote second-hand consumption but also contribute to broader goals of waste reduction, resource efficiency, and carbon footprint minimisation across the fashion and consumer goods sectors.

Originality of the paper. This study makes several original contributions to the existing literature at the intersection of digital nudging, behavioural economics, and sustainable consumption.

First, and most centrally, this is among the first studies to systematically compare the effectiveness of three distinct digital nudge typologies, green, social, and fair price, within a single experimental framework applied specifically to online second-hand consumption. While prior research has examined individual nudge types in isolation, or has applied nudging to adjacent domains such as sustainable fashion retail (Prashar & Kaushal, 2025) or energy conservation (Beermann et al., 2022), no previous study has conducted a direct within-design comparison of environmental, normative, and economic nudges in the context of second-hand e-commerce. This comparative approach allows for a more nuanced understanding of the psychological mechanisms underlying nudge effectiveness, and provides practitioners with evidence-based guidance on communication strategy selection.

Second, the study contributes original empirical evidence on the equivalence of nudge types in this specific context. The finding that all three nudges produced statistically indistinguishable effects on purchase intention, despite operating through theoretically distinct motivational pathways, challenges assumptions of differential effectiveness that pervade the nudging literature (Congiu & Moscati, 2022) and suggests that, in the second-hand domain, the salience of the message itself may matter more than its specific content. This is a theoretically meaningful result that invites further investigation into the boundary conditions of nudge type specificity.

Third, the study integrates experimental manipulation with a rich battery of individual difference measures, motivations, perceived barriers, and platform trust, within a unified hierarchical regression framework. This design allows for the simultaneous assessment of situational nudge effects and stable psychological predictors, providing a more complete and ecologically valid account of second-hand purchase intention than experimental or correlational studies conducted in isolation. In particular, the finding that perceived barriers, hygiene concerns and social stigma, no longer predict purchase intention in this sample represents a novel empirical signal of cultural normalisation in second-hand consumption, particularly among younger consumers.

Fourth, the study extends the application of established scales, including the Green Scale (Haws et al., 2014), the second-hand motivation scale (Roux & Guiot, 2008), the perceived risk dimensions adapted from Koay et al. (2023), and the platform trust scale adapted from Gammoudi and Saied Ben Rached (2025), to an Italian-speaking sample,

contributing to the cross-cultural validation of these instruments in a European context that remains underrepresented in the international second-hand consumption literature.

Taken together, these contributions position this study as a foundational reference for future research on digital nudging in circular economy contexts, and offer a replicable experimental template that can be adapted across product categories, platforms, and cultural settings.

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Embedding ESG in the Balanced Scorecard: A Work-in-Progress Framework for Strategic Translation, Innovation, and Long-Term Value Creation

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Framing of the research. The increasing relevance of ESG issues has altered the strategic landscape within which firms define priorities, allocate resources, and justify long-term investments. However, in many organizations ESG remains only partially connected to the core architecture of strategic management. It is frequently visible in sustainability reports, investor communication, and compliance routines, yet much less embedded in the internal systems that actually structure strategic dialogue, managerial accountability, and day-to-day trade-offs. This disconnect creates an important managerial and scholarly problem: firms may publicly communicate sustainability commitments without substantially changing the organizational mechanisms through which strategic priorities are translated into action.

This paper starts from the assumption that the critical issue is not whether ESG indicators are present somewhere in the organization, but whether they are incorporated into the same system through which firms define strategic objectives, monitor progress, coordinate functions, and evaluate initiatives. From this perspective, the Balanced Scorecard is particularly relevant. Since its original formulation, the BSC has been more than a performance dashboard. Its importance lies in its ability to connect financial and non-financial objectives through a structured causal logic and to turn strategic intent into measurable priorities across organizational levels (Kaplan & Norton, 1992, 1996, 2001). In other words, the BSC can be understood as an architecture of strategic translation: it links vision, objectives, measures, targets, and initiatives, thereby shaping what managers discuss, how they interpret performance, and which actions are legitimized inside the organization.

This strategic architecture is especially important in contexts characterized by uncertainty, competing demands, and long time horizons. Research on strategic performance measurement systems has shown that these systems can influence alignment, organizational learning, role clarity, and managerial performance when they are designed and used in ways that connect measurement to strategy rather than merely to operational monitoring (Chenhall, 2005; Hall, 2008; Ittner et al., 2003). In this sense, the BSC is not just a tool for reporting outcomes; it is a mechanism for structuring managerial attention and organizational dialogue. That feature becomes crucial when organizations attempt to incorporate ESG goals that often cut across functions, combine short-term costs with long-term benefits, and involve tensions between efficiency, legitimacy, resilience, and innovation.

The sustainability literature has already recognized the potential compatibility between the BSC and sustainability objectives. The seminal contribution by Figge et al. (2002) showed that the Sustainability Balanced Scorecard can link sustainability management to business strategy by embedding environmental and social objectives into a scorecard logic. Later work has mapped different SBSC architectures and clarified that sustainability can be inserted into the BSC in multiple ways, for example by integrating sustainability objectives into existing perspectives, by adding a dedicated perspective, or by developing more hybrid configurations (Hansen & Schaltegger, 2016). These contributions are important because they demonstrate that sustainability is not conceptually foreign to strategic performance measurement.

Yet this stream of research also reveals an important limitation. Much of the SBSC literature has focused on architecture design, classification, and implementation options. Less attention has been devoted to the internal organizational effects of ESG-BSC integration: how it may alter managerial decision criteria, affect which initiatives receive resources, influence incentive schemes, or stabilize new patterns of cross-functional coordination and learning. In parallel, broader corporate sustainability research has shown that firms with deeper sustainability orientation tend to differ in organizational processes, long-term orientation, nonfinancial measurement, stakeholder engagement, and executive compensation (Eccles et al., 2014). This suggests that the internal strategic consequences of ESG integration may be

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substantial, but it does not specify the role that the BSC, as a strategic translation infrastructure, may play in producing such consequences.

A second relevant stream concerns the relationship between sustainability and management control systems. Studies on sustainability control systems and CSR strategy have argued that control systems matter because they communicate priorities, delimit acceptable behaviour, support risk identification, and enable dialogue around strategic uncertainty (Gond et al., 2012; Arjaliès & Mundy, 2013; Beusch et al., 2022). This literature is highly relevant for the present study because it moves beyond the view of sustainability as disclosure and instead examines how it becomes operationalized inside firms. It also shows that the role of control is not limited to monitoring. Depending on their design and use, controls can either marginalize sustainability by treating it as an add-on, or integrate it into core strategic processes.

However, while this literature has developed rich insights into levers of control and system configurations, it has not fully clarified the specific role of the BSC as an integrated architecture of planning, strategic review, accountability, and initiative management. This is a significant omission, because the BSC can act as the organizational "carrier" through which ESG objectives become connected to the broader strategic system. Put differently, if ESG remains outside the BSC logic, it may remain symbolically important but strategically weak. If it is embedded inside the BSC logic, it may begin to influence how managers evaluate projects, how functions coordinate, which capabilities receive investment, and how long-term value is interpreted.

A third stream of research that matters for this paper is the literature on management control and innovation. Earlier research on product innovation, new product development, and ambidexterity has shown that formal controls are not necessarily enemies of innovation. On the contrary, when used interactively and in balanced ways, management control systems can support dialogue, prioritize uncertainty, and improve the organizational conditions under which innovation becomes productive rather than chaotic (Bisbe & Otley, 2004; Davila, 2000; Henri, 2006; Bedford, 2015; Chenhall et al., 2011). This insight is central for the present study because it suggests that the question is not whether ESG introduces more control and therefore less innovation, but rather whether ESG-related controls are designed and used in ways that stimulate learning, experimentation, and coordinated adaptation.

This issue becomes particularly salient when ESG is interpreted as a source of future growth, resilience, and innovation rather than as a constraint. If ESG targets are embedded in a scorecard only as compliance metrics, they may narrow managerial behaviour and encourage symbolic achievement. By contrast, if ESG priorities are linked to strategic objectives, investment initiatives, and interactive review routines, they may help managers identify new opportunities, justify capability-building investments, and reframe innovation agendas. In that case, the BSC does not simply record sustainability performance; it becomes a mechanism for exploring the strategic and innovative implications of sustainability commitments.

The final stream informing this paper is the dynamic capabilities and routine dynamics literature. Dynamic capabilities research has emphasized that firms create and sustain advantage in changing environments not only through static resources, but through the capacity to sense, seize, and reconfigure (Teece et al., 1997; Eisenhardt & Martin, 2000). Zollo and Winter (2002) further explain that such capabilities evolve through learning, articulation, and codification. In parallel, routine dynamics scholars have shown that routines are not merely sources of inertia, but can also be sources of flexibility and change when they organize repeated action while remaining open to reinterpretation and adaptation (Feldman & Pentland, 2003). These ideas are particularly useful for the present study because they provide a vocabulary for explaining why a strategically embedded ESG-BSC may matter over time. If the scorecard becomes a recurring site of strategic review, target negotiation, resource allocation, and cross-functional discussion, it may institutionalize the very routines through which dynamic capabilities are built.

Against this background, the paper addresses a gap at the intersection of BSC research, sustainability integration, management control, and innovation studies. Specifically, it seeks to explain how ESG objectives and metrics, when integrated into the BSC, can influence decision-making processes, investment priorities, incentives, and organizational routines in ways that support innovation-oriented dynamic capabilities and long-term value creation. The paper therefore reframes the BSC not as a neutral measurement device, nor as a reporting support, but as an internal strategic architecture whose design and use may materially affect how firms deal with sustainability-related opportunities and tensions.

Purpose of the paper. The purpose of this paper is to develop a conceptual framework that explains how the integration of ESG objectives and metrics into the Balanced Scorecard can affect strategic and organizational processes beyond disclosure and compliance. The paper is motivated by a simple but underexplored question: what changes inside the organization when ESG enters the scorecard that managers use to translate strategy into objectives, targets, initiatives, and reviews?

The paper adopts the view that the relevant unit of analysis is not "ESG performance" in general, but the strategic and organizational use of ESG within a BSC logic. This distinction is important. Many firms already disclose ESG data, monitor sustainability indicators, or publish integrated reports. Yet these practices do not necessarily imply that ESG affects internal choices. The present study therefore focuses on whether and how ESG becomes part of the strategic management architecture through which managers identify priorities, discuss trade-offs, review progress, and allocate attention and resources.

Conceptually, the paper defines an ESG-integrated Balanced Scorecard as a scorecard in which ESG objectives and metrics are embedded in at least five interrelated components:

(1) the strategic causal map linking objectives across perspectives;
(2) the portfolio of measures and targets;
(3) the cascading of objectives across units and functions;
(4) the prioritization of strategic initiatives and investments;
and (5) the accountability and incentive routines through which managers are evaluated and engaged.

From this perspective, ESG integration is not binary. It can vary in depth. At a superficial level, ESG may appear as an external reporting appendix or as a small set of isolated indicators, with minimal impact on strategic choices. At a more advanced level, it may be embedded in the causal logic of the scorecard, influence capital allocation, and become part of managerial review and incentive systems. The paper argues that these different degrees of integration are likely to be associated with different organizational consequences.

The proposed framework suggests that the effects of ESG-BSC integration are mediated by four processual mechanisms.

First, ESG integration may broaden managerial cognition and temporal orientation. By entering the scorecard's cause-and-effect chain, ESG metrics can make externalities, stakeholder expectations, capability gaps, and long-term risks more visible in strategic discussions. This can change the way managers interpret trade-offs between short-term financial performance and future resilience, legitimacy, or innovation potential.

It may also reshape resource allocation and the prioritization of investments. Once ESG objectives are linked to strategic initiatives rather than remaining isolated, capability-building projects that would otherwise appear discretionary may gain greater legitimacy. Investments in new processes, product redesign, data collection systems, supplier collaboration, employee training, or circular business models may move from the periphery to the strategic portfolio.

The third processual mechanism leads to a realignment between accountability and incentive systems. Research on sustainability-oriented firms suggests that sustainability becomes organizationally consequential when it is tied to governance and managerial evaluation, rather than being treated as a specialist concern (Eccles et al., 2014). If ESG targets are incorporated into the scorecard and cascaded across functions, they can encourage broader ownership and reduce the misalignment between finance, strategy, operations, and sustainability functions.

Finally, integrating ESG issues into the corporate BSC may stabilize new routines of coordination and continuous learning. Scorecards take shape through meetings, reviews, target negotiations, and exception handling. When ESG becomes part of these recurring routines, organizations may develop stronger sensing, seizing, and reconfiguring capabilities. This is especially likely when the scorecard is used interactively, that is, as a platform for dialogue, challenge, and strategic inquiry rather than as a narrow diagnostic system.

P1. The greater the extent to which ESG objectives and metrics are embedded within the BSC's cross-perspective causal logic, the more strategic decision-making will reflect broader value drivers and longer time horizons.

P2. The stronger the linkage between ESG objectives in the BSC and strategic initiatives, the more likely firms are to prioritize medium-term capability-building and innovation-oriented investments.

P3. The more ESG targets are cascaded through the BSC and connected to managerial accountability, the more likely firms are to develop cross-functional coordination and recurring organizational learning routines around sustainability-related priorities.

P4. The positive relationship between ESG-BSC integration and innovation orientation will be stronger when the BSC is used interactively rather than merely diagnostically.

Taken together, these propositions support the paper's core argument: ESG can become a driver of innovation and long-term value creation only when it is translated into the same organizational architecture that governs strategic priorities, discussions, targets, and resource commitments. The contribution is therefore not to propose yet another sustainability scorecard, but to explain how and why an ESG-integrated BSC may function as a strategic and innovation-enabling infrastructure.

Methodology. Because the paper is a work in progress, the methodology is presented in two connected stages: a current conceptual-development stage and a planned empirical stage.

The current stage is based on a focused conceptual review of the literature on five interconnected domains: Balanced Scorecard and strategic performance measurement; sustainability and ESG integration into strategy; management control systems and sustainability control systems; management control and innovation; and dynamic capabilities and organizational routines. The purpose of this first stage is not to produce an exhaustive systematic review, but to identify the core constructs, mechanisms, and theoretical tensions necessary to develop a coherent framework. The article set selected for this phase includes seminal and directly relevant contributions from strategic management, management accounting, sustainability, and innovation studies.

The second stage, planned but not yet completed, is designed as a qualitative multiple-case study. A qualitative design is appropriate because the paper is interested in internal mechanisms, processual effects, and organizational routines rather than in testing a narrow net-effect relationship between variables. More specifically, the aim is to investigate how ESG-BSC integration is enacted in practice and how different configurations of that integration relate to decision-making, investment choices, incentives, coordination, and innovation-related capability development.

The proposed empirical setting consists of medium-to-large firms that meet three criteria. First, they must use a formal strategic performance measurement system, ideally a Balanced Scorecard or a scorecard-like system that explicitly

translates strategy into measures and initiatives. Second, they must publicly or internally articulate ESG or sustainability objectives as relevant to business strategy rather than only to reporting. Third, they must operate in contexts where innovation and medium-term adaptation are meaningful, such as manufacturing, industrial services, consumer goods, infrastructure, or knowledge-intensive services.

The sample logic is purposeful and theory-driven. The intention is to select four to six cases varying along at least two dimensions: (1) the maturity of ESG integration into the scorecard; and (2) the innovation intensity or strategic renewal pressure of the business context.

This design should make it possible to compare firms where ESG is marginal, partially integrated, or deeply embedded, and to observe how these differences affect organizational processes.

Data collection is expected to rely on multiple sources. The first source will be semi-structured interviews with key organizational actors, including CFOs or controllers, chief sustainability officers or ESG managers, strategy managers, innovation managers, HR managers involved in incentives, and selected business-unit or operations managers. The second source will be internal or public documents, such as scorecards, strategy maps, planning templates, sustainability reports, incentive policies, investment committee guidelines, and presentations used in strategic reviews. The third source, where feasible, will be observational evidence from strategic review or planning meetings.

The interview protocol will focus on several themes: how ESG objectives enter the scorecard; how targets are chosen and cascaded; how strategic initiatives are selected and reviewed; whether ESG affects capital allocation and incentive systems; which functions own ESG measures; how review meetings are conducted; and whether managers perceive ESG metrics as compliance indicators, strategic drivers, or both.

The planned analysis strategy combines within-case process tracing with cross-case pattern matching. Within each case, the objective will be to reconstruct how ESG-BSC integration emerged and how it shapes decision episodes, investment discussions, and routine interactions. Across cases, the analysis will compare configurations and outcomes in order to refine the proposed propositions. A Gioia-style coding logic may be used in the early analytic stages to capture first-order practitioner concepts and second-order themes, especially around decision criteria, review routines, organizational learning, and capability development.

The main constructs to be explored include:

- degree of ESG-BSC integration;
- strategic use of ESG metrics;
- influence on resource allocation and initiative prioritization;
- link to incentives and accountability;
- cross-functional coordination;
- organizational learning routines;
- innovation orientation;
- indications of dynamic capability development.

This method fits the research question for three reasons. First, the paper investigates how a system operates, which makes a qualitative, mechanism-focused design appropriate. Second, the unit of analysis is organizational and processual rather than purely individual or financial. Third, the present literature suggests that the difference between symbolic and substantive sustainability integration may depend on use, interaction, and organizational context, which are difficult to capture through decontextualized measurement alone.

At the present stage, therefore, the methodological contribution of the paper is to provide a credible empirical pathway for testing the framework. The manuscript does not report final empirical findings; rather, it clarifies how the conceptual model can be examined in future research.

Results. As this short paper reports work in progress, the current “results” are conceptual rather than final empirical findings. More specifically, the paper generates two preliminary outputs: a mechanism-based framework and an emerging typology of ESG-BSC integration patterns.

The first output is the conceptual framework developed above. Its central result is the argument that the organizational consequences of ESG integration depend on whether ESG metrics are positioned outside or inside the BSC’s strategic causal architecture. When ESG measures remain peripheral, they are likely to be used mainly for reporting and legitimacy. In this configuration, their influence on decision-making, investment prioritization, and innovation routines is expected to remain weak. By contrast, when ESG is embedded in the causal structure of the scorecard and connected to targets, initiatives, review routines, and incentives, the system is expected to become more consequential for internal strategic behaviour.

The second output is an emerging typology of three possible integration patterns that will guide the empirical phase.

The first pattern can be described as peripheral integration. In this case, ESG indicators exist but are decoupled from the main scorecard logic. They are monitored separately, owned by specialists, and weakly linked to mainstream planning, capital budgeting, or incentives. The expected consequence is a compliance-oriented use of ESG with limited effects on innovation or capability development.

The second pattern is embedded integration. Here ESG objectives are incorporated into one or more BSC perspectives and linked to selected initiatives and review processes. This configuration is expected to improve coordination and make some medium-term investment priorities more visible, but without fully transforming managerial accountability or organizational routines.

The third pattern is generative integration. In this configuration, ESG is embedded not only in metrics but also in the causal map, target setting, initiative selection, resource allocation logic, and managerial review/incentive routines. The expected analytical implication is that ESG becomes a source of strategic inquiry and organizational learning, thereby supporting sensing, seizing, and reconfiguration processes linked to innovation and long-term value creation.

These patterns are not presented as empirical findings already verified. They are analytical expectations to be examined in the next stage of the research. Nevertheless, they already provide a useful way to sharpen the paper's contribution. They suggest that the debate should move away from the simple question of whether firms "use sustainability indicators" toward the more demanding question of how deeply sustainability is integrated into the organizational architecture of strategy execution.

A further expected analytical insight is that interactive use is likely to be a decisive condition. Even a technically well-designed ESG-BSC may have limited impact if it is used only diagnostically, that is, as a tool for variance reporting and target checking. The positive effects should be stronger when managers use the system interactively to challenge assumptions, discuss strategic uncertainties, coordinate functions, and revise initiative portfolios.

Overall, the present results indicate that an ESG-integrated BSC may become a strategic and innovation-enabling infrastructure when it influences not only what the organization measures, but how it discusses priorities, legitimizes investments, and reproduces learning routines over time.

Research limitations. The main limitation of the present paper is that it remains at a conceptual and design stage. The analytical propositions and integration typology have not yet been tested through fieldwork. A second limitation is that the argument is likely to be more applicable to firms with relatively formalized strategy and control systems; organizations relying on more emergent or informal strategic processes may require a different analytical lens. A third limitation concerns construct operationalization. Concepts such as long-term value creation, dynamic capabilities, or strategic use of ESG metrics are theoretically rich but empirically demanding, and their refinement will be an important task in the next stage of the project. Finally, industry and institutional differences may shape how ESG enters control systems, which means that findings from one context may not be automatically transferable to others.

Managerial implications. The paper suggests several managerial implications. First, managers should avoid treating ESG as a parallel dashboard detached from mainstream strategy execution. If the goal is to make ESG consequential, it must be translated into the same architecture that guides objectives, initiatives, reviews, and accountability. Second, firms should embed ESG into the BSC's causal logic, not merely into isolated KPI lists. This means clarifying how ESG-related objectives affect customer value, internal processes, learning needs, risk profiles, and financial outcomes over time.
Third, ESG-related priorities should influence initiative portfolios and investment reviews. When ESG metrics remain disconnected from resource allocation, organizations risk signalling ambition without changing what they actually fund.
Fourth, ownership matters. ESG integration should not remain confined to sustainability departments. Finance, strategy, operations, HR, and innovation functions need shared accountability if the scorecard is to shape routines and decisions.
Finally, the paper suggests that review routines are critical. Managers should use ESG-BSC systems interactively, as occasions for dialogue about trade-offs, emerging risks, capability gaps, and innovation opportunities. In this way, the scorecard can become a platform for coordinated learning and long-term strategic renewal rather than a static reporting mechanism.

Originality of the paper. The contribution of this paper lies in framing the Balanced Scorecard as a possible architecture through which ESG considerations can be translated into strategy, organizational learning, and capability development. Prior studies have shown that sustainability dimensions can be incorporated into scorecards and that sustainability-related issues can be addressed through management control systems. However, the literature has been less specific in explaining how ESG metrics, when integrated into the logic of the BSC, may influence decision criteria, investment priorities, incentive structures, and recurring organizational routines.

In this respect, the paper connects insights from BSC research, sustainability control systems, innovation-oriented management control, and the dynamic capabilities perspective. Its central argument is that ESG becomes strategically relevant not only through disclosure, but through its integration into the organizational infrastructure that links strategy to execution. From this perspective, the paper is situated less in the field of compliance or reporting, and more in that of strategic management, focusing on how ESG can become part of a planning, execution, and learning architecture that supports medium-term innovation and long-term value creation.

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Emerging frames of tourism in small island destinations: The case of San Pietro Island

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Abstract. *Tourism development on small islands requires balancing economic growth with the protection of environmental and cultural assets. This study focuses on San Pietro Island to explore how local stakeholders construct the meaning of tourism rather than merely report its impacts. Using framing theory, the research highlights the interpretive lenses through which stakeholders view tourism and community identity. Qualitative analysis (ongoing) reveals that tourism is framed in narratives emphasizing environmental stewardship, the preservation of local identity, and authenticity. By centering the study on these interpretive frames, rather than solely on stakeholder interests or impacts, this research illuminates how perceptions may shape tourism strategies, offering a fresh perspective on sustainable development in small island contexts.*
Keywords: *tourism management; small-island tourism; stakeholders; framing theory*

Framing of the research. *Small island destinations represent some of the most sensitive and complex contexts in tourism management (McLeod, 2025). Characterized by ecological fragility, strong social cohesion, and the constraints imposed by planetary boundaries, tourism is often a structural force that shapes everyday life and community identity (Graci and Maher, 2020; McLeod et al., 2021). In such contexts, even moderate variations in tourism flows can generate visible environmental pressures, social tensions, and transformations in local economic structures.*

For this reason, governance and stakeholder engagement are particularly central in small island tourism. Destination development cannot rely solely on market dynamics or centralized planning but depends on the interaction among residents, entrepreneurs, institutional actors, and other local stakeholders whose interests are closely intertwined (Bramwell and Lane, 2011; Hall, 2011). Drawing on Freeman's (1984) foundational work, stakeholder theory conceptualizes destinations as networks of interdependent actors whose collaboration is essential for sustainable outcomes. Accordingly, tourism planning research highlights the importance of involving a broad range of stakeholders (Cerdá-Mansilla et al., 2024; Huang et al., 2023), particularly local communities (Khazaei et al., 2015). This is especially relevant in island contexts, where dense social networks and limited resources make the alignment – or misalignment – of stakeholder perspectives particularly influential for development trajectories. A substantial body of tourism – and sustainable tourism – research has therefore examined stakeholder perceptions and engagement in destination development (Bornhorst et al., 2010; Burbano et al., 2022; Pasquinelli and Kavaratzis, 2025), with particular attention to residents' support for tourism. Studies grounded in social exchange theory show that such support largely depends on perceived economic benefits, environmental costs, trust in institutions, and distributive fairness (Nunkoo and So, 2016; Rasoolimanesh et al., 2015; Stylidis et al., 2022).

However, even within small island research, stakeholder perspectives are frequently operationalized through standardized attitudinal constructs. Empirical studies examining residents' support for tourism in island and peripheral destinations typically rely on models derived from social exchange theory, where tourism is conceptualized as a set of economic, social, and environmental impacts to be evaluated by local actors (e.g., Nunkoo and So, 2016; Rasoolimanesh et al., 2015; Stylidis, 2022). For instance, while the study of Butler (2019) shows how the increasing number of visitors to a remote island destination may have a positive impact on resident well-being and benefits, Thompson (2026) suggests that positive impacts can occur even with limited stakeholder collaboration

In these approaches, tourism tends to be treated as a relatively stable and predefined phenomenon – an economic activity producing measurable benefits and costs to which stakeholders respond. The analytical focus is therefore placed on identifying predictors of support or opposition, rather than on examining how tourism itself is interpreted and constructed within the local context.

Yet in small island destinations, tourism is often not a neutral or uncontested object (McLeod, 2025). It may be simultaneously experienced as an economic lifeline, a cultural threat, an opportunity for community continuity, or a risk of overexploitation. Conflicts may thus arise not only from uneven distributions of costs and benefits, but from fundamentally different interpretations of what tourism represents for the island and what its future should look like. As Hall (2011) and McLeod (2025) note, policy debates or frameworks in tourism frequently involve competing problem definitions rather than simple disagreements over resource allocation. In island contexts, where identity, heritage, and environmental stewardship are particularly salient, these divergences in interpretation may be especially pronounced.

To address this dimension, the present study complements stakeholder theory with framing theory. Originally developed by Goffman (1974) and further elaborated in social movement research (Benford and Snow, 2000), framing

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analysis examines how actors construct meanings, define problems, attribute responsibilities, and articulate legitimate courses of action. Applying a framing perspective to small island tourism shifts the analytical focus from measuring support for tourism to examining how tourism itself is defined and narrated by local actors. Rather than assuming a shared understanding of tourism development, this approach investigates the interpretive frames through which stakeholders make sense of its role in the island's economy, identity, and future. Framing theory emphasizes that actors actively construct meanings around contested issues, defining what is at stake and what courses of action are legitimate. In tourism contexts, this implies that development is not simply evaluated but discursively constituted. The emergent frames shape not only individual attitudes, but also governance preferences, perceptions of policy legitimacy, and strategic priorities (Bramwell and Lane, 2011; Cornelissen and Werner, 2014).

In small islands, where social cohesion, spatial proximity, and place identity play a particularly central role, understanding these interpretive frames becomes even more important (Graci and Maher, 2020; McLeod et al., 2021). Tourism debates in such contexts frequently extend beyond economic performance to questions of heritage preservation, environmental limits, and intergenerational responsibility. Development strategies that align with one interpretive frame – such as growth-oriented competitiveness – may generate resistance from actors operating within preservation-oriented frames, even when overall levels of attitudinal support appear similar. As governance research suggests, conflicts often emerge from divergent problem definitions rather than solely from distributive disagreements (Bramwell and Lane, 2011; Hall, 2011). By uncovering how tourism is socially constructed through stakeholders' own narratives, a framing approach offers a deeper understanding of governance dynamics in island destinations.

Against this background, this study adopts an inductive framing-based perspective to explore how local stakeholders in a small island destination interpret tourism and articulate their visions for its development. By moving beyond attitudinal measures commonly used in stakeholder research (Nunkoo and So, 2016; Stylidis et al., 2022) and examining stakeholders' meaning-making processes, the research contributes to tourism management literature by integrating stakeholder theory with framing theory. In doing so, it offers a more nuanced account of how island tourism futures are negotiated, legitimized, and socially constructed.

Purpose of the paper. *Building on the theoretical considerations outlined above, this paper seeks to advance the understanding of stakeholder dynamics in small island tourism by shifting the analytical focus from attitudinal support to interpretive meaning-making. While existing research has provided substantial insights into residents' support for tourism (Khazaei et al., 2015) and its determinants, much of this literature conceptualizes tourism as a relatively stable object of evaluation. In fact, stakeholders are typically asked to assess perceived impacts and benefits, often within frameworks derived from social exchange theory (Rasoolimanesh et al., 2015). Although these approaches have significantly contributed to tourism governance research, they offer limited insight into how tourism itself is defined, problematized, and normatively positioned within local communities.*

In small island contexts, this limitation becomes particularly salient. Tourism is rarely experienced as a discrete economic sector; rather, it is deeply intertwined with identity, environmental limits (McLeod, 2025), heritage, and intergenerational continuity (Graci and Maher, 2020; McLeod et al., 2021). As governance scholarship suggests, conflicts in tourism development may stem not only from distributive disagreements but from divergent problem definitions and normative orientations (Bramwell and Lane, 2011; Hall, 2011). Understanding these divergences, therefore, requires analytical tools capable of capturing how stakeholders actively construct meaning around tourism and its future.

To address this gap, the present study adopts a framing perspective (Benford and Snow, 2000; Cornelissen and Werner, 2014; Goffman, 1974), which conceptualizes stakeholders not merely as evaluators of tourism outcomes but as active interpreters who structure their understandings through distinct interpretive frames. Framing theory, rooted in Goffman's (1974) seminal work Frame Analysis, has increasingly been applied to tourism research to understand how social situations are interpreted and codified by individuals with varying cultural backgrounds (Apchain and MacCannell, 2022). In tourist contexts, frames help both visitors and hosts make sense of interactions, often in simplified ways due to limited shared knowledge of social norms. Recent studies extend this perspective by examining how destinations strategically employ framing to influence tourist perceptions and behaviors. For instance, Hajarrahmah et al. (2026) demonstrate that diagnostic, prognostic, and motivational framing strategies, coupled with frame resonance, can significantly shape tourists' engagement in regenerative tourism across multiple countries. Similarly, other scholars have explored how framing informs tourists' discourse of transformation (Soulard and McGehee, 2023), public support for social movements (Bonilla and Tillery Jr, 2020), and climate change communication (Smith, 2015). Despite these advances, little is known about how framing operates from the perspective of local stakeholders, particularly in island contexts where the interaction between destination narratives and residents' perceptions can create tensions or misalignments. Addressing this gap, the present study applies framing theory to explore how tourism is discursively constituted and how these constructions shape visions of legitimate development. Accordingly, the study is guided by the following research question: What interpretive frames structure local stakeholders' understandings of tourism in a small island destination, and how do these frames shape their visions of development?

Theoretically, this research contributes to tourism management literature in two main ways. First, it extends stakeholder theory (Freeman, 1984) by integrating it with framing theory (Goffman, 1974), thereby moving beyond models that treat stakeholders primarily as respondents to predefined development scenarios. Second, it contributes to

small island tourism research by suggesting that local development futures are shaped not only by formal policies but also by how different perspectives and interpretations of tourism are constructed and negotiated.

From a managerial perspective, the findings suggest that effective destination governance in island contexts cannot rely solely on measuring levels of stakeholder support. Instead, it requires a nuanced understanding of the interpretive frames that underpin local debates, as these frames shape policy legitimacy, conflict dynamics, and long-term strategic alignment.

By repositioning stakeholders as meaning-makers rather than evaluators, combining stakeholder theory and framing theory, this study offers both a more nuanced account of how island tourism futures are negotiated, contested, and collectively imagined, and a more reflexive and governance-oriented account of how island tourism futures are collectively imagined and contested.

Methodology *To address our research question, we adopt a qualitative research design, appropriate for investigating "how" questions and for exploring socially constructed meanings in context (Barratt et al., 2011). The study follows an inductive approach inspired by Gioia et al.'s (2013) methodology, which is particularly suitable for early-stage theory development (Gehman et al., 2018) or when processes are complex.*

3.1 Research setting. The empirical setting of this study is the island municipality of Carloforte[4], located on San Pietro Island, off the southwestern coast of Sardinia (Italy). Carloforte represents a particularly appropriate context for three reasons.

First, small island destinations are characterized by ecological fragility, limited spatial and infrastructural capacity, and strong place-based identities, making them especially sensitive to tourism-related transformations (Graci and Maher, 2020; McLeod et al., 2021). In such settings, tourism is deeply intertwined with everyday life, local social relations, and collective identity, and even moderate increases in visitor flows may have visible economic, social, and environmental consequences (Bramwell and Lane, 2011).

Second, Carloforte is marked by a distinctive historical and cultural identity rooted in its Ligurian origins and long-standing maritime traditions. The island's economy historically revolved around tuna fishing (the "tonnara"), which remains a powerful symbolic and cultural reference in local narratives and continues to shape the island's gastronomic and identity discourse. This strong heritage dimension makes the case particularly suitable for exploring how tourism intersects with concepts like authenticity, tradition, and local future-making.

Third, tourism has gained increasing economic relevance in recent years. Local reports indicate that summer arrivals have reached significant levels, with approximately 33,000 non-resident arrivals in June 2025, 38,000 in July, and 56,000 in August[5]. Comparative data suggest that arrivals have grown by over 30% between 2022 and 2024, alongside an expansion in private accommodation and shorter average stays. These trends point to a progressive intensification and transformation of tourism dynamics on the island.

3.2 Data collection. Data are being collected through semi-structured interviews conducted in Italian. Interviews explore participants' perceptions of tourism's role in the local economy and society, observed changes over time, perceived opportunities and challenges, and expectations for the island's future. Interviews explored stakeholders' perceptions of tourism through open-ended questions, following an inductive approach (Gioia et al., 2013). Interviews are audio-recorded and transcribed verbatim. The research design follows an iterative logic in which data collection and analysis proceed in parallel, enabling progressive refinement of emerging insights (Langley and Abdallah, 2011). Given that the project is ongoing, the findings presented in this paper should be considered preliminary and part of a broader multi-stage research process.

We employ a purposive and theoretically informed sampling strategy (Eisenhardt and Graebner, 2007; Glaser and Strauss, 1967). Informants are selected based on theoretical appropriateness and their potential to provide information-rich accounts of tourism-related dynamics on the island, rather than on representativeness. The intended sample comprises approximately 30–35 interviewees representing different local stakeholder categories, including tourism operators, entrepreneurs, long-term residents, newer inhabitants, small business owners, public officials – but not tourists – and other actors involved in or affected by tourism governance and development. At the time of writing, four initial exploratory interviews have been conducted with informants. Data collection will continue in the coming months until theoretical saturation is reached (Corley and Gioia, 2004).

3.3 Data analysis. Data is analyzed inductively, following Gioia et al.'s (2013) methodology. The process involves iterative coding and constant comparison between empirical material and emerging interpretations (Glaser and Strauss, 1967; Suddaby, 2006). Following Gioia et al. (2013), we identify first-order concepts (expressed in the informants' own terms), second-order themes, and aggregate dimensions in an iterative process. Given the ongoing nature of data collection, these dimensions remain provisional and will be further refined as additional interviews are conducted and theoretical saturation is approached (Corley and Gioia, 2004)

To enhance analytical rigor and minimize personal bias, the analysis consists of a back-and-forth process, with each author independently engaging in open coding, remaining close to the informants' language. We then engage in multiple

[4] Carloforte is the only municipality on San Pietro Island.
[5] Osservatorio del Turismo, Artigianato e Commercio. Sardegna Turismo.

rounds of discussion to compare coding structures, interrogate divergent readings of the data, and achieve convergence on emerging interpretations.

Results. *At the time of writing, four exploratory interviews have been conducted in this initial stage. These preliminary informants include a long-term foreign resident originally from Germany, a local police officer, and two long-term Sardinian residents living on the island. The findings presented here should be considered preliminary and indicative of emerging interpretive patterns rather than definitive conclusions.*

Evidence reveals that tourism is interpreted through distinct lenses reflecting different priorities for identity, development trajectory, and long-term sustainability. Aligned with the methodology (Gioia et al., 2013; Strauss and Corbin, 1998), Table 1 (data structure) illustrates the preliminary process of investigation, presenting the first-order concepts (open coding) that lead to the second-order themes and, ultimately, to the aggregate dimensions that emerged from the analysis (axial coding).

Two aggregate dimensions currently structure these narratives: tourism as the preservation of authenticity and tourism as the custodianship of place. While analytically distinct, these frames coexist in stakeholders' accounts and together shape how tourism is interpreted and evaluated within the local context.

Table 1. Data structure (initial draft)

First-order concepts	Second-order themes	Aggregate dimensions
Carloforte is a small jewel	Perceived authenticity of the island	Tourism as preservation of authenticity
This place has strong traditions and a very unique culture		
Things happen here that could only happen in Carloforte	Uniqueness of local atmosphere and experiences	
People come here because it feels different from other places		
People come here for the sea, the nature, and the landscape	Value of natural environment and landscape	
The island is still very natural and wild in many places		
Tourism has brought growth and opportunities to the island	Tourism as a driver of local development	Tourism as custodianship of place
Tourism must be regulated to protect the island	Need for regulation and balance in tourism flows	

Tourism as preservation of authenticity. The first interpretive frame emerging from the data conceptualizes tourism primarily as a way to experience and preserve the island's authenticity (Croes et al., 2013). Within this perspective, the value of tourism lies not only in its economic contribution but also in its ability to attract visitors interested in the island's distinctive cultural, social, and natural environment. Several informants described Carloforte as a place characterized by a strong sense of authenticity, rooted both in its cultural traditions and in its relatively unspoiled natural landscape. The island was frequently portrayed as "different" from other Sardinian destinations, particularly because it has maintained a strong local identity and a close relationship with the surrounding natural environment. For example, the German resident described the island as a place whose appeal derives precisely from its authenticity and natural character:

"Carloforte is a small jewel. It is not like the rest of Sardinia. There is something very authentic here – the traditions, the people, but also the nature. The island is still wild in many places, and that's part of its beauty."

Similarly, informants highlighted the importance of preserving the island's natural resources, including its coastal landscapes, marine environment, and relatively untouched areas. These natural features were described as fundamental elements of the island's attractiveness and identity:

"People come here for the sea, for the nature, for the landscape. Carloforte is still a very natural island. If we lose that, we lose the real value of this place."

In these narratives, tourism is perceived positively when it allows visitors to experience this combination of cultural authenticity and natural beauty without transforming it. Tourism should therefore remain compatible with the island's existing rhythms, landscapes, and ways of life. Two second-order themes underpin this interpretive frame. The first concerns the perceived authenticity of the island, which informants associate with local traditions, social life, and historical identity. The second relates to the value of the natural environment, including the island's landscapes, coastal ecosystems, and sense of environmental integrity. These narratives resonate with the tourism literature on authenticity (De Bernardi and Arenas, 2022; Nguyen and Cheung, 2016; Park et al., 2019), which highlights how destinations derive value from the preservation of distinctive cultural and environmental characteristics (Rickly, 2022; Rickly-Boyd, 2013; Wang, 1999). In island contexts in particular, authenticity is often closely linked to the perceived integrity of natural environments and landscapes, which play a central role in shaping visitors' experiences and local identity (Graci and Maher, 2020).

Tourism as custodianship of place. Alongside authenticity-oriented narratives, a second interpretive frame emerges from the interviews, emphasizing the responsibility of local actors to manage tourism in ways that protect the island's long-term sustainability. Within this frame, tourism is simultaneously recognized as economically valuable and potentially problematic if left unmanaged. Several informants acknowledged the important role tourism has played in the island's economic development. Long-term residents highlighted how tourism has positively contributed to local growth and expanded economic opportunities over time. However, these narratives were often accompanied by concerns about specific forms of tourism perceived as unsustainable or poorly integrated into the local context. In particular, informants expressed criticism toward large volumes of short-term visitors arriving for day trips. A local police officer, for example, described the impact of daily ferry visitors during peak summer periods:

"The problem is not tourism itself. The problem is when there is no selection. Uncontrolled day-trip tourism can create social and infrastructural pressures".

These concerns were not limited to social or infrastructural impacts but also extended to environmental pressures. Informants frequently emphasized the need to protect the island's landscapes and marine environment from overuse. In this sense, tourism was often framed as a phenomenon that requires careful governance and collective responsibility. Even informants who recognized its economic benefits emphasized the need to regulate tourism flows and maintain a balance between development and preservation:

"Tourism is important for the island, of course. But it must be regulated. We cannot lose what makes this place special."

These themes reflect a broader understanding of tourism as something that must be actively managed to safeguard both the community and the natural environment. This perspective aligns with the concept of custodianship (Dacin et al., 2019; Haugh et al., 2026) in tourism and sustainability literature, which emphasizes the role of local actors as guardians of destination resources and identity and responsible for protecting the long-term integrity of destinations (Boley et al., 2018; Moscardo, 2021). In this sense, tourism development is not only an economic issue but also a matter of environmental stewardship and intergenerational responsibility.

Research limitations. *This study focuses on the perspectives of local stakeholders, capturing how actors embedded in the destination interpret tourism development and the preservation of environmental and cultural resources. While this approach provides important insights into locally grounded visions of tourism, it does not include the perspectives of tourists, whose expectations and perceptions may differ from those of residents and institutional actors. Future research could therefore explore how visitors perceive the island's identity, natural environment, and tourism offer, and whether these perceptions align with local narratives (Bramwell and Lane, 2011).*

Furthermore, additional research could examine whether the interpretive frames identified in this study are translated into actual policies, governance practices, and tourism management strategies over time. Longitudinal or policy-oriented studies could explore how stakeholder framings influence decision-making processes and destination planning in practice (Hall, 2008).

Managerial implications. *The findings offer a useful starting point for tourism planning (Cerd´a-Mansilla et al., 2024; Huang et al., 2023) in destinations characterized by strong environmental and cultural identities. By identifying how local stakeholders frame tourism development – particularly in relation to the protection of natural resources and the island's relatively unspoiled character – this study provides insights that may support policymakers and destination managers in designing strategies that reflect local values and priorities.*

Importantly, tourism development cannot rely on standardized policy models, as effective strategies must be grounded in the specific social, environmental, and cultural context of each destination (Hall, 2008). Understanding the interpretive frames of local actors, therefore, becomes a key step in developing context-sensitive tourism policies and in assessing the degree of alignment between stakeholder visions and visitor expectations (Bramwell and Lane, 2011).

Originality of the paper. *This study contributes to tourism research by applying framing theory to the analysis of stakeholder perspectives in a small-island tourism context. Framing theory highlights how actors interpret issues and construct meanings that influence perceptions, priorities, and potential actions (Goffman, 1974). While stakeholder participation has been widely discussed in tourism studies, less attention has been given to the interpretive processes through which stakeholders frame tourism development and destination resources.*

By identifying the frames through which local actors interpret tourism and the preservation of natural and cultural assets, the study provides a theoretically informed perspective on how tourism development narratives are socially constructed within destination communities. In doing so, it contributes to expanding the application of framing theory within tourism research and offers a conceptual lens for understanding how local meanings and values shape tourism development in environmentally sensitive destinations (Benford and Snow, 2000).

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Evolution of the role of the sustainability manager in the Italian context

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Abstract. *The corporate ecosystem has undergone significant changes in recent years, especially with regard to certain managerial positions that have developed and evolved to monitor and manage changes and contingencies occurring outside the company's perimeter. Indeed, the global context in which companies operate is marked by numerous critical issues, such as widespread degradation, the crossing of various planetary boundaries, climate change related to anthropogenic climate-altering emissions, pollution of various environmental matrices, the reckless and unsustainable use of resources, the loss of numerous species due to human activity, geopolitical and social crises, and conflicts gripping several countries. This general context has meant that companies can no longer afford not to account for and address these burdensome issues (also in light of the resulting regulatory interventions, especially at the European level). This has led to the emergence of highly specialized professionals capable of expertly and competently managing issues across the company. It is important to emphasize that these aspects must be viewed through a double materiality lens: aspects of the company that impact the external ecosystem from an "inside-out" perspective, and external aspects that impact business continuity from an "outside-in" perspective. The need to proactively manage the most crucial issues is proving to be a key factor in achieving a competitive advantage and ensuring survival in a context where ESG issues have become a cornerstone of every corporate strategic plan.*

In this context, the role of sustainability manager is increasingly playing a strategic role within the company, characterized by transversal skills. In recent years, it has evolved from a purely operational role, focused on the execution of environmental initiatives, to a strategic position that integrates sustainability into high-level corporate decisions.

The current work aims to trace its evolution within the Italian context, attempting to delineate its evolution in terms of skills, tasks, positioning, and training programs, and to assess its adoption rate by Italian companies (including by evaluating trends). The research also aims to outline a regulatory framework to fully understand the drivers behind their growth and then begin to evaluate their future perspectives.

Keywords: *Sustainability; Sustainability manager; ESG; corporate strategy; corporate management.*

Framing of the research. *In terms of framing the research, it is important to immediately recognize that the analytical study of the sustainability manager is intimately connected to two strands of research: sustainability, which has seen exponential growth in recent years, and corporate management, thus representing a sort of hybridization of the two. This research seeks to address the research gap related to the lack of precise, up-to-date public data on this professional figure in the Italian corporate context (as highlighted in the research limitations), recognizing that it is essential to provide a more detailed and in-depth picture of the skills, positioning, role, and adoption rate of these roles by Italian companies, the drivers behind growth, and future prospects.*

The research also fits perfectly within the equally well-known ESG framework, an increasingly crucial element in the corporate context as it can affect aspects such as reputation, competitiveness, financing possibilities, and business continuity. All these considerations are naturally linked both to the well-known transcendence of planetary boundaries, which inexorably forces companies to rethink their operations, shifting toward socio-environmentally sustainable practices, and to the proliferation of regulatory mandates (especially European ones, which are then naturally implemented within the national context) that require companies to pay greater attention to the impacts associated with their operations (emissions impacts related to the production site, impacts along the supply chain, impacts on local communities, etc.).

The ongoing work, in order to better explore the evolution of the role of the sustainability manager in Italy, therefore aims to analyse its specific features and numbers in order to provide interesting insights and to serve as a reminder of the strategic importance of this role within the corporate context.

Purpose of the paper. *The primary objective of this ongoing work is to provide a clear and comprehensive descriptive analysis of the sustainability manager role within the Italian corporate context.*

The analysis aims to provide an opportunity to update the specifics of this professional role within Italy in terms of skills, tasks, positioning within the corporate organization, and attitudes, while also addressing the motivations (such as the degraded global context and ESG factors, along with the resulting mandatory European regulatory requirements) behind the emergence of this role.

In addition to providing a snapshot of the current situation, it is essential to evaluate the evolution of this role over recent years, both in terms of the skills and tasks required and in terms of its positioning within the specific company

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context (for example, by evaluating the level of the position, the relationship with top management) to understand how it is evolving and to attempt to outline, in a perspective view, its future characteristics.

It is equally important to analyse the numerical evolution (is the trend growing, as easily predictable?) over recent years to understand how this role is growing in importance in the Italian corporate context (also making necessary distinctions, for example, in terms of the company's geographic location or gender).

A subsequent objective is to emphasize the importance of this role in contributing to the company's resilience, its ESG regulatory compliance, its business continuity, and its reduction of social and environmental impacts. This will enable the company, through scientifically considered strategic choices, to move toward a sustainable future that, in addition to being characterized by lower socio-environmental impact, allows the company to enhance its reputation, thus achieving a competitive advantage (in a market where sustainability is essential).

Precisely in relation to these advantages associated with the strategic adoption of sustainability managers, there is an indirect desire to motivate administrators to seize this opportunity even when there are no mere regulatory constraints obliging them; hence, during the ongoing research, surveys will be administered to various companies to assess the situation and obtain the opinion of top management.

The work is also intended to be a source of information for industry professionals who want to update their knowledge or for professionals who want to pursue this career but currently lack sufficient data and information to gain a complete picture of the situation.

Methodology. *From a methodological perspective, a qualitative research approach was chosen, through which a systematic review of the technical and scientific literature on the role of the sustainability manager was undertaken. This was accompanied by a review of various statistical surveys and reports that traced the evolution of this role in various fields. This allowed for assessment of aspects such as positioning, required skills, actual role, adoption rate within companies (with specifics on the type of company and its geographic location), drivers of growth, and the regulatory frameworks that govern it.*

In terms of temporal scoping, the analysis focused on the most recent findings to ensure adequate updating in a rapidly evolving context, both in terms of regulations and skills. Regarding the geographical boundaries of the research, Italy was chosen to provide a detailed and specific analysis in a context not so well delineated in the literature.

Considering this is a work in progress, the intention is to subsequently continue with a quantitative phase through the use of a statistical survey to be administered to a representative company sample. This will allow to further quantify the growth rate, positioning, skills, role, and actual impact of this figure within the Italian corporate strategic decision-making context.

Results. *Starting from the general technical framework, the professional profile of the sustainability manager in Italy, as anticipated, has evolved from an operational role, simply focused on managing environmental issues, to a strategic position that allows for integrating sustainability into high-level corporate decisions (the role is gradually moving towards high-level governance). In the last decade, in fact, the role has undergone significant professionalization following external pressures, such as regulatory mandates such as EU Directive no. 2022/2464, also known as the Corporate Sustainability Reporting Directive (CSRD), which aims to standardize and strengthen corporate sustainability reporting requirements (which came into force on January 5, 2023, replacing the previous Non-Financial Reporting Directive (NFRD)), growing pressure from investors and consumers, and the inexorable and ongoing deterioration of planetary health. The role was initially primarily tied to the execution of environmental and Corporate Social Responsibility (CSR) projects, but today it contributes to business model transformation, with cross-functional expertise in ESG governance. The increasingly centrality this role is assuming in the Italian context is leading it to engage[2] directly with the board of directors, becoming a key figure in Italian corporate organizational charts, growing in importance alongside the strategic importance of sustainability, very often with specialized oversight of non-financial reporting and ESG risks.*

In terms of skills, this role must have transversal yet advanced technical skills, having to navigate ESG and sustainability regulations (to ensure legal compliance), sustainability reporting, data analysis and KPI monitoring, supply chain knowledge and impact measurement (for example, through Life Cycle Assessment), without focusing solely on the pure environmental aspect (social impact, for example, is becoming increasingly important). Specifically, they must master regulations, standards, and reporting specifications such as the Corporate Sustainability Reporting Directive (CSRD)[3], the Sustainable Finance Disclosure Regulation (SFDR), the European Sustainability Reporting Standards (ESRS), the Corporate Sustainability Due Diligence Directive, the EU Taxonomy, reporting standards and initiatives such as the GRI (Global Reporting Initiative), SASB (Sustainability Accounting Standards Board), TCFD (Task Force on Climate-related Financial Disclosures), SBTi (Science-Based Targets Initiative), certification systems such as ISO 14001, SA8000, B Corp, and various other protocols, such as those for carbon footprinting. This knowledge must be combined with significant analytical skills to expertly and efficiently manage the large amounts of data, for example, with the help of digital tools such as IoT or AI. Skills must also go beyond this, addressing issues such as materiality analysis (double materiality according to the latest regulatory requirements), stakeholder engagement, preventing greenwashing and

[2] For example, as Chief Sustainability Officer.
[3] Implemented in Italy with Legislative Decree 125/2024.

reputational risks, internal management training, audit oversight, developing action plans for optimizing resources (including energy efficiency) and departments, and reducing waste and emissions, supporting leadership with risk and opportunity analyses (aligning sustainability with core business), promoting technological innovation, raising awareness of ethical governance, and the relationship between sustainability and finance.

The sustainability manager must therefore operate holistically, just as the vision of sustainability is holistic: it's not about focusing on one aspect rather than another, which is why skills must necessarily be cross-sectoral. Furthermore, being in a constantly evolving context, the sustainability manager must be proactive in managing change and innovation to continually address new challenges (even considering the more stringent and binding regulatory requirements resulting from the CSRD, despite the simplifications of the Omnibus package).

In Italy, when dealing with the role of the sustainability manager, reference must be made to the UNI/PdR 109 reference practice "Non-regulated professional activities: professional profiles in the field of sustainability" developed by UNI together with Intertek, Confassociazioni, and CSR Manager Network, which is divided into two parts: specifically, part 1 (UNI/PdR 109.1:2021) «defines the requirements relating to the professional activity of the Sustainability Manager and Sustainability Practitioner, i.e. the professional who carries out management activities at a managerial level of sustainability in the company and corporate social responsibility and the professional who develops and manages sustainability at an operational level», while part 2 (UNI/PdR 109.2:2021) «defines the requirements relating to the professional activity of the Sustainability & CSR Auditor, SDG Action Manager, SDG User, i.e. the professional who carries out audit activities in the field of sustainability and corporate social responsibility, management of SDG objectives in organizational structures, management aspects and daily activities of citizens related to the SDGs not related to specific professional activities». It should be clarified that the Sustainability Manager and Practitioner logically have different roles and responsibilities as the former requires advanced managerial skills with strategic decision-making autonomy and involves the development of ESG strategies, plan monitoring and risk and stakeholder management, while the latter focuses on operational support with a lesser mastery of the same knowledge (for example, support in reporting and projects without decision-making autonomy); both in any case require a secondary school diploma and 40 hours of specific training in the last 3 years[4].

In numerical terms, it's important to start from the assumption that in Italy there are no precise and up-to-date public data that can provide a basis for a detailed analysis[5]: for example, referring to the Accredia website, there are only 113 certified sustainability managers[6]. To address this, surveys conducted by private institutions such as Deloitte[7] were considered, which revealed that only 7% of Italian companies have a person dedicated exclusively to sustainability (a position that is also recent, meaning it has been in place for 2-5 years, for 52% of companies), a figure that rises to 37% for companies with more than 50 employees. The data therefore show that this role is relatively new for most companies (71% of these roles have been active for less than 5 years) and a 19% increase in requests has been observed since 2021, driven by ESG regulations and the demand for green skills. It can therefore be stated that this role[8], classified in 38% of cases as a manager[9], is following a growing trend (it is among the top 5 most sought-after), with projections of expansion in the next 5 years due to stakeholder and compliance issues[10], it is linked to the company's size, and it is also concentrated in Northern Italy (11% in the North West alone) [11]. It is also evident that among companies with a sustainability manager, 85% adopt sustainability plans and 80% actively communicate ESG objectives (against lower national averages).

[4] It should also be noted that a manager requires three years of full-time managerial experience in sustainability, while a Practitioner requires only proven operational experience and a different exam. Educational programs to become a sustainability manager in Italy may include master's degrees, executive courses of at least 40 hours, and professional certifications recognized by UNI and CEPAS. Sustainability Manager certification (which requires an update process to maintain certification) in Italy must be obtained from an accredited body that complies with UNI/PdR 109.1:2021 and ISO 17024 standards, with lists available in the Accredia database, such as Intertek Italia Spa.

[5] The registers are public but partial (certified only) and can be integrated with surveys, for example from the Osservatorio Bilancio Sostenibilità for aggregate estimates or, for a complete mapping, combined with LinkedIn or GRI company reports.

[6] Evidently, the data cannot be representative of the Italian total, which also includes non-certified individuals.

[7] "Il ruolo del sustainability manager", 2023

[8] Who in 31% of cases reports directly to the CEO and who in 43% manages teams of up to 2 people.

[9] In Italy, sustainability managers generally reach senior positions in the organizational charts of large companies, often as Chief Sustainability Officer or Group Sustainability Officer reporting directly to the CEO, integrating strategic committees and operational teams.

[10] For companies, the main driving force will come from stakeholder expectations, customers (37%) and suppliers (20%) rather than from shareholders (13%).

[11] The presence of this role is correlated with the concentration of large companies and multinationals, with an estimated greater prevalence in Northern Italy (Lombardia, Veneto, Emilia-Romagna), where 70-80% of companies with more than 50 employees and formal ESG plans are located. Growth in particular is driven by industrial hubs and PNRR incentives, with more consolidated roles in export-oriented contexts and ESG investors.

Finally, some interesting data emerges from the 2024 studies promoted by Sustainability Makers[12] in collaboration with EASP[13] and AIDP[14]; the first study highlights two interesting considerations: a strong female component among internal sustainability professionals and a significant increase in in-house professionals dedicated exclusively to sustainability; the second study shows that organizational sustainability units are beginning to appear not only in large companies (71.6%) but also in small companies (33.3%), and that the role of Sustainability Manager is beginning to be present not only in large companies (71.2%), but also in medium-sized (66.7%) and small companies (55.6%).

In conclusion, it can be stated that the role of sustainability manager within the Italian context is increasingly growing, driven by pressing socio-environmental issues, compliance, and commercial and reputational needs, albeit with diversification in terms of company size and geographical location.

This ongoing work aims to clarify and outline the characteristics, evolution, and prospects of this role within the Italian context, also analysing its numerical evolutionary trends, in the knowledge that this role will assume an increasingly strategic role within the Italian business context. It would be interesting for future research to focus even more on numerical analysis as well as on the drivers and obstacles that may influence its adoption.

Research limitations. *The research presents several limitations, primarily related to the availability of specific and geographically contextualized company data. Specifically, it is reiterated that in Italy, precise and up-to-date public data on the numerical and geographical distribution of sustainability managers do not exist (there are no official public datasets or centralized national registers to map sustainability managers in Italy, as the role is not regulated as a professional body, thus limiting sources to private surveys or accredited lists: these ones are, however, partial, as is the case with the national accreditation body Accredia's register, which lists professionals certified in sustainability through the databases for the UNI/PdR 109.1:2021 and UNI/PdR 109.2:2021 standards for Sustainability Managers and Practitioners, accessible online for searches by region or sector) and are available only analyses, such as the Deloitte 2023-2025 one, which, however, do not provide detailed regional or provincial breakdowns. To overcome these limitations, it is possible to turn to networks like Sustainability Makers, which publishes reports and profiles of professionals (over 500 members) with aggregated data from ESG governance surveys or consider surveys and observatories like the Osservatorio Bilancio Sostenibilità, which offers annual surveys with publicly available, non-named or georeferenced demographic data. It is possible also to consult ISPRA and MATES project[15] reports, which provide qualitative analyses of profiles, downloadable for indirect company correlations***.***

Managerial implications. *A detailed analysis of the specific technical characteristics of the sustainability manager role, ranging from role to positioning, skills to responsibilities, as well as an updated assessment of its adoption trends within Italian corporate contexts, certainly provides a wealth of interesting information both for professionals already employed in the role and, above all, for professionals who wish to approach the role by pursuing this type of career.*

This information can also be of great importance for companies, which can better understand the crucial importance this role has for the corporate ecosystem in terms of compliance with increasingly stringent regulations, reputation, creation of a competitive advantage, lower socio-environmental impact, and greater resilience - in short, ensuring the company's survival and flourishing.

This work can allow companies to fully understand the need to employ such a figure who is capable of managing issues across the ESG spheres, ensuring business continuity in this challenging external environment. The hope is also to act as a lever for less inclined administrators (where there are no regulatory obligations) so that, especially by outlining advantages and growing numbers, they are truly convinced of the great positive impact that can derive from it.

Originality of the paper. *This work represents an important opportunity to outline an updated and contextualized description of the role of the sustainability manager within the Italian context (where such precise and up-to-date public data does not exist). This role is increasingly crucial in the corporate world due to the delicate socioeconomic and environmental context in which companies operate (global warming, conflicts, environmental contamination, social tensions).*

The originality lies precisely in the precise and detailed analysis of all the facets of this managerial figure (from role to positioning, from skills to tasks), without neglecting issues such as the numerical evolution within the Italian corporate fabric (in connection with potential drivers such as commercial needs, regulatory requirements, etc.). The ultimate goal is to provide a detailed and up-to-date framework that can clarify and provide information on issues that are not always so well-defined. This numerical analysis allows to provide a snapshot demonstrating the evolution and ever-increasing importance of this professional figure (this could provide further impetus to senior figures who still today view the need for a figure like this in a company with suspicion).

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[12] Italian association that brings together professionals dedicated to defining and implementing sustainability strategies and projects in businesses and other organizations.
[13] European Association of Sustainability Professionals. The study is titled "Sustainability Career Compass."
[14] Italian Association for Personnel Management. The study is titled “Le professioni della sostenibilità: unità organizzative e profili emergenti”.
[15] Project created by Sistemi Formativi Confindustria (SFC) e Fondazione Ecosistemi for the green managerial skills (Sustainable Transition Manager).

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Exploring the relationship between firm innovativeness and biodiversity: opportunity or liability?

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Abstract. *Environmental sustainability, including biodiversity protection, is a central concern for many firms. However, preserving biodiversity is often considered a liability by companies, which frame it as a potential constraint to their profitable activities and view their relationship with biodiversity merely in terms of limiting negative impacts on it. Nevertheless, some scholars have started observing the relationship with biodiversity as a potential source of competitive advantage, investigating its role in influencing firm performance and risk mitigation capability. In this perspective, our exploratory research aims to explore whether the relationship with biodiversity can influence a company's level of innovativeness.*

We adopted a mixed-method approach, consisting of an original survey completed by 226 valid responses (Italian firms: 81,4%; international firms: 18,6%), followed by in-depth interviews with the CEO / managers of ten Italian firms. Quantitative results indicate that firms passively operating in a biodiverse environment without integrating it into their business model are less likely to be highly innovative; conversely, firms deliberately engaging with biodiversity tend to perform better in innovation-related measures, highlighting the crucial distinction between active and passive exposure in innovation processes. Qualitative results emphasize the relevance of both stakeholders and digital technologies for biodiversity practices and goals, and of biodiversity for firm innovativeness. Findings help advance the literature about the link between biodiversity and firm innovativeness and to define some managerial implications.

Keywords: *biodiversity; innovation management; firm innovativeness; stakeholder theory; digitalization; mixed-method.*

Framing of the research. *In recent years, sustainability has become an increasingly important concern for firms and policymakers. Among the various dimensions of environmental sustainability, the conservation of biodiversity, meant as "the variety of life, including variation among species and functional traits" (Cardinale et al., 2012, p. 60), has received growing attention due to its implications for ecosystems and economic systems. Firms are finding new ways to incorporate biodiversity into their sustainability practices in the process of understanding how it impacts the business environment. New frameworks and tools can help organizations tackle sustainability and biodiversity issues by reducing the impacts of their activities on the environment (Reale et al., 2019). As sustainability, including the pressing topic of biodiversity protection, is gaining popularity amongst researchers, policymakers, and businesses, this debate is now more relevant than ever before.*

While policymakers seek to protect the environment's interests, they introduce constraints and tensions that companies must consider when undertaking business activities. This pressure on firms is not only imposed by policymakers but also by consumers who favor products and services from companies that have sustainability practices. Although this pressure is generally viewed as having a negative impact on companies, it can encourage firms to define innovative management strategies to counteract the environmental impacts. This approach also contributes to their long-term stability and may help secure key resources for the firm (Ivanov, 2022). These tensions bring up important questions regarding the role of innovation in this context: thus, the link between biodiversity and innovation is far from being explained. With this research, we aim to contribute to filling the gaps in the literature regarding this relationship. Recent studies have been focusing more on the effects of biodiversity and adjacent topics. Research argues that biodiversity and ecosystem service management should be regarded as a core sustainability issue that can influence firm performance (Wagner, 2023). Katic and colleagues (2023) found that companies are adopting biodiversity impact measurement and management tools into their processes as a way to mitigate and understand how biodiversity affects them. Overall, the literature has a fragmented perspective on biodiversity, as on one side it could be regarded as a strategic issue for firms, and on the other side, it could be a potential driver for firm innovativeness and growth.

Contributing to this topic, a growing number of scholars and practitioners are recently looking at managing sustainability and biodiversity issues by considering the role played by stakeholders (Bronzetti et al., 2023), with respect to the activation of sustainable business solutions that could positively affect biodiversity practices (Henriques & Sharma, 2005). Specifically, for biodiversity practices, scholars refer to the activities that can help to tackle the loss of biodiversity (Salmi et al., 2023). Boiral and Heras-Saizarbitoria (2017) proposed a framework that differentiates biodiversity practices into: (i) internal practices that are implemented by the firm itself; and (ii) external practices implemented in association or collaboration with various stakeholders.

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Another important aspect in motivating operational practices to tackle biodiversity issues is linked to the diffusion of ecological knowledge. Specifically, ecological knowledge is vital in influencing biodiversity culture and shaping learning about biodiversity in the social context. Stakeholders are integrated into this learning process (Smith et al., 2020) because of their key role in value co-creation (Boiral and Heras-Saizarbitoria, 2017). According to stakeholder theory, in developing their overall strategies, companies and organizations must consider the interests and expectations of their various stakeholders, defined as "any identifiable group or individual who can affect the achievement of an organization's objectives, or who is affected by the achievement of an organization's objectives" (Freeman & Reed 1983, p. 91). Some studies have highlighted the importance of stakeholders' engagement and involvement in managing complex environmental issues and promoting proactive environmental strategies (e.g., Buysse & Verbeke, 2003; Cragg & Greenbaum, 2002).

In addition to stakeholders, digitalization also plays a key role in managing sustainable goals (Broccardo et al., 2023). Emerging digital technologies may lead to variations in how organizations involve stakeholders in sustainable practices. Moreover, in recent years, there has been growing attention on how digitalization can support organizations in the optimization of business processes, including environmental sustainability concerns (Piccarozzi et al., 2022, 2023). Digital technologies can serve as solutions for facing biodiversity issues in different ways, as they can be used to offer innovative regenerative solutions in agriculture (Cumming et al., 2020), but also to tackle biodiversity loss, playing a complementary role alongside existing technology, or supporting other innovation processes (Ziegler et al., 2022).

The connection between biodiversity and innovation emerges as a promising field of research as pursuing biodiversity goals could affect firm innovativeness, in terms of processes, products, services, and business models. These contributions suggest that biodiversity may represent not only a constraint, but also a potential strategic resource for firms. In the management literature, it has been found that diversity is considered a driver of innovation (Hewlett et al., 2013). Different forms of diversity, such as gender, culture, education, background, and cognitive (Mitchell, 2008; Østergaard et al., 2011), as well as the diversity of cooperation and relationships among companies and stakeholders (Vence & Trigo, 2009), have positive effects on firm innovativeness. In the context of sustainability (and biodiversity), companies have started to innovate their business models to include also environmental and social considerations (Feger & Mermet, 2022). These sustainable business models are designed to integrate sustainability into companies to create ecological and social values, and to adapt the firm to the changing external environment. This perspective will drive the next wave of innovation and growth in the global economy and will also contribute to reshaping businesses and the relationships with society (Porter & Kramer 2019).

Purpose of the paper. *Overall, existing research provides fragmented insights: on the one hand, biodiversity is increasingly recognized as a strategic issue for firms; on the other, the literature on sustainability and innovation suggests that innovation can support environmental objectives only under specific conditions and may otherwise entail trade-offs (Pichlak & Szromek, 2021). Despite an increasing interest in the implementation of biodiversity practices from a business viewpoint, we still lack a deeper understanding of the effects on innovation and firm innovativeness. The main purposes of the study concern assessing the relationship between biodiversity and firm innovativeness and the following deeper understanding of the factors, in terms of new theoretical patterns (Sabherwal & King, 1991), that can affect this relationship. In doing so, the study tries to answer the following research questions:*

RQ1: Does biodiversity affect firm innovativeness?

RQ2: What is the role of stakeholders in biodiversity practices?

RQ3: What is the role of digitalization in biodiversity practices?

The purpose of the study is to evaluate the management of biodiversity from a business perspective and assess the relationship with innovation and, specifically, with firm innovativeness. We attempt to answer the study's research questions through both a quantitative study assessing the relationship between biodiversity and firm innovativeness and a qualitative one to gain a deeper understanding of this relationship and the factors that can affect it, to develop a theoretical framework useful for future research.

Methodology. *The empirical analysis is based on data collected through a survey targeting executives responsible for innovation and sustainability within their organizations (e.g., Chief Innovation Officers – CInO, and Chief Sustainability Officers – CSO). CEOs were also included, as smaller companies may not have dedicated C-level executives responsible for innovation and/or sustainability. The survey captures data regarding firm innovativeness, organizational approach to sustainability practices, biodiversity-related activities, and other firms' characteristics. We collected a total of 226 responses. Table 1 summarizes the main characteristics of the sample.*

An ordered logit model is used to analyze the relationship between the firm's biodiversity-related activities and innovativeness in terms of performance. In our analysis, the firm's innovativeness (dependent variable) was measured using the share of revenue generated from innovative products and services in the last 3 years, using a 5-point scale ranging from 0% to over 25%. As regards biodiversity-related activities (independent variables), we measured five items capturing various aspects of the firm's relationship with biodiversity. The items are 1) operating in biodiversity-rich environments (oper_bio_rich), 2) innovation activities are carried out in biodiversity-rich ecosystems (act_bio_rich), 3) biodiversity preservation efforts (preserving_bio), 4) assessment of impact on biodiversity (impact_bio), and 5) the use of biodiversity as a source of competitive advantage (comp_adv_bio).

Tab. 1: Sample main characteristics of the quantitative study

Description	***%***
Role respondent	
CInO	*64,2%*
CEO	*31,0%*
CSO	*4,9%*
Firm size (number of employees)	
Small (0-50)	*20,3%*
Medium (51-250)	*24,2%*
Large (over 250)	*55,5%*
Industry	
Manufacturing	*64,6%*
Others	*34,4%*
Country	
Italy	*81,4%*
International	*18,6%*

N = 226. Source: authors' own elaboration

In the model, we control for country of origin (country), firm size (size), and industry sector (sector) to account for organizational and institutional factors that may affect both innovation performance and biodiversity-related activities. The country variable is modeled as a dummy variable since more than 80% of the responses were headquartered in Italy. In addition, the industry sector is introduced as a binary variable differentiating manufacturing firms from other industries, since manufacturing companies account for approximately two-thirds of the sample (64.6%).

For the qualitative study, we performed a multiple case study (Yin, 2014) using multiple material sources from in-depth interviews, to better understand the phenomenon, and secondary data extracted from companies' websites and companies' LinkedIn webpages. We have collected data about ten Italian firms, detailed in Table 2.

Tab. 2: Case studies

Company	***Founded***	***Size (employees)***	***Industry/Activity***	***Interviewed***
Company 1	*2017*	*Medium-sized*	*Technology / Technology provider*	*Marketing manager*
Company 2	*2019*	*Medium-sized*	*Food / Food delivery services; Education services*	*Co-founder*
Company 3	*2018*	*Medium-sized*	*Consulting / Innovation and technology consulting services*	*Marketing manager and Agronomist*
Company 4	*2022*	*Small-sized*	*Technology / Bio-technology solutions*	*Co-founder*
Company 5	*2019*	*Small-sized*	*Food / Health food production*	*Founder / Marketing manager*
Company 6	*2017*	*Small-sized*	*Technology / Technology provider for agriculture*	*Sustainability manager*
Company 7	*1974*	*Large-sized*	*Food / Production of canned fish*	*CEO*
Company 8	*1974*	*Small-sized*	*Food / Wine producer*	*CEO*
Company 9	*2016*	*Large-sized*	*Consulting / Sustainability and biodiversity-related services*	*Co-founder*
Company 10	*2022*	*Small-sized*	*Technology / Sustainable-related digital solutions*	*CEO*

Source: authors' own elaboration

In this case, we performed two steps of analysis: a preliminary desk analysis of companies' website and LinkedIn webpage and a content analysis of the interviews done to extract common concepts useful for our research goals. The interviews aimed at investigating the link between business and biodiversity, the firms' activities (practices) adopted for biodiversity goals, and the effect of these practices on innovation.

Results. *According to our quantitative results, we observed a heterogeneous relationship between company innovation performance and biodiversity-related activities. As shown in Table 3, considering companies that have active engagement with biodiversity (act_bio_rich), it is positively correlated with higher revenue from innovative products ($\beta = 0.38$, $p < .05$), while operating in a biodiverse environment shows a negative correlation ($\beta = -0.44$, $p < .01$). These results suggest that there are deeper mechanisms involved in biodiversity's impact on innovation performance, since the effect is not uniformly positive, which signifies a trade-off. Based on these results, we can mainly state that, on one side, companies that actively carry out innovation-related activities in biodiversity-rich environments tend to perform better in the overall*

level of innovation; instead, on the other side, simply operating in a biodiverse environment does not assure innovation performance.

Tab. 3: Regression results

Variable	***Coefficient***	***p-value***	***Effect / Significant***
Independent			
Oper_bio_rich	*-.444*	*.009***	*Negative / Significant*
Act_bio_rich	*.380*	*.027**	*Positive / Significant*
Comp_adv_bio	*.126*	*.384*	*Not significant*
Preserving_bio	*-.097*	*.560*	*Not significant*
Impact_bio	*.115*	*.479*	*Not significant*
Control			
Industry	*.219*	*.459*	*Not significant*
Size	*-.323*	*.004***	*Negative / Significant*
Country	*.014*	*.970*	*Not significant*

N = 226. Source: authors' own elaboration

The contrasting findings indicate that the distinction between positive and negative correlation might stem from external factors, such as environmental policies and regulations, and a deliberate and strategic inclusion of biodiversity in the business processes. Regarding the control variables, we found a significant negative effect of size, suggesting that larger companies tend to generate less revenue from innovative products, in line with evidence from the literature (Chandy & Tellis, 1998).

The evaluation of the ten firms involved in the qualitative study started with a desk analysis of the companies' websites and LinkedIn pages to mainly assess how biodiversity is part of the business (activities, products, services for biodiversity) and the collaborations and the digital technologies used to manage biodiversity. A summary of the main results of the desk analysis is reported in Table 4.

From this first step of qualitative analysis, emerged a clear positive role of both stakeholders and digitalization as two relevant factors that firms involved with biodiversity concerns have to take into consideration. Stakeholders can support and/or push a firm to implement biodiversity practices for different reasons. Digital technologies are essential to monitoring and managing biodiversity.

In addition to the desk analysis of companies' websites and LinkedIn pages, we analyzed the interviews done with managers and a co-founder of the ten companies considered in this study. The content analysis of the interviews allowed us to have some insights into our research goals. Firstly, all companies consider biodiversity a current issue that firms must tackle and thus consider in their own overall strategy.

As far as the relationship between biodiversity and innovation, we found (as the following quotes show) that biodiversity can positively affect a firm's innovativeness in very different ways, with positive effects on products, services, processes, and business models.

"When we noticed that people were interested in biodiversity issues, we basically modified our business model to involve individuals." (Company 1)

"Biodiversity allows us to satisfy different people's needs. In this way, we can innovate our business also promoting personalized nutrition." (Company 2)

"In our solutions, we offer the clients the opportunity to innovate the business models." (Company 3)

"Biotechnology can certainly be an extraordinary lever of innovation to face biodiversity issues." (Company 4)

"Offering bio-solutions is very innovative because probably these situations could have been addressed with chemical or other industrial solutions." (Company 5)

"We developed an innovative DSS (decision support systems) tool that uses sensors in the field, which are processed using agronomic models, to provide advice to farmers." (Company 6)

"To preserve product characteristics and assure a top-quality product, we innovated our salting process, which now takes place within 24 hours of the catch at the fishing grounds." (Company 7)

"We launched a project in 2008 to rediscover old historic grape varieties through mass selection." (Company 8)

"We use bees as bioindicators by measuring emissions in the environment covering a very large area." (Company 9)

"We use innovative algorithms to identify correlations and describe any trends about biodiversity." (Company 10)

As far as the role of stakeholders for biodiversity issues is concerned, through the analysis of interviews emerged that the involvement of stakeholders is a key factor that helps firms to reach sustainable and biodiversity goals, because of the complexity of these topics.

Tab. 4: Main results of qualitative desk analysis

Company	***Products/Services***	***Collaboration strategies***	***Digital techs for biodiversity***
Company 1	▪ *Monitoring* ▪ *Regeneration* ▪ *Education* ▪ *Innovative biodiversity-related services for citizens*	▪ *Collaborations with their clients to control bees' lives* ▪ *Collaborations with other organizations (universities and research centers) to develop new solutions* ▪ *Involvement of the clients of their clients*	▪ *IoT* ▪ *Sensors* ▪ *Satellite imagery* ▪ *AI tools* ▪ *App*
Company 2	▪ *Food production (recipes) and delivery for individuals and organizations* ▪ *Personalized nutrition*	▪ *Collaborations with suppliers to assure ingredients variety* ▪ *Collaborations with other organizations (universities, research centers, and consultants) for technical aspects*	▪ *Digital platform,* ▪ *App (for service delivery, for personalized nutrition, for B2B relationship)*
Company 3	▪ *Nature-based solutions* ▪ *Local and industrial resource efficiency solutions services* ▪ *Biodiversity monitoring and innovative regeneration services* ▪ *Open Innovation*	▪ *Involvement of clients to favor biodiversity practices and promote them in the client's network.*	▪ *Sensors* ▪ *Satellite imagery* ▪ *Virtual collaboration tools*
Company 4	▪ *R&D and production of science-based and plant-derived active ingredients for the Personal Care and Health Care markets.*	▪ *Very important collaboration with research centers, universities, and other organizations (mainly consultants) for the development of innovative solutions*	▪ *Smart production technologies instrumental for the business based on biodiversity*
Company 5	▪ *Production of functional fibers and antioxidants for health food that are already present in nature.*	▪ *Collaborations with different organizations (from business partners to universities, research centers, and consultants) to develop innovative solutions*	▪ *Smart production technologies instrumental for business biodiversity-based* ▪ *Digital platform*
Company 6	▪ *Consulting services and technology provider for the digitalization of agriculture firms*	▪ *Several collaborations with the following organizations: supply-chain, food producers and distributors, other tech providers, and the agriculture association*	▪ *AI tools* ▪ *IoT* ▪ *Sensors* ▪ *Satellite imagery* ▪ *Digital platform for agriculture solutions for managing sustainability and biodiversity issues*
Company 7	▪ *Production of canned fish using sustainable packages and assuring 100% of residual CO_2 emissions are offset*	▪ *Main collaboration with supply-chain, universities, and research centers.*	▪ *Life Cycle Assessment tools* ▪ *Digital data-driven tools for monitoring the supply chain*
Company 8	▪ *Wine production follows sustainable processes that preserve biodiversity*	▪ *Collaboration with consulting firms for sustainability and biodiversity concerns* ▪ *Collaboration with other business partners*	▪ *Innovative technological solutions are used to preserve product characteristics.*
Company 9	▪ *Innovative biodiversity-related services for citizens*	▪ *Collaborations with different organizations (business partners, universities, research centers, and consultants)*	▪ *Innovative digital solutions and AI tools for monitoring biodiversity and environmental impacts*
Company 10	▪ *Digital and consulting services for the monitoring and evaluation of biodiversity and environmental impacts of business*	▪ *The field of Open Innovation has a main collaboration with a consulting company* ▪ *Collaboration with a technology developer* ▪ *Collaboration with agri- and food-related firms*	▪ *AI tools* ▪ *Machine learning tools* ▪ *Cloud solutions* ▪ *Digital tools for data-driven analysis*

Source: authors' own elaboration

"In addition to our clients, citizens are also directly involved in the business because of the relevance of biodiversity. Moreover, we collaborate with different research universities and other institutions." (Company 1)
"In our business, we need the involvement of other organizations and of clients." (Company 2)
"Biodiversity needs stakeholders' involvement. Biodiversity loss is a social issue that needs the participation of different actors." (Company 3)

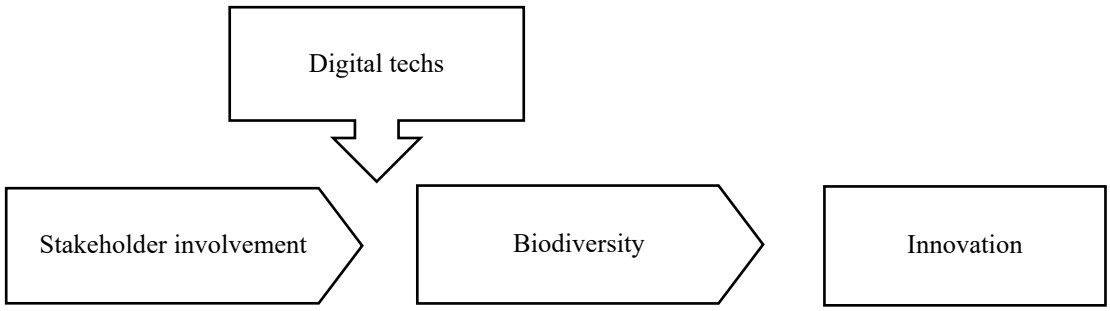
"We have to involve stakeholders and institutions and share with them the culture of bio-solutions to reach sustainable goals." (Company 4)
"Everyone has to participate actively. For example, scholars are useful for doing outreach to affect the culture." (Company 5)
"Research centers and universities are potential and essential partners in the development of specific indicators." (Company 6)
"We try to advocate on behalf of the fishermen...in this way we lead to 46 fishing vessels being certified by Friend of the Sea." (Company 7)
"Smart people respond very well to our biodiversity policy: suppliers and consortia ask us to visit vineyards to take inspiration from us." (Company 8)
"It is rare and always very difficult to achieve such operational and functional goals on one's own." (Company 9)
"Small producers support us because they appreciate the value this creates for the environment" (Company 10)

Finally, in addition to stakeholders, from the content analysis of interviews emerged the relevance of technologies in pursuing biodiversity goals. Specifically, companies stressed the role of digital technologies that are essential to monitoring, preserving, and promoting biodiversity.

"To provide our services, we need technology and data to precisely meet need of beekeepers as well as of individuals that adopt a beehive…Technology is for us necessary to assure biodiversity." (Company 1)
"'The advent of artificial intelligence allowed for easier prediction and knowing what ingredients must be produced and used in specific diet programs." (Company 2)
"In promoting our Nature Based Solutions, we consider technologies necessary to reach efficient sustainable results. Moreover, technologies allow us to monitor biodiversity and act immediately." (Company 3)
"We are a circular economy model that relies on digital technologies to work." (Company 4)
"Culture is important. Understanding the relevance of biodiversity affects the social approach to the topic." (Company 5)
"Biodiversity needs to harness innovation and technological tools to be protected." (Company 6)
"Preserving biodiversity is essential, and to achieve this, we need technological tools." (Company 7)
"Technology is essential to us – things like weather stations and software that predicts the spread of pathogens, or the recovery sprayer that halves the number of treatments required." (Company 8)
"We use sensors inside the hive to monitor the bees' health... an artificial intelligence system." (Company 9)
"The main challenge was to try to gather data and identify which variables are more or less significant. You can only do this by using technology." (Company 10)

The results of desk and content analyses of the firms involved in the qualitative study allowed us to depict a possible conceptual framework (Figure 1) that summarizes how the different variables relate among them, highlighting the double face of biodiversity promotion or loss prevention, as output of innovative services and a driver for innovation. Stakeholders can be a driver for the management of biodiversity issues; instead, digital technologies are surely a support that allows for managing biodiversity effectively and linking it to firm innovativeness in terms of products, services, processes, and business models.

Fig. 1: Conceptual framework proposed



Source: authors' own elaboration

Research limitations. *It should be noted that this study is exploratory in nature, and the findings need careful interpretation. First of all, further investigation is strongly recommended, especially using a different method for estimating the innovativeness of firms, focusing on other innovativeness measures linked to all the different kinds of innovation. Secondly, an increase in dataset depth and breadth would highly benefit the robustness of the study's results, as our sample was geographically constrained, which reduces the generalizability of our results. Third, the biodiversity-*

related items that were created for the questionnaire would benefit from further refinement. Lastly, taking into consideration the qualitative investigation, a more comprehensive stream of research that considers a quantitative approach and other variables in addition to those reported in Figure 1, such as culture, is needed to better understand cause-effect relationships among the different variables and deeper asses the relationship between biodiversity and innovation.

Managerial implications. *Although exploratory in nature, our research offers significant managerial implications. We argue that both sustainability and innovation managers should adopt a new perspective on biodiversity: integrating it into the innovation strategy appears to be positively related to a firm's overall innovativeness. Conversely, treating biodiversity as a mere contextual factor limits its innovation potential. Therefore, a different managerial approach is required: one that involves a shift in the mainstream mindset to recognize the relationship with biodiversity as a potential source of advantage. Moreover, in dealing with biodiversity goals, firms must consider the involvement of stakeholders to foster the process of transition towards sustainable businesses that favor biodiversity and, as a consequence, business innovation (products, processes, and business model innovation). The involvement of stakeholders leads to an integrated strategy that accelerates the process of transition towards sustainable businesses that favor biodiversity (Leclère et al., 2020). Moreover, firms must use digital technologies (various kinds of technologies for various kinds of activities and purposes) to reach positive results in terms of biodiversity protection and promotion. Digital technologies allow for the development of an efficient ecosystem of services (preventing, monitoring, but also promoting) needed for biodiversity (Pimm et al., 2015). By reaching biodiversity goals, companies had to innovate their own business model, as well as products and services, to meet both business and individual needs.*

Originality of the paper. *Conceptually, the main originality of our contribution consists of reframing biodiversity as a potential source of advantage, showing that actively including it in the innovation process is related to higher levels of innovation revenue. Moreover, the study offers a deeper understanding of the relationship between biodiversity and innovation through the qualitative study by introducing a new conceptual framework that highlights the possible double role of biodiversity as output of innovative services mostly developed through the involvement of different stakeholders, and as a driver for business innovation. In this model, digital technologies play a key supporting role. In this sense, policymakers should support companies in adopting the digital technologies needed to handle biodiversity as well as foster activities to promote the biodiversity-based culture.*

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Food as Well-Being in the Digital Age: Motivational Drivers of Fruit Consumption among GenZ

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Abstract. *Fresh fruit consumption is increasingly recognized not only as a driver of physical health but also as a contributor to psychological well-being, supporting the "food as well-being" perspective. Despite public health initiatives, Generation Z (GenZ, born 1997–2012) exhibits lower fruit intake compared to older cohorts, raising concerns about long-term dietary patterns and well-being trajectories. This ongoing study investigates the motivational mechanisms underlying fruit consumption among GenZ and examines the interplay between motivations and digitally mediated social influences. Drawing on Self-Determination Theory, this ongoing research differentiates autonomous motivations (intrinsic, integrated, identified) from controlled motivations (introjected, external) and amotivation, exploring their effects on actual fruit consumption and well-being. Data were collected via an online survey (N = 164) and analyzed using Structural Equation Modeling. Results indicate that intrinsic motivation and integrated regulation significantly predict fruit consumption, while controlled motivations do not. Moreover, social media influence on the diet moderates the relationship between integrated regulation and actual fruit consumption, weakening the expression of identity-based motivations. Fruit consumption, in turn, positively predicts well-being, highlighting the psychological benefits of healthy eating for younger consumers. These findings suggest that interventions should foster personally meaningful, identity-consistent fruit consumption rather than rely on externally driven pressures or trend-based messaging. This research advances understanding of the drivers of fruit consumption among GenZ and offers insights for designing targeted communication strategies that promote both healthier eating and well-being in digitally mediated environments.*

Keywords: *Food as well-being; Generation Z; Fruit consumption; Self-Determination Theory; Motivation; Social media influence*

Framing of the research. *Fresh fruit consumption plays a crucial role in promoting both physical and psychological well-being. A body of research suggests that eating fruits and vegetables is associated not only with improved physical health but also with higher levels of life satisfaction, positive mood, and overall well-being (Blanchflower et al., 2013; Conner et al., 2017; Mujcic & Oswald, 2016; Rooney et al., 2013; Wahl et al., 2017). These findings support the "food as well-being" perspective, according to which healthy dietary behaviors may represent a long-term investment in individuals' present and future well-being. This perspective is particularly relevant for younger consumers, whose dietary habits are likely to shape long-term health trajectories. However, despite increasing public health efforts to promote healthy eating, fresh fruit consumption is experiencing stagnation or decline across several national contexts (Stewart et al., 2024). At the same time, generational analyses indicate that Generation Z (GenZ, born 1997–2012) reports lower fruit intake compared to older cohorts (Alqahtani et al., 2025), raising concerns about long-term dietary patterns among younger consumers. Encouraging healthier dietary choices among younger consumers represents an important societal objective, reflected in the United Nations Sustainable Development Goal (SDG) 3 (Good Health and Well-Being), as well as in SDG 12, which promotes more sustainable food consumption patterns (United Nations, 2015). These trends highlight the strategic importance for firms operating in the fresh produce sector, as well as public health organizations, to identify the motivational mechanisms shaping fruit consumption among GenZ, thereby enabling the development of targeted interventions and communication strategies aimed at enhancing dietary behaviors and promoting overall well-being.*

Prior research on healthy eating has largely focused on interventions aimed at encouraging healthier food choices. Over the years, governments, public health organizations, and other stakeholders have promoted a wide range of initiatives designed to foster healthier dietary behaviors among younger consumers. These interventions are typically classified into "hard" and "soft" approaches. Hard approaches mainly rely on regulatory and economic measures implemented by governments, such as taxes, subsidies, and restrictions aimed at modifying food environments and consumption patterns. In contrast, soft approaches generally involve educational campaigns, information-based policies, and voluntary agreements with the food industry intended to guide consumers toward healthier food choices (Swinburn et al., 2015). However, purely informational approaches have been found to be effective in raising awareness but less successful in translating such awareness into actual behavioral change. Indeed, despite the known benefits, GenZ still reports significantly lower fruit intake compared to older cohorts, necessitating targeted interventions to reshape their dietary trajectories (Pocol et al., 2021). Consequently, research has increasingly focused on interventions capable of shaping food choices by modifying the decision environment, such as nudging strategies (Vecchio & Cavallo, 2019).

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However, nudging interventions may be short-lived, suggesting that external interventions alone may not be sufficient to produce lasting dietary changes.

While previous research has explored structural and informational interventions promoting healthy eating, less attention has been devoted to the motivational mechanisms underlying fruit consumption among younger consumers, particularly within digitally mediated food environments. Scholars have therefore highlighted the importance of understanding the underlying motivations that drive individuals to adopt healthy eating behaviors (e.g., Zwierczyk, 2022). While studies have identified taste, price, and health as primary drivers for GenZ (Halicka et al., 2025), the motivational mechanisms specifically underlying fruit consumption remain insufficiently understood. A critical point of debate in current literature concerns the influence of social media on food consumption, a landscape that remains evolving and is gaining significant momentum (Chhabra et al., 2026). Research suggests that social media trends and influencers play a relatively limited role in shaping core food choices (Halicka et al., 2025), whereas other perspectives suggest that the role of social media is complex and ambivalent (Rounsefell et al., 2020).

Despite these advances, important gaps remain in the literature. The motivations driving fruit consumption among GenZ, and the ways in which social media may interact with these motivations, remain underexplored. Beyond understanding these drivers, it is also essential to examine the potential outcomes of these behaviors. Although evidence suggests a positive link between fruit consumption and well-being (Blanchflower et al., 2013; Conner et al., 2017; Mujcic & Oswald, 2016; Wahl et al., 2017), limited research has explored whether GenZ consumers—whose dietary habits and digital environments differ significantly from previous generations—actually see fresh fruit consumption as an antecedent of their well-being. Investigating the relationship between fresh fruit consumption, underlying motivations, and well-being among GenZ represents a crucial step toward understanding how healthier eating can contribute to both individual flourishing and broader societal goals.

Purpose of the paper. *This ongoing research aims to investigate the motivational factors that influence fruit consumption among Generation Z. By examining how different forms of motivation shape dietary choices, this research aims to contribute to the literature on healthy food consumption and provide insights for both marketers and public health practitioners seeking to encourage healthier and more sustainable eating behaviors among younger consumers.*

To investigate the motivational drivers of fruit consumption among younger consumers, this research adopts Self-Determination Theory (SDT) as its primary theoretical framework. Developed by Deci and Ryan (2000), SDT posits that human behavior is driven by a continuum of motivations, ranging from autonomous to controlled. While autonomous motivations primarily shape long-term commitment to a behavior, controlled motivations may initiate an action but often fail to sustain it over time. Intrinsic motivation represents the most autonomous form of regulation. According to Carbonneau et al. (2021), individuals with high intrinsic motivation are more likely to maintain healthy eating patterns over time because the behavior is inherently self-rewarding. In the context of fresh fruit consumption, we assume individuals consume fruit for the inherent satisfaction, enjoyment, and sensory pleasure derived from the activity itself. Consequently, this study hypothesizes that:

H1. *Intrinsic motivation significantly influences actual fruit consumption.*

However, individuals also engage in specific behaviors for reasons beyond inherent enjoyment; these are classified as extrinsic motivations. According to Deci and Ryan (2000), extrinsic motivations range from more autonomous to more controlled ones. Specifically, integrated and identified regulations are considered autonomous, while introjected and external regulations are categorized as controlled. In this context, integrated regulation occurs when fruit consumption is fully assimilated into one's identity, whereas identified regulation involves a conscious valuing of the associated health benefits. Conversely, introjected regulation involves internal pressures, such as guilt or shame, and external regulation stems from perceived pressure from family or peers. Literature suggests that most health-related behaviors are driven by extrinsic factors (Teixeira et al., 2011; McSpadden et al., 2016). Therefore, this study hypothesizes that:

H2. *Extrinsic motivations significantly influence actual fruit consumption.*

At the opposite end of the spectrum lies amotivation. Amotivated individuals typically lack interest in consuming fresh fruit and may perceive that increasing their intake would have no positive impact on their health. In this state, individuals fail to recognize the benefits of fruit consumption or feel incapable of modifying their current habits (Deci & Ryan, 2000). This leads to the following hypothesis:

H3. *Amotivation significantly influences AC.*

It has been well-documented that fuit intake increases health (Vecchia et al., 2004), contributing to both physical well-being and psychological well-being (Conner et al., 2017). The present research intends to better understand whteher the target audience sees fruit consumption as an antecedent of their overall well-being. Informational approaches have been largely employed to raise awareness about the positive consequences of engaging with healthy eating (Swinburn et al., 2015), but GenZ still reports significantly lower fruit intake compared to older cohorts (Pocol et al., 2021). The study assumes that GenZ actually consumes fresh fruit because they feel they can reach a higher state of well-being. Therefore, it is hypothesized that:

H4. *Actual fresh fruit consumption positively influences well-being.*

A critical variable in health-related behaviors is perceived social support, as it can significantly shape the relationship between an individual's motivations and their actions (McSpadden et al., 2016). Social support manifests in multiple forms and can influence behavior and well-being through various pathways (Feeney & Collins, 2015). Younger generations increasingly utilize social media platforms as a source of social support (Kim, 2014). Social media cues may

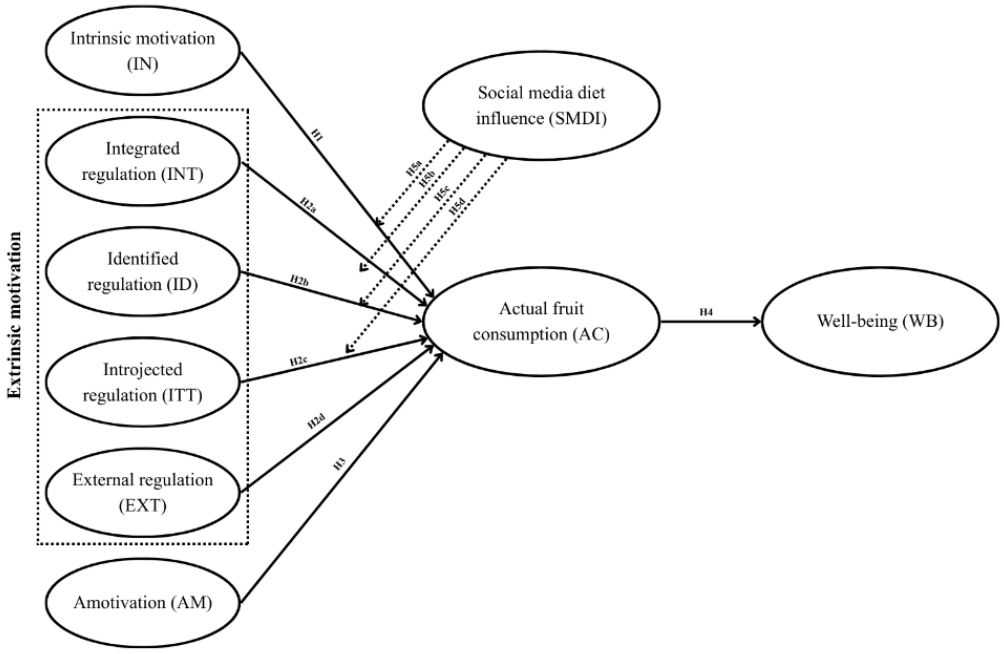
interact with motivations that involve some degree of internalization (i.e., intrinsic, integrated, identified, and introjected regulations), potentially reinforcing or interfering with the translation of these motivations into behavior. Given that the modern dietary landscape is increasingly influenced by digital environments—where notifications, food trends, and visual cues are pervasive (Patwardhan et al., 2024; Chhabra et al., 2026) —this study investigates the interaction between social media influence on diet and individual motivations with at least a partial degree of internalization (ranging from intrinsic to introjected regulations), leading to the following hypothesis:

H5. *Social media influence on diet moderates the relationship between intrinsic, integrated, identified and introjected regulations and actual fruit consumption.*

Finally,

Figure 1 illustrates the conceptual model under investigation.

Figure 1. Conceptual model



Source: authors' elaboration

Methodology.

Data collection and data analysis. *Data were collected via an online questionnaire administered through Google Form within the Italian context. Respondents indicated their level of agreement using a 7-point Likert scale, ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Data analysis was conducted using IBM SPSS Statistics 25 and IBM SPSS AMOS 23. To evaluate the fit between the observed data and the hypothesized theoretical model, a Confirmatory Factor Analysis (CFA) was performed (Mueller & Hancock, 2015). Following the assessment of validity and reliability, Structural Equation Modeling (SEM) was employed to test the primary hypotheses. Finally, to examine the potential moderating effect of Social Media Diet Influence (SMDI), an interaction term method was utilized (Hair Jr. et al., 2021).*

Measurements. *All constructs were measured using validated scales. Actual Fresh Fruit consumption (AFC) was assessed with a self-reported frequency scale (0 = never/fewer than once per month to 7 = two or more times per day; Brug et al., 2006). Well-being was measured with items on satisfaction and quality of life (Mohanty & Kumar, 2025). Intrinsic and extrinsic motivation and amotivation were adapted from Appleton & Adams (2023) and Schulze & Janssen (2024). Social Media Diet Influence (SMDI) was adapted from Patwardhan et al. (2024).*

Results.

Sample profile. *Preliminary results are based on 164 valid responses. All participants were born between 1997 and 2012 (Gen Z), with the highest concentration born in 2003 (aged 23). The sample is predominantly female (58.5%) and mostly of them are students (67.7%). Regarding nutritional information, respondents identified physicians or nutritionists as their preferred source (31.1%), closely followed by TikTok (20.7%). The majority reported a preference for common fruits, such as bananas or apples (68.3%), typically consumed during breaks (45.7%) or during lunch (31.1%). Additionally, a significant portion of the sample reported regularly practicing sports (69.5%).*

Descriptive statistics, CFA, Reliability and Validity analysis. *Following Hair et al. (2010) and utilizing IBM SPSS Statistics 25, a descriptive analysis—including mean, standard deviation, skewness, and kurtosis for each item—was conducted. Skewness and kurtosis values for all items fell within the acceptable ranges of ±3 and ±10. respectively. Specifically, skewness values ranged from -1.651 to 2.958, while kurtosis values ranged from -1.175 to 9.383. The*

Confirmatory Factor Analysis (CFA) demonstrated a good model fit, with $\chi2(247) = 444.3$, $p < 0.001$, TLI = 0.927, CFI = 0.94, and RMSEA = 0.07. Factor loadings were predominantly above 0.7, with only one item yielding a loading of 0.6. Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE) all exceeded the recommended thresholds of 0.7, 0.6, and 0.5, respectively. To assess discriminant validity, the Heterotrait-Monotrait (HTMT) ratio was employed due to its high sensitivity (Henseler et al., 2015). All calculated HTMT values remained consistently below the 0.85 threshold, thereby confirming the discriminant validity of the measurement scales used in this study.

Hypothesis testing. *SEM was performed using IBM SPSS AMOS 23. Intrinsic motivation (IN) and integrated regulation (INT) positively predicted actual fresh fruit consumption (AC), with standardized estimates of $\beta = 0.249$, $p = .041$ and $\beta = 0.619$, $p = .001$, respectively. Other motivational constructs—identified regulation (ID), introjected regulation (ITT), external regulation (EXT), amotivation (AM) —did not significantly predict AC (all $p > .05$). In turn, AC positively predicted well-being (WB; $\beta = 0.564$, $p < .001$). The interaction between SMDI and integrated regulation (interSMDIxINT) negatively predicted AC ($\beta = -0.211$, $p = .028$), all other interaction terms (SMDI × IN, SMDI × ID, SMDI × ITT) were not significant (all $p > .05$). Table 1 synthetises hypoteses testing.*

Discussion. *The findings of this study provide several insights into the motivational mechanisms underlying fresh fruit consumption among Generation Z. Consistent with the "food as well-being" perspective (Blanchflower et al., 2013; Conner et al., 2017; Mujcic & Oswald, 2016), the results confirm that actual fruit consumption positively predicts overall well-being, suggesting that younger consumers may indeed experience psychological benefits from engaging in healthier dietary behaviors. This result supports the argument that fruit consumption can contribute not only to physical health but also to broader dimensions of individual flourishing in younger cohorts as well. The results partially support the assumptions of Self-Determination Theory (Deci & Ryan, 2000). Intrinsic motivation and integrated regulation—both forms of autonomous motivation—were found to positively influence fruit consumption. This aligns with prior research indicating that self-determined motivations are more likely to sustain health-related behaviors over time because such behaviors are internally valued and self-endorsed (Carbonneau et al., 2021). In contrast, controlled forms of motivation, such as introjected and external regulation, did not significantly predict fruit consumption, suggesting that externally driven pressures may be insufficient to promote stable dietary behaviors among GenZ.*

Contrary to previous literature highlighting a moderatingrole of perceived social support on the association between controlled motivation and fruit and vegetable intake (McSapadden et al., 2016), results show a moderation effect of social media influence on diet on the association between integrated regulation (an autonomous form of motivation), and actual fruit consumption. Specifically, the interaction between SMDI and integrated regulation negatively predicted fruit consumption. This finding suggests that higher levels of social media influence weaken the positive association between integrated regulation and actual behavior. Integrated regulation reflects a deeply internalized form of motivation in which the behavior is aligned with personal values and becomes part of one's identity (Deci & Ryan, 2000). When dietary behaviors are strongly identity-based, individuals may rely primarily on internalized standards rather than external informational cues. In this context, individuals whose fruit consumption is strongly identity-based may be less responsive to social media stimuli, or such cues may even disrupt the consistency of their internally regulated eating habits. In particular, the "new food trends" promoted on social media may be perceived as superficial, temporary, or fashion-driven by individuals who instead experience fruit consumption as a deeply rooted and identity-relevant behavior. This discrepancy may generate a form of cognitive dissonance between a stable, value-based dietary identity and externally promoted, trend-based eating cues. When behaviors are strongly linked to personal identity, individuals may resist or disengage from external cues perceived as inconsistent with their self-concept (Oyserman, 2009; Deci & Ryan, 2000). As a consequence, rather than reinforcing fruit consumption, exposure to these social media trends may weaken the behavioral expression of internally regulated dietary habits, ultimately reducing the frequency of actual fruit consumption.

Table 1. Hypotesis testing

Path	*β*	*Lower*	*Upper*	*S.E.*	*p-value*	*Hypotesis*
IN→AC	0.249	.017	.477	0.112	.041	Accepted
INT→AC	0.619	.296	.958	0.133	.001	Accepted
ID→AC	-0.194	-.453	.007	0.111	.056	Rejected
ITT→AC	-0.007	-.212	.184	0.087	.970	Rejected
EXT→AC	0.054	-.089	.294	0.101	.458	Rejected
AM→AC	-0.058	-.058	.069	0.093	.371	Rejected
AC→ WB	0.564	.417	.689	0.066	<.001	Accepted
SMDI × INT→AC	-0.211	-.378	-.026	0.030	.028	Accepted
SMDI × IN→AC	0.022	-.117	.157	0.033	.748	Rejected
SMDI × ID→AC	-0.019	-.180	.124	0.031	.725	Rejected
SMDI × ITT→AC	0.029	-.164	.185	0.033	.851	Rejected

Source: authors' elaboration

Research limitations. *Despite providing valuable insights into the motivational mechanisms underlying fruit consumption among Generation Z, this study presents several limitations that should be acknowledged.*

First, the research presents an ongoing study, and the preliminary results rely on a relatively small sample size (N = 164) collected within the Italian context, which may limit the generalizability of the findings. Second, fruit consumption was measured using self-reported frequency data, which may be subject to recall bias or social desirability bias. Future research could employ more objective measures of dietary behavior, such as food diaries or digital tracking methods, to obtain more precise estimates of actual consumption patterns. Third, the study focuses specifically on the role of social media influence on diet as a contextual moderator. However, younger consumers operate within complex food environments that include multiple sources of social influence, such as family, peers, and institutional actors. Future research could explore how different forms of social influence interact with motivational processes in shaping healthy eating behaviors. Finally, although the present research examines fruit consumption as an antecedent of well-being, future studies could further investigate the broader psychological and lifestyle outcomes associated with healthy dietary behaviors among younger consumers, including mental health, life satisfaction, and subjective vitality.

Managerial implications. *The findings of this study offer several implications for practitioners operating in the fresh produce sector, as well as for public health organizations aiming to promote healthier dietary behaviors among younger consumers.*

First, the results suggest that strategies aimed at increasing fruit consumption among Generation Z should prioritize the activation of autonomous forms of motivation. In line with the principles of Self-Determination Theory, intrinsic motivation and integrated regulation were found to significantly predict fruit consumption, indicating that younger consumers are more likely to adopt healthier dietary behaviors when these behaviors are personally meaningful and aligned with their identity. For marketers and public health practitioners, this implies that communication strategies should move beyond purely informational messages emphasizing nutritional benefits and instead focus on fostering a positive and personally relevant relationship with fruit consumption. Campaigns could emphasize enjoyment, taste experiences, lifestyle integration, and the role of fruit consumption as part of a balanced and self-expressive way of living.

Second, the results indicate that externally driven pressures, such as social expectations or guilt-based messaging, may be less effective in promoting stable dietary habits among Gen Z. Traditional public health campaigns often rely on normative or prescriptive messages aimed at encouraging healthier food choices. However, the lack of significant effects for controlled forms of motivation suggests that such approaches may not generate lasting behavioral change among younger consumers. Instead, communication strategies may benefit from framing fruit consumption as a voluntary and self-endorsed choice rather than a socially imposed obligation.

Third, the moderating role of social media influence highlights the complexity of digital food environments. While social media platforms are often considered powerful tools for promoting healthy eating, the results suggest that their influence may not always reinforce healthy behaviors. In particular, exposure to food-related trends and visually appealing dietary content may weaken the behavioral impact of identity-based motivations for fruit consumption. For firms and public health organizations, this finding suggests that social media communication strategies should be carefully designed to avoid presenting healthy eating as a transient trend. Instead, digital campaigns may benefit from emphasizing authenticity, consistency, and long-term lifestyle integration rather than short-lived food trends.

Finally, the positive relationship between fruit consumption and overall well-being suggests that communication strategies may benefit from highlighting not only the physical health benefits of fruit intake but also its potential contribution to psychological well-being and quality of life. Framing fruit consumption as part of a broader well-being lifestyle may resonate particularly strongly with younger consumers, who often prioritize holistic well-being and personal development.

Originality of the paper. *Overall, this study contributes to the literature on healthy food consumption by showing that autonomous motivations play a central role in shaping fruit consumption among younger consumers, while digitally mediated social influences may not always reinforce healthy eating behaviors and may even weaken the behavioral expression of identity-based dietary motivations.*

Specifically, this ongoing research extends literature on fruit consumption by applying Self-Determination Theory to better understand the motivational mechanisms underlying dietary behaviors among Generation Z. While previous studies have primarily focused on structural interventions or informational campaigns aimed at promoting healthy eating, this research highlights the central role of autonomous motivations in shaping fruit consumption among younger consumers. The study contributes to the emerging literature on digital food environments by examining the moderating role of social media influence on the relationship between motivation and dietary behavior. The findings reveal that social media influence may not always reinforce healthy eating behaviors. Instead, exposure to social media food trends may weaken the behavioral expression of identity-based motivations, suggesting that digitally mediated environments can interact with motivational processes in complex and sometimes counterintuitive ways. Finally, this research integrates the study of dietary motivations with the broader "food as well-being" perspective by demonstrating that fruit consumption is positively associated with well-being among Generation Z consumers. By linking motivational drivers, dietary behavior, and well-being outcomes within a single conceptual framework, the study provides a more comprehensive understanding of how healthy eating behaviors contribute to individual flourishing.

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Green Tech Startups: A bridge between science and sustainability

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Abstract. *Climate change has emphasized the need for innovative approaches that can link scientific knowledge and effective environmental action. Green tech startups are emerging as key actors and assume a relevant role in bridging this challenging gap by integrating environmental protection objectives with the development of advanced digital technological solutions. They leverage emerging technologies, such as artificial intelligence, to design and implement tools and platforms that enhance environmental monitoring, data-driven decision-making, and more sustainability practices.*

This research aims to explore how green tech startups seek to bridge scientific knowledge and the environment, and it focuses on two research questions: How do green tech startups link science and environmental goals? What could be the possible development trajectory of technology-based green innovation?

The study examines the case of Pachama to analyze its technology-based business model, development trajectory of green innovation, and the key challenges encountered during its growth. Particular attention is devoted to assessing the principal implications associated with the acquisition of the company by Carbon Direct. The results highlight that through the integration of technological innovation and environmental objectives green tech startups contribute to the development of scalable solutions to complex climate-related problems. Theoretical and managerial considerations are developed, including insights for future research directions.

Keywords: *green tech startups; innovation management; Artificial Intelligence; sustainability.*

Framing of the research. *The inevitable linkage between sustainability and Artificial Intelligence (AI) has increasingly been conceptualized in the management and innovation literature as a structural rather than merely occasional convergence (Nambisan et al., 2017). The pressing sustainability challenges, such as climate change, resource depletion, and biodiversity loss, are characterized by complexity, interdependence, uncertainty, and temporal asymmetry (Markard et al., 2012). Traditional reporting mechanisms and static performance indicators struggle to address these properties in a comprehensive manner. From this perspective, AI introduces a qualitatively different capability: it processes large-scale, heterogeneous datasets in real time, generates predictive insights, and supports adaptive decision-making under conditions of uncertainty and complexity (Raisch and Krakowski, 2021). In this sense, AI does not merely optimize existing sustainability practices; it enables the reconfiguration and translation of ecological phenomena into continuously monitored, algorithmically interpretable data streams. By doing so, it embeds digital intelligence within organizational sensing, learning, and decision-making architectures, thereby enhancing firms' capabilities to anticipate, adapt to, and shape evolving environmental conditions (Yoo et al., 2010; Teece et al., 1997).*

Through machine learning, IoT sensors, remote sensing technologies, cloud infrastructures, ecological activities and processes - carbon sequestration, deforestation patterns, energy consumption, and water usage - can be systematically translated into measurable indicators embedded within digital tools and platforms. In this way, AI reduces information asymmetries, enhances transparency, and lowers transaction costs in environmental markets (Haefner et al., 2023). Additionally, AI enables forms of predictive governance by identifying risk directions, simulating future environmental scenarios and defining sustainable business models, thereby shifting sustainability management from reactive compliance toward proactive resilience building.

In this evolving landscape, green tech startups play increasingly a pivotal role as entrepreneurial actors that operate and scale the convergence between AI and sustainability (Tian et al., 2023; Jorzik et al., 2024) by translating scientific knowledge and emerging technologies into scalable solutions capable of generating both environmental and economic value (Hockerts and Wüstenhagen, 2010). Considered at the intersection of technological experimentation and sustainable entrepreneurship, these organizations leverage AI capabilities to design tools and platforms that integrate environmental measurement, advanced analytics, and market interfaces (Gupta et al., 2023). Drawing on sustainable entrepreneurship literature (Schaltegger and Wagner, 2011), green tech startups embody hybrid value creation logics, simultaneously pursuing economic returns and measurable ecological and social impact (Jorzik et al., 2024). Their competitive advantage often derives from proprietary datasets, algorithmic learning models, and ecosystem orchestration capabilities that enable multi-sided interactions among corporations, investors, policymakers, and local communities. By embedding ecological intelligence into digital infrastructures, green tech startups contribute to the reconfiguration of environmental governance, from project-based interventions to continuously monitored, market-compatible systems. In doing so, they act not merely as technology providers but as architects of new socio-technical arrangements that harmonize sustainability objectives with digital innovation dynamics.

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Purpose of the paper. *The growing overlap between digital technologies and sustainability transitions has stimulated increasing research interest in understanding the potential contribution of technology innovation to environmental governance and sustainable development. Although prior research has examined the contribution of digital innovation to organizations (Nambisan et al., 2017) and sustainability transitions (Markard et al., 2012), there has been relatively less research on the mechanisms that can be used by green tech startups to integrate scientific knowledge with environmental markets via data-driven infrastructures. In this regard, the growing application of artificial intelligence, and digital platforms to environmental processes has redefined the measurement, monitoring, and integration of ecological processes with economic systems. In this context, the technology innovation that can be used to quantify environmental processes such as carbon storage, biodiversity, and ecosystem regeneration. Against this background, there has been growing research interest in understanding the contribution of green tech startups to the integration of scientific knowledge with environmental markets. In this context, the application of digital technologies has enabled the design of platforms that can be used to integrate environmental measurement with environmental markets.*

Building on the framework of the 2030 Agenda for Sustainable Development, particularly SDG 12.2, and its interconnections with SDGs 7, 9, and 15, this research investigates the role of green tech startups in bridging scientific knowledge and environmental action. These firms increasingly operate at the intersection of scientific research, digital advanced technologies, and sustainability-oriented innovation, by defining and developing technology-based solutions aimed at improving resource efficiency, environmental monitoring, and the inevitable management of climate-related challenges (Fichter et al., 2025).

Within this context, the study aims to examine how green tech startups integrate scientific knowledge, advanced technologies, and environmental sustainability objectives into technological business models. It also explores how these firms transform research-based knowledge into innovation processes capable of generating environmental and economic value. Accordingly, the research addresses two main questions: 1) How do green tech startups link scientific knowledge with environmental goals? 2) What development trajectories may characterize technology-based green innovation?

These questions aim to shed light on the strategic, technological, and organizational dynamics that shape the evolution of green startups in the sustainability transition.

To answer these research questions, this research paper employs a qualitative single-case research design (Yin, 2009), focusing on the green tech startup company Pachama. The analysis explores the ways in which this startup company utilizes artificial intelligence and satellite monitoring technologies in measuring and verifying forest carbon storage in the voluntary carbon market. Additionally, this research paper explores the business model evolution of the startup company, as well as its technological capacity, after being acquired by Carbon Direct.

Methodology. *Green tech startups can be considered organizations that bridge functionally and efficiently the green and the blue theorized by Floridi (2020). Where green encompasses all environmental instances (urban, economic, political) and blue includes all digital technologies, ranging from big data to artificial intelligence.*

To encompass the widest possible range of issues that the construction of this bridge entails, we conducted an exploratory analysis using the snowball sampling technique (Biernacki and Waldorf, 1981) on primary and secondary data.

In the first phase, we attempted to identify the most active start-ups in the green-tech sector. Using the least restrictive search string possible, i.e., only the two key terms "green tech" and "companies", we identified and used as a reference the first ranking of green tech companies conducted by TIME and Statista, based on three pillars: positive environmental impact, drive for innovation, and financial strength (Time Staff, 2025), the list of the 25 Best Forestry Startups to Watch in 2026 and the 69 Best Climate Tech Green Tech Startups to Watch in 2026 (SeedTable, 2025).

Beyond the strong focus on decarbonization emerging from the analysis of the top companies on these lists we noted that one of the top startups, Pachama, in November 2025 was acquired by Carbon Direct.

Founded in 2018, Pachama supports environmentally responsible companies in offsetting their CO2 emissions with the purchase of carbon credits, by involving them with reliable reforestation and forest conservation projects, with the possibility of monitoring them through due diligence tools based on remote sensing and artificial intelligence. It guarantees a real-time measurement of the growth of forests and of the carbon stored inside them, becoming a promising startup as decarbonization moves from a "niche" to a globally recognized solution, essential to getting closer to zero impact. With the acquisition by Carbon Direct, Pachama does not lose its identity even better if both companies integrate their services. The carbon Direct engineering solutions, in fact, are improved and integrated by the Pachama platform and a satellite-based tool for monitoring, reporting, and evaluating their effectiveness.

So, we selected Pachama as a single case study (Yin, 2009) because it represents a prominent example of a green-tech venture that integrates scientific knowledge, digital advanced technologies, and environmental objectives to develop scalable climate solutions. Its rapid growth and subsequent acquisition by Carbon Direct provide a relevant setting for exploring and examining how green tech start-ups translate scientific knowledge and advanced digital technologies into scalable environmental solutions and viable business models.

In line with the aim and the initial phases of the research, to retrieve data about Pachama we adopted a broad, ethnographic approach to understand Pachama, aiming to better understand the dynamics of this startup.

In the exploratory phase, we collected data from multiple sources to analyze the phenomenon from various perspectives and identify the key players. Specifically, we conducted direct observation of the website and platform and

public interviews (to 2021 to 2025) with CEO Diego Saez Gil (now in the leadership team of Carbon Direct), analyzed key articles and web information about Pachama and its acquisition by Carbon Direct.

So, by collecting data from different websites, analyzing available online documents and interviews, we traced Pachama's development trajectory from its founding to its acquisition by Carbon Direct.

Results. *Operating in the voluntary carbon market (VCM), Pachama business concept is founded on the use of AI and satellite imagery to identify the extent of storage carbon in the forest ecosystems. Initially, in 2018, Pachama was involved in the development of its AI-based platform for carbon storage in forests. In the second stage of development, in 2019-2021, Pachama grew its business by establishing a digital marketplace for connecting forest conservation projects with corporate buyers of carbon credits. Then, in 2022-2024, Pachama made its business model more robust by participating in the development of reforestation projects. By the end of 2023, Pachama had raised approximately $88 million from major funds, such as Breakthrough Energy Ventures and the Amazon Climate Pledge Fund, as well as from well-known business angels, to finance several projects. However, in 2025, environmental uncertainty, including the lack of guarantees regarding additional federal funding for direct carbon capture (DAC), led to the abandonment of some of these projects, resulting in staff reductions. Pachama has returned to being the geospatial AI-based technology platform to help make informed investment decisions in nature-based climate solutions and sustainable land management (Giles, 2025). At the end of 2025, Pachama was acquired by Carbon Direct, a company specialized in carbon emission management, and its technology was integrated into a carbon management system of advisory, project development, and AI-based monitoring.*

In the initial phase, Pachama follows a platform-based intermediary model. It develops a platform integrating two types of players. On one side, Pachama deals with forest project developers of several reforestation and conservation projects all over the world. On the other side, Pachama deals with corporate buyers who want to access carbon credits from these projects. In this model, Pachama earns money from transaction fees for the sale of carbon credits that are traded on the platform. It acts as a middleman who removes information asymmetry for project developers and buyers. Pachama can be viewed as a technology market facilitator that helps in providing verification for voluntary carbon markets.

As the company grew, Pachama's activities evolves beyond the role of intermediary on the marketplace. Some challenges facing the voluntary carbon market are the lack of quality projects, the permanence and the measurement of the project. To overcome these challenges, Pachama becomes more involved in project development, the process of designing, implementing, and monitoring new projects in the forest. The company diversifies into project origination and initiatives directly involved in the reforestation projects. In this way, the startup improves the quality and credibility of the carbon credits developed through its system and it could create more value from the lifecycle of the carbon credits, rather than just the transaction fees. It unlocks additional value along the carbon credit value chain, decreases reliance on third-party project developers. Its business model evolves from a platform intermediary to a hybrid model incorporating both marketplace and asset activities, by developing specific capabilities (see Table 1) that permit the company to obtain positive results.

Table 1. Key capabilities of Pachama

Capability	***Description***	***Technology Role***	***Contribution to Environmental Markets***
Scientific capability	*Ability to measure and analyse ecological processes (forests' growth)*	*Satellite images, AI algorithms, use remote sensing techniques to analyse environmental data*	*Enables the measurement and verification of carbon storage*
Monitoring capability	*Monitoring of the conditions of the forests and environmental risks*	*AI-based monitoring systems to detect deforestation, rate of carbon absorption*	*Enhances the transparency and reliability of carbon credits in the market*
Platform capability	*Linking forest project developers with corporate buyers*	*Online marketplace for integrating environmental data and carbon credit trade*	*Supports coordination between environmental market supply and demand*
Project development capability	*implementation of reforestation or conservation projects*	*Integration of monitoring technology throughout the project*	*Ensures higher quality and integrity of carbon credit projects*
Strategic integration capability	*Integration with advisory and carbon management services with Carbon Direct*	*AI-based Measurement, Reporting, and Verification systems*	*Develops a full stack for carbon management*

Source: Author's own elaboration based on company reports and secondary data (Jha, 2022; Giles, J. (2025; https://www.ycombinator.com/companies/pachama; Carbon Direct, 2025).

In the last phase, up until its acquisition, Pachama addresses environmental uncertainty by reverting to a remote sensing platform that combines satellite imagery, drone and lidar technologies, and machine learning to expand forest protection and restoration while also enabling companies to offset their carbon emissions.

The Pachama case underscores a set of key capabilities that enable green tech startups to connect scientific knowledge with environmental sustainability. As indicated in Table 1, Pachama leverages its capabilities in scientific measurement, digital monitoring, platform coordination, and project development to deliver carbon market solutions that enable the firm to turn ecological data into credible environmental assets, facilitating transactional linkages between project developers and corporate buyers' key capabilities. In this way Pachama harmonizes science and environment.

Pachama's ability to use environmental intelligence in their technology platforms is contributing to the development of new forms of environmental governance in which ecological processes are continually validated and integrated into the economy.

Through the acquisition by Carbon Direct, Pachama's technology was integrated into its end-to-end carbon management model. Carbon Direct becomes a full stack carbon solutions company leveraging Pachama's AI-based Measurement, Reporting, and Verification (MRV) systems. Pachama gains financial security, access to more clients, and institutional credibility. This acquisition allows them to consolidate strategies in the carbon management sector, and it is in line with the sustainability transition theory (Geels, 2002).

Overall, Pachama case addresses our research questions as described in the following Table 2.

Table 2. How Pachama case addresses research questions of this study

RQ	***Evidence from case study***	***Mechanism***	***Implications***
How do green tech startups link science and environmental goals?	*Pachama uses AI, satellite imagery, and remote sensing technologies to monitor forest ecosystems. The Pachama platform connects forest conservation projects with corporations seeking carbon offsets*	*Scientific data are translated into digital datasets supporting carbon credit verification and environmental monitoring. AI system reduces information asymmetry and increases transparency in carbon markets*	*Green tech startups can bridge science and markets by integrating environmental measurement into digital platforms, enabling more credible environmental markets*
What could be the possible development trajectory of technology-based green innovation?	*Pachama evolved from a digital marketplace intermediary to a hybrid model including project origination. The acquisition by Carbon Direct integrated Pachama's AI monitoring systems with carbon management advisory services*	*Vertical integration allows greater control over the quality and supply of environmental assets. Integration of technological and advisory capabilities creates end-to-end carbon management solutions.*	*Green tech startups may expand upstream to strengthen environmental impact, sustainability and value creation. Future green tech ecosystems may combine technological platforms, environmental projects, and strategic advisory services*

Source: Author's own elaboration

The Pachama case demonstrates that the future of environmental sustainability could depend not just on conservation efforts but also on digital infrastructure for measuring and integrating ecological value into economic systems, in line with the literature (Chen et al., 2025; Fichter et al., 2025; Jorzik et al., 2024). It suggests broader trends in green tech startups' role as infrastructure providers (Jorzik et al., 2024; Pakura, 2020). The AI systems of verification may become incorporated into the carbon markets of compliance.

Research limitations. *The limitations of this study are that it is based on a single case study. Even though this single case study on Pachama gives a better understanding of AI in green innovation, it cannot be generalized to other sectors. In addition, this research is based on secondary data. There is a need to improve the understanding of the strategic processes of the organization through interviews with the stakeholders themselves (Creswell et al., 2011). Finally, the voluntary carbon market is observing major shifts in its regulations and institutions, which could have a major impact on the strategic position of organizations such as Pachama in the future.*

Future research could be based on comparative studies on different green tech startups to have a better understanding of the sustainability of the business model itself.

Managerial implications. *Green tech startups, such as Pachama, close the gap between science and the environment by converting the tools of scientific measurement into digital platforms. Managers could combine AI and remote sensing technology with the voluntary carbon markets. Pachama's business model illustrates the evolution from an intermediary to a vertically integrated developer. Its acquisition by Carbon Direct combines Pachama's technological strength with a carbon management system.*

As climate regulations become increasingly effective, the formation of AI-based systems can lead to biodiversity credits and natural capital markets, with green tech startups contributing to the environmental market.

Pachama does not just leverage technology to reach environmental goals, it is reframing environmental stewardship as a data-driven, monitored, and market-friendly system. The future of environmental protection and green innovation could depend on the development of digital infrastructures that can measure and validate environmental value in the economy and predict the potential damage to the environment in advance.

Originality of the paper. *The originality of this study is related to the focus on green tech startups as integrators that transform scientific measurement into digital infrastructures for environmental markets. We underline that this is a work in process. We want to shed new light on how AI-based platforms transform ecological processes into measurable datasets. In addition, this short paper also provides new evidence on how business model innovation and AI-based monitoring systems can enhance transparency in voluntary carbon markets, as illustrated by the Pachama startup case study.*

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Information framing and plant-based food choices: An experiment on isolated and cumulative effects across dietary identities

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Abstract. *Reducing meat consumption is crucial for the transition toward more sustainable food systems. Informational and normative interventions are widely used to promote plant-based alternatives, yet empirical evidence regarding their effectiveness remains unclear. One possible explanation lies in the heterogeneity of consumers' dietary identities and in the psychological mechanisms that sustain meat consumption despite environmental and ethical awareness. This study investigates the isolated and cumulative effects of five informational cues - animal welfare information, health information, environmental impact disclosure, static social norms, and dynamic social norms - on consumers' choice between a meat-based and a plant-based dish in a restaurant context. The experiment was administered online in February 2025 by a professional survey provider to a sample of Italian consumers aged 18-70 (n = 2015). Participants were randomly assigned to one of seven experimental conditions. Logistic regression analyses show that environmental information and cumulative informational framing significantly increase the likelihood of selecting the plant-based option. The cumulative condition produces the strongest effect, particularly among meat-oriented consumers. Predicted probabilities indicate that plant-based choice rises from 3% to 24% among carnivores and from 17% to 32% among omnivores under cumulative framing. Cumulative informational framing may limit mechanisms of moral disengagement by constraining consumers' ability to rely on selective justificatory arguments. Additional analyses including socio-demographic and psychological variables confirm the robustness of the experimental results. Beyond the experimental manipulations, individual attitudes play a relevant role. In particular, attitudes toward meat reduction for health and environmental reasons, perceived pro-vegetarian social norms, and concern for animal welfare positively influence the likelihood of choosing the plant-based option. Conversely, hedonic attachment to meat consumption emerges as the strongest negative predictor of plant-based choice.*

Keywords: *plant-based choice; dietary identity; moral disengagement; cumulative informative framing; sustainable consumption*

1. Framing the research. The urgency of reducing meat consumption is widely recognized within sustainability discourse. Livestock production contributes significantly to greenhouse gas emissions, land degradation, water consumption, and biodiversity loss (Notarnicola et al., 2017). Also, an excessive intake of red and processed meat is associated with heightened risks of chronic and cardiovascular diseases (Wang et al., 2016; Neuenschwander et al., 2019). Simultaneously, the consumption of animal-based products has a huge impact on animal suffering (Graça, 2016; Nordquist et al., 2017). While awareness of these environmental, health and animal welfare implications has grown, consumer behavior remains resistant to change.

A wide range of behavioral interventions has therefore been developed to encourage plant-based consumption and reduce meat intake: these interventions typically rely on informational strategies -such as health claims and environmental labeling - as well as on normative cues signaling what others are doing (Lin et al., 2025; Wolfswinkel, 2025). However, empirical findings on their effectiveness are discouraging (Çoker et al., 2022; Pechey et al., 2022; Wolfswinkel et al., 2025) showing no or negligible effects on behavioral change.

A critical factor explaining this resistance can be dietary identity (Rosenfeld & Tomiyama, 2021) as food consumption is not merely functional but identity relevant. Individuals often define themselves through their dietary practices, and such identities can become integrated into the self-concept (Rosenfeld & Burrow, 2017). Identity-based motivation theory (Oyserman, 2009) posits that individuals are motivated to enact behaviors consistent with salient aspects of their identity. When a behavior aligns with identity, it feels authentic and self-congruent; when it conflicts, it generates psychological discomfort and defensive processing. Meat consumption, in particular, is often associated with masculinity, tradition, and social normality (Rothgerber, 2013; Piazza et al., 2015). Conversely, vegetarian and vegan identities tend to be moralized and linked to ethical commitments. The so-called "meat paradox" (Bastian & Loughnan, 2017) captures the tension between caring about animals and continuing to consume meat. To resolve this tension, individuals can engage in moral disengagement (Bandura, 2007; Graça et al., 2014). This means that individuals selectively interpret or dismiss information that threatens their identity or habitual behavior employing strategies such as denying animal mind, diffusing responsibility, or rationalizing meat consumption as natural, necessary, normal, and nice (Piazza et al., 2015). As a result, isolated informative cues and nudges may leave intact the justificatory structures sustaining meat consumption.

The present research builds on this theoretical background to propose that cumulative informational framing-integrating multiple informational arguments simultaneously - may reduce moral disengagement by constraining the availability of justificatory pathways. Framing effects suggest that individuals often respond differently to alternative

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descriptions of the same problem (Frisch, 1993). In the context of reducing meat consumption, this study posits that the key challenge may not lie solely in identifying the most effective information for promoting behavioral change, but rather in combining multiple informational cues in order to limit consumers' ability to disengage from a specific issue by relying on alternative justificatory considerations. When environmental, health, ethical, and social norm dimensions converge within a single message, selective dismissal becomes more difficult. This cumulative framing may therefore weaken defensive reasoning and reduce the likelihood that consumers "switch off" individual concerns. Such a mechanism is expected to be particularly relevant among omnivorous consumers, whose dietary identity is typically less rigidly anchored and therefore more open to influence from converging informational cues.

2. Purpose of the paper. The primary objective of this paper is to examine how different informational strategies influence consumers' choice between meat-based and plant-based dishes in a restaurant context, and how these effects vary across dietary identities and individual predispositions. In particular, our study investigates the isolated effects of different informational cues - including animal welfare information, health information, environmental impact disclosure, and social norms - as well as the impact of cumulative informational framing that combines multiple sustainability-related arguments within a single message. At the same time, the analysis explores whether the effectiveness of these interventions varies across dietary identities and whether plant-based choices are also shaped by underlying psychological factors, such as environmental concern, attitudes toward meat reduction, perceived social norms, concern for animal welfare, and hedonic attachment to meat consumption. By integrating experimental manipulation with the analysis of individual predispositions, the study aims to provide a more comprehensive understanding of how informational strategies interact with dietary identity and psychological drivers in shaping more sustainable food choices.

More specifically, the study addresses four research questions:

(RQ1) Do informational interventions influence consumers' choice between meat-based and plant-based dishes?

(RQ2) Do cumulative informational messages produce stronger behavioral effects than isolated informational cues?

(RQ3) To what extent does consumers' dietary identity shape their responsiveness to informational strategies?

(RQ4) To what extent do individual psychological predispositions - such as environmental concern, attitudes toward meat reduction, perceived social norms, concern for animal welfare, and hedonic attachment to meat consumption - affect plant-based food choices?

3. Methodology

Data Collection. The experiment was conducted online in February 2025. Data were collected through a professional survey provider (SWG), which administered the experiment using a Computer-Assisted Web Interviewing (CAWI) procedure to a large and representative sample of the Italian population aged between 18 and 70. A total of 2015 valid responses were obtained. Table 1 reports the sociodemographic characteristics of the sample.

Table 1: Sociodemographic characteristics

Demographics		**Frequencies (n=2015)**	**%**
Gender	Male	983	48.78
	Female	1032	51.22
Age class	18-24 years old	168	8.34
	25-34 years old	281	13.95
	35-44 years old	347	17.22
	45-54 years old	444	22.03
	55-70 years old	775	38.46
Education	Elementary and middle school	172	8.54
	High school	1323	65.66
	Bachelor degree	179	8.88
	Master's degree and postgraduate	341	16.92
Geographical area	North-west	538	26.7
	North-east	371	18.41
	Centre	390	19.35
	South	486	24.12
	Islands	230	11.41

Dietary identity of participants was measured by asking respondents to select the statement that best described their usual eating habits. Participants were presented with six mutually exclusive categories representing different positions along the meat consumption continuum: carnivore (meat is the predominant component of my meals), omnivore (I consume a varied diet including meat), reductionist (I eat meat but try to reduce my consumption), pescatarian (I avoid meat but consume fish and seafood), vegetarian (I do not eat meat or fish), and vegan (I avoid all animal-derived products, including eggs and dairy). This classification reflects a gradient of dietary identities ranging from meat-centered diets to strictly plant-based orientations. The distribution of respondents across these categories is reported in Table 2. The distribution of dietary identity reflects real Italian prevalence patterns, with omnivores constituting the majority of the sample.

Table 2: Dietary identities

Dietary identity	N = 2015	%
Carnivore	188	9.33
Omnivore	1176	58.36
Reductionist	513	25.46
Pescatarian	64	3.18
Vegetarian	58	2.88
Vegan	16	0.79

Experimental design. After indicating their dietary identity, participants were randomly assigned to one of seven experimental conditions. In each condition, respondents were presented with the same following task scenario:

"You are having dinner in a well-known and highly rated restaurant. You want to order a second course and the waiter points out two dishes of the day, masterfully prepared by the Chef. Which do you choose?".

The two alternatives presented were: (1) a meat-based stew (prepared with veal, lamb, or pork), and (2) a plant-based stew (prepared with legumes, tofu, or seitan).

The restaurant context was selected in order to isolate the decision from factors related to cooking skills, preparation time, or household food availability. The dishes were designed to be comparable in format and culinary style in order to minimize differences unrelated to the experimental manipulation.

The seven experimental conditions differed according to the informational cue accompanying the proposed dishes:

1. **Control condition:** no additional informational cue was provided.
2. **Animal welfare condition**: the plant-based dish was described as prepared without animal exploitation or suffering.
3. **Health condition**: the plant-based dish was presented as healthier than meat and beneficial for preventing chronic and cardiovascular diseases.
4. **Environmental impact condition:** environmental information was provided through the disclosure of CO_2 emissions associated with each dish, indicating a high climate impact for the meat-based option and a low climate impact for the plant-based option.
5. **Static social norm condition**: a message indicated that many customers - not only vegetarians and vegans - had chosen the plant-based dish and were satisfied with it.
6. **Dynamic social norm condition**: a message indicated that an increasing number of customers - not only vegetarians and vegans - were choosing the plant-based dish and were satisfied with it.
7. **Cumulative framing condition**: the plant-based dish was accompanied by the combination of all previously described informational cues, including environmental impact disclosure, animal welfare information, health benefits, and both static and dynamic social norm messages.

The complete description of the seven experimental conditions presented to participants is reported in **Appendix A.**

The number of participants per condition ranged from 287 to 289 respondents. This balanced allocation ensured comparable sample sizes across conditions and strengthened the internal validity of the experimental design.

To further verify the effectiveness of the random assignment procedure, we tested whether dietary identity differed across the seven experimental conditions. A one-way analysis of variance (ANOVA) revealed no significant differences in dietary identity across conditions ($F(6, 2008) = 0.58$, $p = 0.749$). This result indicates that respondents with different dietary identities were evenly distributed across experimental conditions, confirming the effectiveness of the randomization procedure and ensuring comparability between groups.

Measurement of other psychological dimensions. Other psychological variables were measured through the survey using multi-item Likert scales inspired or adapted from previous studies in the sustainable consumption and meat reduction literature. The scales captured general environmental concern (Trivedi et al., 2018), attitudes toward meat reduction for health and environmental reasons (Mai & Hoffmann, 2015), perceived pro-vegetarian social norms (De Groot et al., 2021), concern for animal welfare and hedonic attachment to meat consumption (Graça et al., 2015).

4. Results and discussion

Results description. We first explored the food choice across the seven experimental conditions (see Table 3).

Table 3: Distribution of food choices across experimental conditions

Experimental condition	Meat-based dish	Plant-based dish	Total	Plant-based (%)
1. Control	205	84	289	29.1
2. Animal welfare information	197	90	287	31.4
3. Health information	191	96	287	33.4
4. Environmental impact information	180	107	287	37.3
5. Static social norm	202	87	289	30.1
6. Dynamic social norm	199	89	288	30.9
7. Cumulative informational framing	169	119	288	41.3
Total	**1343**	**672**	**2015**	**33.4**

Logistic regression was employed to estimate the probability of choosing the plant-based option as a function of experimental conditions (Table 4). The control condition was used as the reference category.

Table 4: Logistic regression results

Plant-based choice	Odds ratio	Std. err.	z	P>z	[95% conf.	interval]
1 (control)						
2	1,11	0,20	0,60	0,549	0,78	1,59
3	1,23	0,22	1,13	0,257	0,86	1,75
4	**1,45**	0,26	2,09	0,037*	1,02	2,06
5	1,05	0,19	0,27	0,785	0,74	1,50
6	1,09	0,20	0,48	0,630	0,76	1,56
7	**1,72**	0,30	3,07	0,002**	1,22	2,43

The results indicate that most isolated informational frames do not significantly affect food choice relative to the control condition. In particular, the animal welfare, health, and social norm conditions do not produce statistically significant changes in the probability of selecting the plant-based dish. In contrast, the environmental impact condition shows a positive and statistically significant effect (OR = 1.45, p = 0.037), indicating that providing transparent information about the climate impact of food increases the likelihood that respondents choose the plant-based option compared with the control condition. The cumulative informational condition, which integrates environmental, health, animal welfare, and social norm messages, produces the strongest effect. In this condition, the probability of selecting the plant-based dish is significantly higher than in the control condition (OR = 1.72, p = 0.002).

Overall, these results suggest that isolated informational cues have no significant impact on consumers' food choices, with the exception of environmental information. However, combining multiple sustainability-related arguments appears to substantially increase the effectiveness of informational interventions aimed at promoting plant-based food choices.

To further explore whether these effects vary across consumer segments, we examined the role of dietary identity. Table 5 reports the predicted probabilities of choosing the plant-based dish across experimental conditions and dietary identities, derived from the logistic regression model including the interaction between experimental condition and dietary identity.

Table 5: Predicted probability of choosing the plant-based dish by experimental condition and dietary identity

Dietary identity	Control	Animal welfare	Health	Environmental impact	Static norm	Dynamic norm	Cumulative
Carnivore	0.03	0.14	0.04	0.18	0.07	0.15	0.24
Omnivore	0.17	0.20	0.27	0.28	0.18	0.19	0.32
Pescatarian	0.49	0.47	0.48	0.62	0.47	0.53	0.54
Reductionist	0.83	0.88	0.71	0.63	0.64	0.67	0.83
Vegetarian	—	0.86	0.89	0.86	0.92	0.83	0.90

The results highlight substantial differences across dietary groups. Informational framing produces the largest variation among carnivores and omnivores, while respondents with plant-oriented dietary identities (pescatarians, reductionists, and vegetarians) display consistently higher probabilities of selecting the plant-based option across conditions. Among omnivores, the probability of selecting the plant-based option increases from 17% in the control condition to 32% in the cumulative framing condition. A particularly strong relative change is observed among carnivores, whose probability of choosing the plant-based option rises from 3% in the control condition to 24% under cumulative framing. Vegan respondents are not reported in Table 5 because plant-based choice perfectly predicts the outcome in this subgroup.

Our findings suggest that effectiveness of information depends on consumers' dietary identity, with carnivores and omnivores representing the segments most responsive to informational interventions. Moreover, combining multiple informational cues appears to reduce selective dismissal and increases the likelihood of plant-based choice by limiting selective justification.

As a further robustness check, we estimated an additional logistic regression model including socio-demographic characteristics and several psychological/attitudinal factors (Table 6), such as environmental concern, attitudes toward meat reduction for health and environmental reasons, concern for animal welfare, perceived pro-vegetarian social norms, and hedonic attachment to meat consumption. The results remain consistent with the main analysis. In particular, the environmental impact condition ($\beta = 0.649$, $p = 0.002$) and the cumulative framing condition ($\beta = 0.809$, $p < 0.001$) significantly increase the likelihood of selecting the plant-based dish.

Psychological factors emerge as significant predictors of plant-based choice. These effects appear to operate across the sample independently of the experimental manipulations. Respondents who believe that reducing meat consumption benefits health ($\beta = 0.258$, $p < 0.001$) or the environment ($\beta = 0.130$, $p = 0.015$) are more likely to select the plant-based option. Similarly, perceived social norms favoring reduced meat consumption ($\beta = 0.191$, $p < 0.001$) and concern for animal welfare ($\beta = 0.196$, $p < 0.001$) positively influence plant-based choice. In contrast, hedonistic orientation toward meat shows a strong negative association with plant-based choice ($\beta = -0.543$, $p < 0.001$), suggesting that consumers who

prioritize sensory pleasure in meat consumption are less likely to choose plant-based options. Among socio-demographic variables, age displays a negative and significant effect, indicating that younger respondents are more inclined toward plant-based choices.

Table 6: Logistic regression results including control variables

Plant-based choice	Coefficient (β)	Std. Err.	z	p-value
Experimental conditions				
Animal welfare information	0.286	0.217	1.32	0.188
Health information	0.306	0.214	1.43	0.152
Environmental impact information	**0.649**	0.213	3.04	**0.002**
Static social norm	0.076	0.218	0.35	0.727
Dynamic social norm	0.217	0.217	1.00	0.317
Cumulative informational framing	**0.809**	0.214	3.79	**0.000**
Socio-demographic variables				
Age	-0.012	0.004	-2.90	0.004
Gender (Female)	0.128	0.115	1.12	0.262
University degree	-0.004	0.135	-0.03	0.974
Psychological factors				
Environmental concern	0.110	0.056	1.96	0.050
Attitude towards meat reduction for health reasons	0.258	0.057	4.55	0.000
Attitude towards meat reduction for environmental reasons	0.130	0.053	2.43	0.015
Perceived pro-vegetarian/vegan social norms	0.191	0.052	3.67	0.000
Hedonic attachment to meat consumption	**-0.543**	0.039	-13.78	**0.000**
Concern for animal welfare	0.196	0.038	5.16	0.000
Constant	-2.414	0.435	-5.55	0.000

5. Discussion. Our results show that not all informational cues are equally effective in influencing food choice. Among the isolated informational strategies tested, only environmental impact information significantly increased the likelihood of selecting the plant-based dish compared with the control condition. This finding is consistent with previous studies suggesting that environmental information may play a particularly relevant role in shaping sustainable food choices.

In contrast, the isolated informational cues related to health benefits, animal welfare, and social norms did not produce statistically significant changes in choice behavior. This result does not necessarily imply that these dimensions are irrelevant for consumers. Rather, it suggests that when presented individually within a short decision context, such as a restaurant menu, these messages may not be sufficiently salient to override existing preferences or habits. Previous research has highlighted that although consumers often express concern about health, animal welfare, or social norms, such concerns do not always translate into immediate behavioral change (Graça et al., 2019; Piazza et al., 2015).

Second, the cumulative informational condition produced the strongest effect among all experimental treatments. When environmental, health, ethical, and social norm information were presented simultaneously, the probability of selecting the plant-based dish increased significantly. This result supports the idea that combining multiple sustainability arguments may reduce consumers' ability to selectively dismiss individual concerns. When a single argument is emphasized, consumers may justify maintaining their existing behavior by focusing on alternative considerations. By contrast, cumulative informational framing constrains the availability of such justificatory pathways. This interpretation aligns with the concept of moral disengagement proposed by Bandura (2007). Consumers may cognitively disengage from the negative consequences of meat consumption by minimizing ethical, environmental, or health implications. However, when multiple dimensions are simultaneously highlighted, it becomes more difficult to deactivate each concern individually. The cumulative framing tested in this experiment may therefore reduce the opportunity for moral disengagement mechanisms to operate.

Third, the results reveal substantial heterogeneity across dietary identities. Consumers with plant-oriented dietary identities - such as pescatarians, reductionists, and vegetarians - already display high baseline probabilities of choosing the plant-based option. For these groups, informational framing produces only limited additional effects, as their dietary choices are largely consistent with their identity-based motivations. This finding is consistent with identity-based models of behavior suggesting that individuals tend to act in ways that are coherent with their self-concept and established habits.

By contrast, omnivorous and carnivorous consumers appear to be the most responsive segment to informational interventions. In this group, the probability of selecting the plant-based option increases substantially in cumulative informational condition compared with the control condition. This result suggests that informational strategies may be particularly effective among consumers whose dietary identity is less rigidly defined and therefore more open to influence.

Finally, the robustness analysis incorporating socio-demographic and psychological variables provides further insight into the drivers of plant-based choice. Several psychological factors emerge as significant predictors of behavior, including attitudes toward meat reduction for health and environmental reasons, concern for animal welfare, and perceived social norms favoring reduced meat consumption. These results confirm that individual predispositions play a central role in shaping dietary choices.

Among all predictors included in the model, hedonic attachment to meat consumption emerges as the strongest negative determinant of plant-based choice. Respondents who associate meat consumption with sensory pleasure are significantly less likely to select the plant-based dish. This finding supports previous research highlighting the central role

of taste expectations and hedonic motivations in sustaining meat consumption (Piazza et al., 2015; Graça et al., 2016). Even when consumers recognize environmental or ethical concerns, the perceived pleasure associated with meat consumption may facilitate forms of moral disengagement that justify maintaining existing dietary habits.

Overall, the findings suggest that informational strategies can influence food choices, but their effectiveness depends on both message design and consumer characteristics. In particular, environmental information and cumulative informational framing emerge as the most effective approaches for promoting plant-based choices, especially among consumers with meat-oriented dietary identities.

6. Research limitations. Despite its contributions, this study presents several limitations that should be considered when interpreting the results. First, the experiment relied on a hypothetical decision scenario rather than observing actual behavior. Although hypothetical choice experiments are widely used in consumer research to isolate causal mechanisms, real-world food choices may be influenced by additional contextual factors such as price, product availability, social context, or situational constraints. Future research could complement the present findings with field experiments conducted in real restaurant settings.

Second, the experiment was conducted within a specific consumption context, namely a restaurant menu choice. While this context was intentionally selected to minimize factors related to cooking skills, preparation time, and household food availability, consumer behavior may differ in other consumption settings, such as grocery shopping or home meal preparation.

Third, the study focuses on a national sample of Italian consumers aged between 18 and 70. Cultural norms, culinary traditions, and attitudes toward plant-based foods may vary across countries, potentially influencing the effectiveness of sustainability-related informational strategies. Future studies could replicate the experimental design in different cultural contexts to assess the generalizability of the results.

Fourth, dietary identity was measured through self-reported categories. Although this approach captures important differences in dietary orientation, individual eating habits may be more nuanced than categorical classifications suggest. Future research could explore more fine-grained measures of dietary behavior and food-related identities.

Fifth, our study does not directly measure moral disengagement, relying instead on theoretical inference.

Finally, while the present analysis incorporates several psychological variables, additional factors such as taste expectations, perceived product quality, or emotional responses to food could further contribute to explaining consumer choices. Integrating these dimensions into future experimental designs could provide a more comprehensive understanding of the mechanisms underlying sustainable food consumption.

7. Managerial implications. Our findings offer several implications for practitioners and policymakers interested in promoting more sustainable dietary choices.

First, the results suggest that communicating the environmental impact of food products can effectively encourage plant-based choices. Providing clear and concrete environmental information - such as carbon footprint indicators - may increase consumers' awareness of the ecological consequences of their dietary decisions. Restaurants, food service providers, and menu designers could incorporate environmental impact labels or sustainability indicators to support more informed choices.

Second, the effectiveness of cumulative informational framing indicates that sustainability communication may benefit from combining multiple arguments rather than focusing on a single dimension. Messages simultaneously highlighting environmental impact, health benefits, animal welfare considerations, and social norms may reinforce one another and reduce consumers' ability to selectively ignore individual concerns. Menu communication strategies could therefore integrate multiple sustainability cues within the same message to strengthen their overall impact.

Third, the heterogeneity observed across dietary identities suggests that communication strategies should be tailored to different consumer segments with omnivorous and carnivorous consumers appear to be the most responsive segment to informational interventions.

Finally, the strong negative effect of hedonic attachment to meat consumption highlights the importance of addressing taste perceptions in promoting plant-based diets. Informational messages alone may not be sufficient if consumers perceive plant-based dishes as less satisfying or less enjoyable than meat-based alternatives. Restaurants and food producers should therefore invest in improving the sensory quality, culinary appeal, and gastronomic positioning of plant-based dishes. Emphasizing taste, creativity, and culinary craftsmanship may help overcome hedonic barriers and increase the acceptance of plant-based options.

Taken together, these findings suggest that promoting more sustainable food choices requires a combination of complete informational strategies, increasing awareness champaigns as well as improvements in the sensory attractiveness of plant-based foods. By aligning sustainability communication with consumers' psychological motivations and taste expectations, practitioners may enhance the effectiveness of interventions aimed at reducing meat consumption.

8. Originality of the Paper. This study contributes to the literature on sustainable food consumption by advancing the understanding of how informational strategies influence consumers' dietary choices. While previous research has examined individual informational frames - such as environmental impact, health benefits or social norms - this study investigates both the isolated and cumulative effects of several informational cues within a controlled experimental setting.

First, the paper provides evidence that not all informational frames are equally effective in influencing food choices. Among the isolated messages tested, environmental impact information emerges as the only frame capable of significantly increasing the probability of selecting a plant-based option.

Second, the study empirically tests the concept of cumulative informational framing, showing that the simultaneous presentation of multiple arguments produces stronger behavioral effects than isolated messages. This result suggests that combining environmental, health, ethical, and social norm information may reduce consumers' ability to selectively dismiss individual concerns, thereby limiting mechanisms of moral disengagement.

Third, the study demonstrates that the effectiveness of informational framing depends on consumers' dietary identity. Informational interventions appear to be particularly effective among omnivorous and carnivorous consumers, whose dietary identity is less rigidly anchored to ethical considerations, while individuals with plant-oriented dietary identities already display high baseline probabilities of selecting plant-based options.

Finally, by integrating psychological drivers such as environmental concern, animal compassion, perceived social norms, and hedonic attachment to meat consumption, the study highlights the interplay between informational cues and underlying motivational factors in shaping sustainable food choices.

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Appendix A: Experiment Design

Task scenario:
You are having dinner in a well-known and highly rated restaurant. You want to order a second course and the waiter points out on the menu two dishes of the day, masterfully prepared by the Chef. Which one do you choose?

Experimental conditions	Option 1	Option 2
1. Control	**Meat stew** (choice of veal, lamb, or pork) 	**Plant-based stew** (choice of legumes, tofu, or seitan) 
2. Animal welfare	**Meat stew** (choice of veal, lamb, or pork) 	**Plant-based stew** (choice of legumes, tofu, or seitan)  *Dish prepared without animal exploitation or suffering.*
3. Health	**Meat stew** (choice of veal, lamb, or pork) 	**Plant-based stew** (choice of legumes, tofu, or seitan)  *Healthier than meat, helping protect against chronic and cardiovascular diseases.*
4. Environmental impact	**Meat stew** (choice of veal, lamb, or pork)  *Climate change environmental impact: HIGH (4 kg of CO_2 per portion)*	**Plant-based stew** (choice of legumes, tofu, or seitan)  *Climate change environmental impact: LOW (0.12 kg of CO_2 per portion)*
5. Static social norms	**Meat stew** (choice of veal, lamb, or pork) 	**Plant-based stew** (choice of legumes, tofu, or seitan)  *Many customers, not only vegetarians and vegans, have chosen this dish and were satisfied!*
6. Dynamic social norms	**Meat stew** (choice of veal, lamb, or pork) 	**Plant-based stew** (choice of legumes, tofu, or seitan)  *More and more customers, not only vegetarians and vegans, are choosing this dish and are satisfied!*
7. Cumulative framing	**Meat stew** (choice of veal, lamb, or pork)  *Climate change environmental impact: HIGH (4 kg of CO_2 per portion)*	**Plant-based stew** (choice of legumes, tofu, or seitan)  *Climate change environmental impact: LOW (0.12 kg of CO_2 per portion)* *Dish prepared without animal exploitation or suffering.* *Healthier than meat, helping protect against chronic and cardiovascular diseases.* *Many (and increasingly more) customers, not only vegetarians and vegans, choose this dish and are satisfied!*

Is sustainable fashion cool? An exploration of ethical, slow and sustainable fashion hashtags on Instagram

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Abstract. *This research aims to frame the concept of coolness in sustainable fashion discourse and reach insights into how coolness and sustainability are intertwined. It proposes an exploration of sustainable fashion discourse on Instagram, a digital setting where the social construction of coolness occurs. In this setting, the research questions that this study addresses are: How is coolness framed in the Instagram discourse on sustainable fashion? To respond to this broader question, this study explores i) the key dimensions of coolness in sustainable fashion; ii) what themes of sustainability emerge when referring to coolness; iii) the sentiment associated with coolness in sustainable fashion discourse and, iv) geographical differences among content creators. According to findings, sustainable fashion discourse incorporates coolness primarily as an aesthetic and symbolic attribute (Original, Attractive, and High Status), while deeper integration with sustainability narratives remains limited. Coolness is present and emotionally positive, but only weakly integrated with sustainability discourse within the analysed corpus. Authenticity functions as the strongest bridge between coolness and sustainability, particularly in relation to Human Rights. Higher coolness intensity weakens sustainability integration, suggesting a potential symbolic trade-off between the two overall concepts. Geographical differences are substantial, especially in emoji-based expression (Asia) and hashtag signalling (Africa and Europe).*
Keywords: Coolness, Sustainable fashion, Brand coolness, Instagram, Text analytics

Framing of the research. *Coolness is a subjective, socially constructed, and dynamic positive attribute of brands and, more generally, of cultural objects or individuals (Warren et al., 2019; Loureiro et al., 2024). It plays a special role in symbolic consumption where identity expression plays a central role (Stein et al. 2025). Coolness is not just a form of liking someone or something; rather, it is the result of an evaluation or judgement of distinctiveness, which is associated with various characteristics and dimensions emerged in the literature. Based on this definition, it is evident how coolness is embedded within a cultural and social context, evolving over time depending on the evolution of social groups (Warren et al., 2019). What is cool in a setting can be uncool in another; such setting for instance can be geographical, cultural and temporal. The social construction of coolness emphasises the importance to focus on the interactions between consumers, brands and cultural contexts to reach insights into what coolness is (Stein et al., 2025). In fact, coolness can be understood as a multifaceted and culturally embedded concept that has evolved from subcultural movements into a significant element of consumer culture (Loureiro and Lopes, 2012; Loureiro et al., 2024).*

Brand coolness corresponds to positive perceptions that consumers attribute to brands that appear as authentic, distinctive, and socially relevant (Stein et al., 2025). Ten main dimensions characterize cool brands: innovativeness (creativity and capacity to anticipate trends), emotional stimulation, exclusivity, positive emotions, preciousness, singularity, unconventionality, social conscience, youthfulness and vintage (Loureiro and Lopes, 2012). It was said to reflect perceptions of autonomy in relation to the independence from conventions, originality or nonconformity (Warren et al., 2019). Innovativeness, meaningfulness and capacity to stand out from the mainstream are discussed as key dimensions of a cool brand (Stein et al., 2025). According to Warren et al. (2019), a set of characteristics commonly associated to coolness are extraordinary, aesthetic appeal (design quality and visual attractiveness), energy, high-status, originality, authenticity (as perceptions of brands that are genuine and consistent with their own values), rebelliousness (linked to unconventionality contributing to the perceptions of differentiation from mainstream brands), sub-cultural appeal, iconicity and popularity. In the luxury fashion context, a distinction was made in conceptualising brand coolness, such as "mass cool" and "niche cool". Mass cool brands refer to the perceptions of coolness in the broader market, while niche cool brands are defined in relation to perceptions of coolness reached within specific and narrower subcultural groups (Loureiro et al., 2024). This distinction frames different concepts of coolness and may explain different consumer behaviours. This distinction mirrors the importance of understanding and conceptualising coolness within consumer segments and groups within them because interpretation and valuation of cool may vary.

Brand coolness was discussed in relation to the impact on consumer-brand relationships. Positive brand attitudes, emotional attachment and self–brand connections, brand credibility brand love, passionate desire, brand loyalty, increase of consumers' willingness to pay, word of mouth and brand equity have been discussed as a consequence of the perceived coolness (Loureiro and Lopes, 2012; Warren et al. 2019; Loureiro et al., 2020; Loureiro et al., 2024; Alanadoly and Salem, 2023; Stein et al., 2025).

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Attention has also been drawn to experiential modalities to construct perceived coolness. For instance, technology-enabled experiences such as virtual reality (VR) and gamification may play a significant role in shaping coolness perceptions (Stein et al., 2025). Immersive gaming may represent a modality to boost perceptions of coolness, particularly in relation to perceived enjoyment, although different segments may respond differently to the same experiential inputs (Alanadoly and Salem, 2023).

Purpose of the paper. *Considering the definition of coolness, there is a need to situate the study of the concept within specific settings, paying much attention to its constructed meanings in relation to given sectors, practices of consumption and groups of consumers. Research needs to acknowledge and focus on differences and nuances of coolness, as well as on the potentially different modalities to boost perceptions of coolness and its different outcomes. Besides, there is a need to gain insights not only into the positive impacts of perceived coolness but also into the negative responses that coolness might elicit depending on the analysed settings. These insights would complement the existing knowledge on coolness and its capacity to transfer meaning and value through consumer experiences. Accordingly, this study focuses on sustainable fashion as a field where the concept of coolness may enhance the knowledge of how sustainable fashion brands work and brand equity is built. On the other hand, attention needs to be driven to the controversial aspects that may characterise coolness in relation to brands and products that are supposed to appeal to a sense of responsibility for the planet, ethical consumption based on consciousness of ecological and social problems that are related to the fashion industry and global value chains. New social norms, as well as consumers, have tied together to drive fashion brands to engage in sustainability at different level, from fast-fashion to luxury (Karaosman et al., 2020), with the latter often negatively evaluated for their unresponsible practices (Wang et al., 2021) related to questionable raw materials, and social justice related issues (Bubicz et al., 2021; Gardetti, 2017; Henninger et al., 2017; McKinsey, 2026). Consequently, fashion brands have increasingly included sustainable product attributes, including green manufacturing (Karaosman et al., 2020), the dearth of expertise (Guercini and Ranfagni, 2013), product longevity (Kapferer, 2010), and commitment to eco-fashion besides environmental conservation (Godart and Seong, 2014). However, much of the literature often analyses sustainability without fully understanding its complex character (Nagendra et al., 2024; Alwani et al., 2025) in particular in fashion, with respect to its specificities regarding brand social sustainability interpretation as in sustainable fashion narrative.*

If coolness is socially constructed, does it emerge in sustainable fashion narrative? If so, what are the dimensions of coolness that assist the sustainable fashion discourse? Finally, what the impacts of coolness on sustainable fashion consumers? This enquiry has recently emerged in the sustainable fashion literature. Singh et al. (2024) focused on the relationship between sustainability, brand coolness, and brand romance in the context of sustainable fashion consumption. With a focus on Gen Z consumers, this study demonstrated that portraying sustainable fashion as "cool" can enhance its attractiveness and boost purchase intention, also by fostering emotional attachment. However, there is a need to investigate in depth the specific dimensions that constitute coolness in sustainable fashion, considering that the social and cultural setting where coolness is constructed and exerts its impacts highly influences how coolness takes shape. Research is needed to better understand how coolness is constructed within the fashion domain for then to understand how coolness and its underlying dimensions influence consumers' emotional responses toward sustainable fashion.

The purpose of this research is, therefore, to frame the concept of coolness in sustainable fashion discourse and reach insights into how coolness and sustainability are intertwined. This is pursued by exploring the sustainable fashion discourse on Instagram, which is a digital setting where users generate content and interact. Not only Instagram has been progressively and generally relevant among social media, but it has played an important role in fashion (Tia et al., 2024) and has been widely used to disseminate brand messages about sustainability by corporate brands and entrepreneur brands (Kwon & Lee, 2021; Milanesi et al., 2022; Pasquinelli et al., 2025). In Instagram discursive setting, the research questions that this study addresses are: How is coolness framed in Instagram discourse on sustainable fashion? To respond to this broader question, the following research questions have been addressed: RQ1: what are the key dimensions of coolness in sustainable fashion? RQ2: What themes of sustainability emerge when referring to coolness? RQ3: What sentiment is associated with coolness in sustainable fashion discourse? And finally: RQ4: is there any geographical difference among content creators in framing coolness in sustainable fashion?

Methodology. *This study adopts a quantitative, dictionary-based computational research design to examine how coolness is framed within sustainable fashion discourse on Instagram and how it relates to sustainability dimensions, sentiment, and geographical provenance. The research relies on large-scale social media analytics of digital trace data, enabling the observation of naturally occurring communication and reducing typical self-reporting biases (Tirunillai & Tellis, 2014). The unit of analysis is the individual Instagram post caption. Variables were operationalized at the post level using normalized frequency measures to control for caption length. To address the research questions, the study combines descriptive statistics, longitudinal trend analysis, Pearson correlation analysis, and one-way ANOVA tests. The dictionary-based approach ensures theoretical alignment and replicability (Humphreys & Wang, 2017). Robustness checks were conducted using a High-Coolness subsample to test whether higher coolness intensity corresponds to stronger sustainability integration.*

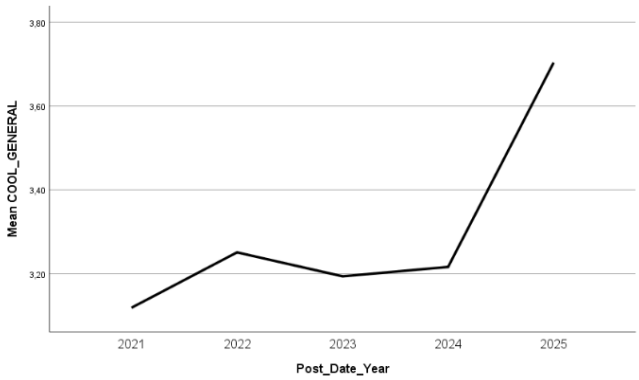
Data. *A total of 202,499 Instagram posts were collected by means of a specific data crawler through hashtag-based retrieval. The following hashtags were used: #ethicalfashionbrand, #slowfashionbrand, #slowfashionmovement,*

#sustainablefashionbrand. Posts collected span a five-year period (2021–2025). The dataset is evenly distributed across hashtags (≈25% each) and includes both brand-generated and user-generated content. For each post the following fields were retrieved: Post_Likes, Total_Comments, Followers, Followings, Total_Posts, Number_Photo, Word_Count_Post. Given the exploratory nature of this research, we focus on post captions only, excluding comments, in order to capture how coolness is framed in primary content production.

To examine the emotional and symbolic framing of coolness within sustainable fashion discourse, we conducted an automated textual analysis of Instagram post captions using Linguistic Inquiry and Word Count (LIWC 2022). LIWC is a validated computational linguistic tool that quantifies psychologically meaningful categories by matching textual input against an extensive dictionary of words, stems, and emojis (Boyd et al., 2022). The tool has been widely adopted in social media and influencer marketing research to capture emotional expressiveness in naturally occurring digital communication, including Instagram data (e.g. Garner & Myers, 2025; Son & Park, 2023; Holiday et al., 2023). The study combines different dictionaries. We employed two theory-driven dictionaries developed for this study: (1) a coolness dictionary (Warren et al., 2019), structured into nine dimensions (i.e. Extraordinary, Energetic, Attractive, Original, Authentic, Rebellious, High Status, Popular, Iconic) including relevant keywords and emoji for each category, and (2) a sustainability dictionary (Pencle & Mălăescu, 2016), capturing four thematic dimensions (i.e. Human Rights, Employees, Social & Community, Environment). In parallel, we operationalized textual emotional expression using LIWC's affective categories and specifically positive emotion (posemo), capturing words associated with positive affect (e.g., love, beautiful, amazing); and negative emotion (negemo), capturing language associated with negative affect (e.g., sad, angry, unfair). Emojis were analyzed alongside textual content and treated as paralinguistic emotional markers, consistent with research demonstrating their role in clarifying or amplifying emotional intent in social media environments (Prada et al., 2018; Holiday et al., 2023). Dictionary-based scores were computed as normalized frequency measures relative to caption length. Additionally, a High-Coolness subsample (i.e. Cool_General ≥ 5.00; N = 44,911) was constructed to assess whether the relationship between coolness and sustainability dimensions varies under conditions of higher discursive intensity. This robustness analysis allows us to examine whether stronger coolness framing enhances sustainability integration or, alternatively, leads to symbolic decoupling when coolness becomes dominant.

Results. *The marked rise of Cool_General in 2025 (figure 1) indicates that coolness becomes increasingly central in sustainable fashion discourse rather than remaining a marginal stylistic feature. To unpack this aggregate trend, we analyze the nine coolness dimensions composing the Cool_General index, identifying which specific symbolic components are the most relevant.*

Figure 1. Longitudinal evolution of Cool_General (2021–2025)



Key Dimensions of Coolness in Sustainable Fashion. *The mean value of Cool_General (M = 3.24; SD = 4.07) indicates that coolness is present in sustainable fashion discourse, although its distribution is highly dispersed, as reflected by the relatively large standard deviation. This suggests substantial heterogeneity in the intensity of coolness framing across posts.*

At the dimensional level, Original (M = 0.41; SD = 1.40) and Attractive (M = 0.30; SD = 1.01) emerge as the most salient components of coolness, followed by High Status (M = 0.19; SD = 0.85). These findings indicate that aesthetic differentiation and symbolic distinctiveness constitute the dominant expressions of coolness in sustainable fashion discourse. In contrast, dimensions such as Rebellious (M = 0.009), Energetic (M = 0.027), and Popular (M = 0.034) display very low mean values, suggesting that countercultural or overtly expressive forms of coolness are comparatively marginal. Authentic (M = 0.12) and Iconic (M = 0.11) occupy an intermediate position, indicating a moderate but non-dominant presence.

Overall, the descriptive results (table 1) suggest that coolness in sustainable fashion is primarily articulated through originality, aesthetic appeal, and status signaling rather than through rebellion or overt expressiveness.

Table 1. Descriptive statistics

Variable	*N*	*Min*	*Max*	*M*	*SD*
Cool_General	*202,357*	*0.00*	*89.47*	*3.24*	*4.07*
Extraordinary	*202,357*	*0.00*	*19.05*	*0.06*	*0.39*
Energetic	*202,357*	*0.00*	*25.00*	*0.03*	*0.27*
Attractive	*202,357*	*0.00*	*50.00*	*0.30*	*1.01*
Original	*202,357*	*0.00*	*50.00*	*0.41*	*1.40*
Authentic	*202,357*	*0.00*	*50.00*	*0.12*	*0.62*
Rebellious	*202,357*	*0.00*	*33.33*	*0.01*	*0.15*
High Status	*202,357*	*0.00*	*50.00*	*0.19*	*0.85*
Popular	*202,357*	*0.00*	*33.33*	*0.03*	*0.34*
Iconic	*202,357*	*0.00*	*50.00*	*0.11*	*0.68*

Note. Values represent normalized frequency measures at the Instagram post-caption level.
Cool_General reflects the aggregate coolness index computed from the nine underlying dimensions.

Coolness and Sustainability: Correlation Analysis. *We performed a Pearson Correlation analysis considering the full sample (N ≈ 202,357). The overall category of coolness (i.e. Cool_General) significantly correlates with all four sustainability dimensions (p < .01). Specifically, with Human Rights (r = .067), Employees (r = .020), Social & Community (r = −.042), and Environment (r = .031). The negative correlation with Social & Community suggests a potential discursive tension between coolness framing and community-oriented sustainability narratives.*

At the dimensional level, notable patterns emerge. Authentic is the only coolness dimension positively correlated with all sustainability dimensions (non-significant only for Employees). The correlation between Authentic and Human Rights is comparatively strong (r = .517, p < .01). Original is the only dimension negatively correlated with all sustainability dimensions (always statistically significant). Environmental sustainability appears more compatible with coolness framing than social dimensions, as fewer coolness dimensions are negatively associated with Environment.

We then performed a Pearson Correlation analysis considering only a High-Coolness Subsample (N = 44,911) (i.e. Cool_General ≥ 5). In this case, correlations between Cool_General and sustainability dimensions become even weaker, specifically Human Rights (r = .018, p < .01), Employees (r = .036, p < .01), Social & Community (r = −.050, p < .01), Environment (r = .011, p < .01). This suggests that stronger coolness intensity does not correspond to deeper integration of sustainability discourse. Rather, the association appears to weaken as coolness becomes more dominant. However, the relationship between Authentic and Human Rights strengthens further (r = .61, p < .01), reinforcing the idea that authenticity constitutes a key bridging construct between coolness and normative sustainability claims.

Conversely, Original remains negatively correlated with all sustainability dimensions, confirming its structurally antagonistic role.

Coolness and Sentiment. *When considering the full sample (N≈ 202,357) Cool_General is more strongly correlated with positive sentiment (r = .139, p < .01) than with negative sentiment (r = .011, p < .01). Across dimensions Attractive shows the strongest positive correlation with positive sentiment (r = .257, p < .01), Iconic and Original show negligible or non-significant associations with positive sentiment, Negative sentiment correlations are generally weak and often non-significant. Overall, coolness framing is associated predominantly with a positive emotional tone. In the high-coolness subsample (N = 44,911) the strongest positive sentiment correlation concerns Attractive (r = .347, , p < .01), while Original and Iconic become negatively correlated with positive sentiment. This indicates that certain forms of coolness, when intensified, may decouple from positive affective framing.*

Geographical Differences in Coolness Framing. *Using a subsample of 146,578 posts with valid localization data, one-way ANOVA tests reveal statistically significant differences across continents for Cool_General (F = 44.705, p < .001), EmojiCool (F = 397.436, p < .001), HashtagsCool (F = 59.895, p < .001). Cool_General Mean levels are highest in Africa (M = 3.73) and Asia (M = 3.63), while Lowest in Europe (M = 3.23) and North America (M = 3.23). Post hoc tests confirm that Asia refers to coolness significantly more than Europe, North America, and Oceania. Africa exhibits consistently high levels, though not always significantly different from Asia. Asia shows substantially higher emoji-based coolness (Emoji_Cool) (M = .46) than all other regions, indicating a stronger reliance on symbolic-affective expression. Coolness hashtags (Hashtags_Cool) are most prevalent in Africa (M = .28) and Europe (M = .21), compared to other regions.*

Overall, results indicate that geographical provenance significantly shapes how coolness is expressed in sustainable fashion discourse, both lexically and symbolically.

Discussion. *This study aimed to investigate whether and how coolness emerges in sustainable fashion discourse in a digital setting, i.e. Instagram, examining the dimensions of coolness, its relationship with sustainability themes, the emerging emotional framing, and their geographical variation. Across the analysis, four core patterns emerged (figure 2). First, coolness is present and emotionally positive, but only weakly integrated with sustainability discourse within the analysed corpus. Second, Authenticity functions as the strongest bridge between coolness and sustainability, particularly in relation to Human Rights. Third, higher coolness intensity weakens sustainability integration, suggesting potential*

trade-off between the two overall concepts. Fourth, geographical differences are substantial, especially in emoji-based expression (Asia) and hashtag signalling (Africa and Europe).

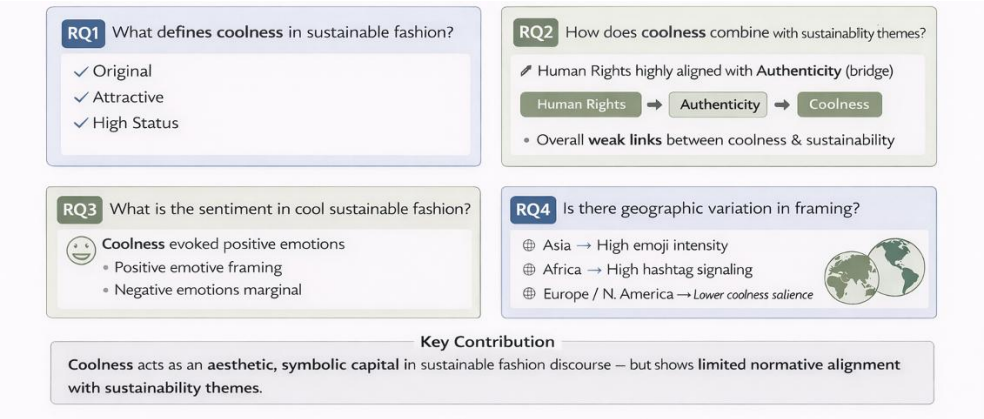
These results indicate that coolness is indeed present in sustainable fashion narratives and has become increasingly salient over time, integrated into the sustainable fashion discourse. However, while used in the general discourse, when coming to discuss specific themes of sustainability, coolness role slightly decreases. This may support the argument that sustainability-oriented brands increasingly rely on coolness to enhance attractiveness and consumer engagement, particularly in visually driven social media environments such as Instagram, but at the same time coolness is less likely to be referred to when addressing directly and explicitly sustainability topics (such as social and ecological issues and challenges).

Coolness in sustainable fashion takes a specific shape. Being Original, Attractive, and High Status the most salient dimensions, coolness seems to be primarily expressed through aesthetic and creative differentiation and symbolic prestige, in contrast with general representations of coolness that also emphasize rebelliousness, subcultural positioning, or nonconformity (Warren et al., 2019). This is quite unexpected results, given the focus of this study, suggesting that coolness in sustainable fashion discourse do not integrate with the countercultural resistance that the sustainability discourse might embed.

Although coolness shows statistically significant correlations with sustainability themes, coefficients are small and, in some cases, negative. In particular, the negative correlation with the Social & Community dimension indicates a potential tension between coolness and community-oriented sustainability narratives. Authenticity, instead, emerged as a crucial bridging dimension. Authentic is the only coolness dimension positively associated with all sustainability themes and shows a particularly strong relationship with Human Rights. This result aligns with previous literature highlighting authenticity relevance in both sustainable consumption (Rovai and Jain, 2025) and perceptions of coolness (Warren et al., 2019; Loureiro et al., 2024), indicating the centrality of perceptions of genuineness and consistency with own values. Originality, instead, is in antithesis with sustainability discourse in fashion, as it is negatively correlated with all sustainability dimensions. When discourse emphasizes novelty, creativity and uniqueness, sustainability themes become extremely marginal.

The sentiment analysis indicates that when coolness is central to discourse there are primarily positive emotional expressions. This confirms the literature defining coolness as positive attribute (e.g., Loureiro and Lopes, 2012; Warren et al., 2019). Nevertheless, in high-coolness contexts some dimensions such as originality and iconicity show weaker or even negative associations with positive sentiment, suggesting that intense references to coolness might introduce more complex emotional dynamics, potentially leading to negative reactions. Finally, coolness is not constructed in the same way across geographical contexts, reinforcing the idea that coolness is culturally embedded and socially constructed (Warren et al., 2019), highlighting the importance of contextualizing coolness within specific cultural contexts and communication practices.

Figure 2. Emerging framework of coolness in sustainable fashion discourse



Research limitations. *The results are part of a first phase of a broader study, which aims to measure the impact of coolness on UGC in the sustainable fashion discourse on Instagram, focusing on the emotional responses to coolness-sustainability content. Before proceeding to this second phase of the research project, we will deepen insights into the collected data by adding a qualitative study aimed to further frame coolness, sustainability and their relationship. Particularly, we want to develop a qualitative content analysis of the text fragments where a negative sentiment has emerged. Although the adopted methodological approach ensures theoretical consistency and replicability, a limitation of the dictionary-based approach is its reduced ability to capture semantic nuance and contextual meaning. Developing qualitative insights in the phase two of this research will allow an integration of the findings with emerging meanings. These analysis focuses solely on post captions, excluding user comments and audience interactions. Including these elements (e.g. comments, likes, shares) in future research would allow a deeper understanding of how coolness and sustainability are co-constructed through engagement.*

Managerial implications. *Although these findings are preliminary, these insights suggest the need to think carefully about the relationship between coolness and sustainability in the sustainable fashion industry. Particularly, sustainable fashion brand managers may be cautious about the potential trade-offs between the two concepts: this implies reflecting on brand communication and how to leverage coolness for brand building. Which dimensions of coolness may be levered to frame sustainable fashion brands and, particularly, in relation to what sustainability dimensions. Even though this research needs further development, these preliminary findings encourage critical thinking about coolness in sustainable fashion, drawing attention to the chance that, in some settings and relatively to specific social groups, coolness may even activate negative sentiment and, generally, consumer response.*

Originality of the paper. *This research aims to frame the concept of coolness in sustainable fashion discourse and reach insights into how coolness and sustainability are intertwined. It proposes an exploration of sustainable fashion discourse on Instagram, understood as the digital context in which coolness is socially constructed. The explorative effort is carried out using an original dataset including brand-generated and user-generated content and a big data analysis.*

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Market Segmentation along the Value-Chain and Sustainability Orientation: Evidence from Italian Fashion Firms

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Abstract. *Sustainability challenges are intrinsically value-chain specific: upstream production stages typically concentrate resource and pollution-intensive processes, while downstream stages are more exposed to consumer scrutiny and reputational pressures. This work examines whether market orientation (B2B versus B2C), used as a proxy for firms' position along the value chain, is associated with different patterns of environmental and social sustainability orientation. We study around 1000 Italian fashion firms by combining firm-level economic and governance data from the AIDA/Orbis database with original unstructured textual information extracted from corporate websites. Firms' sustainability orientation is measured through a lexicon-based Natural Language Processing approach. OLS estimates indicate that B2B firms communicate higher sustainability orientation than B2C firms on both the environmental and social dimension. The environmental sustainability orientation result supports the view that buyer requirements, certification regimes, and compliance incentives push upstream firms to adopt and signal greener practices. The social sustainability orientation result is more unexpected and suggests that social sustainability is increasingly governed through inter-firm relationships (audits, codes of conduct, and due diligence) rather than being driven primarily by consumer-facing reputation.*
Keywords: *value chain; B2B and B2C; sustainability orientation; environmental sustainability; social sustainability; fashion industry, natural language processing*

Framing of the research. Building on industrial marketing and sustainability research, we argue that market segmentation along the value-chain (B2B vs B2C) captures meaningful differences in firms' environmental and social sustainability orientation. B2B firms typically operate upstream or midstream, selling intermediate inputs, components, and manufacturing services to other firms. Their sustainability incentives are embedded in buyer-supplier relationships and in compliance with formal standards and certifications (Hoejmose et al., 2012; Huang et al., 2022). B2C firms are more likely to be downstream and consumer-facing; therefore, they are exposed to consumer activism, media attention, and brand legitimacy concerns (Johnson et al., 2018; Swani et al., 2014).

These differences matter because environmental and social sustainability may be governed through distinct channels. Environmental sustainability in supply chains is often monitored and incentivized via product specifications, certifications, and auditing routines (Sharma et al., 2010). Buyer pressure can be particularly effective when downstream actors internalize reputational risk and extend requirements upstream (Delmas & Montiel, 2009). In B2B contexts, sustainable brand positioning and the ability to meet clients' environmental expectations may directly shape relationship outcomes (Casidy & Lie, 2023) and create stakeholder value in climate-risk management (Khan et al., 2023).

Social sustainability, conversely, is often portrayed as more salient in consumer markets, where firms can leverage ethical sourcing, labor standards, and community engagement as differentiation signals. Consumer willingness to pay for ethical attributes and charity-linked products provides incentives for downstream communication (Elfenbein & McManus, 2010; Kimeldorf et al., 2006).

Overall, the literature lacks firm-level, comparative evidence on how sustainability orientation differs between B2B and B2C firms, and especially on how these differences play out across environmental versus social dimensions. This study addresses this gap with an empirical focus on Italian fashion firms, a context where both upstream production and downstream branding are prominent (Paulicelli, 2014; Tokatli, 2013).

Within this landscape, firms increasingly treat sustainability not only as operational change but also as strategic orientation: a set of priorities that shapes decisions, investments, partner selection, and communication. Communication is particularly relevant because sustainability claims affect reputation, consumer trust, and business relationships, yet standardized sustainability reporting remains uneven across firms, especially among SMEs (Dienes et al., 2016). This creates a measurement challenge: in many settings, the absence of structured disclosure prevents researchers from comparing sustainability commitments across firms and along value chains.

A related issue is that the availability of sustainability information is itself endogenous. Firms decide whether to publish a formal sustainability report, which topics to cover, and how to frame trade-offs. Systematic reviews of sustainability reporting identify multiple drivers - such as regulation, stakeholder pressure, and managerial attitudes - but also point to strong heterogeneity across sectors and firm sizes (Dienes et al., 2016; Lee, 2011; Roxas & Coetzer, 2012). Specifically, in industries populated by SMEs, reliance on formal reports would exclude large parts of the population and would over-represent highly visible firms. Website-based measures therefore complement reporting-based approaches by capturing sustainability narratives even when no report exists, albeit with the caveat that narratives may be selective.

A promising way to capture such commitments is to observe how firms publicly describe sustainability on their corporate websites. Websites represent a pervasive, low-cost channel used by both large and small firms to signal priorities to

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stakeholders, including customers, buyers, regulators, and employees. Text mining approaches have thus become an increasingly useful way to quantify otherwise hard-to-observe constructs such as sustainability orientation (e.g., Blasi et al., 2020). Website content is not a perfect proxy for performance, but it provides systematic evidence about what firms choose to emphasize and how they frame sustainability to external audiences.
Beyond differences in stakeholder exposure, B2B and B2C firms also differ in the channels and styles through which they communicate sustainability. Studies comparing communication in business versus consumer markets show systematic differences in the use of emotional versus functional appeals and in the content that firms post on social media (Swani et al., 2014; Swani et al., 2017). If such differences extend to corporate websites, then sustainability orientation should be understood as a strategically constructed signal tailored to the audience, rather than as a neutral reflection of underlying practices. This further motivates a measurement approach that can capture sustainability language at scale, while still allowing for careful interpretation of what "orientation" means in different markets.

Purpose of the paper. This work investigates how firms' position along the fashion value chain - operationalized through market orientation (B2B versus B2C) - relates to their sustainability orientation. The core objective is to understand whether upstream-oriented firms (B2B) and downstream-oriented firms (B2C) systematically differ in the emphasis they place on environmental and social sustainability when communicating to external stakeholders.
From a conceptual standpoint, we build on three complementary perspectives. First, institutional theory suggests that sustainability strategies respond to regulatory pressures, normative expectations, and stakeholder demands (Lee, 2011; Roxas & Coetzer, 2012). Second, market-based and relationship-based views highlight that sustainability can be a source of differentiation and relational value, particularly in buyer-seller relationships (Mariadoss et al., 2011; Talay et al., 2025). Third, a resource-based view emphasizes that sustainability orientation depends on capabilities, managerial attention, and the ability to mobilize resources for change (Tate & Bals, 2018).
These perspectives converge on the idea that B2B and B2C firms face different sustainability incentives. In B2B markets, sustainability is intertwined with procurement routines, certifications, and the need to comply with business clients' requirements. Sustainability-oriented collaborations can enhance trust and strategic alignment, supporting long-term relationships (Hoejmose et al., 2012; Sharma et al., 2010). Environmental considerations are particularly salient when clients seek to manage their own footprints and reputational risks by extending environmental standards upstream (Delmas & Montiel, 2009; Huang et al., 2022). Therefore, we expect B2B firms to communicate stronger environmental sustainability orientation than B2C firms.
Environmental sustainability is particularly likely to be shaped by industrial-market governance. Upstream firms often face requirements related to materials, chemical safety, traceability, and emissions. Compliance is monitored through audits and certifications, and environmental improvements can become a prerequisite for market access in buyer-driven chains. Because B2B firms depend on repeated transactions and reputation within professional networks, they may invest in environmental sustainability language as part of relational positioning (Casidy & Lie, 2023; Khan et al., 2023).
H1: The environmental sustainability orientation of B2B firms is higher than that of B2C firms.
In B2C markets, firms compete for end-consumers and are exposed to public scrutiny. Social sustainability messages - such as fair labor, inclusion, and community engagement - may be more effective as emotional and identity-based appeals in consumer branding (Swani et al., 2014; Iankova et al., 2019). Consumer willingness to reward ethical attributes can create incentives for downstream firms to emphasize social sustainability (Elfenbein & McManus, 2010; Kimeldorf et al., 2006). Consequently, a common expectation is that B2C firms would communicate stronger social sustainability orientation than B2B firms.
Social sustainability is often assumed to be more visible and thus more relevant for consumer-facing firms, because labor practices and community impacts are salient issues in public debates. Consumer sensitivity to ethical attributes can trigger reputational risks for brands and retailers, and can incentivize downstream firms to highlight social commitments in their marketing and corporate communication (Elfenbein & McManus, 2010; Kimeldorf et al., 2006).
H2: The social sustainability orientation of B2C firms is higher than that of B2B firms.
Beyond hypothesis testing, we also examine how firm characteristics related to size, financial structure, location, and governance are associated with sustainability orientation. This allows us to interpret whether differences across market orientation persist after accounting for firm resources and managerial capacity.

Methodology. We focus on Italian firms operating in the fashion sector, a context characterized by a dense ecosystem of upstream manufacturers and downstream brands competing in international markets (Paulicelli, 2014; Tokatli, 2013). The empirical sample includes 1,069 firms identified in the AIDA/Orbis Bureau van Dijk database. For each firm, we retrieved economic, geographical, and organizational indicators from AIDA/Orbis and linked them to the firm's corporate website. We capture sustainability orientation using a lexicon-based Natural Language Processing approach. The procedure follows three steps. First, we collected publicly available textual content from corporate websites (e.g., "about", "sustainability", "CSR", production and sourcing pages) and cleaned the corpus by removing HTML, boilerplate content, and stop words. Second, we built two sustainability lexicons - one environmental and one social - based on prior text mining research and qualitative refinement (Blasi et al., 2020). Both lexicons were originally constructed in Italian, reflecting the language of the corporate websites analysed. The environmental lexicon includes terms related to emissions, circular economy, sustainable materials, traceability, and environmental management (e.g., "carbon footprint", "recycled", "circular economy", "traceability"). The social lexicon includes terms related to labor standards, employee

wellbeing, diversity and inclusion, community engagement, and responsible sourcing (e.g., "fair wages", "working conditions", "community", "inclusion"). Third, for each firm we computed term frequency–inverse document frequency (TF-IDF) weights for lexicon terms and aggregated them to obtain two firm-level indices: environmental sustainability orientation and social sustainability orientation. Both indices are standardized (z-scores) to facilitate comparisons across models.

Operationally, TF-IDF assigns higher weight to terms that are frequent in a given firm's website but relatively rare across the full corpus. For each firm *i* and term *t* in the sustainability lexicon, we compute TF-IDF(*t,i*) = TF(*t,i*) * log(N/DF(*t*)), where TF is the term frequency in the firm-level corpus, DF is the number of firms whose websites contain the term, and N is the total number of firms. We then aggregate TF-IDF weights across all terms in the environmental lexicon to obtain the environmental index, and analogously for the social lexicon. This approach reduces the influence of generic words that appear across most websites and emphasizes distinctive sustainability language.

To assess face validity, we manually inspected a stratified subset of websites at different points of the score distribution and confirmed that high-scoring firms provide richer sustainability content (e.g., dedicated sustainability pages, detailed descriptions of materials and sourcing policies), while low-scoring firms provide little or no sustainability discussion. We also checked that the environmental and social indices are correlated but distinct, consistent with the idea that the two dimensions capture different sustainability emphases.

The key explanatory variable is a dummy identifying whether a firm primarily operates in B2B markets (B2B = 1) or in consumer markets (B2B = 0, i.e., B2C). Classification was conducted by combining structured information (business descriptions and activity fields) with website evidence regarding target customers and go-to-market channels. This operationalization captures whether the firm's core transactions occur mainly with other firms (intermediate markets) or with final consumers (consumer markets).

To isolate the association between market orientation and sustainability orientation, we include a set of controls which include Employees (firm size), Total Assets, Solvency Ratio, Share Capital, number of Executives and Managers, number of Advisors, number of Group Companies and Industrial Agglomeration (belonging to an industrial district). Continuous variables are standardized to make coefficient magnitudes comparable.

For the analysis, we estimate two linear regression models (OLS) with robust standard errors: one for environmental sustainability orientation and one for social sustainability orientation.

Results. Table 1 presents the descriptive statistics of the variables included in the analysis. It is worth noting that approximately 70% of firms are classified as B2B-oriented.

Table 1. Descriptive statistics

Variable	Mean	SD	Min	p25	p50	p75	Max
Dependent Variables							
Environmental Sustainability	-0.001	0.998	-1.106	-0.602	-0.345	0.226	5.594
Social Sustainability	-0.003	1.003	-1.326	-1.326	0.257	0.777	1.648
Explanatory Variables							
B2B	0.705	0.456	0	0	1	1	1
Advisors	0.014	1.004	-0.846	-0.846	-0.340	0.166	3.707
Executives and Managers	-0.009	0.969	-1.288	-0.869	-0.031	0.598	5.001
Employees	0.001	1.002	-0.541	-0.401	-0.286	-0.031	7.853
Group Companies	0	0.994	-0.212	-0.212	-0.189	-0.173	8.150
Total Assets	-0.006	0.976	-0.419	-0.335	-0.250	-0.072	8.352
Solvency Ratio	0.008	0.993	-2.046	-0.772	-0.054	0.735	2.252
Share Capital	-0.023	0.959	-0.466	-0.444	-0.346	-0.036	7.094
Industrial agglomeration	0.706	0.456	0	0	1	1	1
Share Capital	-0.023	0.959	-0.466	-0.444	-0.346	-0.036	7.094

The two sustainability orientation indices are standardized around zero and display substantial dispersion, suggesting meaningful heterogeneity in how firms communicate sustainability on their websites.

Table 2 reports the OLS estimates linking firms' market positioning along the value-chain to environmental and social sustainability orientation. Consistent with H1, B2B firms exhibit significantly higher environmental sustainability orientation than B2C firms. Because the outcome is standardized, this corresponds to a difference of about 0.4 standard deviations between B2B and B2C firms, conditional on the set of controls.

Contrary to H2, B2B firms also exhibit significantly higher social sustainability orientation than B2C firms. This result suggests that social sustainability communication is not limited to consumer-facing firms. Instead, upstream-oriented firms appear to actively signal social practices and commitments, potentially reflecting the diffusion of social compliance requirements through buyer-supplier relationships and supply-chain governance.

Regarding controls, managerial capacity is consistently associated with stronger sustainability orientation in both dimensions: the coefficient on Managers is positive and statistically significant in both models. This pattern aligns with capability-based arguments that emphasize the role of managerial attention and internal governance in structuring sustainability priorities (Tate & Bals, 2018). For environmental orientation, the coefficient on Employees is negative and

significant, suggesting that larger workforces may face coordination challenges or may communicate environmental sustainability less intensively, once other financial controls are accounted for. In the social sustainability model, Total Assets and Group Companies are positively associated with social sustainability orientation, indicating that resource availability and group affiliation may facilitate the adoption or communication of social initiatives.

Table 2. Market orientation and sustainability orientation (OLS)

	Environmental Sustainability Orientation - OLS	Social Sustainability Orientation - OLS
Constant	-0.338***	-0.355***
	(0.047)	(0.066)
B2B	0.412***	0.457***
	(0.052)	(0.065)
Advisors	0.014	0.014
	(0.037)	(0.032)
Executives and Managers	0.171***	0.166***
	(0.045)	(0.038)
Employees	-0.136***	-0.006
	(0.045)	(0.049)
Group Companies	-0.027	0.068***
	(0.033)	(0.026)
Total Assets	0.078	0.073**
	(0.056)	(0.036)
Solvency Ratio	-0.015	0.003
	(0.032)	(0.030)
Share Capital	0.143***	0.063*
	(0.047)	(0.035)
Industrial agglomeration	0.072	0.047
	(0.061)	(0.064)
Observations	1069	1069
Adjusted R2	0.085	0.107
Log-likelihood	-1462.057	-1454.324
F-statistics (Wald χ^2)	11.729	21.687
DF	9.000	9.000
p-value	0.000	0.000

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. N = 1,069. Adjusted R2: 0.085 (environmental), 0.107 (social). Environmental and social sustainability orientation are standardized indices derived from website texts. All continuous covariates are standardized.

One plausible mechanism behind the stronger-than-expected social sustainability orientation among B2B firms is the increasing formalization of social compliance in supply chains. In buyer-driven chains, lead firms can shift monitoring costs upstream and require suppliers to document labor standards, training, and community-related initiatives. For suppliers, communicating such initiatives can signal reliability and reduce perceived risk in asymmetric buyer-seller relationships, thereby improving relationship satisfaction and stability (Talay et al., 2025). This interpretation also aligns with comparative evidence that stakeholder engagement practices differ between B2B and B2C firms (Johnson et al., 2018), suggesting that social sustainability in industrial markets may be less about mass persuasion and more about meeting the information needs of professional buyers and auditors.

The environmental sustainability result is consistent with the idea that B2B firms are embedded in governance structures where sustainability is codified via standards, certifications, and procurement requirements (Hoejmose et al., 2012; Huang et al., 2022). In these contexts, sustainability orientation supports relationship outcomes and competitive positioning (Casidy & Lie, 2023). The social sustainability result invites a reinterpretation of social sustainability along the value chain: rather than being predominantly consumer-driven, social sustainability communication may be increasingly shaped by private standards and due diligence practices that directly target suppliers. This interpretation is coherent with the growing role of upstream compliance and the relational nature of sustainability in industrial markets (Sharma et al., 2010; Talay et al., 2025).

Research limitations. First, our dependent variables capture sustainability orientation as communicated on websites, not necessarily sustainability performance. Website texts may reflect symbolic communication or greenwashing, even though they still provide valuable evidence on what firms choose to emphasize to stakeholders. Second, the B2B/B2C distinction is a simplified proxy for value-chain position. Many firms operate hybrid business models (mixed B2B and B2C channels), and classification necessarily captures the dominant market orientation rather than the full complexity of multi-channel strategies. Third, the analysis is cross-sectional, which limits causal interpretation. It is plausible that unobserved characteristics (e.g., leadership values, ownership structure, or client portfolio composition) influence both market segmentation along the value-chain and sustainability orientation. Fourth, the empirical setting is specific (Italian fashion

firms). Extending the approach to other countries and industries would help assess the generalizability of value-chain patterns in sustainability orientation. A further limitation is that corporate websites represent only one of the channels through which firms communicate sustainability. Future research could integrate multi-channel evidence to obtain a more comprehensive picture of how sustainability communication differs along the value chain.

Managerial implications. For managers in upstream and midstream (B2B) segments, the results underline that sustainability orientation is increasingly a competitive asset in inter-firm relationships. Investments in traceability, certifications, and credible social compliance programs can strengthen buyer trust and support long-term contracts. Importantly, communication should be aligned with verifiable practices to reduce greenwashing risks and to meet evolving due diligence requirements.
For managers in downstream (B2C) segments, the evidence suggests a potential communication gap, especially on social sustainability. Consumer-facing firms may need to move beyond generic claims and invest in transparent, comparable disclosures about labor standards, sourcing, and community impacts. Differentiation through sustainability requires credibility; therefore, downstream actors may benefit from third-party verification and stronger integration of supplier monitoring into brand narratives).
More broadly, the text-mining approach provides a practical benchmarking tool. Firms, industry associations, and policymakers can use similar analytics to monitor the evolution of sustainability narratives across value-chain positions, identify lagging areas (environmental versus social), and design targeted support initiatives.

Originality of the paper. The paper offers three main contributions. First, it provides firm-level evidence on how market segmentation along the value-chain (B2B versus B2C) - a proxy for value-chain position - correlates with sustainability orientation. Second, it distinguishes between firms' environmental and social sustainability orientation, showing that value-chain patterns differ across sustainability dimensions and that upstream firms may play a larger role in social sustainability signaling than commonly assumed. Third, it advances methodology by integrating structured firm data with unstructured website texts and by operationalizing sustainability orientation through a scalable lexicon-based TF-IDF approach, which is especially valuable for contexts where formal sustainability reporting is limited.

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Promoting the energy transition: The influence of social norms on citizens' willingness to promote energy communities

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Abstract. *To decarbonize the energy sector, there is a widespread consensus that the role of end-users in the energy system should change from passive consumption to active prosumption and engagement. This is of particular importance as an increasing number of technologies and business models focus on end users. These developments provide new opportunities for further technical and social innovation toward smarter, flexible, and integrated systems, such as Renewable Energy communities (RECs). Despite the high relevance, one of the critical challenges remains ensuring engagement and active citizen participation. The citizens' willingness to promote RECs is rather low compared to their willingness to participate, and there is limited knowledge on the citizens' willingness to promote, as well as the associated factors determining such willingness. Through a randomized survey-based experiment composed of three scenarios among citizens in Italy, this research investigates whether mimetic social norms (i.e., neighbourhood and authority figures) play a role in shaping individuals' willingness to promote RECs. The study is currently in the data collection phase.*

Keywords: *Social norms, energy communities, willingness to promote, citizens, experiment*

Framing of the research.

Energy Communities Business Models and citizens involvement. *Governance is the set of rules that the REC and all its stakeholders must follow, and the Energy Communities Business Model (ECBM), defined before the REC's implementation, embraces most of these rules (Moreno et al., 2022). How their members deploy the REC, how they interact with each other, and the decision-making power each has within the REC are highly dependent on the ECBMs adopted (Moreno et al., 2022; Reis et al., 2021). Reis et al. (2021) conducted a comprehensive review of the European literature on emerging ECBMs, identifying eight distinct archetypes. These include: collective self-consumption initiatives (European Commission, 2018; European Parliament, 2019) (i.e., Community collective generation), ECBMs dedicated mostly to SMEs (i.e., Community flexibility aggregation and Energy cooperatives), vehicle-to-grid and grid-to-vehicle solutions (i.e., E-mobility cooperatives), and four other ECBMs (i.e., Community prosumerism, Local energy markets, Third-party-sponsored communities, Community ESCO). In addition to categorising these models by function, Reis et al. (2021) classified them by investment and asset ownership structures, distinguishing between "customer-side" and "third-party-side" business models. However, this perspective may be overly narrow, particularly given the evolving role of citizens as central actors in RECs (Wahlund & Palm, 2022). Citizens are not only potential investors or consumers but can also play a key role in promoting, co-designing, implementing, and operating RECs—activities that significantly shape how value is created, addressed and distributed within the ECBM (Teece, 2010; Euchner & Ganguly, 2014).*

Despite this potential, evidence suggests that citizens' active involvement in governance remains limited. A study by Lennon et al. (2019) across five European countries found that most REC participants did not perceive themselves as having meaningful agency in decisions related to energy use, beyond their role as consumers. Similarly, Koirala et al. (2018) observed that while citizens are generally willing to participate in RECs, their willingness to promote and take initiative—what the authors refer to as "steering" local energy—is considerably lower. This gap highlights the need for further research into the factors that can positively influence citizen leadership and engagement in RECs.

Factors shaping citizens' acceptance and engagement in RECs. *Previous literature has largely focused on identifying the factors and dynamics that facilitate the implementation of RECs (Lode et al., 2022). For instance, the scarcity of clean energy in the local energy mix and the distance to central grid infrastructure were identified as driving factors for the development of local grids (Chan et al., 2017; Reis et al., 2021). In North-Western Europe, European countries are pioneers, and their long-standing tradition of renewable-based community projects (i.e., hydro, biomass, solar photovoltaic, and wind technologies) is driven by the need to address supply issues in rural and isolated areas (Huybrechts and Mertens, 2014; Bauwens et al., 2016). However, in contexts where energy supply is not a critical concern, citizens' acceptance becomes a prerequisite for fostering active motivation to join RECs (Lode et al., 2022), and engagement, defined in terms of the volume of financial investment made and the degree of participation in the governance of organisations (Bauwens et al., 2016). To address barriers related to citizens' acceptance (Doci et al., 2015), prior studies have highlighted the importance of enabling actors (e.g., utilities andmunicipalities) and the availability of accessible financial participation mechanisms as key facilitators of citizen mobilisation (Maleki-Dizaji et al., 2020; Sperling, 2017; Heaslip et al., 2016).*

In parallel, individual and community-level factors—such as cultural traditions, historical experiences, and psychological dimensions (e.g., social norms, values, cognitive traits and trust)—also play a crucial role in shaping willingness to participate and in building acceptance of RECs (Lode et al., 2022; Koirala et al., 2018; Doci et al., 2015).

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For instance, Bauwens et al. (2016) empirically examined the heterogeneity among members of community renewable energy projects, focusing on differences in motivations and levels of engagement. The study found that these motivational differences are reflected in the depth of involvement: norm-driven individuals tend to invest more financially and participate more actively in governance. Moreover, Bauwens et al. (2016) observed that self-interested motivations (e.g., financial incentives) and normative motivations (e.g., community identity and trust) appear to be somewhat mutually exclusive. Individuals driven by material incentives often show weaker identification with the community and a lower orientation toward environmental values.

The role of mimetic social norms in RECs engagement. *Personal choices are often influenced by others, and the role of mimetic social norms—such as those shaped by people we care about, neighbours, or authority figures— has gained increasing attention in the literature on renewable energy investments (Fischer et al., 2021). For instance, Mignon and Bergek (2016) found that some individuals choose to invest in renewable electricity production to align with peer behaviour and gain social acceptance or recognition. Similarly, other studies have highlighted how social interactions and peer effects can significantly influence the decision to adopt photovoltaic systems (Bollinger & Gillingham, 2012; McEachern & Hanson, 2008; Noll et al., 2014; Curtius et al., 2018).*

In the context of RECs, the activation of mimetic social norms has emerged as a promising mechanism for stimulating both engagement and investment decisions (Bauwens et al., 2016; Guetlein and Schleich, 2023). Mimetic social norms have been identified as the most influential factor in driving willingness to participate in community energy projects, surpassing even trust and environmental concern (Kalkbrenner and Roosen, 2016; Fischer et al., 2021). Guetlein and Schleich (2023) further confirmed the relevance of mimetic social norms, alongside place identity and trust, in shaping investment decisions regarding RECs. In addition, Conradie et al. (2021) applied the Theory of Planned Behaviour (TPB) to examine intentions to join a REC, finding that attitudes and subjective norms were the strongest predictors of such intentions. This underscores the importance of perceptions like "My friends would approve of participating in a local REC," suggesting that the opinions of family, friends, and neighbours are key levers for increasing REC adoption. However, previous studies have tended to treat "influencing actors" as a single, undifferentiated group, without isolating the specific effects of different referents. For example, while Kalkbrenner and Roosen (2016) focused specifically on peers such as neighbours or local community members, other studies (e.g., Fischer et al., 2021; Guetlein & Schleich, 2023; Conradie et al., 2021) considered the broader influence of social norms without distinguishing between referent categories like family, friends, or neighbours.

Mimetic social norms are shaped by factors such as personal proximity and the specific domain in question. People are generally more influenced by those who are physically or emotionally close to them, such as family, friends, and neighbours (Melnyk et al., 2019). The degree of influence also varies depending on the context. In the case of energy consumption, neighbours are often the strongest predictors of behavioural change, given their visibility in everyday life and the relevance of localised norms (Nolan et al., 2008; Griskevicius et al., 2012). At the same time, individuals also tend to emulate authority figures, especially when these figures are seen as knowledgeable or credible (Van Vugt et al. 2008). As such, government representatives, experts, or institutional actors can shape behaviour through formal or informal authority (Cialdini, 2001; Van Kleef et al., 2019). Both neighbourhood referents and authority figures could therefore play a critical role in shaping individual decision-making, particularly in collective action contexts (Griskevicius et al., 2012), such as REC engagement.

Purpose of the paper. *The global transition to a more sustainable and resilient energy system has been at the forefront of policy and scholarly discussions in recent years, particularly considering the ongoing energy crises and climate change concerns (IEA, 2023; Tomczyk & Łapniewska, 2025). Central to this transition is the decentralization of energy production and decision-making, a shift that seeks to reduce reliance on conventional, centralized energy companies by empowering consumers and local communities (Wahlund & Palm, 2022). In this context, RECs have emerged as a promising tool for fostering such decentralization, enabling citizens, small and medium enterprises (SMEs), and public authorities to take an active role in the generation, consumption, and management of energy. Therefore, RECs are not only seen as key players in the decarbonization of the energy system but also as sources of social, environmental, and economic benefits for their members (Lode et al., 2022; Moreno et al., 2022).*

Despite their potential, RECs face a critical challenge: ensuring meaningful and sustained citizen engagement (Lode et al., 2022). While willingness to participate in REC initiatives tends to be relatively high, willingness to take on more proactive roles—such as initiating or driving the development of a REC—remains significantly lower (Doci et al., 2015; Koirala et al., 2018). As highlighted by Koirala et al. (2018), citizens' willingness to steer local energy—that is, their readiness to take initiative as promoters and engage as active participants rather than passive consumers—is often limited. In this study, we focus on the concept of "promote" as an initial yet crucial form of proactive engagement in RECs. We define "promoting" as the act of publicly supporting and endorsing the idea of a REC, acting as a testimonial or informal ambassador. This includes mobilizing others, raising awareness, and encouraging participation—behaviors that often precede and potentially lead to deeper involvement in planning or governance activities. Understanding what drives this promotional role is key to unlocking the full transformative potential of RECs (Koirala et al., 2018). This study builds on the ECBM (Reis et al., 2021) as developed in the Italian context, where successful implementation could hinge on having motivated local promoters.

Through an experimental design, we examine how descriptive mimetic social norms—that is, individuals' perceptions of what others (e.g., peers, family or authority figures) typically do (Cialdini et al., 1990; Goldstein, Cialdini, &

Griskevicius, 2008)—shape their willingness to promote RECs. These norms reflect the influence of observed or assumed behaviors within one's social environment, suggesting that individuals may be more likely to promote RECs when they believe that others around them are doing the same. Prior literature has demonstrated the importance of mimetic social norms in fostering participation (Kalkbrenner & Roosen, 2016; Fischer et al., 2021; Guetlein & Schleich, 2023), to the best of our knowledge, no studies have disentangled the distinct influence of specific social referents in shaping individuals' willingness to promote RECs. Because the strength of social influence often depends on both personal proximity (e.g., close versus distant relationships) (Melnyk et al., 2019) and issue relevance (e.g., energy behaviors) (Griskevicius et al., 2012), this study focuses specifically on two influential referent groups: neighborhood peers and authority figures. We investigate not only whether these social norms affect individuals' willingness to promote RECs, but also which group exerts a greater influence.

With this aim, the study addresses the following research questions:

- *Do mimetic social norms (i.e., neighborhood and authority figures) influence individuals' willingness to promote RECs?*
- *Which of the two social referents—neighborhood peers or authority figures—has a stronger influence?*

Methodology. *We use a randomized survey-based experiment composed of three scenarios (hereafter referred to as scenarios 0, 1, and 2). This experiment is administered online by a commercial survey service provider. The reference target of the surveys is the Italian population aged 25 and over. We chose to focus on an Italian sample for two main reasons, in addition to the limited scientific literature available on the topic. Firstly, Italian legislation concerning RECs is relatively recent and still evolving (Italian Legislative Decree No. 199/2021, 2021), making the country a relevant case study where regulatory innovation actively shapes the development of RECs. Secondly, the adoption of RECs in Italy is not yet widespread, offering significant potential for growth and further development.*

The commercial agreement with the professional provider ensured that, for each survey, we would receive representative samples of the target population in terms of gender, age, and geographic area. A total of 2000 individuals will take part in the study. Each scenario is delivered through a short video (van Zelderen et al. 2024) composed of a common section, identical in all cases, and a distinct part—the stimulus—specific to each video. Scenario 0 represents the baseline case, with no stimulus applied. Scenario 1 and scenario 2 show respectively the neighborhood and authority figures' willingness to promote choices as a descriptive norm message (Goldstein et al., 2008). The respondents will be randomly assigned to one of the three scenarios and will be asked to complete a survey. Both the short scenario videos and the questions of the survey are presented in Italian to ensure clarity and accessibility for the Italian-speaking respondent pool. To measure our constructs, the study uses scales adapted from the literature, revised to better fit our aims. The samples' demographics and the control variables (i.e., neighborhood involvement; energy identity and motivation to lead) are in line with previous literature analyzing willingness to engage/participate/steer in RECs (e.g., Conradie et al. 2021; Koirala et al., 2018; Kalkbrenner and Roosen 2016).

The dependent variable, willingness to promote, is first measured as a behavior by asking respondents to leave a comment. Subsequently, we assess their intention, focusing on their level of interest in becoming promoters, drawing on the scales of Koirala et al. (2018) and Hoti et al. (2021). Respondents were required to select a single option from five mutually exclusive response categories. These categories were then aggregated into three dependent variables: non-participation (category 1), tokenism (categories 2 and 3), and citizen power (categories 4 and 5). For this second response phase, to ensure the quality of responses, we also consider participants' interest in joining a REC, using it as a benchmark for comparison with their willingness to promote it.

Results. *The study is currently in the data collection phase. Building on prior literature on social norms and pro-environmental behavior, we expect descriptive mimetic social norms to positively influence individuals' willingness to promote RECs. In particular, we anticipate that exposure to normative messages indicating that others are promoting RECs will increase respondents' willingness to act as promoters compared to the baseline scenario with no normative stimulus.*

Furthermore, we expect differences in the strength of influence depending on the type of social referent. On the one hand, neighborhood peers may exert a stronger influence due to their social proximity and everyday interaction, which can enhance identification and imitation dynamics. On the other hand, authority figures may also play a significant role, as they are often perceived as credible sources of information and guidance on complex issues such as energy transitions. The experiment will allow us to disentangle the relative effect of these two referent groups.

More broadly, the study is expected to contribute to the literature on citizen engagement in RECs by shedding light on the early-stage behavioral mechanisms that can stimulate proactive involvement, particularly in the form of promotion and advocacy. Understanding these dynamics is particularly relevant in contexts such as Italy, where the development of RECs is still emerging and relies strongly on local initiatives and social mobilization.

Research limitations. *This study presents several limitations that should be acknowledged. First, the research relies on a survey-based experimental design that measures individuals' willingness to promote RECs rather than observing actual behavior in real-world contexts. While experimental approaches allow for greater control over causal mechanisms and enable the identification of the effects of specific stimuli, responses collected in survey settings may not fully translate*

into real-life actions. As a result, the findings should be interpreted primarily as evidence of behavioral intentions rather than confirmed behavioral outcomes.

Second, the study focuses on descriptive mimetic social norms conveyed through short video scenarios. Although this design allows us to isolate the impact of different social referents, it inevitably simplifies the complexity of real-world social interactions and communication dynamics. In practice, individuals are exposed to multiple, sometimes conflicting, social signals from various sources, including the media, institutions, and personal networks. Future research could therefore explore more complex or combined normative messages, as well as the interaction between descriptive norms and other behavioral drivers such as perceived benefits, trust, or social identity.

Another limitation concerns the geographic scope of the study. The research focuses exclusively on an Italian sample, selected because of the relatively recent introduction of the regulatory framework for RECs and the still-emerging stage of their diffusion in the country. While this context offers a relevant case for analyzing early-stage engagement dynamics, the results may not be fully generalizable to countries where RECs are more established or where institutional and cultural conditions differ significantly.

Managerial implications. *The findings of this study are expected to generate several practical implications for policymakers, local authorities, and organizations involved in the development and promotion of RECs. One key implication concerns the role of communication strategies in fostering citizen engagement in REC initiatives. If descriptive mimetic social norms are shown to positively influence individuals' willingness to promote RECs, communication campaigns could benefit from highlighting examples of community members who actively support or endorse these initiatives. Presenting RECs as socially supported and locally endorsed initiatives may help reduce uncertainty and encourage broader participation.*

In particular, understanding which social referent exerts a stronger influence—whether neighborhood peers or authority figures—could help practitioners design more targeted engagement strategies. If neighborhood-based norms prove to be particularly influential, initiatives aimed at fostering local networks and peer-to-peer communication could be especially effective. For example, community meetings, neighborhood ambassadors, or local testimonials may help strengthen the perception that RECs are supported by people within one's immediate social environment.

Conversely, if authority figures play a more significant role, institutional endorsement from local governments, energy agencies, or recognized experts could be leveraged to legitimize and promote EC initiatives. Public statements, informational campaigns, and visible support from trusted institutions may help increase confidence and credibility, particularly among citizens who are less familiar with RECs.

More broadly, the results may help practitioners recognize the importance of citizens not only as participants or investors in RECs but also as informal promoters or ambassadors capable of mobilizing others. Encouraging this promotional role could be a valuable strategy for increasing awareness, strengthening community support, and accelerating the diffusion of RECs, particularly in contexts where these initiatives are still in the early stages of development.

Originality of the paper. *This paper contributes to the literature on RECs and citizen engagement by addressing an underexplored dimension of participation: the willingness to promote REC initiatives. While previous studies have primarily focused on individuals' willingness to join, invest in, or actively manage RECs, far less attention has been devoted to the role of citizens as promoters or advocates of these initiatives. By conceptualizing promotion as a form of proactive engagement that involves publicly supporting and encouraging participation in RECs, this study highlights an important behavioral mechanism that may precede and facilitate deeper forms of involvement.*

Another element of originality lies in the focus on descriptive mimetic social norms and their influence on individuals' willingness to promote RECs. Although the literature has extensively documented the role of social norms in shaping pro-environmental behaviors, limited research has examined how these norms influence engagement in community-based energy initiatives. Moreover, the study goes a step further by disentangling the influence of different social referents, comparing the effects of neighborhood peers and authority figures within an experimental framework.

By doing so, the research contributes to a more nuanced understanding of how different sources of social influence shape behavioral intentions related to the energy transition. The experimental design allows for the identification of causal relationships and offers empirical evidence on the relative strength of different normative signals.

Finally, the study provides new empirical insights in the Italian context, where the regulatory framework for RECs is relatively recent and their diffusion remains limited. Investigating the social mechanisms that may stimulate early engagement is therefore particularly relevant for understanding how RECs can develop and scale in emerging policy environments.

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Stakeholder engagement, sostenibilità e co-creazione di valore nelle PMI: una revisione sistematica bibliometrica della letteratura

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Abstract. *Le piccole e medie imprese (PMI) svolgono un ruolo cruciale nei sistemi economici globali, ma continuano ad affrontare difficoltà significative nell'implementazione di pratiche di sostenibilità e nel coinvolgimento efficace degli stakeholder. Sebbene il coinvolgimento degli stakeholder sia ampiamente studiato nel contesto delle grandi imprese, il suo ruolo nelle PMI rimane ancora poco esplorato e concettualmente frammentato. Per colmare questa lacuna, lo studio presenta una revisione bibliometrica sistematica di 195 articoli pubblicati tra il 2015 e il 2025 e indicizzati in Web of Science e Scopus, seguendo il protocollo PRISMA. I risultati mostrano un'evoluzione della produzione scientifica articolata in tre fasi, con una crescita particolarmente marcata negli ultimi anni. La ricerca risulta concentrata in pochi paesi europei ed è caratterizzata da una collaborazione internazionale ancora limitata. Inoltre, il campo è guidato da un principale canale di pubblicazione, mentre la comunità scientifica appare frammentata e priva di un nucleo stabile di autori dominanti. Le evidenze preliminari mostrano che il coinvolgimento degli stakeholder è sempre più interpretato come una leva strategica per promuovere la sostenibilità, integrare i criteri ESG e rafforzare il vantaggio competitivo. Tuttavia, la letteratura rimane prevalentemente descrittiva e mancano modelli teorici chiari che spieghino come i meccanismi di coinvolgimento possano attivare processi di co-creazione di valore. Alla luce di queste lacune, lo studio propone un programma di ricerca volto a sviluppare quadri teorici più integrati che colleghino il coinvolgimento degli stakeholder, la co-creazione e l'innovazione dei modelli di business sostenibili nelle PMI, offrendo anche indicazioni utili per manager e policy maker.*
Parole chiave: *stakeholder engagement; value co-creation; SMEs; sustainability; bibliometric analysis; ESG*

1. Inquadramento della ricerca. Le piccole e medie imprese (PMI) sono una componente fondamentale dei sistemi economici globali e contribuiscono in modo significativo all'innovazione, alla creazione di posti di lavoro e allo sviluppo socioeconomico (Fatoki, 2021; Muriithi, 2017). A livello globale, le PMI rappresentano circa il 90% di tutte le imprese e sono riconosciute come motori chiave della crescita economica sostenibile sia nelle economie avanzate che in quelle emergenti (Ligorio et al., 2025). Tuttavia, nonostante la loro importanza economica, le PMI continuano ad affrontare notevoli vincoli operativi, in particolare nell'attuazione di pratiche commerciali sostenibili e nel coinvolgimento efficace dei loro stakeholder (Chinaire, 2021). Questi vincoli sono in gran parte attribuibili alle risorse finanziarie limitate, al sostegno istituzionale inadeguato e alle più ampie pressioni strutturali all'interno del contesto operativo (Muriithi, 2017). Il coinvolgimento degli stakeholder, definito come "collaborazione basata sulla fiducia tra individui e/o istituzioni sociali con obiettivi diversi che possono essere raggiunti solo insieme" (Andriof & Waddock, 2017), è emerso come un meccanismo chiave attraverso il quale le PMI possono integrare la sostenibilità nelle loro attività, rafforzare la legittimità e promuovere l'innovazione. La letteratura mostra che il coinvolgimento degli stakeholder consente di identificare questioni di sostenibilità materialmente rilevanti, promuove la sensibilità organizzativa alle dimensioni ambientali, sociali e di governance (ESG) ed è uno strumento utile per sostenere la legittimità che le organizzazioni cercano quando comunicano le loro attività all'esterno (Campra et al., 2020). Tuttavia, sebbene il coinvolgimento degli stakeholder sia stato ampiamente studiato nelle grandi aziende, la sua applicazione nelle PMI rimane in gran parte inesplorata (Ligorio et al., 2025). Tuttavia, nonostante la loro importanza economica, le PMI continuano ad affrontare notevoli vincoli operativi, in particolare nell'attuazione di pratiche commerciali sostenibili e nel coinvolgimento efficace dei propri stakeholder (Muriithi, 2017). Questi vincoli sono in gran parte attribuibili a risorse finanziarie limitate, sostegno istituzionale inadeguato e pressioni strutturali più ampie all'interno dell'ambiente operativo (Chinaire, 2021). Allo stesso tempo, la co-creazione di valore, intesa come il processo attraverso il quale gli stakeholder partecipano attivamente alla creazione e alla fornitura di valore attraverso interazioni dirette (Yang & Leposky, 2022), ha acquisito sempre più importanza come meccanismo strategico per la competitività e la sostenibilità delle PMI. La co-creazione di valore facilita la condivisione di informazioni, la costruzione di fiducia e la collaborazione efficace con gli stakeholder, rafforzando al contempo la capacità delle PMI di generare valore significativo e ampliare la loro presenza sul mercato (Song et al., 2022; Mohamad et al., 2022). L'integrazione delle tecnologie digitali e delle pratiche di sostenibilità nei processi di co-creazione amplifica ulteriormente il suo potenziale, consentendo alle PMI di rispondere in modo dinamico alle mutevoli esigenze del mercato e alle aspettative degli stakeholder (Purnami et al., 2024). Tuttavia, rimane una lacuna critica nella letteratura riguardo al modo in cui i processi di coinvolgimento degli stakeholder contribuiscono specificamente alla co-creazione di valore nelle PMI (Ligorio et al., 2025). Sebbene diversi studi abbiano affrontato separatamente questioni quali la responsabilità sociale d'impresa (CSR), le catene di approvvigionamento "verdi" e il marketing digitale (Baumann et al., 2013), l'interconnessione tra i meccanismi di coinvolgimento degli stakeholder e i risultati della co-creazione di valore è

ancora frammentaria (Muridzi & Dhliwayo, 2025; Purnami et al., 2024). Inoltre, la ricerca accademica si è storicamente concentrata sulle aziende di grandi dimensioni, con una conseguente sottorappresentazione delle piccole e medie imprese nel dibattito accademico (Bartolacci et al., 2019; Cortes et al., 2021). Questa frammentazione è particolarmente evidente se si considerano questioni emergenti come la trasformazione digitale, l'integrazione della sostenibilità e il ruolo del coinvolgimento degli stakeholder nella gestione delle pressioni istituzionali, che sono aree cruciali per l'adattamento e la resilienza delle PMI (Ligorio et al., 2025; Purnami et al., 2024). Il crescente riconoscimento del ruolo centrale delle PMI nel raggiungimento degli Obiettivi di Sviluppo Sostenibile (SDG) delle Nazioni Unite (Muridzi & Dhliwayo, 2025; Matarazzo et al., 2024), insieme ai crescenti requisiti normativi relativi alla rendicontazione sulla sostenibilità e al coinvolgimento degli stakeholder (Giacomini et al., 2024), ha accentuato l'importanza di comprendere come questi processi interagiscono e generano valore reciproco. Tuttavia, mancano ancora mappature bibliometriche sistematiche che integrino il coinvolgimento degli stakeholder, la co-creazione di valore e la sostenibilità nel contesto delle PMI, in un campo di ricerca ancora recente, disperso tra riviste, paesi e prospettive teoriche e non sempre affrontato in modo congiunto (Purnami et al., 2024), lasciando la ricerca accademica, la politica e la pratica disallineate rispetto alle attuali trasformazioni del panorama imprenditoriale (Ligorio et al., 2025). Per colmare questa lacuna, il presente studio adotta una revisione bibliometrica sistematica della letteratura basata su pubblicazioni sottoposte a revisione paritaria, ritenuta particolarmente adatta a delimitare un campo ancora frammentato, individuare i nuclei emergenti del dibattito e far emergere i principali vuoti di ricerca. L'approccio bibliometrico è ampiamente utilizzato negli studi di gestione e contabilità, in quanto consente un esame approfondito e critico della letteratura su un argomento specifico (Marzi et al., 2024). In particolare, consente una valutazione critica delle ricerche pubblicate sfruttando gli indicatori bibliometrici e le relazioni di rete tra autori e contributi, al fine di mappare efficacemente il campo accademico e identificare le tendenze emergenti della ricerca (Paul & Criado, 2020; Van Raan, 2003). La selezione del campione è stata condotta attraverso una serie di passaggi successivi seguendo il protocollo PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).

Il resto dell'articolo è strutturato come segue. La sezione 2 delinea lo scopo dello studio e le domande di ricerca. La sezione 3 descrive la metodologia, compreso il processo di selezione basato su PRISMA e le tecniche bibliometriche applicate. La sezione 4 riporta i principali risultati dell'analisi descrittiva. La sezione 5 discute i limiti dello studio. La sezione 6 presenta le implicazioni manageriali e politiche. Infine, la sezione 7 conclude con l'originalità.

2. Scopo. Lo scopo di questo studio è condurre un'analisi bibliometrica della letteratura accademica sul coinvolgimento degli stakeholder nelle PMI. Tale focus risulta particolarmente rilevante nel contesto delle piccole e medie imprese, che, pur essendo caratterizzate da significativi vincoli finanziari e organizzativi, sono chiamate a innovare e ad adattarsi rapidamente alle crescenti pressioni normative e alle aspettative del mercato in materia di sostenibilità. Lo studio cerca di identificare temi emergenti, nuove prospettive teoriche e lacune chiave nella ricerca all'intersezione tra coinvolgimento degli stakeholder, co-creazione di valore e sostenibilità, considerando anche il ruolo della trasformazione digitale e delle pressioni istituzionali, nonché le differenze contestuali tra le PMI.

Sulla base di queste premesse, vengono affrontate le seguenti domande di ricerca:

RQ1. *Come si è evoluta nel tempo la letteratura sul coinvolgimento degli stakeholder, la co-creazione di valore e la sostenibilità nelle piccole e medie imprese (PMI)?*

RQ2. *Quali sono i principali filoni tematici, cluster concettuali e prospettive teoriche che caratterizzano la ricerca sul coinvolgimento degli stakeholder nelle strategie di sostenibilità delle PMI?*

RQ3. *Quali gap di ricerca, aree ancora poco esplorate e future direzioni di studio emergono dalla letteratura sul rapporto tra stakeholder engagement e sostenibilità nelle PMI?*

Attraverso un'analisi sistematica e bibliometrica della letteratura, lo studio offre una mappatura strutturata di un campo di ricerca ancora disperso e interdisciplinare, relativo al coinvolgimento degli stakeholder, alla co-creazione di valore e alla sostenibilità nelle PMI. In particolare, l'analisi consente di delimitare il campo, identificare i principali filoni tematici, le prospettive teoriche dominanti, l'evoluzione del dibattito scientifico e le aree ancora poco esplorate. I risultati contribuiscono quindi ad approfondire la comprensione del posizionamento teorico del tema e a individuare future direzioni di ricerca, offrendo al contempo indicazioni utili per studiosi, manager e policy maker interessati a promuovere strategie di coinvolgimento più inclusive e orientate alla sostenibilità.

3. Metodologia. Lo scopo di questo studio è analizzare la letteratura sul coinvolgimento degli stakeholder nelle PMI per vedere in che modo questi processi contribuiscono alla co-creazione di valore, evidenziando i temi emergenti che potrebbero guidare la ricerca futura. Per la ricerca è stato utilizzato un approccio bibliometrico, riconosciuto nella letteratura per la sua capacità di mappare gli studi su un determinato argomento e di evidenziare le tendenze della ricerca (Paul & Criado, 2020), e particolarmente appropriato in questo studio per analizzare un ambito recente, in rapida crescita e ancora frammentato sotto il profilo tematico, geografico e teorico. L'obiettivo è quello di identificare la letteratura, generare nuove domande di ricerca ed esplorare le tendenze future (Van Raan, 2003; Aria et al., 2020). Il campione è stato selezionato attraverso una serie di passaggi successivi utilizzando il protocollo PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses).

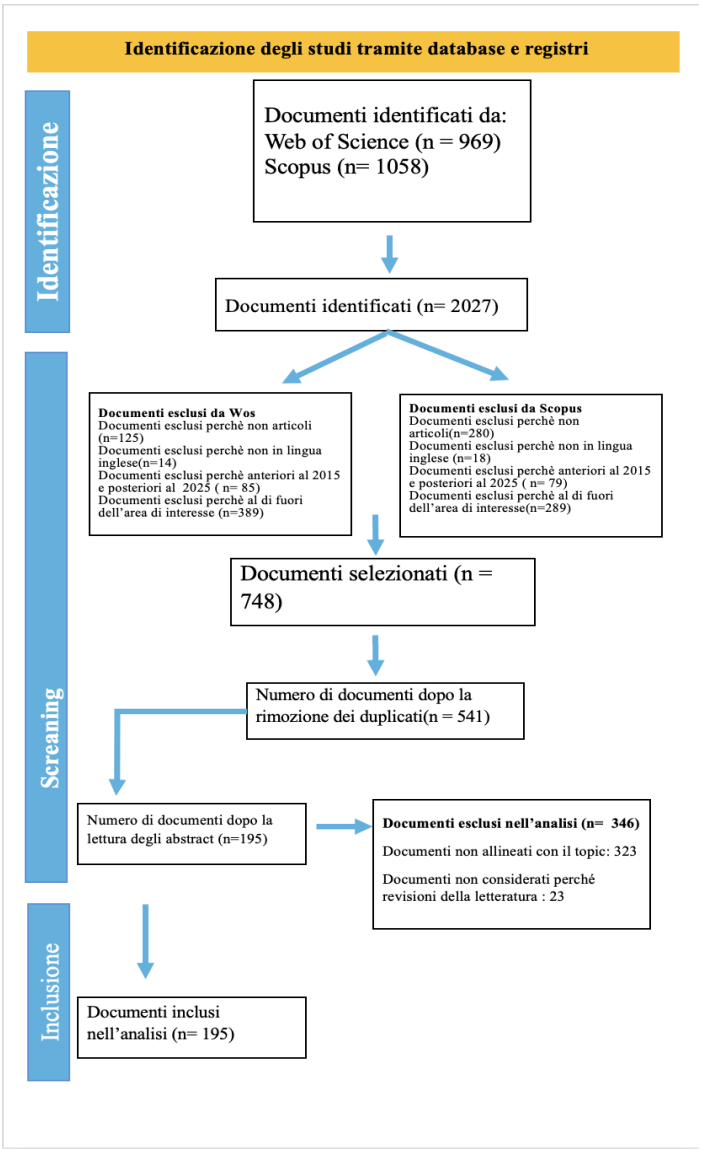
3.1 Selezione della query. Per quanto riguarda la selezione delle parole chiave per la ricerca, si è deciso di concentrarsi sugli articoli indicizzati nei database Web of Science (WoS) di Clarivate Analytics (171 milioni di record) e Scopus di

Elsevier (78 milioni di record), noti per la loro autorevolezza nel garantire la qualità delle riviste scientifiche (Chavarro et al. 2018). Le parole chiave utilizzate nei database sono elencate di seguito:

stakeholder AND (engag* OR involv* OR collaborat* OR interact* OR participat* OR partnership* OR relationship*) AND("small and medium enterprise*" OR SME* OR "small firm*" OR "small enterprise*" OR "medium enterprise*") AND(sustainab* OR "sustainable development" OR "corporate sustainability" OR ESG OR "environmental social and governance" OR "social responsibility" OR CSR OR "environmental sustainability")*

3.2 Raccolta e definizione del campione. Il processo di analisi è descritto in dettaglio nella Figura 1 riportata di seguito.

Figura 1 - Prisma



Fonte: elaborazione propria

Come già accennato, la ricerca è stata condotta su più banche dati per fornire una sintesi completa della letteratura (Cook, 2009). Nello specifico, per ciascuna banca dati, la ricerca è stata condotta per abstract, titolo, parole chiave e risultati per tutti i termini considerati. Gli articoli sono stati prima filtrati in base a vari criteri, poi combinati tra le due banche dati ed eliminati i duplicati. In particolare, sono stati utilizzati quattro criteri di selezione: tipo di contributo, lingua, data e area. In primo luogo, sono stati considerati solo gli articoli pubblicati su riviste e scritti esclusivamente in inglese, escludendo quindi gli atti di conferenze e i capitoli di libri. In secondo luogo, sono stati considerati solo i contributi pubblicati tra il 2015 e il 2025, escludendo quindi i contributi più vecchi e quelli del 2026, poiché questi erano in corso e avrebbero distorto le analisi temporali. Infine, sono stati presi in considerazione solo i contributi relativi alle categorie di gestione, economia, etica e contabilità. I due corpora sono stati quindi uniti e i duplicati sono stati eliminati, ottenendo un corpus di 541 articoli. Dopo un'attenta lettura degli abstract, i contributi identificati hanno portato a un corpus di 195 articoli, escludendo 323 articoli perché non pertinenti all'argomento di ricerca e 23 articoli perché erano revisioni della letteratura.

3. Risultati

3.1 Strumento utilizzato nell'analisi bibliometrica. L'analisi è stata condotta utilizzando il software R, in particolare il pacchetto Bibliometrix (versione 4.1.4) (Aria & Cuccurullo, 2017; Belfiore et al., 2022). Il documento è attualmente in fase di elaborazione e per ora sono state condotte analisi descrittive con informazioni sul set di dati bibliografici, tra cui la produzione scientifica annuale, i paesi, le riviste e gli autori più produttivi sull'argomento (Aria & Cuccurullo, 2017), ponendo le basi per successivi approfondimenti sulla struttura concettuale e sull'evoluzione tematica del campo. L'analisi è stata facilitata dal pacchetto Bibliometrix, che consente anche l'analisi della struttura della conoscenza di un campo tematico, ovvero la sua struttura concettuale e sociale.

3.2 Caratteristiche del campione. Il campione di articoli analizzati comprende 195 documenti pubblicati tra il 2015 e il 2025. Gli articoli includono 745 parole chiave fornite dagli autori e 544 attribuite dalle riviste. La produzione scientifica mostra un tasso di crescita annuo del 21% con una media di 31,25 citazioni per documento, corrispondenti a 4,94 citazioni all'anno per documento. Dei 195 documenti, 30 sono stati scritti da un unico autore con una media di 3,23 coautori per documento.

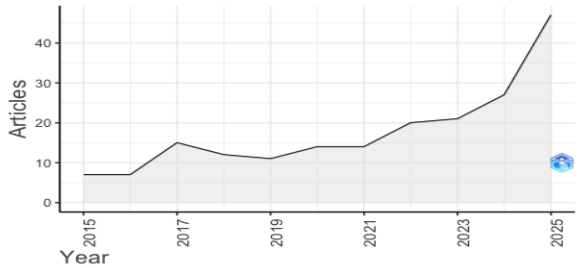
3.3. Analisi descrittiva. Nella ricerca bibliometrica, il processo di analisi descrittiva consente di identificare temi generali e argomenti promettenti in un determinato periodo, consentendo così lo sviluppo di approfondimenti che arricchiscono l'interpretazione complessiva del settore in questione (Aria & Cuccurullo, 2017). In questa prospettiva, lo studio valuterà innanzitutto l'andamento delle pubblicazioni nel corso degli anni; proseguirà poi con un'analisi dei paesi più produttivi, per concludersi con un'analisi degli autori più produttivi e, infine, con una valutazione della produttività delle riviste.

3.3.1 L'andamento delle pubblicazioni nel corso degli anni. Il set di dati analizza articoli pubblicati tra il 2015 e il 2025, con una media annuale di 17,72 contributi. Il periodo di tempo è stato selezionato al fine di bilanciare la completezza storica e la rilevanza contemporanea delle pubblicazioni, garantendo al contempo un volume di dati gestibile per i ricercatori.

Come mostrato nella figura sottostante, è possibile identificare tre fasi evolutive delle pubblicazioni. La prima (2015-2016) mostra una produzione stabile con sette articoli all'anno, probabilmente segno dell'avvio del campo di ricerca. La seconda fase (2017-2021), con una media di 11,4 articoli all'anno, mostra il primo picco nel 2017 con la pubblicazione di 15 articoli, a dimostrazione di una crescita più che doppia rispetto all'anno precedente. Dopo il 2017 si osserva una fase di instabilità, con un calo nel 2018 e nel 2019. Infine, la seconda fase si conclude con un periodo di stabilizzazione, con 14 pubblicazioni all'anno nel 2020 e nel 2021. Infine, la terza fase (2022-2025) mostra una crescita esponenziale, con una media di 28,8 pubblicazioni all'anno, più del doppio rispetto al periodo precedente. Il punto di svolta è il 2022, quando vengono pubblicati 20 articoli, seguito da una progressiva accelerazione nel 2023 con 21 articoli, nel 2024 con 27 pubblicazioni e nel 2025 con 47 articoli pubblicati. Pertanto, le pubblicazioni nel 2025 rappresentano circa il 24% dell'intera produzione decennale.

La crescita esponenziale potrebbe indicare un graduale aumento dell'interesse per l'argomento. Questo trend esponenziale (CAGR 20,98%) testimonia l'emergere di questo campo come area di crescente importanza nella comunità scientifica. Tuttavia, resta da chiarie, attraverso approfondimenti successivi, se tale crescita corrisponda anche a una maggiore maturità teorica del campo.

Figura 2. Produzione scientifica annuale



Fonte: elaborazione propria

3.3.2 Produttività per paese. La figura 3 mostra la distribuzione della produttività scientifica dei paesi, distinguendo tra pubblicazioni di un singolo paese (SCP) e pubblicazioni di più paesi (MCP). Questo approccio non solo ci permette di cogliere il volume dei contributi nazionali, ma anche di osservare il grado di collaborazione internazionale.

Nel complesso, la produzione è molto concentrata, con i primi 10 paesi che rappresentano 104 contributi, pari a circa il 63% dell'intero dataset.

In Europa, il Regno Unito è in testa alla classifica con 20 articoli pubblicati, seguito dall'Italia (17) e dalla Spagna (13), mentre la Francia si colloca al settimo posto con 8 pubblicazioni, preceduta da India (12), Cina (11) e Indonesia (10). La Malesia completa il quadro con 5 pubblicazioni, seguita da Australia e Ghana con 4 pubblicazioni ciascuna.

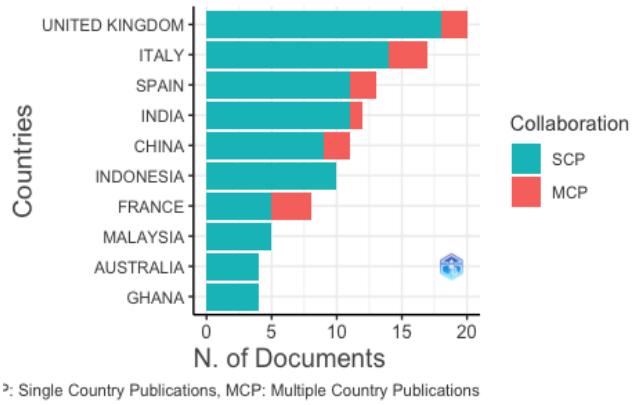
È interessante notare che i primi tre paesi rappresentano oltre il 30% del totale delle pubblicazioni. Tuttavia, nel complesso, la presenza asiatica suggerisce che la ricerca in questo campo ha attirato l'attenzione di un gruppo eterogeneo ma selezionato di nazioni.

Dal punto di vista delle collaborazioni internazionali, si registra una chiara prevalenza del lavoro nazionale. Infatti, ci sono 91 pubblicazioni attribuibili a un singolo paese, rispetto a 13 pubblicazioni nate da collaborazioni internazionali, il che suggerisce che la ricerca viene svolta in gran parte all'interno dei confini nazionali.

Tuttavia, un dato interessante riguarda la Francia, che ha il rapporto MCP più alto (0,375) con 3 pubblicazioni su 8 risultanti da collaborazioni internazionali. Seguono la Cina (0,181), l'Italia (0,176) e la Spagna (0,153), che mostrano livelli moderati di collaborazione internazionale, mentre il Regno Unito (0,100) e l'India (0,083) mostrano tassi più bassi di co-autorevolezza internazionale. Al contrario, Indonesia, Malesia, Australia e Ghana non mostrano alcuna co-autorialità internazionale, il che suggerisce una produzione interamente nazionale nel campione considerato.

Questa distribuzione rivela, da un lato, che i sistemi di ricerca consolidati (Regno Unito, Italia, Spagna) dimostrano un'elevata produttività con vari gradi di internazionalizzazione; dall'altro lato, i contributori emergenti (Indonesia, Malesia, Ghana) mostrano una produzione significativa ma un'integrazione globale limitata. La supremazia del Regno Unito in termini di volume, accompagnata da un modesto rapporto MCP (0,100), suggerisce una forte capacità di ricerca interna, mentre il tasso di collaborazione più elevato della Francia potrebbe indicare un posizionamento strategico all'interno delle reti internazionali. Nel complesso tali evidenze preliminari non segnalano soltanto differenti livelli di produttività scientifica, ma suggeriscono anche che il dibattito si stia articolando in modo non uniforme nei diversi contesti nazionali.

Figure 3. Paesi più produttivi



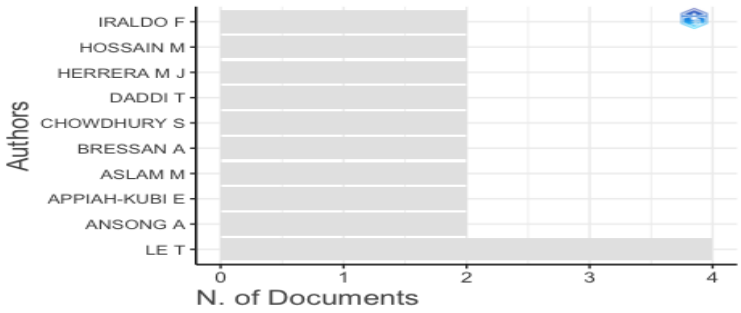
Fonte: elaborazione propria

4.2 Produttività degli autori. Per quanto riguarda la produttività degli autori, il quadro che emerge è quello di una bassa concentrazione. Infatti, la figura 4 mostra una distribuzione molto piatta, senza alcuna evidenza di un piccolo gruppo che domini il campo.

Tutti gli autori nella top 10 hanno due pubblicazioni ciascuno. L'autore più produttivo ha quattro pubblicazioni. Ciò significa che anche ai vertici i valori sono modesti. Pertanto, il campo sembra essere dominato da molti autori con poche pubblicazioni ciascuno.

In conclusione, si può affermare che la produttività è frammentata, poiché il settore non è guidato da autori super prolifici, ma da una vasta comunità, e le collaborazioni sono significative ma non uniformi. Infatti, mentre alcuni autori pubblicano spesso come parte di un team, altri tendono a pubblicare come autori singoli.

Figure 4. Autori più produttivi



Fonte: elaborazione propria

4.3 La produttività delle riviste. Per quanto riguarda la produttività della rivista, come mostra la tabella sottostante, emerge una struttura chiara in cui poche riviste concentrano una percentuale significativa di articoli sull'argomento, mentre il resto della produzione scientifica è distribuito su diverse riviste.

L'analisi mostra che il Journal of Cleaner Production è la fonte più rilevante con un totale di 20 articoli pubblicati che rappresentano il 37% della produzione scientifica totale.

Questa chiara predominanza è coerente con l'attenzione della rivista, tradizionalmente incentrata sulla sostenibilità e sulle aree correlate.

Corporate Social Responsibility and Environmental Management segue con 11 articoli, confermando l'importanza della CSR e della governance della sostenibilità, mentre Business Strategy and the Environment la segue con 6 contributi, sottolineando l'importanza di una lettura strategica dell'integrazione della sostenibilità nei processi decisionali e nella competitività aziendale. Successivamente vi è una sequenza di tre riviste (Journal of Business Ethics, Journal of Business Research e Sustainable Futures) con quattro pubblicazioni ciascuna, che le colloca nella fascia media. In generale, i temi centrali di queste riviste si riferiscono a prospettive normative etiche, argomenti di gestione generale e di business, e contributi orientati alle traiettorie future della sostenibilità. Infine, quattro riviste con tre pubblicazioni ciascuna si posizionano in fondo alla tabella. Queste riviste sono: Cogent Business & Management, International Journal of Accounting and Economics Studies, International Journal of Production Economics e Journal of Sustainable Tourism, indicando una diffusione dell'argomento in ambiti eterogenei. Gli argomenti di interesse in queste riviste spaziano dalle prospettive sul business e la gestione generale, le operazioni e le traiettorie di produzione, alle applicazioni settoriali come il turismo sostenibile. In conclusione, si può osservare che la maggior parte dei contributi sull'argomento sono pubblicati su riviste specializzate dedicate alla sostenibilità e alla CSR. Tuttavia, l'analisi mostra che l'argomento compare anche in riviste appartenenti ad altri settori disciplinari. Ciò suggerisce che si tratti di un tema di interesse trasversale, capace di attirare l'attenzione di diverse discipline che lo affrontano da prospettive differenti.

5. Limiti della Ricerca. La ricerca presenta diversi limiti, soprattutto considerando che si tratta di un documento in fase di elaborazione. In primo luogo, considerato lo stato di avanzamento del lavoro, le analisi risultano puramente descrittive; manca pertanto un'analisi della struttura intellettuale e concettuale del campo. In secondo luogo, l'analisi si basa su due banche dati (Wos e Scopus) e prende in considerazione articoli scritti esclusivamente in inglese; ricerche future potrebbero prendere in considerazione altre banche dati, come EBSCO e Google Scholar, nonché contributi scritti in lingue diverse. Infine, l'analisi della letteratura è di natura bibliometrica, quindi ricerche future potrebbero analizzare la letteratura in modo sistematico, identificando i principali vantaggi del coinvolgimento degli stakeholder nelle PMI.

6. Implicazioni Manageriali. I risultati dell'analisi bibliometrica offrono alcune implicazioni manageriali rilevanti per gli imprenditori e i manager delle PMI interessati a integrare strategie di sostenibilità attraverso il coinvolgimento degli stakeholder. In primo luogo, la significativa crescita delle pubblicazioni negli ultimi anni evidenzia come il coinvolgimento degli stakeholder stia diventando un tema sempre più centrale nelle strategie di sostenibilità aziendale. Per i manager delle PMI, ciò suggerisce la necessità di considerare il coinvolgimento degli stakeholder non solo come uno strumento di comunicazione, ma come una leva strategica a sostegno dell'attuazione delle pratiche ESG. In secondo luogo, la concentrazione di pubblicazioni nelle principali riviste accademiche dedicate alla sostenibilità e alla responsabilità sociale indica che il legame tra il coinvolgimento degli stakeholder e la sostenibilità è sempre più riconosciuto come un elemento chiave della competitività aziendale. I manager delle PMI possono quindi utilizzare pratiche di coinvolgimento strutturate per identificare le priorità di sostenibilità più rilevanti e migliorare la legittimità delle loro iniziative nei confronti dei clienti, delle comunità locali e degli altri stakeholder. Infine, i risultati evidenziano che il tema del coinvolgimento degli stakeholder nelle PMI è ancora relativamente emergente rispetto alla ricerca sulle grandi aziende. Ciò implica che i manager delle PMI possono svolgere un ruolo attivo nello sviluppo di approcci più partecipativi e collaborativi alla sostenibilità, sfruttando la maggiore flessibilità organizzativa tipica delle piccole e medie imprese.

Tabella 1. Riviste più rilevanti

Riviste	**Numero di contributi**
JOURNAL OF CLEANER PRODUCTION	20
CORPORATE SOCIAL RESPONSIBILITY AND ENVIRONMENTAL MANAGEMENT	11
BUSINESS STRATEGY AND THE ENVIRONMENT	6
JOURNAL OF BUSINESS ETHICS	4
JOURNAL OF BUSINESS RESEARCH	4
SUSTAINABLE FUTURES	4
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Fonte: elaborazione propria

7. Originalità. Questo studio offre una delle prime mappature bibliometriche sistematiche dell'intersezione tra stakeholder engagement, sostenibilità e value co-creation nel contesto delle PMI, con l'obiettivo di chiarire la struttura iniziale del campo e individuarne le principali lacune teoriche. A differenza degli studi precedenti, che hanno analizzato separatamente le grandi aziende e il loro impatto sul coinvolgimento degli stakeholder, sulla co-creazione di valore e sulla sostenibilità, questo lavoro esamina sistematicamente come questi processi interagiscono e generano valore reciproco nelle PMI, che sono spesso caratterizzate da risorse limitate. L'approccio bibliometrico ci permette di identificare modelli di frammentazione nel campo scientifico, dimostrando che, nonostante il crescente interesse, la letteratura rimane in gran parte descrittiva e priva di quadri teorici integrati. Lo studio contribuisce al progresso della ricerca sulle PMI chiarendo la struttura delle conoscenze relative al coinvolgimento degli stakeholder e alla co-creazione di valore nelle PMI, identificando le tendenze emergenti e le lacune teoriche della loro intersezione e proponendo un programma di ricerca integrato che collega i meccanismi di coinvolgimento ai risultati di sostenibilità e all'innovazione del modello di business. Inoltre, l'analisi evidenzia che la ricerca in questo settore è concentrata in poche riviste di riferimento e limitata a un gruppo selezionato di paesi, con un basso livello di collaborazione internazionale, suggerendo opportunità per studi più globali, diversificati e interdisciplinari. Combinando indicatori bibliometrici con un'analisi sostanziale dei modelli di pubblicazione, della produttività degli autori, il lavoro fornisce una base empirica utile sia per lo sviluppo teorico sia per futuri approfondimenti del campo.

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The impact of Stakeholder Engagement on Circular Economy performance in Family Firms

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Abstract. *This study investigates how Stakeholder Engagement (SE) practices influence Circular Economy (CE) performance within the organizational context of Family Firms (FFs). Although prior research increasingly acknowledges FFs' propensity toward sustainable development, limited attention has been devoted to the drivers that foster the adoption of CE practices in this organizational setting. Accordingly, grounded in Stakeholder Theory and the Socioemotional Wealth (SEW) perspective, this study examines whether proactive and structured stakeholder management enhances FFs' ability to integrate diverse stakeholder expectations into strategic decision-making, thereby promoting the adoption of CE practices.*

Drawing on an international panel of 185 FFs', observed over the 2013–2024 period, we test the direct effect of SE practices on CE performance, measured through Waste Recycling Initiatives (WRI) and Policies on Water Efficiency (PWE). Fixed-effects panel data estimations reveal a positive and statistically significant association between stakeholder engagement practices and both waste recycling initiatives and policy of water efficiency. Accordingly, the findings suggest that FFs adopting structured stakeholder dialogue are better positioned to strengthen CE practices. By highlighting the role of stakeholder-oriented governance mechanisms, reinforced by SEW preservation goals, this study contributes to the emerging literature on CE in family firms, showing how stakeholder engagement can support the transition toward more sustainable and efficient business models.

Keywords: *stakeholder engagement; circular economy; waste recycling; water efficiency; family firms.*

Framing of the research. *After decades of sustained global economic growth (global GDP increased from approximately $3 trillion in 1970 to $117.2 trillion in 2025) policymakers, businesses, and scholars have increasingly recognized that uncontrolled development can generate significant social and environmental pressures. Rising inequality, the depletion of natural resources, and escalating climate risks have intensified concerns regarding the long-term sustainability of prevailing economic systems (Stiglitz, 2017; Piketty, 2020). At the same time, the global population has reached 8 billion people, further increasing the demand for energy and materials (Schandl et al., 2024) and placing additional pressure on the Earth's life-support systems and natural resources (Green and Healy, 2022).*

In response to these challenges, the circular economy (CE) emerged as a key paradigm aimed at reconciling economic development with environmental sustainability (Geissdoerfer et al., 2017). According to the Ellen MacArthur Foundation, the CE refers to "a system in which materials never become waste and nature is regenerated, while products and materials are kept in circulation through processes such as maintenance, reuse, remanufacturing, recycling, and composting." Within this framework, production and consumption systems are conceptualized as closed-loop systems in which resource flows are continuously regenerated and environmental impacts are minimized (Murray et al., 2017; Geissdoerfer et al., 2017; Kirchherr et al., 2023). Central to this approach is the 3R hierarchy—reduce, reuse, and recycle — which provides firms with a structured pathway to enhance resource efficiency across productive and organizational processes (Kirchherr et al., 2017; 2023).

Despite the growing attention devoted to circular strategies, the global economy remains largely linear. Recent evidence shows that only 6.9% of economic activities currently operate according to circular principles, and this share has even declined in recent years (Circle Economy, 2025). Among the most critical areas for advancing the CE transition, the efficient use of natural resources—particularly water management—represents a pivotal dimension for mitigating resource pressures and supporting sustainable development (Symbola, 2025). This scenario highlights the need to better understand the organization drivers that can foster the adoption of CE practices, particularly within contexts characterized by distinct governance structures and strategic orientations. In this regard, family firms (FFs) represent one of the most prevalent corporate forms worldwide and play a key role in global economic development (Chen, 2014; Deloitte, 2025). Indeed, given both their economic relevance and their distinctive governance characteristics, FFs constitute a particularly relevant context for examining the organizational mechanisms that may facilitate firms' engagement in CE practices.

However, despite FFs are recognized as theoretically inclined toward environmental engagement, empirical evidence on this point is mixed, with some studies funding a positive relationship between family ownership and environmental performance (e.g., Agostino and Ruberto, 2021; Gómez-Mejía et al., 2025; Gangi et al., 2025), while other authors show a negative o no relationship (e.g., Herrero et al., 2024; Miroshnychenko and De Massis, 2022). This is consistent with

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Miroshnychenko et al. (2022), who confirm that the impact of FFs on environmental performance range from extremely negative to no impact, thus living open the debate. Furthermore, only few studies are specifically focused on CE practices in FFs setting (e.g., Núñez-Cacho et al., 2018; Doucet et al., 2025; Agarwal al., 2025).

Based on prior research (Gómez-Mejía et al., 2007; Berrone et al., 2012; Gómez-Mejía et al., 2018), decision-making processes in FFs are characterize by the influence of socioemotional wealth (SEW), which is considered "one of the most important features that differentiate the family firms of other organizations" (Barros et al., 2017, p. 14).

Indeed, SEW refers to the "family's stock of social, emotional, and affective endowments vested in the firm," including the preservation of family reputation, the maintenance of strong relationships with stakeholders, and the intention to pass the business to future generations (Gómez-Mejía et al., 2018, p. 1370). Accordingly, decision-making in FFs is often strongly influenced by family owners, who prioritize long-term relational and reputational goals alongside financial objectives (Gómez-Mejía et al., 2018). This orientation encourages the preservation of collective social capital, trust-based relationships with stakeholders, and the protection of family reputation and legacy.

Within this context, the increasing complexity of the social and competitive environment has strengthened the importance of trusting relationships with stakeholders to help business continuity and transgenerational succession among FFs (Gangi et al., 2025). These goals are consistent with the priority of pursuing SEW preservation (Neubam et al., 2012). Accordingly, the stakeholder engagement (SE) emerges as a relevant managerial approach for FFs.

Following prior studies (e.g., Greenwood, 2007), stakeholder engagement refers to the set of organizational practices aimed at actively involving stakeholders in corporate decision-making and activities. In its proactive form, stakeholder engagement goes beyond a reactive response to external pressures, reflecting instead the systematic integration of stakeholder expectations into business strategies and operations (Cennamo et al., 2012).

Hence, combining the two theoretical lenses, FFs may be particularly inclined to adopt proactive stakeholder engagement practices, while preserving SEW principles that permeate corporate decisions. In this sense, Cennamo et al. (2012) argue that maintaining strong and enduring relationships with stakeholders contributes to safeguard family reputation, legitimacy, and long-term continuity. Consequently, FFs may be inclined to address stakeholders' needs, including the development of environmentally oriented initiatives. Among the latter, CE practices represent the innovative form to conceive how production and consumption models may help the preservation of natural resources for next generation. This sense of continuity in environmentally friendly business models is consistent with the conception of FFs as organizations interested in firm perpetuation and succession legacy.

Moreover, CE strategies typically require collaboration among multiple stakeholders—including industry actors, consumers, policymakers, and academic institutions—whose resources and capabilities enable the implementation of circular solutions (Kirchherr et al., 2023). In this regard, SEW perspective suggests that FFs, motivated to preserve reputation, long-term legitimacy, and trust-based relationships with stakeholders, are more likely to adopt proactive SE practices (Cennamo et al., 2012). Indeed, by actively involving stakeholders in decision-making processes and aligning business strategies with their expectations, FFs may strengthen relational capital and access valuable knowledge and resources. In turn, such stakeholder-oriented governance can facilitate the development and implementation of CE practices, which inherently depend on both corporate decision making and stakeholders' coordination.

Building on the arguments above, in this study we analyse if and to what extent the stakeholder engagement of FFs affects two key CE performance, that is waste recycling initiatives (WRI), and policies aimed at improving water efficiency (PWE). To test these relationships, we employ fixed-effects panel estimations on a global sample of 185 family firms observed over the 2013–2024 period. The results indicate that SE positively affects both WRI and PWE, suggesting that FFs—due to their inclination to nurture and sustain stakeholder dialogue—may be well positioned to implement CE practices.

Hence, overall, this study advances the literature by deepening the understanding of both the organizational drivers of CE practices and the relevant role of FFs in developing these innovative initiatives. Indeed, we find stakeholder engagement as a key governance mechanism that helps environmental transition through improved CE performance of FFs.

Purpose of the paper. *Despite gaining increasing mainstream attention, the implementation of the CE remains a significant challenge (Doucet et al., 2025; Circle Economy, 2025). In the business context, adopting CE requires sustained commitment and substantial strategic and operational transformations aimed at decoupling business growth from resource depletion. Indeed, CE strategies entails building resilient and sustainable supply chains, fostering collaboration with stakeholders, improving resource efficiency, redesigning products to extend their lifespan, achieving cost and energy savings, and generating long-term market opportunities (Kirchherr et al., 2023). Accordingly, identifying the drivers that can accelerate the adoption of CE is essential to support the transition toward a more sustainable economy, while ensuring firms' long-term competitiveness.*

However, the adoption of CE practices is not uniform across firms and may vary depending on specific organizational characteristics and governance structures (Faller and zu Knyphausen-Aufseb, 2018; Doucet et al., 2025). In this regard, FFs represent a unique organizational setting in which SEW orientation may distinguish the approach to environmentally oriented initiatives (Cennamo et al., 2012; Agostino and Ruberto, 2021). This aspect is relevant to the broader debate on which managerial practices can reverse the trend toward a general lack of commitment to the circular economy (The Circularity Gap Report, 2025), giving the economic relevance of FFs on global scale (De Massis et al., 2018).

According to Cennamo et al. (2012), the distinctive SEW approach permeates the inclination of family owners to adopt SE strategies. In particular, neglecting stakeholder expectations may expose FFs to reputational risks and legitimacy losses that could threaten the family's image and long-term standing in the community. For this reason, FFs should be inclined to engage in active dialogue with stakeholders, avoiding the perception as irresponsible actors, and, thus, safeguarding the family's reputation.

In this sense, SE aligns closely with the core dimensions of SEW (Berrone et al., 2012; Cennamo et al., 2012). First, from an instrumental perspective, family owners may use SE to cultivate relationships with key stakeholders whose support is essential for ensuring the continuity and stability of both the family and the business. Second, engaging stakeholders contributes to the development of relational networks that can sustain transgenerational value creation and long-term organizational longevity. Third, stakeholder dialogue helps protect and enhance the reputation of the family and the firm, which are often closely intertwined in family-controlled businesses. Fourth, the strong emotional attachment of family owners to the firm often encourages greater transparency and responsiveness toward stakeholders to prevent reputational damage. Finally, consistent with both the SEW and stakeholder perspectives, engagement practices strengthen trust-based relationships and social bonds with stakeholders, thereby reinforcing the socioemotional assets that family owners seek to preserve over time (Gómez-Mejía et al., 2018; Cennamo et al., 2012).

Accordingly, the commitment to the SE can be closely related to the way family owners conceive their approach to business, to the extent that both emphasize a long-term orientation toward non-financial objectives (Cennamo et al., 2012). Indeed, while FFs tend to nurture key socioemotional values—such as family image, strong social ties, and affective endowments—SE represents a deliberate managerial choice characterizing FFs (Cennamo et al., 2012).

By engaging with stakeholders and fostering structured dialogue mechanisms, FFs preserve reputation, trust-based relationships, and legitimacy in the long run. Accordingly, the SEW perspective provides a useful framework to explain why FFs can be characterized by a strong orientation toward SE, which, in turn, may support the design and adoption of environmentally friendly initiatives, including innovative CE practices. The latter, indeed, frequently require collaboration, coordination, and alignment with stakeholders' expectations. Then, this convergence of interests, may help to depict a win-win scenario for all the parts involved. Finally, the collaboration with stakeholders in managerial practices may be the source of new knowledge and experience that contribute to support FFs' performance (Gangi et al., 2025). Accordingly, SE can be beneficial to the accruing of skills and capabilities necessary for improved CE performance.

Therefore, based on the above considerations the current study aims to test the following research question:

***RQ:** Does proactive stakeholder engagement positively affect CE performance in the FFs context?*

Methodology. *The study relies on data from several sources. Specifically, we refer to LSEG Data & Analytic for data on both CE and SE practices, Worldscope database for financial data, and World Bank database for gross domestic product (GDP) data. Relative to the sample selection, we started from the FFs included in the World's Top 750 Family Businesses, reporting the worldwide top FFs ranked by Family Capital, supported by PwC. According to Cambrea et al. (2022), which relies on to the cut-off of 25% or more of the voting shares to identify FFs, Family Capital defines "family business" those companies in which the family or group of families held at least the 30% of the voting rights. Thus, to build our sample, we match Family Capital's initial list with LSEG and Worldscope databases. We exclude 565 FFs for which employed databases do not disclose any data over the time horizon of the study (2013-2024). This procedure leads to a panel of 185 FFs, for a total of 2.200 observations. Relative to main variables of the study, we refer to LSEG database for data on FFs' stakeholder engagement practices and CE proxy, Worldscope database for financial data, and World Bank database for GDP.*

As main variables of the study, we consider a) the waste recycling initiatives (WRI) and the policies of water efficiency (PWE), as proxies of CE practices; b) the presence of stakeholder engagement (SE) mechanisms at corporate governance level. Relative to CE proxies, aligned with recent studies (e.g., Symbola, 2025; Circle Economy, 2025), we consider two aspects related to resource efficiency. First, we focus on waste recycling initiatives (WRI), proxied by a dummy variable equal to 1 if the company is engaged and report initiatives and partnership aiming to recycle, reduce, reuse, substitute, treat or phase out total waste, 0 otherwise. Second, we consider the Policies on Water Efficiency (PWE), a dummy variable equal to 1 if the company has established a formal policy aimed at improving water efficiency, 0 otherwise. This includes the presence of documented systems, procedures, or operational mechanisms designed to promote the efficient use of water and support continuous improvement in water management practices.

Moreover, we measure SE through a dummy variable equal to 1 if the company is equipped of formal procedures and practices through which stakeholders are engaged in the decision-making process, 0 otherwise. Accordingly, the SE variable captures the presence of structured, two-way communication mechanisms between the firm and its key stakeholder groups, reflecting the extent to which organizations promote dialogue, consultation, and feedback in managing stakeholder relationships.

To mitigate potential model misspecification, we include a set of control variables. Specifically, we control for firm size, measured as the natural logarithm of total assets (Size); financial leverage, proxied by the ratio of total debt to total capital (Leverage); and the percentage of shares available to ordinary investors (Free Float). We also account for the presence of a corporate social responsibility (CSR) strategy, through a dummy variable equal to 1 if the firm has a CSR strategy, 0 otherwise, as well as governance structure through a dummy variable equal to 1 if the CEO simultaneously

chairs the board and 0 otherwise (CEO separation). Finally, we include the gross domestic product (GDP) as country-level control.

Regarding the empirical approach, relying on the Hausman test (p. value lower than .05), we perform a fixed effect (FE) panel regression analysis. Moreover, in line with prior studies (Jo and Harjoto, 2012), independent variables are lagged 1 year to address reverse causality and simultaneity issues. The regression equation is formalized as follows:

$$CE_{i,t} = a + \beta\ Stakeholder\ Engagement_{i,t-1} + \gamma X_{i,t-1} + \varepsilon_i \quad (1)$$

where CE represents circular economy performance of family firms i at time t; Stakeholder Engagement represents the presence of stakeholder management practices of a family firm i, a time t-1; X is a vector of control variables, while ε is the random error term. We estimate Equation (1) two times, due to the adoption of two different measurements of CE, namely the WRI and PWE.

Results. *Table 1 reports the descriptive statistics of the variables included in the analysis. As reported in Table 2, all correlation coefficients are below the commonly accepted threshold of 0.70 (Ratner, 2009), suggesting that multicollinearity is not a concern. This evidence is further supported by the Variance Inflation Factor (VIF) values, which range from 1.04 to 2.25 (mean VIF 1.69).*

Table 3 presents the results of the empirical models estimating the influence of FFs' SE on CE performance, proxied by WRI and PWE. Specifically, Models 1–2 use WRI as the dependent variable, while Models 3–4 adopt PWE. For each CE proxy, two model specifications are estimated depending on the inclusion of year fixed effects. All models include SE as the main explanatory variable together with firm-level and country-level controls.

Models 1 and 2 show that SE has a positive and statistically significant effect on WRI. The SE coefficient is significant at the 1% level in both specifications (Model 1: t = 3.13; Model 2: t = 2.73), suggesting that proactive SE enhances CE performance in FFs in terms of recycling activities. Consistent evidence emerges from Models 3 and 4, which examine the impact of SE on PWE. The coefficient of SE remains positive and statistically significant, at the 5% level in Model 3 (t = 2.45) and at the 10% level in Model 4 (t = 1.94). This finding further suggests that the integration of stakeholders' perspectives into organizational decision-making can also facilitate the adoption of policies aimed at improving water-use efficiency. Overall, the empirical evidence of the current study allows to positively answer the research question on the impact of SE on CE performance under the FFs organizational setting.

Research limitations. *Notwithstanding findings obtained, the study is subject to some limitations. First, with reference to SE, this is measured through a dummy variable capturing the presence of formal stakeholder engagement practices. Future research could adopt more nuanced measures of SE, incorporating additional informative sources on different SE dimensions.*

Second, to proxy CE performance, the study focuses on waste recycling initiatives and policies aimed at improving water efficiency. Although these dimensions represent relevant aspects of CE practices, further studies could expand the analysis by considering additional CE proxies, such as supply chain circularity rate.

Third, the empirical analysis relies on a sample of international family firms. Then, future research could further explore whether and to what extent stakeholder engagement supports CE practices in small and medium-sized family firms, which may face different organizational constraints in implementing CE strategies.

Fourth, to make more robust our findings, future research agenda could include a comparison with non-family firms.

Finally, due to differences in environmental sensitivity and rule among social and economic contexts, next studies can investigate country related aspects may affect the link between SE and CE performance.

Managerial implications. *The present study contributes to the current knowledge relative to the drivers of CE performance in FFs. Specifically, the findings highlight the importance of SE practices as mechanisms through which FFs can acquire and integrate diverse perspectives and knowledge resources, thereby improving waste management practices and enhancing water efficiency within organizational and production processes. Accordingly, for managers, the results encourage FFs to adopt structured SE policies to better understand and respond to stakeholders' expectations regarding environmental practices. In this regard, our study also suggests that SE can represent a strategic tool for balancing the transition toward CE models, while nurturing long-term oriented and trust-based relationships with key stakeholders.*

Originality of the paper. *The present study offers several contributions to the literature. First, it contributes to the emerging debate on the organizational drivers of CE performance. Second, by specializing our analysis in the FFs organizational setting, we contribute to FFs literature on the attitude of these firms toward environmentally friendly practices. Indeed, while prior research increasingly acknowledges the role of family businesses in promoting environmental sustainability, limited attention has been devoted to the mechanisms that can facilitate the adoption of circular practices in this organizational setting. This is a big matter due to the worldwide circularity gap and the economic relevance of FFs at global level.*

Our findings identify SE as a key managerial mechanism through which FFs can integrate stakeholders' expectations into strategic decision-making and enhance CE performance. In doing so, the study highlights how stakeholder-oriented managerial practices can foster the adoption of circular initiatives in FFs, which are characterized by the pursuit of non-

financial objectives related to the preservation of the SEW. In this regard, our results complement prior studies on proactive stakeholder management in family firms (e.g., Cennamo et al., 2012).

Second, the study focuses on a category of firms playing a pivotal role in the CE transition. Given FFs' economic relevance and long-term orientation, understanding drivers of engagement in CE practices is relevant. In this context, and considering the growing concerns regarding natural resource management, the study examines two critical dimensions related to resources efficiency, namely waste recycling initiatives and policies aimed at improving water efficiency. In this perspective, the study provides novel insights into how SE can facilitate the adoption of CE initiatives and support the transition toward more sustainable and resource-efficient business models in family-controlled firms.

Third, our empirical analysis relies on an international panel of family firms, thereby enhancing the generalizability of the findings and addressing the limitations of prior studies on the link between FFs and environmental responsibility that are focused on single-country settings or based on single case-study (e.g., Berrone et al., 2010; Núñez-Cacho et al., 2018; Dini et al., 2019).

Hence, overall, the current paper advances earlier knowledge on environmental responsibility of FFs and drivers of CE performance, by showing how SE can act as a strategic driver of these practices in the distinctive context of family business.

Table 1. Descriptive statistics

Variables	Obs.	Mean	Median	SD
Waste Recycling Initiatives (WRI)	2,148	0.84	1	0.37
Policy Water Efficiency (PWE)	2,134	0.74	1	0.44
Stakeholder Engagement (SE)	2,152	0.67	1	0.47
Board Size	2,206	11.04	11.00	3.30
CEO separation	2,220	0.45	0	0.50
CSR strategy	2,220	53.47	60.20	31.70
Size	2,217	7.89	7.54	1.14
Leverage	2,217	43.10	42.23	34.43
Free Float	2,176	61.05	58.00	23.23
GDP	2,220	40,848.12	45,192.49	25,727.89

Table 2. Pairwise correlation analysis and VIF

Variables	1	2	3	4	5	6	7	8	9	10	VIF
1. Waste Recycling Initiatives	1										
2. Policy Water Efficiency	0.5321*	1									
3. Stakeholder Engagement	0.4347*	0.4834*	1								2.15
4. Board Size	0.1496*	0.1526*	0.1661*	1							1.20
5. CEO separation	-0.0646*	-0.0053	-0.0490*	-0.0037	1						1.05
6. CSR strategy	0.5032*	0.5043*	0.6906*	0.2814*	-0.0066	1					2.25
7. Size	0.0150	0.0405	0.1522*	-0.1110*	-0.1659*	0.0186	1				1.41
8. Leverage	0.0581*	0.0622*	0.0744*	0.0770*	0.0416*	0.0997*	0.0011	1			1.04
9. Free Float	-0.0349	-0.1509*	-0.1308*	0.1831*	0.0942*	-0.0077	-0.1898*	0.0098	1		1.24
10. GDP	-0.0030	-0.1168*	-0.1290*	0.0477*	0.1868*	0.0464*	-0.5075*	0.0025	0.3739*	1	1.64

Table 3. Fixed effect regression models

Variables	(1) *WRI*	(2) *WRI*	(3) *WPE*	(4) *WPE*
Stakeholder Engagement (t-1)	0.153***	0.129***	0.102**	0.079*
	(3.13)	(2.73)	(2.45)	(1.94)
Board Size (t-1)	-0.003	0.003	0.006	0.0120
	(-0.35)	(0.34)	(0.75)	(1.48)
CEO separation (t-1)	-0.034	-0.0358	-0.008	-0.002
	(-0.71)	(-0.80)	(-0.21)	(-0.05)
CSR strategy (t-1)	0.000***	0.002***	0.003***	0.002***
	(4.27)	(3.92)	(4.38)	(3.76)
Size (t-1)	0.356***	0.117	0.529***	0.255**
	(3.61)	(0.97)	(5.38)	(2.29)
Leverage (t-1)	-0.000	-0.000	0.000	0.000
	(-0.26)	(-0.53)	(1.63)	(1.06)
Free Float (t-1)	0.000	0.000	-0.000	-0.000
	(0.30)	0.43	(-0.63)	(-0.60)
GDP (t-1)	0.000*	0.000	-0.000	0.000
	(1.65)	(0.87)	(-1.30)	(0.00)
Year	*No*	*Yes*	*No*	*Yes*
_cons	-2.283***	-1.507*	-1.507*	-3.655***
	(-3.07)	(-1.74)	(-1.74)	(-4.83)
Obs.	1,916	1,916	1,904	1,904
R^2	0.20	0.23	0.20	0.22

*, ** and *** indicate statistical significance at the 10%, 5 and 1% levels, respectively.

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The regenerative firm: evolution and upgrade of the sustainable firm able to increase its resilience and agility

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Abstract. *The global context in which we find ourselves is, as is unfortunately well known, characterized by widespread degradation and the crossing of numerous planetary boundaries: issues such as global warming linked to anthropogenic emissions of climate-altering gases, the contamination (and in some cases the compromise) of air, water, and soil, the indiscriminate use of non-renewable resources and the reckless use of renewable ones (i.e., without waiting for natural regeneration rates), the impact on the health of natural ecosystems with the resulting loss of numerous species, and the effects on human health linked to human interference have led to the need to rethink how we view the world and how we manage it. In this sense, the concept of sustainability was born, which seeks to holistically support the planet without harming it in any of its facets. Naturally, this concept has also become a key element in the corporate world, quickly becoming a foundation for reputation and competitiveness. This concept embraces the idea of continuous improvement, and precisely in this context, its potential evolution should be considered: the idea of the regenerative company.*

The regenerative company goes beyond the dictates of the sustainable company, which seeks simply to reduce its ecological footprint, and simultaneously aims to expand its positive socio-ecological footprint, restoring the health of people, places, communities, and the planet, thus seeking to ensure a positive impact (not limited to avoiding harm). Ongoing work seeks to define the characteristics and unique features of the regenerative company, analysing possible strategies, including through the concrete cases of companies that have already implemented them, thus going beyond the potential limits of sustainability. Companies must be able to go beyond sustainability to increase their positive impact on the planet, their reputation, their resilience, and their agility.

Keywords: *Regenerative firms; regenerative strategies; sustainable development; corporate strategy; ESG.*

Framing of the research. *In terms of research framing, it is important to immediately recognize that the concept of "regenerative firm" and its associated strategies are intimately connected to the sustainability movement, which has seen a veritable boom in recent years; however, it is important to clarify that the concept of regeneration seeks to transcend the most conservative dictates of sustainability, aiming to have a positive impact on the entire ecosystem (both socially and environmentally). Research in this new field is still highly conceptual, unconnected to concrete reality, and it is precisely this gap that this work seeks to address; reducing the conceptual nature of this field is crucial to ensure that regenerative strategies are understood, applicable, effective, and compatible with corporate profitability.*

The research also fits well within the ESG framework, which is increasingly crucial at the corporate level in terms of reputation, competitiveness, access to credit, and business continuity: this is due to the well-known crossing of planetary boundaries, which inexorably forces companies to rethink their operations, shifting toward more environmentally and socially responsible practices, and given the growing concern of the average consumer.

Furthermore, socio-environmental regeneration is perfectly aligned with all the latest European requirements (regulations and directives) that require companies to pay greater attention to the impacts of their operations (impacts related to the production site, supply chain[2], product, communities involved, etc.); indeed, it can represent an upgrade, as it goes beyond simply avoiding harm and aims to go further, towards the proactive concept of positive impact, whereby the company cares for and improves the socio-environmental ecosystem within which it operates.

The ongoing work, in order to better explore the concept of regeneration, thus seeks to thoroughly analyse the meaning of regeneration through the evaluation of its possible definitions and to evaluate the possible regenerative strategies also connected to specific business cases.

Purpose of the paper. *The paper's primary purpose can be divided into two: the first is informative, that is, to provide, after an intense and in-depth analysis of recent and specific literature on the topic, precise definitions that fully describe the concept of a regenerative company, a careful detailed analysis of regenerative strategies through both their categorization and a detailed analysis, and concrete cases to realistically (not just conceptually) analyse their state of the art, real-world applicability, and effectiveness. The aim is therefore to shed light on a topic that is still too conceptual, rather avant-garde, and therefore viewed with suspicion by the corporate world.*

The second objective is a direct consequence of the first: acting as a driving force for companies; in fact explaining what the concept of a regenerative company represents and the possible regenerative strategies that can be implemented within different fields (categorizing them to better understand the specific areas of intervention within a corporate context, dispelling any doubts and removing the halo of conceptuality that surrounds it), seeking to demonstrate how in the current

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[2] Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on corporate sustainability due diligence.

global context, doing no harm is no longer enough, but rather that it is necessary to be proactive and have a positive impact (not just zero, therefore); presenting concrete success stories in which pioneering companies have adopted regenerative strategies without affecting their profits while simultaneously increasing their positive impact on the environment and society, their reputation with stakeholders, their resilience, and their agility (thus representing the prototype of an ideal company in the challenging global context in which we live), it can represent a valuable source of information for companies, a potential boost especially for those hesitant, undecided (and probably even a little fearful) about whether or not to adopt these new and interesting business strategies; the reassuring and compelling effect of the dual process of clarification and presentation of successful case studies can undoubtedly be an important driving force for the confident adoption of these strategies, so crucial to the deteriorating health of the planet.

Methodology. *From a methodological standpoint, a purely qualitative approach was chosen: it was decided to undertake a review of existing technical-scientific literature to thoroughly examine the definitions and characteristics of a regenerative enterprise, the most recent and innovative regenerative strategies, and successful case studies in which pioneering companies have implemented interesting regenerative solutions. In terms of scoping, a recent time frame was chosen for the analysis to include only the most recent and innovative solutions (logically, they have been tested to a greater or lesser extent depending on their level of technical maturity). Geographical scoping also considered cases from around the world, avoiding geographical exclusions (it would be pointless to limit the analysis, for example, to just Europe, as this would risk severely undermining the range of options and case studies useful for the research).*

Bearing in mind that this is an ongoing project, a subsequent quantitative phase involving statistical surveys on a representative sample of companies is possible. This will provide a concrete idea of their actual awareness of these innovative strategies, their perception of them, and their potential future adoption.

Results. *The results should be divided into three groups: definition of the concept of a regenerative business (where the concept originates, what it refers to, what it may imply, and its relationship to the concept of sustainability); analysis of regenerative business strategies that can be implemented by companies to go beyond the level required by sustainability (and their categorization); and evaluation of case studies to identify concrete implementation examples.*

The general concept of a regenerative economy aims to restore and regenerate damaged ecosystems, thus going beyond the mere mitigation of negative impacts typical of a sustainable approach. Its goal is to create economic systems with a positive impact on the planet, actively contributing to the maintenance of biodiversity, soil regeneration, pollution reduction, and the restoration of damaged ecosystems, where human activities support the health and prosperity of the ecosystem.

This economic thinking draws inspiration from three concepts: a late twentieth-century agricultural concept, the regenerative agriculture movement, which focused on restoring and regenerating depleted agricultural soils through practices such as organic farming, the use of compost, and the restoration of biodiversity. The goal is to create agricultural systems capable of regenerating soil fertility while reducing the use of chemical fertilizers and pesticides. Another important contribution to the history of the regenerative economy was the concept of biomimicry, born in the 1990s. This concept is based on the idea that it is essential to seek to imitate nature (ecological structures and relationships) to develop efficient, resilient, and regenerative products, technologies, and systems. Finally, the concept of the circular economy (reducing waste, repairing and recycling materials, and adopting business models based on reuse and sharing resources) cannot be overlooked.

The concept of regenerative is linked to the work of Reed[3] (2007), in which, in his analysis of the trajectory of ecological design, he sees regenerative systems as a positive antipode to conventional systems, with sustainable systems representing neutrality (hence the need to go a step beyond the sustainable logic).

The regenerative firm, therefore, is a company aware of the difference between growth and development (socio-economic vs. socio-ecological progress) and is aware of the need to go a step further than a simple sustainable company: it is therefore not enough to do no harm, for example, by reducing one's ecological footprint, but there is a need[4] to expand, in an altruistic effort, one's positive socio-ecological footprint and thus restore the health of people, places, communities, and the planet; the regenerative enterprise is also linked to the need to transform anthropocentric business models into more ecocentric models characterised by an intrinsic orientation towards nature (therefore the perspective changes and we move towards a global transdisciplinary vision in which the creation of value must no longer be inevitably associated with the destruction of other external values but rather is linked to their protection and regeneration)[5].

In terms of strategies, as mentioned, regenerative strategies focus on restoring and improving ecosystems (going beyond sustainability) through a holistic approach that encompasses people empowerment, employee well-being, product

[3] Reed, B. (2007), *Shifting from 'sustainability' to regeneration*. Building Research & Information, 35:6, 674-680.

[4] This need also comes from consumers: in fact, according to a study conducted by the American consultancy firm *ReGenFirends*, regenerative brands are preferred by around 80% of consumers over sustainable ones (thanks to their less passive attitude towards socio-environmental issues).

[5] This business concept is most closely embodied in Italy by the benefit corporation, which, according to Law No. 208 of December 28, 2015, identifies those economic activities that «in addition to the purpose of profit sharing, pursue one or more common benefit goals and operate responsibly, sustainably, and transparently towards people, communities, territories, and the environment, cultural and social assets and activities, entities, associations, and other stakeholders».

and process innovation, stakeholder engagement, and land protection. An initial attempt to categorize strategies has identified three areas of application: the natural environment, people, and corporate structure and supply chain; the former includes interventions aimed at reforestation and biodiversity improvement (for example, through corporate tree planting projects, the creation of spaces that favour pollinators), the adoption of regenerative agricultural models (for example, through practices that restore soil fertility), the adoption of circular economy processes capable of regenerating waste, returning it to the beginning of the production cycle as new raw materials, and the use of tools that quantify impact and thus enable improvement and subsequent restoration processes; for the second one, regenerative interventions focus on enhancing human capital through strategies that promote employee well-being and ongoing training, the co-creative engagement of various stakeholders, and the development of regenerative leadership models; whilst for third one, regenerative interventions focus on defining a clear corporate purpose capable of addressing pressing socio-environmental issues, fostering greater transparency within the supply chain (to create a more horizontal rather than vertical relationship), and establishing a connection with the local community in which the company operates to truly understand the issues and needs of local communities. According to several authors, this is defined as triple regeneration, an integrated strategy to coherently and synergistically restore and improve the so-called 3Ps (people, places, planet).

Das and Bocken (2024)[6] instead outline a more detailed characterization (the analytical specification increases) based on six archetypal regenerative corporate strategies: regenerative leadership[7], nature regeneration[8], social regeneration[9], responsible sourcing[10], human health and well-being focus[11], and employee level focus[12].

Hahn and Tampe (2021)[13] identify three main directions for regenerative corporate strategies: restoration (such as reforestation), preservation (such as maintaining the health of an ecosystem), and improvement.

Finally, regarding case studies, some concrete examples are proposed in which pioneering companies have successfully adopted regenerative strategies to demonstrate their feasibility and to provide inspiration. Through its "One Planet. One Health" program, Danone is promoting regenerative agriculture in North America to support soil regeneration, biodiversity, animal welfare, local farming communities, and to try to curb the indiscriminate use of fertilizers and pesticides. Ecosia, a search engine, uses 100% of its profits for the planet (funding reforestation projects) and produces twice the renewable energy needed to power all its research, thus increasing its positive impact. Patagonia is investing in organic and regenerative farming practices, as are General Mills and Illy Caffè (the latter in particular is testing regenerative practices on two plantations in Ethiopia and Guatemala where crops are rotated, minimizing the use of mineral fertilizers, pesticides and herbicides, in an attempt to operate in a carbon-neutral or carbon-negative manner and also aims to remunerate farmers fairly and reduce emissions); Interface (a global manufacturer of modular floor coverings) has developed the "Factory as a Forest" project in Australia, a production plant that, in principle, is able to provide the surrounding environment with many positive ecosystem services (thanks to the collaboration with Biomimicry 3.8 the production plant is more similar to a high-performance ecosystem than a factory); Wildling (a shoe manufacturer) promotes the regenerative economy and proactively seeks sustainable alternatives for materials (for example hemp); Fairafric has decided to establish its production plants of chocolate in Ghana to generate greater wealth in the places where cocoa is directly grown; CarbonEthics restores mangroves in Indonesia, thereby restoring marine and coastal ecosystems (while sequestering carbon); Japanese insurance company Meiji Yasuda, with its ten-year plan "MY Mutual Way 2030", aims to become «the most accessible and industry-leading life insurance, contributing to people's well-being and community vitality» by adopting a new paradigm based on prevention.

These examples, if applied on a large scale, could truly represent a turning point in increasing people's well-being and health, revitalizing ecosystems and communities, and reversing the curve of climate change.

In conclusion, these examples refute the thesis that regenerative business strategies cannot succeed in a competitive market. Indeed, this new paradigm, the evolution of sustainability, can represent a powerful tool for regenerating planetary health and community development.

The ongoing work seeks to serve as a source of information, to dispel doubts, and to act as a catalyst to inspire more and more companies to adopt these innovative regenerative strategies. While it may seem complicated to achieve a fully

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[6] DAS, A., BOCKEN, N. (2024), *Regenerative business strategies: A database and typology to inspire business experimentation towards sustainability*. Sustainable Production and Consumption, Volume 49, September 2024, Pages 529-544. Comprehensive practice review of 84 regenerative business cases from 15 sectors, to build the novel Regenerative Business Case Database. According to this study the predominant sectors with regenerative innovations were food, consumer goods, and fashion and many companies were found to be employing multiple strategies simultaneously, while also collaborating with local organizations.

[7] For example, transparent verification of claims, creating new regeneration pathways in supply chain, reinvesting profits for planet and people, advocating for equity and justice.

[8] For example, biodiversity regeneration, soil health/land regeneration, ecosystem restoration, water body restoration, carbon sequestration, forest restoration, marine regeneration, forest conservation, biodiversity conservation, animal welfare.

[9] For example, community regeneration, creation of alternative livelihoods – climate adaptation, involving local communities in decision-making, just labour conditions, connecting stakeholders to nature and communities.

[10] For example, traceable supply chain, fairer compensation for farmers, supporting small businesses, long term contract commitments, true pricing.

[11] For example, human-health & well-being regeneration, 100% nature-based products, urban green spaces restoration.

[12] For example, fair wages for workers, just labour conditions, increasing employee involvement in decision-making, improving employee health & wellness.

[13] HAHN, T., TAMPE, M. (2021), *Strategies for regenerative business*. Strategic Organization, 19(3), 456-477.

regenerative business in a linear systemic context, it is essential that these changes be implemented, even gradually, to achieve broader changes.

Future research in this field could explore questions such as the correlation between company type and the rate of adoption of regenerative strategies, which regulatory frameworks enable them to thrive, and what potential obstacles or triggers exist for their implementation.

Research limitations. *One of main problems related to this topic is that, to date, most research in the literature is largely conceptual, lacking the necessary physical-empirical connection needed to truly delineate distinctive features and understand how to effectively implement these regenerative strategies.*

This work attempts to address concrete cases, going beyond purely conceptual aspects, but it is still fair to assert that the overall context in this area is still relatively immature and underexplored, and therefore requires further future research in this direction to better understand and contextualize the implementation of regenerative strategies at the corporate level (for example, it could be interesting to better evaluate any correlations between types of companies (sector, size, location) and level of implementation to understand if there could be any barriers or triggers.

Another potential major problem is the potential greenwashing practiced by companies regarding the adoption of regenerative practices: it is essential to be able (and this it is not so easy) to carefully evaluate the interventions implemented to be able to judge whether or not they can be considered truly regenerative.

Moreover, it should be said that there are no references to regulatory frameworks that, potentially, allow regenerative strategies to flourish and this could be certainly addressed further on in the course of research progress.

Managerial implications. *The description and analytical explanation of the concept of a regenerative company, the evaluation of potential regenerative strategies, and the assessment of concrete business cases applying these strategies create a robust information base accessible to a broad audience of interested companies.*

From a practical perspective, thoroughly explaining the essence of a regenerative company, accompanied by success stories of implemented strategies, can only serve as an important accelerator for all those companies that see the future in this new business paradigm, a future that goes beyond the now-familiar dictates of sustainability to embrace a system that not only causes no harm but also has a positive impact on the planet. It has to be remarked that case studies showcasing examples of companies regenerating the environment and society, while also remaining financially viable may, at the same time, alleviate fears of embracing regenerative strategies. Regenerative strategies can prove to be fundamental in terms of resilience, risk management, and mitigation, especially in this era of volatile supply chains (related to climate disasters and conflicts).

Originality of the paper. *This work represents an important opportunity to thoroughly analyse the concept of the regenerative company and contextualize it in the current socioeconomic context, characterized by multiple crises ranging from environmental and climate issues to geopolitical ones. Its originality lies precisely in the detailed analysis of all the specificities of this new concept of business, which goes beyond the now overused concept of the sustainable company. The ultimate goal is to clearly outline regenerative strategies that can serve as inspiration and future cornerstones of corporate strategy in order to increase resilience and agility.*

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The Road Not Taken: the social acceptability of competing mobility interventions in peri-urban corridors

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Abstract. *This paper investigates the social acceptability of three competing mobility intervention scenarios spanning the supply-demand spectrum – Business as Usual (status quo), Road Enhancement (supply-side capacity expansion), and a TDM-based multimodal package (demand-side management) – along the SGC FI-PI-LI corridor in Tuscany, deployed as an empirical context typifying the governance dilemmas faced by peri-urban corridors. Fourteen semi-structured stakeholder interviews informed the construction of the scenarios. A web-based survey then obtained 1,995 valid citizen responses across the provinces of Florence, Pisa, and Livorno, collecting both acceptability scores and attitudinal profiles of respondents. Quantitative analysis combines clustering to identify homogeneous respondent profiles and Propensity Score Matching (PSM) to estimate the causal effect of individual attitudinal variables on collective-level scenario acceptability. Clustering analysis reveals a stable ordinal ranking across all profiles: the TDM-based multimodal package consistently commands the highest collective acceptability, followed by Road Enhancement, with BAU obtaining the lowest scores in every cluster. PSM analysis identifies institutional trust as the single most powerful cross-scenario enabler, car dependence as the primary driver of Road Enhancement support, pro-public-transport and pro-cycling orientations as selective amplifiers of TDM-based package acceptability, and road safety salience as the key mechanism behind BAU rejection. The paper contributes to the sustainable mobility literature providing an empirically grounded, causally identified map of the attitudinal determinants of mobility scenario acceptability, and, methodologically, demonstrating the value of PSM as a complement to hybrid choice modelling for corridor-level policy evaluation in peri-urban contexts.*
Keywords: *mobility acceptability; transport attitudes; propensity score matching; attitudinal segmentation; transport policy; SGC FI-PI-LI*

Framing of the research.

"Two roads diverged in a wood, and I— I took the one less travelled by, and that has made all the difference."
(Frost, 1916)

Private motorised transport is the structural backbone of European mobility. Approximately 90% of terrestrial transport demand across EU member states is concentrated on the road network, of which around 79.5% is satisfied by private light vehicles (EUCRA, 2022; EEA, 2023). Overall transport demand is projected to grow further in the coming decades with private vehicle use expected to increase in absolute terms and its dominant modal share to remain substantially unchanged through 2050 (EUCRA, 2022). This trajectory carries severe environmental consequences. Transport is one of the highest-impact sectors in the European economy due to its profound dependence on fossil fuels: in 2019 it accounted for 29.5% of total EU greenhouse gas emissions (EUCRA, 2022). Although projections indicate a decline in transport emissions after 2030, with a projected 22% reduction by 2050, this trajectory falls far short of the 90% sectoral emission reduction required under the European Green Deal (European Commission, 2019). Commuters, freight operators, local businesses, and residents produce heterogeneous and often conflicting mobility demands, and policymakers must choose between supply-side infrastructure expansion and demand-side management (Batur et al., 2019; Gärling & Schuitema, 2007).

Travel demand management (TDM) encompasses the demand-side policy instruments – modal-shift incentives, road pricing, access restrictions, and multimodal service integration – used to reduce private car dependence and steer mobility toward more sustainable patterns (Batur & Koç, 2017). Research on TDM effectiveness has established that soft, pull-oriented measures generate consistent but modest reductions in private car, while push measures prove more effective at inducing behavioural change but attract systematically lower public support (Wang et al., 2020). This push-pull acceptability asymmetry is the central empirical regularity of the TDM literature: combined packages pairing both components have emerged as the pragmatic response, achieving greater modal shift than pull-only designs while remaining politically viable when the pull component is sufficiently attractive (Moeinaddini et al., 2026; Moeinaddini & Habibian, 2023). Beyond the policy-level push-pull asymmetry, a second strand of the literature asks why individuals respond differently to the same TDM measures. Kim et al. (2023) identifies perceived fairness, infringement of freedom, and perceived effectiveness as the primary predictors. Attitudinal segmentation research has demonstrated that identifiable traveller typologies respond differently to TDM stimuli independently of socio-demographic characteristics (Soza-Parra & Cats, 2024), a finding corroborated by recent hybrid choice modelling showing that pro-car and pro-environment latent constructs are structural determinants of both mode choice utility and TDM policy package acceptability (Adamidis et al., 2025; Moeinaddini & Habibian, 2025). What the literature has not yet adequately addressed is how these attitudinal typologies shape collective-level evaluations of bundled scenario alternatives and whether their effects hold under causal inference designs that control for the selection processes shaping attitudinal profiles.

A further gap concerns the methodological treatment of attitudinal variables in policy acceptability research. The dominant approach – embedding attitudes as latent variables in hybrid choice models (Walker & Ben-Akiva, 2002; Adamidis et al., 2025) – is well suited to predicting individual mode choice utility but is not designed to estimate the causal contribution of attitudinal profiles to collective policy acceptability ratings (Chorus et al., 2014). Standard regression-based treatments share the same limitation: they quantify correlational associations between attitude scores and acceptance outcomes without addressing the selection effects that make certain attitudinal profiles more prevalent among specific demographic groups, nor the endogeneity that arises when attitudes and preferences are jointly shaped by unobserved characteristics (Guerrero et al., 2021; Graham, 2025). Propensity score matching (PSM) offers a more robust alternative, enabling quasi-experimental comparisons between groups defined by distinct attitudinal dispositions while controlling for observable confounding factors (Rosenbaum & Rubin, 1983; Cao et al., 2010). Despite its established track record in transport behaviour research, causal inference methods including PSM remain substantially under-deployed in the acceptability literature relative to their inferential potential (Graham, 2025). Its application to peri-urban corridor acceptability research represents a methodological contribution with direct relevance to the broader class of TDM governance challenges in which policy choice is collective, attitudinal profiles are heterogeneous, and causal identification is required.

The SGC FI-PI-LI is used in this paper as the empirical context for investigating a governance challenge structurally shared by peri-urban corridors across European metropolitan regions. As one of Tuscany's most heavily trafficked arterial corridors, it concentrates competing pressures from urban mobility, industrial logistics, and inter-regional connectivity, making it a rich and policy-relevant arena in which to examine how different citizen profiles evaluate competing mobility intervention scenarios that span the supply-side/demand-side spectrum (Regione Toscana, 2025). The social dimension of potential interventions along this corridor remains empirically underexplored and the analytical question it raises is broadly shared across peri-urban contexts where policymakers face analogous scenario-selection challenges.

Purpose of the paper. *The paper addresses two research questions (RQ). RQ1: Which are the citizen's social acceptability profiles across mobility scenarios spanning the supply-demand spectrum? RQ2: Which attitudinal constructs causally drive differential collective acceptability across mobility scenarios independently of socio-demographic selection?*

In addressing these objectives, the paper contributes to both the sustainable mobility policy acceptability literature and the methodological debate on causal inference in transport policy research (Moeinaddini et al., 2026; Graham, 2025). By supplying rigorous, empirically grounded evidence on the distribution of citizen preferences and their attitudinal determinants, the paper serves two audiences: regional administrators, transport planners, and local authorities directly engaged in transportation management activities, and the wider community of researchers confronting analogous mobility scenario-selection challenges in other peri-urban contexts.

Methodology. *The study adopts a quantitative design, with an integration of qualitative interviews. In the first phase, fourteen semi-structured face-to-face interviews were conducted with key informants from regional and municipal administrations, public-sector companies, private firms, and trade associations along the FI-PI-LI corridor. Once informational saturation was reached, the insights were synthesized into three reality-grounded scenarios: Business as Usual (BAU), Road Enhancement, and a TDM-based multimodal package In the BAU scenario, the transport infrastructure remains largely unchanged aside from already planned interventions, while the financial resources that would otherwise be invested are allocated to other areas of public spending. The Road Enhancement scenario involves substantial investment in supply-side infrastructure expansion, including the construction of an additional driving lane. Finally, the TDM-based multimodal package scenario proposes a holistic set of demand-side management measures, including the development of multimodal hubs, reinforcement of public transport, cycling-rail integration, and the implementation of a regional Mobility-as-a-Service platform.*

In the subsequent quantitative phase, a web-based survey was administered to citizens across the provinces of Florence, Pisa and Livorno, collecting 1,995 valid responses collected between June and August 2025. Attitudinal constructs –car dependence, pro-drive, pro-public-transport, pro-cycling propensity, transportation safety perception, environmental consciousness, openness to change and institutional trust – were measured on seven-point Likert scales using items adapted from validated instruments (Cao, 2010; Kim et al., 2013). The construct structure of the attitudinal battery was validated through Exploratory Factor Analysis (EFA) prior to modelling, following established practice in hybrid choice modelling research (Adamidis et al., 2025). Each scenario was presented via a short video stimulus that included a description of the main features of the scenario, as well as their positive and negative impacts. Respondents then rated its collective acceptability as a public investment priority (Kim et al., 2013). The citizen dataset was then subjected to a two-stage inferential analysis. In the first stage, k-means cluster analysis was applied to identify homogeneous respondent profiles on the basis of their mobility preferences and attitudinal scores. The number of clusters was determined by a combination of statistical criteria and interpretive criteria aimed at maximizing both within-group coherence and between-group distinctiveness (Jaeger & Banks, 2023). In the second stage, Propensity Score Matching was employed to strengthen the inferential basis of the analysis and move toward causal estimation (Graham, 2025). PSM enabled the estimation of the Average Treatment Effect on the Treated (ATET) by comparing scenario acceptability and perceived utility between respondents who differ with respect to a specific treatment variable while remaining

comparable across all other covariates (Rosenbaum & Rubin, 1983). Matching was performed using a nearest-neighbour algorithm (nn=1), with covariate balance verified post-matching in each specification. This procedure allows the mean treatment effect on scenario acceptability to be quantified by isolating the variation attributable to the treatment variable from that explained by other covariates.

Results. *Clustering analysis (k-means, k = 4) identifies four respondent profiles with broadly balanced sample sizes (381–568 respondents), differentiated primarily by age, gender, and educational attainment. All acceptability scores are measured on a seven-point Likert scale. Across clusters, the ranking of scenarios by collective acceptability is consistent: the TDM-based multimodal package is the most acceptable, followed by Road Enhancement, while BAU is the least acceptable. Differences between clusters therefore concern the magnitude of these preferences rather than their ordering.*

The two younger and more educated clusters assign the highest acceptability to the TDM-based multimodal package. In the first (n = 517), composed mainly of women, mean acceptability scores are 5.04 for the TDM-based package – the highest across clusters – 4.61 for Road Enhancement, and 4.12 for BAU. In the second younger-educated cluster (n = 529), the TDM-based package scores 4.86, Road Enhancement 4.49, and BAU 4.08.

The elderly cluster (n = 568) exhibits the lowest acceptability across all scenarios: 4.66 for the TDM-based package, 4.21 for Road Enhancement, and 3.61 for BAU. Although the preference ordering remains unchanged, the smaller margin over Road Enhancement compared with younger clusters suggests a more conservative disposition toward mobility change, indicating that age moderates rather than reverses the preference structure.

Finally, the middle-aged, lower-educated cluster composed mainly of men (n = 381) is the only group in which Road Enhancement approaches parity with the TDM-based package (4.52 vs. 4.69), a gap of only 0.17 scale points compared with 0.37–0.43 in the other clusters. BAU scores 4.09 in this group. This narrower differential is consistent with a profile characterized by stronger structural car dependence, male predominance, and a more direct personal stake in road capacity (Sierra Muñoz et al., 2024).

PSM analysis estimates the ATET for five attitudinal treatment variables. Each variable is dichotomised using a theoretically motivated binary threshold designed to identify respondents with a meaningfully elevated level of the attitude while preserving adequate treated-group size for reliable matching (Ortiz-de-Mandojana & Bansal, 2016). Within each treatment, treated and control respondents are matched on all observable socio-demographic covariates using nearest-neighbour matching, isolating the acceptability difference attributable to the attitudinal variable itself.

Car-dependence attitude produces significant positive effects on BAU and Road Enhancement acceptability (ATET = +0.31 and +0.56 respectively, $p<0.01$ for both), while its effect on the TDM-based package is positive but statistically negligible (ATET ≈ +0.13, $p>0.1$). The contrast is theoretically informative: car-oriented respondents differentially support scenarios that preserve or expand road infrastructure, but their attitudinal disposition carries no significant independent weight when evaluating a multimodal collective mobility scenario.

Pro-public-transport attitude produces a mirror-image pattern. Its effect on the TDM-based package is strongly positive and significant (ATET = +0.41, $p<0.001$), while its effect on Road Enhancement is negative and significant (ATET = −0.25, $p<0.05$), indicating that pro-PT respondents actively discount infrastructure-expansion scenarios on the collective acceptability dimension. The effect on BAU is modestly positive (ATET = +0.26, $p<0.05$), suggesting that pro-PT respondents are not generically opposed to the status quo but specifically favour scenarios oriented toward collective mobility.

Pro-cycling attitude reinforces this pattern. Treated respondents assign significantly higher collective acceptability to both the TDM-based package (ATET = +0.42, $p<0.001$) and BAU (ATET = +0.51, $p<0.001$), while the effect on Road Enhancement is negligible and non-significant (ATET = +0.09, $p = 0.34$). The asymmetry confirms that cycling-oriented respondents are selectively supportive of scenarios compatible with active and integrated mobility, and indifferent to supply-side road interventions.

Institutional trust emerges as the single most powerful and cross-cutting attitudinal determinant. It produces large, significant positive effects on collective acceptability across all three scenarios: ATET = +1.00 for BAU ($p<0.001$), +0.49 for Road Enhancement ($p<0.001$), and +0.49 for the TDM-based package ($p<0.001$). The magnitude of the BAU effect is particularly striking and indicates that trust in institutions substantially raises acceptability of the status quo independently of its substantive content. More broadly, institutional trust operates as a general enabler of policy acceptability rather than as a scenario-specific attitudinal driver, consistent with its identification in the literature as a meta-level disposition that conditions how attitudinal and policy-specific signals translate into acceptability judgements (Morton et al., 2021; Palomo-Vélez et al., 2023).

Road safety perception is the only treatment variable that produces a negative significant effect on the BAU scenario specifically, and the only one whose negative effect targets the status quo rather than an active intervention. Respondents with high safety salience, in fact, actively reject BAU (ATET = −0.23, $p<0.05$), consistent with the interpretation that the status quo is perceived as failing on the safety dimension. At the same time, they assign significantly higher collective acceptability to both Road Enhancement (ATET = +0.34, $p<0.01$) and the TDM-based package (ATET = +0.40, $p<0.01$), suggesting that safety-oriented respondents are not mode-biased but change-oriented: they favour any scenario that signals a departure from current conditions, regardless of whether the intervention is supply-side or demand-side in character.

Taken together, the PSM results confirm the attitudinal structure identified in the clustering analysis and sharpen its causal interpretation. Car dependence reinforces acceptance of supply-side scenarios; pro-PT and pro-cycling orientations selectively amplify acceptance of the TDM-based package while discounting Road Enhancement; institutional trust elevates acceptability all scenarios; and safety salience drives rejection of the status quo without discriminating between the two active intervention types. These attitudinal effects are independent of socio-demographic composition, confirming that mobility policy preferences are structurally grounded in attitudinal profiles rather than reducible to age, education, or habitual modal behaviour alone (Batur & Koç, 2017).

Research limitations. *Several limitations qualify the interpretation of the findings. The quantitative sample, while numerically substantial (N = 1,995), is not fully representative of the Tuscan population, most of all in relation with the education profile of respondents, and the use of a web-based self-administered survey introduces the possibility of self-selection bias: citizens more engaged with mobility issues may be systematically overrepresented.*

The study relies on cross-sectional, observational data. Although PSM substantially reduces confounding from observable characteristics, it cannot eliminate bias arising from unobserved heterogeneity, and the causal estimates should be interpreted as plausible rather than conclusive. The three scenarios were presented via short video stimuli, a pragmatic choice that ensures comparability but inevitably simplifies complex trade-offs, potentially shaping responses in ways that may not fully replicate reactions to real-world implementations. Future research would benefit from longitudinal designs, stratified territorial sampling, and deliberative formats that allow respondents more time to engage with the implications of each scenario.

Managerial implications. *The findings carry concrete implications for regional transport planning and infrastructure governance. Most immediately, the broad rejection of the BAU scenario – driven above all by road safety concerns– signals an urgent need for substantive intervention. The status quo, with just some incremental maintenance, is perceived as inadequate across all demographic groups, and policymakers who delay acting risk further erosion of the institutional trust that the results identify as the single most powerful cross-scenario enabler of acceptability (Morton et al., 2021). The evidence on Road Enhancement warrants particular attention, as its collective acceptability consistently lags behind that of the TDM-based package across three of four citizen profiles. This divergence between private benefit and social legitimacy is a well-documented pattern in transport infrastructure evaluation, where large-scale supply-side investments tend to generate concentrated private gains while dispersing costs and externalities broadly across the population (Gärling & Schuitema, 2007; Rosenfield et al., 2020). Communication strategies that acknowledge the legitimate concerns of car-dependent users while building support for sustainable alternatives among younger cohorts will be essential to securing the social legitimacy required for effective implementation (Tertoolen et al., 1998).*

At a strategic level, the results support the TDM-based multimodal package as the more durable and socially legitimate policy direction. While the Road Enhancement scenario does not command generalised consensus even among car-dependent respondents, the TDM-based package, by contrast, is recognised across all citizen profiles as the option more likely to generate collective benefits. This finding is consistent with the literature showing that combined push-pull packages, when the pull component is sufficiently attractive, can bridge the acceptability gap between supply-side and demand-side interventions (Eriksson et al., 2008; Moeinaddini & Habibian, 2023). Its modular architecture allows phased and reversible investment over an extended planning horizon, reducing the lock-in risks associated with large-scale road infrastructure and permitting progressive adjustment in response to citizen feedback (Driscoll et al., 2014). This adaptive, experimental logic aligns with the emerging governance literature on iterative policy design, which argues that incremental, monitorable interventions are better suited to building public trust and facilitating gradual behavioural change than irreversible infrastructure commitments (Driscoll et al., 2014). The extended implementation timeline also allows citizens to adapt mobility habits progressively, supporting the cultural shift toward intermodal and sustainable travel that the results show is already more advanced among younger, more educated cohorts (Nikitas et al., 2024). The preference structure has implications that extend beyond transport policy proper. The alignment between the TDM-based package and the preferences of younger, highly educated citizens suggests that sustainable mobility investment functions as a locational amenity in regional competition for skilled human capital – a mechanism well established in the literature on knowledge economy development and talent attraction (Florida, 2002; Wagner & Growe, 2023). Sectors most likely to reinforce demand for the TDM-based option are also those whose workforce is most mobile, most educated, and most sensitive to urban quality-of-life conditions, including transport accessibility and environmental sustainability.

Originality of the paper. *This paper makes several original contributions to the literature on sustainable mobility's social acceptability. Substantively, it deploys the SGC FI-PI-LI corridor as an analytically generative empirical context – a high-salience, real-world case that combines the complexity of competing mobility intervention scenarios spanning the supply-demand spectrum, a large and diverse citizen sample, and locally validated attitudinal constructs. The substantive contribution lies not in the corridor's singularity but in the analytical framework's capacity to reveal how attitudinal heterogeneity structures mobility scenario acceptability in ways that are transferable to other peri-urban corridor governance contexts facing analogous scenario-selection dilemmas.*

Methodologically, the application of Propensity Score Matching to attitudinal treatment variables represents a significant innovation for the field. While PSM is well established in programme evaluation and health economics, and has precedent in transport behaviour research as a tool for addressing self-selection in built-environment studies (Cao

et al., 2010), its use in transport policy acceptability research remains limited (Graham, 2025). Critically, the inferential logic differs from the hybrid choice modelling approach that currently dominates attitudinal transport research (Adamidis et al., 2025; Moeinaddini & Habibian, 2025). Where HCM embeds attitudes as latent continuous variables to improve the fit of individual utility functions for discrete mode choices, PSM treats attitudinal profiles as binary quasi-experimental treatments to estimate the causal effect of certain attitudes on collective policy acceptability scores.

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The unintended consequences of collaborative consumption: A quantitative investigation on household rebound effects in the sharing economy

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Abstract. *It is commonly believed that the sharing economy (SE) promotes sustainable consumption. However, a debate is open on its possible negative effects. The cost savings and convenience of sharing practices generates the so-called "rebound effect", a response to a measure that offsets the effect of the measure itself. The purpose of this research is to shed light on the rebound effects that are associable with the SE, focusing on the household level. This emerges as a gap in the wider stream of research about SE and consumer behavior, that is currently receiving great attention, and for which extended knowledge has been called for. Yet, despite some sparse efforts, an investigation on the possible micro-rebound effect is currently missing. The study adopts a quantitative approach based on an online questionnaire administered to users of sharing economy platforms (n=265). The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The results show that economic rebound effects are primarily associated with perceptions of the sharing economy's affordability and value-driven adoption factors. Meanwhile, a platform's experiential and emotional value proposition generates both economic and social effects. Environmental rebound effects, on the other hand, are more closely linked to the complementary − rather than substitutive − use of sharing economy platforms. Overall, the study demonstrates that the economic, environmental, and social dimensions of rebound are interconnected, offering new evidence on the potential externalities of the sharing economy.*
Keywords: *sharing economy; rebound effect; consumer behavior; regression model*.

Framing of the research. *The sharing economy (SE) has emerged as an economic paradigm based on resource redistribution and on the optimized use of assets' idle capacity (Pouri and Hilty, 2021). This virtuous value proposition led this form of consumption to be praised for its inner sustainability, yet it also raises several questions about the appropriateness of this association (Grieco and Palagonia, 2024). Within the debate around the relation between SE and sustainability, a branch of studies about the negative effects (i.e., dark side) of the SE has emerged, with the aim to shed light on the damages it has created at economic, social, and environmental levels (Buhalis et al., 2020). In this context, the discourse about rebound effects is becoming a prominent area of investigation. Despite it has been widely addressed in other related domains such as that of circular economy, studies about the rebound effects in SE are so far scant and fragmented (Henry et al., 2021). The concept of rebound effect has been originally developed concerning energy conservation and it refers to the establishment of behaviors or other responses that offset the potentially positive benefits an initiative might have. For example, when improved energy efficiency leads to potential energy savings, consumers might be inclined to increase their usage of electric devices and ultimately limiting or even canceling out the expected benefit (Dütschke et al., 2018). The interest about the rebound effect in the SE context has recently increased as its exponential growth leads to a higher consumption, severely questioning the actual economic, environmental and social benefits that the SE could bring about (Meshulam et al., 2022).*

Purpose of the paper. *In the SE domain, rebound effects have been scantly investigated. Moreover, extant literature is quite fragmented, with contributions focused on specific effects (e.g., Ackermann and Tunn, 2024) and/or specific product/service categories (e.g., Warmington-Lundström and Laurenti, 2020; Meshulam et al., 2023). For this reason, the purpose of the research is to investigate rebound effects in the SE, quantitatively assessing the impact of different variables on their manifestation. The research is a part of a wider project aimed at mapping these effects in the SE domain and it follows a previous qualitative investigation with SE users. Thus, merging the outputs of a literature search and of the qualitative empirical analysis, the aim is to test a set of hypotheses about the determinants and the typologies of rebound effects.*

The SE is often considered an economically convenient option compared to its non-sharing counterparts (e.g., sharing a car instead of owning one, or doing secondhand shopping instead of buying new garments). Studies about rebound effect in circular economy shed light on the way this perception impacts on the typologies of rebound effect. For example, Zink and Geyer (2017) identify circular products affordability as a source of overconsumption. The same applies to the degree of substitution, which, in the circular economy domain is considered as a potential source of rebound effect. This happens because the secondary good cannot fully substitute the traditional one, leading individuals to an ultimate increase in consumption (Zink and Geyer, 2017; Bączyk et al., 2024). Despite in the circular economy domain this effect has been tested from an economic perspective, it might also lead to different types of effects (i.e., social and

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environmental). A key role is surely played by the drivers which lead individuals to adopt SE services. Scholars agree that the magnitude of rebound effect is increased by consumers economic motivations and decreased by environmental motivation (Merino-Saum et al., 2023; Ribera Jemio et al., 2024). In parallel, the platform itself could play a role through its value proposition which might orient consumers towards incorrect behaviors and in turn support the manifestation of rebound effects. In the circular economy domain, Bączyk et al. (2024) unveil that rebound effect increases when the value proposition entails convenience or enables new forms of consumption, while it decreases when sufficiency is promoted.

SE spreads across different industries, and the differences among products/services offered through the platforms do have an impact on the manifestation of rebound effects. As stated by Merino-Saum et al. (2023), different industries are associated with different levels of rebound effects, which for example is higher in the clothing industry (Wood et al., 2018) and lower for the reselling of smartphones or in boat-sharing (Makov and Font Vivanco, 2018; Warmington-Lundström and Laurenti, 2020). Yet extant contributions usually adopt an environmental perspective, while industrial differences might also impact on different types of rebound effects (i.e., at economic and social level). Finally, the specificities of geographical contexts might have an influence on the manifestation of rebound effects in terms of laws and regulations that can be very different from one country to another. Differences might also emerge from the areas in which individuals live, i.e., large cities versus smaller countries, with specific needs for example in the mobility industry.

Basing on the aforementioned considerations, the following set of hypotheses has been formulated:

H1. The perception of convenience has an impact on the nature and intensity of rebound effects.

H2. The degree of substitution of SE product/service over the non-sharing alternative has an impact on the nature and intensity of rebound effects.

H3. The drivers of adoption which lead to the sharing economy have an impact on the nature and intensity of rebound effects.

H4. Platform's value proposition has an impact on the nature and intensity of rebound effects.

H5. The industry has an impact on the nature and intensity of rebound effects.

H6. The geographical context has an impact on the nature and intensity of rebound

Methodology. *This research adopts a quantitative design aimed at empirically testing the proposed theoretical model in relation to the use of sharing economy platforms and the resulting rebound effects. The data was collected using a structured questionnaire administered online via Google Forms and distributed through digital channels.*

The questionnaire is structured to analyze how users utilize the platforms and to measure, in a first phase, certain internal dimensions, such as adoption drivers, and external dimensions, such as the platform's value proposition. Subsequently, the tool detects the rebound effects − economic, environmental, and social − resulting from the use of sharing economy platforms. The constructs were measured using scales validated and adapted for the research: perceived economic convenience (PEC) (Hawlitschek, 2016), drivers of adoption (DA) (Kurisu, 2021), degree of substitution (DS) (Lamberton and Rose, 2012), platform value proposition (VP) (Zhang et al., 2019), economic rebound effects (ECOR) (Parguel, 2018), environmental rebound effects (ENVR) (Visschers et al., 2016), and social rebound effects (SR) (Mittendorf, 2018). All items were evaluated using a five-point Likert scale.

A non-probability sampling strategy was adopted for convenience, widely used in studies aimed at verifying theoretical models rather than inferring population characteristics (Etikan et al., 2016). The questionnaire was administered to individuals who are familiar with or use sharing economy platforms to ensure the relevance of the responses. The final sample consisted of 265 valid responses, deemed adequate for analysis.

Data analysis was conducted using Partial Least Squares Structural Equation Modeling (PLS-SEM) with R software. In a preliminary phase, a Principal Component Analysis (PCA) was performed on the constructs to verify the factorial structure of the scales used. The principal component analysis (PCA) led to a partial reorganization of some constructs in the model. The PEC (Perceived Economic Convenience) construct remained unchanged.

The DA (Drivers of Adoption) construct was divided into two dimensions: DA1, relating to value-oriented adoption drivers (e.g., economic convenience), and DA2, relating to experience-oriented drivers (e.g., meeting new people). Similarly, the DS (Degree of Substitution) construct was divided into DS1, which expresses full substitution for traditional alternatives, and DS2, which reflects complementary use of the platform. The platform's value proposition (VP) is also divided into two dimensions: VP1, linked to the functional aspects of the service, and VP2, connected to the experiential and emotional dimension. Finally, rebound effects were divided into specific sub-dimensions: EBR (Economic Behavioral Rebound) and EPB (Economic Psychological Rebound) for the economic dimension; SD (Social Distrust), SDE (Social Disengagement), and NSI (Negative Social Impact) for the social dimension; EDP (Environmental Damage Perception) and EW (Environmental Waste) for the environmental dimension.

The PLS-SEM method is widely used in marketing, management, and social science studies due to its high predictive power and flexibility in analyzing complex models, nonlinear relationships, and heterogeneous data (Hair et al., 2014). Following the two-stage approach proposed by Anderson and Gerbing (1988), the analysis was divided into two phases: in the first phase, the measurement model was evaluated, while in the second phase, the structural model was estimated and analyzed in order to examine the causal relationships between the latent constructs.

Results. *The structure of the measurement model was evaluated through construct reliability and validity analysis. This procedure allows for verification of the consistency between empirical data and the hypothesized theoretical structure, evaluating the contribution of the indicators to their respective latent constructs (Brown, 2015).*

The factor loadings of the items are generally adequate, with values ranging from 0.60 to 0.94 (Hair et al., 2010). Composite reliability (rhoC) ranges from 0.74 to 0.93, above the recommended threshold of 0.70 (Hair et al., 2010). Convergent validity is also satisfied, with AVE values ranging from 0.56 to 0.86, above the minimum limit of 0.50 (Fornell and Larcker, 1981).

Cronbach's alpha exceeds the threshold of 0.70 for most constructs (Hair et al., 1998); for some slightly lower values, it was nevertheless decided to keep them in the model, considering the exploratory nature of the analysis and compliance with the composite reliability and AVE criteria (Hair et al., 2010).

Table 1 shows the values of factor loadings, Cronbach's alpha (α), composite reliability (ρc), and AVE for each construct considered in the model.

Table 1. Reliability and validity test

Construct	*Alpha*	*rhoC*	*AVE*
PEC	*0.885*	*0.921*	*0.745*
DA1	*0.627*	*0.795*	*0.566*
DA2	*0.641*	*0.780*	*0.474*
DS1	*0.586*	*0.827*	*0.705*
DS2	*0.553*	*0.815*	*0.688*
VP1	*0.480*	*0.765*	*0.630*
VP2	*0.767*	*0.894*	*0.808*
EBR	*0.639*	*0.845*	*0.732*
EPB	*0.697*	*0.864*	*0.762*
EDP	*0.853*	*0.931*	*0.872*
EW	*0.315*	*0.745*	*0.593*
SD	*0.843*	*0.927*	*0.864*
SDE	*0.418*	*0.745*	*0.608*
NSI	*0.846*	*0.928*	*0.866*

The relationships hypothesized in the model were tested using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS software. Subsequently, to assess the significance of the estimated coefficients, a bootstrap procedure with 5,000 resamples and two-tailed tests was applied, in line with the methodological guidelines in the literature (Hair et al., 2010).

The model's results reveal several significant relationships among the variables analyzed, providing empirical support for some of the hypotheses formulated.

First, the perceived economic convenience (PEC) emerges as one of the main predictors of economic rebound effects. In particular, PEC positively influences both the behavioral and psychological dimensions of economic rebound. This result provides partial support for hypothesis H1, as perceived convenience significantly affects the economic dimension of rebound, while no significant effects emerge on the social and environmental dimensions.

The complementary use of both sharing economy platforms and traditional goods (DS2), on the other hand, influences environmental waste (EW). Therefore, the study provides partial support for hypothesis H2, suggesting that when platforms are used as a complement rather than a substitute for traditional forms of consumption, environmental rebound effects may emerge. Value-oriented adoption drivers (DA1), such as the pursuit of cost savings, also have a positive effect on behavioral economic rebound. This suggests that motivations related to cost savings and perceived value may encourage greater use of sharing economy platforms and, consequently, foster trends toward increased consumption. Therefore, hypothesis H3 is partially confirmed, as adoption drivers primarily influence the economic dimension of the rebound.

The platform's value proposition exhibits varying effects depending on its components. In particular, the functional dimension (VP1) is most strongly associated with economic and social rebound effects, while the experiential and emotional dimension (VP2) plays a particularly significant role in the model, positively influencing both economic and environmental rebound effects. These results suggest that the platform's value proposition may facilitate the generation of rebound effects.

Finally, with regard to the effects of social rebound, significant relationships emerge between the economic and environmental dimensions of rebound and certain manifestations of the social dimension. In particular, social disengagement (SDE) is influenced by psychological economic rebound and the perception of environmental waste. At the same time, social distrust (SD) is positively associated with both the perception of environmental harm and the perception of waste.

The structural model explains a significant portion of the variance, particularly for behavioral economic rebound ($R^2 = 0.458$). Slightly lower values emerge for the psychological economic rebound ($R^2 = 0.237$) and for the social effects, with R^2 equal to 0.205 for SR1, 0.246 for SR2, and 0.232 for SR3. However, these values are close to the 30% threshold, which is generally considered satisfactory in social and behavioral science studies, confirming the robustness of the estimated model (Hair et al., 2010). The environmental rebound dimension is less well explained, with R^2 equal to 0.040

for ENVR1 and 0.116 for ENVR2; however, interesting significant relationships emerge, suggesting the possible presence of additional relevant predictors for these dimensions.

Table 2. Hypothesis testing

Path	β	p
PEC → EBR	0.397	.000
PEC → EPB	0.358	.000
DS2 → EW	0.147	.039
DA1 → EBR	0.172	.018
VP1 → EBR	0.127	.053
VP1 → SDE	0.160	.032
VP2 → EPB	0.196	.003
VP2 → EBR	0.130	.013
VP2 → EDP	0.173	.035
VP2 → EW	0.224	.002
EPB → SDE	0.189	.006
EBR → EW	0.192	.052
EW → SDE	0.180	.003
EW → SD	0.188	.009
EW → NSI	0.189	.008
EDP → SD	0.263	.000
EDP → NSI	0.310	.000
EDP → SDE	0.125	.052

To verify whether the platform's industry sector is a predictor of rebound effects, a one-way ANOVA analysis was conducted, a statistical technique used to compare differences between the means of several independent groups.

The results highlight differences between sectors for certain rebound dimensions. In particular, economic rebound effects (EBR and EPB) are higher in the food sector. With regard to social rebound, significant differences emerge for the dimension of social disengagement (SDE), which is more pronounced in the second-hand and food sectors. Finally, with regard to environmental rebound, the dimension of environmental waste (EW) shows higher levels in the food sector.

Therefore, H5 is partially confirmed, and only with regard to the economic rebound effect. With regard to H6, the results of the ANOVA analysis do not reveal any statistically significant differences among the various geographic contexts considered (small, medium, and large towns); therefore, H6 is not supported.

Table 3. One-way ANOVA

	Second-hand		Accommodation		Mobility		Food		ANOVA one-way	
Rebound effect	μ	ds	μ	ds	μ	ds	μ	ds	F	p
EBR	3.394	0.980	3.098	0.955	2.312	0.948	3.625	0.762	10.140	<0.001
EPB	3.028	1.093	2.866	1.110	2.375	0.967	3.312	0.957	3.678	0.006
SD	2.156	0.811	1.991	0.887	1.859	0.864	2.016	0.828	1.282	0.277
SDE	3.230	0.881	2.973	1.085	2.625	1.157	3.203	0.966	3.070	0.017
NSI	1.628	0.730	1.741	1.049	1.766	1.016	1.641	0.825	0.341	0.850
EDP	2.234	1.024	2.071	1.089	2.219	1.077	1.734	0.898	1.752	0.139
EW	2.702	0.965	2.580	0.994	2.375	1.000	3.094	0.875	2.494	0.043

Overall, the results show that rebound effects in sharing economy platforms emerge from a complex dynamic between users' economic motivations, platform value strategies, and how services are used. In particular, the perceived economic convenience of the platform remains one of the main factors fueling economic rebound, suggesting that the savings generated by using the platform tend to translate into increased consumption or greater spending power. At the same time, value-oriented adoption drivers, such as the search for convenience or the perceived choice of sustainability, also contribute to amplifying these dynamics.

The experiential and emotional value proposition of platforms also plays a particularly important role, not only reinforcing the effects of economic rebound but also contributing to an increase in the size of the environmental rebound, both in terms of perceived environmental damage and waste generated. This suggests that platforms that emphasize experiential and relational dimensions can indirectly stimulate higher levels of consumption or service use.

The results also show that the different dimensions of rebound do not operate in isolation but are interconnected. In particular, economic and environmental effects tend to propagate into the social dimension: perceived environmental waste and psychological economic rebound are associated with higher levels of social disengagement, while the perception of environmental damage and waste is also linked to higher levels of social distrust and a perception of negative social impacts.

Research limitations. *This research is a part of a wider project aimed at investigating rebound effects in the SE domain. The questionnaire has thus been built basing on the merge of extant literature and the findings of a previous qualitative investigation with SE users. In this sense, the items do not always refer to established construct, which might have undermined the validity of the model. A second limitation comes from the research being based on self-reported behaviors which might be biased from individual perspectives and from social desirability.*

Managerial implications. *From a managerial point of view understanding consumer behavior in relation to the SE and the negative effects these behaviors might generate is of strategic relevance. In fact, platform managers can support consumer education towards a wiser use of SE platforms in order to mitigate the possible rebound effect that has the potential to nullify the benefits of the SE. This is particularly true when considering the link between the SE and sustainability, that has so far been highly debated. In fact, while some scholars pinpoint to their closeness, others claim that in the consumers' view the desire to adopt a more sustainable lifestyle is nothing more than a positive side effect of SE adoption.*

Originality of the paper. *The purpose of the research is to understand the rebound effect of the SE, adding on the field of research about its negative externalities at economic, environmental and social level that are referred to as its "dark side". The value of this research is manifold. From the academic perspective, the research allows to fill a gap about the investigation of the rebound effect in the SE domain. The interest towards the topic is witnessed by recent contributions where the need to go in depth in this analysis is raised. Moreover, some attempts have been made, resulting in the identification of specific effect and/or referring to specific product/service categories. Yet, a complete overview is currently lacking, while its development could benefit both scholars and practitioners. The research considers different industries of the SE, answering the call for future studies that integrate the ambivalent impact that is generated relating to different product/service categories.*

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Unveiling Systemic Trade-offs in the Dairy Industry: Beyond Local Optimization of Sustainability Performance

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Abstract. *The dairy sector represents a vital socio-economic engine but faces significant environmental pressures. While Sustainability Performance Measurement Systems are essential for managing Triple Bottom Line performance, current literature highlights a profound methodological fragmentation. This study employs a Systematic Literature Review of 76 peer-reviewed articles to map how sustainability is operationalized across the supply chain. Findings reveal a dominant eco-efficiency logic, where environmental metrics are systematically paired with economic indicators, while the social dimension remains a marginalized pillar, rarely treated as a performance-driven metric.*

Crucially, the research investigates the interaction dynamics between sustainability dimensions in each study, specifically analyzing whether economic, environmental, and social goals result in synergies or trade-offs. Using Fisher's Exact Test, the study statistically validates a structural break: while localized, single-stage assessments frequently report synergies, 100% of end-to-end systemic studies identify trade-offs ($p < 0.05$). This evidence suggests that win-win scenarios are often artifacts of narrow analytical boundaries. For managers, these results necessitate a transition from fragmented optimization toward the strategic governance of systemic frictions.

Keywords: *Dairy Supply Chain; Sustainability; Triple Bottom Line; Performance Measurement; Sustainability Measurement; Performance Indicators*

Framing of the research. The dairy sector represents a critical nexus within global food systems, playing a dual role as both a vital socio-economic engine and a significant environmental pressure point (McGarr-O'Brien et al., 2023). From a socio-economic perspective, dairy is key for global food security and nutrition, and a fundamental pillar for rural livelihoods and economic resilience, contributing directly to multiple Sustainable Development Goals (Gliszczyńska-Świgło et al., 2023; Wattiaux, 2023). However, this economic importance is mirrored by substantial environmental challenges: the sector is responsible for a huge portion of total GHG emissions, exerting also significant pressure on natural resources through high freshwater consumption, extensive land use, and energy-intensive processing stages. Consequently, the dairy sector is considered a critical arena for global sustainability planning (Ineichen et al., 2022).

In light of these pressures, implementing rigorous sustainability assessment frameworks is now a strategic necessity: such systems provide the objective evidence required to move beyond descriptive analysis toward actionable management interventions. Hence, Sustainability Performance Measurement Systems (SPMS) are essential for monitoring and managing Triple Bottom Line (TBL) performance (Carvalho et al., 2022). Their strategic value lies in their ability to enable tailored evaluations across the supply chain, converting sustainability scores into actionable knowledge for strategic decision making (Damtof et al., 2025; Nappi et al., 2024). By providing a structured architecture of Key Performance Indicators (KPIs), SPMS allow managers to align targeted interventions with corporate strategy and context, ensuring that sustainability goals are integrated into the firm's value proposition (Damtof et al., 2025).

However, despite the acknowledged importance of such systems, current scientific literature highlights a profound methodological fragmentation that limits their effectiveness. Many indicators used in the dairy sector are described as fragile and in their initial stages, often proving insufficient for a holistic assessment of the industry (Feil et al., 2020; Carvelho et al., 2022).

In a management context, such fragmentation acts as a barrier to coordination, obscuring the real impact of sustainability efforts and making it difficult to achieve a consistent and comparable assessment across different supply chain stages. Ultimately, the industry lacks a coherent sustainability language, which hinders the strategic ability to track and manage performance from farm to fork as a unified value chain.

Purpose of the paper. This study is part of a broader research project aimed at defining a comprehensive framework for sustainability management within the dairy industry. Given the significant methodological fragmentation identified in literature, the purpose of this research is to provide a synthesis of how sustainability is operationalized and managed across the sector. Particularly, this paper seeks to map research efforts to clarify the locus of sustainability assessment across supply chain stages. In a management perspective, this mapping identifies where sustainability efforts are concentrated, revealing whether the industry is driven by a logic of fragmented optimization or a more advanced systemic coordination. Moving beyond a static categorization, the research investigates the relational dynamics between sustainability dimensions, exploring whether the reported interaction results in synergies or trade-offs depending on the analytical scope. In doing so, the research reveals how system boundaries can bias perception of performance, helping managers to distinguish between localized successes and systemic trade-offs.

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Methodology. This study employs a Systematic Literature Review methodology, strictly following PRISMA guidelines (Page et al., 2021) to ensure transparency and scientific validity.

Conducted in April 2025, the search utilized Scopus and Web of Science, targeting the intersection of the dairy supply chain with sustainability metrics, KPIs, and reporting frameworks.

The selection process followed a two-stage protocol to ensure thematic alignment with research goals. Initially, titles and abstracts were screened, requiring an explicit focus on the sustainability, contextual relevance to the dairy or agri-food sector, and the use of structured methods. Studies focusing strictly on technical efficiency or purely descriptive historical trends were excluded. The second phase of full-text assessment ensured that the empirical content substantiated the claims made in the abstracts, filtering out papers that were overly conceptual, lacked operational metrics, or were too technically granular for strategic application, resulting in a final sample of 76 documents. For each article, the following variables were extracted: Sustainability Coverage; Supply Chain Stage; Interaction Dynamics (Synergies vs. Trade-offs).

The analysis was structured to evaluate both the scope and the nature of sustainability measurement. Initially, a descriptive analysis was performed to evaluate how the literature adheres to the TBL paradigm. Studies were disaggregated by sustainability dimensions, identifying whether they focus on single pillars or integrated frameworks, and by supply chain stages, providing a visual and quantitative assessment of the distribution of sustainability goals across the value chain. Moving beyond this static map, the study investigates the relational dynamics between sustainability dimensions. Given that most research utilizes multi-dimensional frameworks, it is essential to clarify the nature of the reported interactions, specifically whether the pursuit of sustainability goals results in Synergies or Trade-offs. To determine if these outcomes are structurally dependent on the analytical scope, an inferential statistical framework was applied. The Upstream, Midstream, and Downstream stages were aggregated into a Single-Stage cluster and compared against the End-to-End cluster. A Fisher's Exact Test was performed on the resulting 2x2 contingency table. This specific test was selected over the Pearson's Chi-square test for two critical reasons:

- sample size constraints: the limited size of the End-to-End cluster (n=6) makes the large-sample approximations of the chi-square test unreliable;
- zero-frequency cells: the presence of a zero-frequency cell (0 Synergies in the End-to-End group) violates the fundamental assumptions of chi-square.

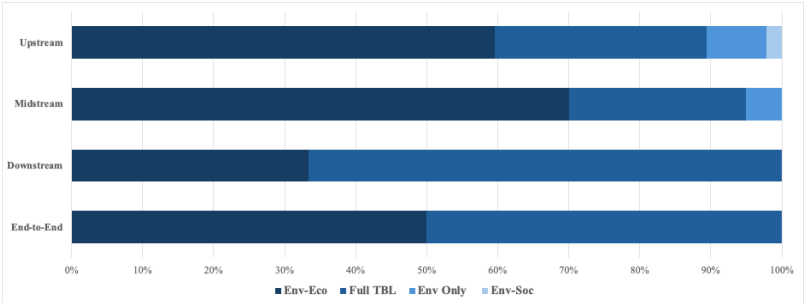
This approach ensures a mathematically rigorous validation of how system boundaries influence the nature of sustainability interactions reported in the literature.

Results. The analysis of sustainability dimensions reveals a significant structural imbalance within the selected literature. The dominant logic identified is centered on Eco-Efficiency (60%, n=46), where environmental metrics are systematically paired with economic indicators. Integrated sustainability approaches, defined as Full TBL, account for 32% of the sample (n=24). Notably, the social dimension emerges as the missing pillar of the discipline: actually, the analysis shows a complete absence of independent social investigations, with no studies focused exclusively on social metrics and the Environment-Social (Env-Soc) configuration being virtually non-existent (n=1). The remaining studies of the sample (n=5) focuses exclusively on environmental metrics, adopting a one-dimensional approach without integrating economic or social factors.

These data indicate that literature prioritizes operational efficiency, defined as doing more with less cost, while treating social equity as a secondary or optional layer: this marginalization is not merely a quantitative gap but reflects a hierarchy in research priorities, suggesting that the social is often treated as a qualitative narrative rather than a performance-driven metric.

Disaggregating TBL configurations by supply chain stage (Fig. 1) reveals structural homogeneity. The Eco-Efficiency paradigm prevails across most operational stages, particularly dominating the Upstream and Midstream sectors. In these phases, which focus on production and processing, sustainability is operationalized primarily as technical efficiency.

Figure 1: Distribution of TBL dimensions across dairy supply chain tiers



Source: Authors' own elaboration.

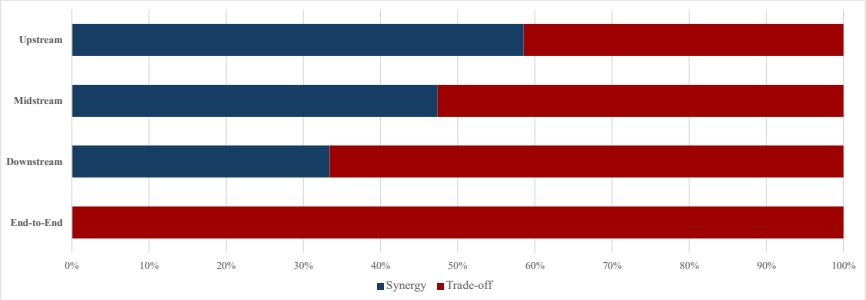
The only notable exception occurs at the Downstream stage, where the Full TBL configuration appears to prevail over the Eco-Efficiency logic. However, this deviation must be interpreted with caution due to the marginal representativeness of this cluster (n=3). Crucially, even within the End-to-End cluster, which encompasses the entire system and its

stakeholders, the adoption of a comprehensive Full TBL framework is not the default standard. This confirms that the marginalization of social equity is a systemic feature of the current literature, framing sustainability through resource efficiency rather than holistic well-being.

The analysis further explores the dynamic interactions between dimensions, classifying outcomes as Synergies (simultaneous improvements) or Trade-offs (conflicts or negative side effects), based on the explicit qualitative assessments of the original authors. To maintain methodological consistency, single-dimension studies and the non-representative Env-Soc (n=1) configuration were excluded. As a result, the analysis focused exclusively on the Env-Eco and Full TBL frameworks.

The relationship between Interaction Dynamics and Supply Chain Stage reveals a radical polarization between local and systemic perspectives (Fig. 2). When the analysis is confined to a single stage, the literature reports a significant presence of both Synergies and Trade-offs. The Upstream appears to be the most optimistic, with Synergies prevailing over Trade-offs, a trend likely driven by the intrinsic alignment between farm-level resource efficiency and cost reduction, where optimization naturally translates into economic benefit. However, a drastic shift occurs as analytical boundaries expand to an End-to-End perspective: the reported possibility of Synergy vanishes, with 100% of systemic studies identifying Trade-offs. This evidence suggests that win-win scenarios are primarily phenomena of local scope, which lose viability when the supply chain is evaluated as a holistic, interconnected system. Complexity, in this context, acts as a filter that reveals the underlying structural frictions between profitability and planetary boundaries that remain obscured in localized assessments.

Figure 2: Distribution of synergies and trade-offs across dairy supply chain tiers



Source: Authors' own elaboration

To validate this dichotomy, a Fisher's Exact Test was performed by aggregating the Upstream, Midstream, and Downstream stages into a Single-Stage cluster (n=63) and comparing it against the End-to-End cluster (n=6). The test yielded a statistically significant result ($p = 0.0248$, $p < 0.05$), confirming that the observed pattern is not random: the expansion of system boundaries to the End-to-End level is a statistically significant predictor of trade-offs.

Hence, the evidence confirms a structural break determined by the scope of analysis. While local optimizations allow for the alignment of competing goals in almost half of single-stage research, this flexibility vanishes in holistic assessments, confirming the idea that complexity acts as a filter, inevitably revealing the underlying structural conflicts between profitability, planetary boundaries, and social equity that remain partially hidden in localized analyses.

Research limitations. Based on the systematic selection process and the resulting analytical framework, several limitations should be acknowledged. First, a primary constraint involves the statistical sample size of the End-to-End cluster. While the Fisher's Exact Test was specifically selected to ensure mathematical validity when dealing with small groups and zero-frequency cells, the limited number of systemic studies (n=6) may constrain the generalizability of the findings regarding the absolute prevalence of trade-offs at the supply chain level. Second, the use of the 2024 ABS Academic Journal Guide as a quality filter, while essential to ensure a strategic and managerial focus, may have excluded high-quality technical, agronomic, or engineering-focused studies that might offer different perspectives not yet codified within business and management literature. Finally, the classification of interactions into Synergies and Trade-offs relies on the explicit qualitative assessments provided by the original authors, assuming a level of terminological consistency across diverse research groups that may not be absolute.

Managerial implications. This research statistically demonstrates that sustainability outcomes are inherently scale-dependent: interactions that can appear as win-win at a single stage tend to dissipate when the system is analyzed in its entirety, suggesting that sustainability is not a sum of local efficiencies, but a systemic balance. Beyond technical measurement, these findings call for a paradigm shift carrying profound implications for supply chain strategy: managers must transition from a logic of isolated optimization to one of strategic orchestration, addressing the synergy illusion of localized gains. In terms of supply chain management, focusing exclusively on localized operational efficiency can lead to myopia and managers risk inadvertently shifting environmental or social burdens to other stages of the dairy chain, creating negative externalities that remain invisible within fragmented performance assessments. These systemic frictions, if left unmanaged, represent a significant strategic risk to the long-term stability of the sector. Consequently, in this holistic

view, the ability to govern interdependencies across the value chain replaces simple operational excellence as the true source of competitive advantage. Competitiveness, therefore, no longer resides in the efficiency of a single node, but in the strategic orchestration of the entire system's frictions.

This shift underscores the urgent need to move toward co-opetition and shared governance models, where implementing inter-stage performance measurement systems is essential not just for monitoring, but for negotiating shared solutions that distribute the weight of identified trade-offs equitably. Furthermore, ignoring these systemic tensions exposes the firm to unpredictable supply and market risks that, for instance, can arise when an economic improvement at one stage triggers environmental or social fragility at another, compromising the entire chain's resilience. Consequently, trade-off analysis must be deeply integrated into strategic planning processes, prompting managers to evaluate sustainability initiatives not only for their immediate gains but for their fundamental contribution to the long-term stability and health of the entire production system.

Finally, the study highlights that the social dimension remains a marginalized pillar, creating a blind spot in governance and suggesting that social equity is treated as a secondary layer rather than a core strategic driver for sector stability. From a management perspective, elevating the social dimension to a strategic priority is not merely an ethical choice, but a necessity for the regeneration of the human and social capital upon which the entire dairy ecosystem depends, addressing systemic risks related to labor, rural resilience, and social equity.

Originality of the paper. The originality of this research lies in its ability to expose the scale-dependency of sustainability narratives within the dairy sector. While other systematic reviews have focused on categorizing indicators or mapping general trends, this study provides a unique contribution by identifying a complexity threshold. It demonstrates that the viability of the win-win paradigm is often an artifact of localized analysis, which tends to dissolve when the dairy supply chain is evaluated as a holistic, interconnected system. Furthermore, by statistically validating the synergy illusion, the paper challenges current managerial orthodoxy, shifting the focus from fragmented optimization to the mandatory management of structural tensions. This work thus moves the conversation from a descriptive mapping of KPIs to a deeper understanding of the structural tensions that define the path toward truly integrated sustainability, providing a new conceptual lens through which to recognize that sustainability is not merely the sum of local efficiencies, but rather the strategic resolution of systemic frictions.

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Short papers

Track:
Tourism & Culture Management



Artificial Intelligence and Digitalisation in the Tourism Sector: Strategies for a Sustainable Future in the Travel Industry

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Abstract. *Tourism is one of the fastest growing sectors globally, but increasing demand and environmental pressures make the transition to sustainable models increasingly necessary. This paper, intended as a preliminary phase of a project that will involve future empirical validation, examines how digitalisation and artificial intelligence (AI) technologies can provide a structured response to these challenges, analysing concrete applications, scientific literature and three international case studies. The research highlights how AI can be understood not only as a tool for operational efficiency, but also as a catalyst for the environmental, economic and social sustainability of tourism.*
Keywords: *artificial intelligence; sustainable tourism; digitalisation; machine learning; smart tourism destination*

Framing of the research. *The global tourism sector is facing dual pressure: on the one hand, exponential growth in demand; on the other, the need to reduce the negative socio-economic and environmental impacts generated by mass tourism. External factors such as geopolitical instability, climate change, health crises and economic crises make the sector particularly vulnerable (Garcia Madurga and Grillo Méndez, 2023) . In this context, the fourth industrial revolution — known as Industry 4.0 — and the spread of technologies such as artificial intelligence, machine learning and big data offer concrete tools to address these critical issues (Zeqiri et al., 2020). Being able to predict tourism demand and adapt quickly to market changes is becoming more important than ever to ensure the competitiveness and resilience of the sector (Ali Louati et al., 2024).*

Tourism has already been transformed by three previous technological trends — Global Distribution System, Central Reservation System and the Internet — which have connected destinations and operators globally, radically changing the way travellers make their decisions (Zeqiri et al., 2020). Now, with the advent of AI, we are facing a fourth transformation, potentially more profound than the previous ones, capable of affecting not only management processes but also the tourist experience, cultural heritage conservation and destination governance (Garcia Madurga and Grillo Méndez, 2023). Technologies such as Cyber Physical Systems, augmented reality, virtual reality and robotics are components of Industry 4.0 that will profoundly change the tourism sector, contributing to the decline of mass tourism and promoting individual and sustainable experiences (Zeqiri et al., 2020).

The spread of the internet and social media has radically changed the decision-making process of travellers, who now search for and plan their experiences online. User-generated content and social media marketing significantly influence tourists' choices, making behavioural analysis a strategic factor for businesses in the sector (Ali Louati et al., 2024). AI has the ability to analyse these behaviours, anticipate trends and offer personalised responses in real time. This work fits into this framework, with the aim of systematically analysing the potential and critical issues of AI applied to sustainable tourism, offering a contribution that links the theoretical dimension to the applicative and managerial dimensions. It should be noted that this is a work in progress: the theoretical framework and comparative analysis of the case studies have been established, but the collection and empirical validation of the primary data are still ongoing; therefore, the results presented here are preliminary and may be further explored in subsequent stages of the research.

Purpose of the paper. *The main objective of the research is to understand how digitisation and the application of artificial intelligence-based technologies can contribute positively to transforming the tourism industry into a sustainable and long-lasting model. In particular, the study aims to: (1) analyse existing scientific literature on AI applied to tourism; (2) examine the main technological applications already in use in the sector, from service personalisation to revenue management, from chatbots to cultural heritage management; (3) assess the concrete impact through three international case studies from different geographical contexts — China, Spain and Saudi Arabia — in order to obtain comparative and multidimensional feedback and provide a solid theoretical basis for future empirical research.*

The work aims to answer the following research question: to what extent can technologies based on artificial intelligence and machine learning support the development of sustainable tourism, and what are the organisational, institutional and technological conditions necessary for this transition to be effective, inclusive and lasting?

The theoretical and practical relevance of the topic is considered to be significant: scholars, tourism businesses, destinations and policy makers need to explore the analytical and practical tools available to guide their strategies in a context of rapid technological change. The study aims to help meet this need by offering an integrated framework that links academic research and operational applicability, with a particular focus on small businesses that are often excluded from the debate on technological innovation in tourism. The ultimate goal is to demonstrate that AI is not only a lever for efficiency, but can also become the driving force behind a structural transformation of tourism towards environmental, economic and social sustainability.

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Methodology. *The research adopts a methodological design structured on two complementary levels: a Systematic Literature Review (SLR) conducted according to the criteria of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol and a multi-case comparative analytical framework. This combination makes it possible to overcome the limitations of purely descriptive approaches, ensuring methodological rigour in the selection and analysis of sources and interpretative soundness in the evaluation of empirical results.*

The SLR was conducted through a three-stage structured procedure. In the identification phase, the bibliographic search covered the main international academic databases — Scopus, Web of Science, Google Scholar and EBSCO — using Boolean search strings built around the key descriptors: "artificial intelligence", "tourism", "sustainability", "machine learning", "smart tourism destination", "digitalisation" and "big data". In the screening phase, the identified contributions were evaluated by title and abstract, excluding works not relevant to the thematic scope of the research. In the eligibility phase, only peer-reviewed contributions published in indexed journals were included, with a time frame mainly between 2018 and 2025, with the exception of seminal works in the field (Anderson and Xie, 2010; McCarthy et al., 2006). The final corpus consists of over 45 scientific contributions covering the thematic areas of personalisation of the tourist experience, AI-based revenue management, chatbots and virtual assistants, predictive analytics and big data, virtual tourism and digital cultural heritage.

The second methodological level consists of a multi-case comparative analytical framework, inspired by Yin's (2014) approach to case study research. Three international case studies with marked contextual heterogeneity were selected: China (Song and Chen, 2025), representative of a continental-scale domestic tourism market; Alpujarra in Spain (Flores Crespo et al., 2022), emblematic of the challenges faced by small rural European destinations subject to overtourism; and Saudi Arabia (Ali Louati et al., 2024), an example of a rapidly expanding post-pandemic destination with a national sustainable tourism strategy. The geographical, dimensional and institutional diversity of the three contexts was deliberately sought in order to maximise the variance of the cases and strengthen the analytical generalisability of the results, in line with the replication logic inherent in the multi-case design.

Each case was analysed using a grid of comparable variables: AI technologies implemented or proposed, stated sustainability objectives, data collection and analysis methodology, results obtained, limitations recognised by the authors, and implications for tourism management and governance. The analytical grid allowed us to conduct both a within-case analysis, exploring the specificities of each context, and a cross-case analysis, aimed at identifying cross-cutting patterns, convergences and divergences between the three cases. The triangulation between the results of the SLR, the evidence from the case studies and the technological applications described in the literature ensures greater interpretative robustness of the overall research results.

Results. *Analysis of the literature and case studies shows that AI applied to tourism has positive effects in several areas: operational, environmental, economic and relational. At the operational level, hybrid recommendation systems, chatbots and AI-based revenue management tools improve process efficiency and service quality (Nugroho et al., 2024; Hanji and Hanji, 2023; Millauer and Vellekoop, 2019). Chatbots, in particular, enable automated management of bookings, 24-hour assistance and check-ins, reducing time and operating costs (Benaddi et al., 2024). The use of AI reduces the time spent making travel reservations by almost 90% (Chen and Prentice, 2024), and platforms such as Booking.com already use AI-based chatbots to analyse user search histories and preferences, offering personalised destinations and accommodation in real time (Chen et al., 2022).*

Revenue management systems are another area where AI is producing significant results. First developed in the airline industry some sixty years ago and subsequently adopted in the hotel sector, these tools have evolved from simple occupancy management to dynamic price optimisation (Millauer and Vellekoop, 2019). AI-based automated revenue management systems effectively and accurately analyse a much larger number of variables than human operators, objectively choosing the options most in line with the company's strategy. For large hotel chains, automation allows the revenue of all properties to be managed with a small number of central supervisors; for smaller businesses, it allows them to gain independence without resorting to expensive external services (Millauer and Vellekoop, 2019). Furthermore, integration with big data allows for the development of customised packages and pricing strategies tailored to each customer segment, while maximising guest satisfaction and company revenue.

On the environmental front, the Chinese case study conducted by Nanchang University (Song and Chen, 2025) demonstrates a positive and statistically robust correlation between AI adoption and improved carbon efficiency in tourism (Tourism Carbon Efficiency, TCE). The study, based on panel data from Chinese provinces, identifies three main channels through which AI promotes TCE: improving tourism labour productivity, rationalising the industry structure, and advances in tourism technology. The researchers verified the robustness of the results through endogeneity tests and excluded data relating to the pandemic period (2020-2022), still obtaining positive TCE regressions. A significant geographical propagation effect was also found: the development of AI in one region contributes to the improvement of TCE in adjacent areas as well, highlighting the importance of interregional cooperation in the sustainable development of tourism. Tourism is responsible for 8% of global greenhouse gas emissions (Song and Chen, 2025) — significantly higher than many other sectors — and these results indicate that AI can become a key tool in the fight against carbon inefficiency. However, the study warns that disproportionate and uncontrolled growth of AI could in turn increase energy consumption and pollution, thus requiring a balanced and monitored approach.

The case study on Saudi Arabia, conducted by Prince Sattam bin Abdulaziz University (Ali Louati et al., 2024), demonstrates how machine learning algorithms applied to real tourism data — 72 monthly data points collected between 2016 and 2021 in collaboration with the Saudi Tourism Authority — can be used to predict tourism trends up to 2030 with a high degree of accuracy. The researchers analysed four categories of flow: inbound tourism, domestic tourism, national tourism and outbound tourism, examining their evolution in three distinct periods — pre-pandemic, pandemic and post-pandemic. The results show that machine learning predictive models are particularly useful for managing economic fluctuations, anticipating periods of high demand and optimising resource allocation. Predictive analysis also makes it possible to forecast areas of growth in the sector and plan for labour needs before they arise (Ali Louati et al., 2024), with important implications for the economic and social sustainability of destinations. The Saudi case is also emblematic of the institutional collaboration between universities and public tourism authorities, which has provided access to a large and reliable dataset: a model of public-private partnership that could be replicated in other national contexts.

The Spanish case study on Alpujarra (Flores Crespo et al., 2022), conducted by the University of Granada, addresses an issue often overlooked by academic research: the impact of mass tourism on small rural communities. The Alpujarra region, at the foot of the Sierra Nevada, consists of the villages of Pampaneira (313 inhabitants), Bubión (361 inhabitants) and Capileira (559 inhabitants), which together form a single tourist hub with only 43 accommodation facilities. Seasonal overcrowding causes a shortage of parking spaces, difficulties for residents, job instability for local operators and the risk of degradation of the natural and cultural heritage. The solution proposed by the researchers is the creation of a scalable Smart City framework, based on the installation of cameras and sensors capable of detecting vehicle number plates, monitoring tourist movements and measuring footfall in local businesses. The system, integrated with machine learning algorithms — and with Generative Adversarial Networks (GAN) to generate synthetic data where real data is insufficient — would make it possible to predict tourist flows, estimate parking occupancy, distribute visitors along alternative routes and adopt sustainable flow management policies. The researchers point out that, if successfully applied, this solution could be transferred to other small rural areas with similar characteristics, representing a turning point for tourism governance in small villages.

Across the three cases and the literature analysed, some common trends of great significance emerge. First, big data is confirmed as an essential enabler of AI: predictive analysis, service personalisation and sustainable resource management depend on the availability, quality and accessibility of data (Hartatik et al., 2024). Secondly, the growing importance of Smart Tourism Destinations (STDs) is emerging, i.e. destinations that combine personalised experiences with sustainable growth policies: cities such as Singapore, Amsterdam, Málaga, Seoul and Busan are already using AI to improve economic, environmental and administrative sustainability (Florido Benítez and De Alcaraz Martínez, 2024). Thirdly, virtual tourism and the digitisation of cultural heritage are opening up new prospects for reducing physical mass tourism by offering immersive experiences with low environmental impact: the virtual tourism market, valued at around £10 billion in 2024, is set to reach £19 billion by 2035 (Siddiqui et al., 2022). Finally, there is a strong need to balance automation and human interaction: the personal touch remains an essential element of the tourist customer experience, especially in the luxury segment, where establishments such as Four Seasons Hotels and Resorts adopt AI for tailored recommendations but emphasise the importance of human contact as a distinctive element of service (Al-Hyari et al., 2023; Nugroho et al., 2024). Table 1 shows a comparative summary of the case studies, highlighting the main elements analysed for each of them and the related results.

Table 1 – Comparative summary of case study results

Dimension	Cina (Song e Chen, 2025)	Spagna – Alpujarra (Flores Crespo et al., 2022)	Arabia Saudita (Ali Louati et al., 2024)	Common trends
AI technologies used	Econometric models and panel data; predictive algorithms on Chinese provinces	ML, GAN for synthetic data, IoT sensors and smart cameras	Machine learning (regression, classification), predictive analysis on tourism big data	Big data, ML, IoT, chatbot, revenue management IA
Sustainability goal	Carbon emissions reduction in tourism (TCE)	Sustainable management of flows in small rural communities	Resilience and post-pandemic recovery; economic and environmental sustainability	Operational efficiency, reduced environmental impact, customisation
Main results	Positive correlation between AI and TCE; interregional geographical propagation effect	Scalable framework for forecasting flows, parking spaces and tourist distribution	Tourism forecast for 2030; resource optimisation and work planning	AI as a driver of efficiency and sustainability; STD as an emerging model

Dimension	Cina (Song e Chen, 2025)	Spagna – Alpujarra (Flores Crespo et al., 2022)	Arabia Saudita (Ali Louati et al., 2024)	Common trends
Limits	Data limited to China; AI energy impact not measured	Sensor network not yet installed;	Insufficient real data Privacy and data extrapolation difficulties;	Lack of direct empirical data; limited geographical contexts
Managerial implication	Smart tourism policies; interregional cooperation; AI training	Open data and shared infrastructure for small villages; local governance	Replicable public-private partnership model; dynamic AI pricing	Balance between automation and human relations; transparency and privacy protection

Source: Author's elaboration

Research limitation and future directions. *This study has some limitations that should be explained. Firstly, despite the adoption of a structured SLR protocol, the research is based exclusively on secondary sources — scientific literature and published case studies — without direct collection of empirical data through surveys, interviews or field experiments. This limits the possibility of controlling contextual variables that are not observable in the analysed texts and of verifying the applicability of the results in specific contexts not examined by the available literature.*

Secondly, the selected case studies are relatively recent and are still in the preliminary stages of technological implementation. The Spanish case of Alpujarra (Flores Crespo et al., 2022) had not yet completed the installation of the physical sensor network at the time of publication of the study, making the available results predominantly conceptual in nature and not yet empirically validated on a real scale. The novelty of the technologies analysed does not yet allow for sufficient longitudinal data to assess the sustainability and effectiveness of the interventions in the long term: a longer time horizon will be necessary to distinguish structural effects from cyclical ones.

Thirdly, each of the three case studies is geographically and culturally limited — China, Spain, Saudi Arabia — and is affected by the specific regulatory, institutional and economic characteristics of their respective national contexts. As recognised by the authors of the cases analysed, the transferability of the results to other tourism markets requires caution and further empirical verification (Song and Chen, 2025; Ali Louati et al., 2024). The Chinese case, in particular, is based on panel data relating to a political-economic system with characteristics that are difficult to replicate in Western contexts or in developing countries, limiting the generalisability of its policy implications.

A fourth limitation concerns the energy dimension of AI, which the case studies analysed do not adequately measure. The increase in the adoption of AI technologies — in particular deep learning models and the data centres needed to train them — entails growing energy consumption which, in the absence of infrastructure powered by renewable sources, could partially contradict the environmental sustainability objectives pursued (Song and Chen, 2025) . This trade-off between tourism carbon efficiency and the energy footprint of AI is a critical variable that future research will need to address using Life Cycle Assessment (LCA) methodologies specifically adapted to the context of digital tourism.

The limitations identified open up a number of promising avenues for future research. First, subsequent studies should integrate mixed methods research designs, combining SLR with quantitative surveys of samples of tourism businesses or destinations and qualitative research based on interviews with managers, destination managers and policy makers. This would allow for empirical testing of the causal relationships hypothesised in the literature between AI adoption and sustainability performance, overcoming the limitations of documentary analysis.

Secondly, it is necessary to broaden the geographical scope of the analysis to include contexts that have been underrepresented in the literature to date, such as South-East Asia, sub-Saharan Africa, Latin America and small tourist islands, which present unique sustainability challenges and levels of technological maturity that are very different from those of the case studies analysed. The construction of shared international datasets — through collaborations between universities, tourism authorities and international organisations such as the UNWTO — is a strategic priority for research in the sector (Ali Louati et al., 2024; Song and Chen, 2025).

Thirdly, future research should explore the dynamics of technology acceptance by tourists and industry operators, analysing how variables such as age, level of education, culture of origin and market segment influence the propensity to adopt AI tools. Customer attitudes towards new technologies range from enthusiasm to anxiety (Chen and Prentice, 2024), and understanding these mechanisms is key to designing implementations that maximise acceptance and minimise resistance.

Fourthly, the issue of the social sustainability of digital tourism — i.e. the impact of automation on employment, worker training and the redistribution of value generated by AI along the tourism supply chain — represents an urgent and still largely unexplored research agenda. The rapid growth of technology raises important questions about the future of human workers in the sector (Florido Benítez and De Alcaraz Martínez, 2024), and future studies will need to rigorously address the ethical and distributional dimensions of the digital transition in tourism. Finally, the development of regulatory frameworks and international standards for AI governance in tourism — balancing innovation, privacy,

transparency and inclusiveness — represents a frontier of interdisciplinary research involving management, law, computer science and social sciences.

In line with the work-in-progress nature of this contribution, the directions outlined above are not only suggestions for the scientific community but also represent the stages of the research path that the authors intend to follow in the next phases. In particular, the next planned developments concern the design of an empirical survey tool — questionnaire or interview grid — to be administered to managers and destination managers in European contexts, with the aim of validating in the field the theoretical hypotheses that emerged from the SLR and the comparative analysis of the case studies. This paper is therefore submitted to the scientific community of the conference with the explicit aim of gathering critical feedback to guide and enrich the next stages of the research.

Managerial implications. *The research results offer concrete and detailed guidance for managers in the tourism sector, smart tourism destinations and policy makers. Firstly, the adoption of AI systems for revenue management, experience personalisation and predictive demand analysis is a strategic competitive lever that can simultaneously improve operational efficiency and customer satisfaction (Millauer and Vellekoop, 2019; Nugroho et al., 2024). Tourism businesses that invest in these technologies reap tangible benefits: reduced operating costs, increased sales, optimised customer journeys and improved productivity (Florido Benítez and De Alcaraz Martínez, 2024).*

For hotel managers, implementing AI in revenue management requires a review of internal organisational processes: staff must be properly trained to interact with the new systems, handle customer requests generated by automation, and deal with any technical issues (Kaul, 2021). The transition to automated systems does not eliminate the need for human skills, but transforms their nature from operational to supervisory and strategic. Large hotel chains can centralise revenue management across all properties with a small number of specialists, while independent establishments gain the ability to compete on a more level playing field with the big players without incurring the costs of external consultants (Millauer and Vellekoop, 2019).

On the sustainability front, tourism authorities should integrate AI into their governance policies, promoting smart tourism and incentivising private operators to adopt data-driven technologies. The Chinese study (Song and Chen, 2025) suggests that policymakers should aim to create interregional tourism development alliances, maximising the geographical propagation effects of AI on TCE. In areas with insufficient tourism resources, priority should be given to investments in AI-based technologies; in areas where the impact is less discernible, greater attention should be paid to sustainable tourism projects that build fundamental capacities for the future. It would also be essential to invest in AI-oriented education and training programmes for tourism development, accelerating technological upgrading and improving energy efficiency.

For destinations experiencing overtourism — as in the case of Alpujarra — AI allows for more balanced monitoring and distribution of tourist flows, reducing the impact on local communities and ecosystems (Flores Crespo et al., 2022). This type of application is particularly relevant for small villages and rural areas, which are often excluded from technological innovation despite being among the most vulnerable to the negative effects of mass tourism. Local institutions should promote the availability of open data and the construction of shared digital infrastructure at the territorial level, lowering the barriers to access to technology for smaller operators. The use of Generative Adversarial Networks (GANs) to generate synthetic data where real data is insufficient is an innovative solution to overcome one of the main obstacles to the adoption of AI in small destinations (Flores Crespo et al., 2022).

On the cybersecurity front, managers need to be aware that increased digitalisation exposes accommodation facilities to growing risks: hotels handle large volumes of personal and financial data, making them potential targets for cyberattacks (Kaul, 2021). AI-based security systems are capable of analysing parameters such as access behaviour, IP address location and device used in real time, assigning risk scores and automatically activating protective measures in the event of suspicious activity. However, it is essential that these systems are implemented in a way that is transparent to users in order to maintain customer trust and comply with privacy regulations: higher levels of transparency and privacy protection lead to greater perceived value, trust and satisfaction among guests (Chen and Prentice, 2024).

Finally, for managers operating in the premium and luxury segments, the main challenge is to find the optimal balance between automation and human interaction. AI should enhance — not replace — the interaction between staff and guests, ensuring personalised experiences and simplifying operations, while preserving that human touch that remains the cornerstone of hospitality.

Originality of the paper. *The original contribution of this work lies in the integrated and comparative approach adopted in the analysis of AI applied to sustainable tourism. Unlike studies focused on individual technological applications or specific geographical contexts, this work offers an overview that links the literature review, the analysis of applications in use, and the comparative evaluation of three international case studies from contexts that are radically different in terms of size, culture, and stage of technological development.*

Particular attention is paid to small rural areas — often neglected by academic research, which tends to favour large urban centres — demonstrating how even contexts with limited resources can benefit from the implementation of smart technologies for sustainable tourism management (Flores Crespo et al., 2022). The work also contributes to the debate on the relationship between AI and environmental sustainability in tourism, providing empirical evidence on the correlation between AI adoption and improved carbon efficiency (Song and Chen, 2025).

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Artificial Intelligence and Small and Medium-Sized Enterprises in the Accommodation Sector. A Systematic Literature Review from an Economic and Managerial Perspective

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Abstract. ***Frame of the research****. The accommodation sector is a central component of tourism systems and, in many European contexts, is largely composed of SMEs facing digital transformation, sustainability pressures, changing customer expectations, and increasing uncertainty.*

Purpose of the paper*. This paper examines how the management and economics literature explains the role of artificial intelligence (AI) in shaping performance, customer experience, organizational structures, and strategic decision-making in the accommodation sector, with particular attention to SMEs.*

Methodology. *The study adopts a systematic literature review informed by PRISMA and SPAR-4-SLR principles. Peer-reviewed journal articles published between 2010 and early 2026 and indexed in Scopus and Web of Science were selected through a multi-stage process, resulting in a final sample of 95 articles.*

Results. *The findings identify four main dimensions of AI adoption: operational performance, customer experience, organizational transformation, and strategic decision-making. AI supports forecasting, revenue management, automation, personalization, review analytics, and market sensing, but its effects depend on data quality, managerial interpretation, organizational readiness, employee capabilities, customer trust, and ecosystem conditions.*

Research limitations. *The review is limited to English-language peer-reviewed articles indexed in two databases and excludes grey literature and purely technical studies.*

Managerial implications. *Accommodation SMEs should approach AI adoption as a staged, selective, and problem-driven process while preserving human hospitality and responsible governance.*

Originality of the paper. *The paper offers a sector-specific and SME-sensitive framework for understanding AI-enabled managerial transformation in accommodation firms.*

Keywords: *artificial intelligence; accommodation sector; tourism; SMEs; hospitality management; systematic literature review*

1. Framing of the research. The accommodation sector represents one of the most strategically relevant components of contemporary tourism systems, contributing to employment generation, local development, territorial competitiveness, and the valorization of cultural and environmental resources. In many European contexts, and especially in Southern Europe, the sector is largely composed of small and medium-sized enterprises (SMEs), including family-owned hotels, boutique properties, agritourism businesses, independent lodging providers, and locally embedded hospitality firms. These organizations play a crucial socio-economic role within destination ecosystems, but they often operate with limited financial resources, restricted access to specialized knowledge, weak digital infrastructures, and reduced economies of scale (Pencarelli, 2022).

Over the last decade, accommodation firms have been exposed to a set of interconnected pressures that are reshaping both tourism demand and managerial practice. These include the acceleration of digitalization, increasing sustainability requirements, changing customer expectations, labor shortages, demographic shifts, and geopolitical uncertainty affecting tourism flows and supply chains (Gössling et al., 2021; Sánchez-Sánchez et al., 2026). Within this evolving environment, artificial intelligence (AI) is emerging as a relevant driver of transformation, not only because it enables automation, but also because it changes how firms collect information, interpret markets, interact with customers, and organize decision-making processes.

AI refers to a broad family of technologies, including machine learning, predictive analytics, natural language processing, service robots, chatbots, recommendation systems, computer vision, and generative AI. These technologies allow firms to process large volumes of structured and unstructured data, automate repetitive tasks, support managerial decisions, and personalize services at scale (Davenport et al., 2020; Huang & Rust, 2021). In the accommodation sector, AI applications are increasingly visible in revenue management, demand forecasting, guest communication, online reputation monitoring, predictive maintenance, customer segmentation, dynamic personalization, energy management, and service automation (Ivanov et al., 2020; Verma et al., 2022).

However, AI adoption remains highly uneven. Large hotel chains and digital-native platforms are generally better positioned to exploit AI because they can rely on stronger technological infrastructures, larger datasets, dedicated analytics teams, and greater investment capacity. SMEs, by contrast, often face higher barriers connected to costs, limited

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digital skills, fragmented data, uncertainty about return on investment, and dependence on external technology providers (Tavanxhiu et al., 2026). This creates a dual-speed transformation dynamic that may widen competitive gaps within the sector.

For this reason, AI should not be interpreted merely as an operational tool or as a set of isolated technological applications. Its adoption raises broader questions about organizational learning, human-AI collaboration, managerial cognition, customer trust, ethical accountability, data governance, and the changing nature of hospitality work (Kabadayi et al., 2019; Sharma & Mattila, 2026). The accommodation sector therefore provides a particularly relevant context for examining AI as a managerial and socio-technical transformation, especially when the focus is placed on SMEs and their specific adoption pathways.

2. Positioning within existing literature and research gap. Research on AI in tourism and hospitality has expanded rapidly across several disciplinary domains, including tourism studies, hospitality management, information systems, service management, marketing, and strategic management (Mariani et al., 2023; Tuo et al., 2025). This growing body of literature has already been synthesized by recent reviews, which provide important but different contributions to the field. Doborjeh et al. (2022) review AI methods and applications across hospitality and tourism; Law et al. (2024) offer a state-of-the-art overview of AI research in hospitality; and Della Corte et al. (2025) identify future research directions through an umbrella review. While these contributions provide a valuable basis for understanding the evolution of the field, they mostly adopt broad tourism or hospitality perspectives. As a result, they tend to aggregate heterogeneous domains such as accommodation, restaurants, transport, platforms, destinations, and tourism marketing. This broad scope is useful for mapping the field, but it may obscure the distinctive managerial features of accommodation firms, which are characterized by service intensity, labor dependence, simultaneous production and consumption, strong experiential content, and a close relationship between physical spaces, digital touchpoints, and customer perceptions (Tussyadiah, 2020; Verma et al., 2022). These features influence how AI is adopted, evaluated, and integrated into managerial routines.

To clarify the contribution of this paper, Table 1 compares the present review with selected recent reviews on AI in tourism and hospitality. The comparison shows that this study addresses a more specific gap by focusing on accommodation SMEs and by interpreting AI adoption through a managerial and strategic lens.

Table 1. Positioning of our study in relation to selected prior reviews on AI tourism and hospitality

Review	Scope	Main Focus	Limitation addressed by this study
Doborjeh et al. (2022)	Hospitality & Tourism	AI methods/applications	Limited SME focus
Law et al. (2024)	Hospitality	State-of-the-art review	Limited theoretical integration
Della Corte et al. (2025)	Umbrella Review	Future AI research directions	Broad sectoral lens
This Study	Accommodation SMEs	Managerial/strategic AI transformation	Integrative SME-specific framework

Source: our elaboration

The SME perspective also remains comparatively underdeveloped. Although SMEs dominate many accommodation markets, their specific constraints and capabilities are rarely placed at the center of analysis. Smaller accommodation firms differ from large hotel chains in terms of resources, governance, absorptive capacity, entrepreneurial orientation, local embeddedness, and dependence on external ecosystems. These differences shape both the barriers to AI adoption and the ways in which AI may generate value (Pencarelli, 2022; Tavanxhiu et al., 2026). A generic account of AI in hospitality therefore risks overlooking the differentiated adoption trajectories of smaller firms.

A further gap concerns the theoretical interpretation of AI. Much of the literature focuses on technologies, customer acceptance, or specific application domains, while the strategic and organizational meaning of AI remains less fully theorized. AI is often treated as a technological artifact rather than as a mechanism that can reconfigure routines, decision architectures, value creation processes, and managerial capabilities over time. This limitation is particularly relevant for accommodation SMEs, where AI adoption is rarely a purely technical decision and is instead shaped by resource constraints, managerial cognition, customer proximity, and dependence on external digital ecosystems. Moreover, the existing literature only partially explains how smaller firms can transform external technological solutions into context-specific managerial capabilities. This issue is crucial because many accommodation SMEs do not develop AI internally, but access it through platforms, software providers, destination-level infrastructures, and service ecosystems. A more integrated perspective is therefore needed to connect technological applications with organizational conditions, ecosystem relationships, and managerial outcomes. This paper addresses this gap by reviewing AI adoption in the accommodation sector through an economic-managerial lens, focusing on performance, customer experience, organizational transformation, and strategic decision-making.

3. Purpose of the paper. Against this background, the paper addresses the following research question: How does the scientific literature in management and economics explain the role of artificial intelligence in shaping performance,

customer experience, organizational structures, and strategic decision-making in the accommodation sector, particularly for SMEs?

The aim of the paper is to provide a systematic and theoretically grounded synthesis of the literature, clarifying how AI adoption affects accommodation firms and why SMEs require specific analytical attention. The study responds to the need for a more integrated understanding of AI in hospitality management, moving beyond fragmented analyses of individual technologies or isolated use cases. Rather than cataloguing AI applications, the paper examines the mechanisms through which AI influences managerial practices, organizational capabilities, service relationships, and strategic adaptation in accommodation markets.

More specifically, the paper seeks to connect the technological dimension of AI adoption with its economic and managerial implications. This means investigating not only what AI tools are used in accommodation firms, but also how these tools contribute to efficiency, customer value creation, organizational learning, and strategic adaptation. In this perspective, AI is treated as a multi-level managerial phenomenon whose effects unfold across operational, relational, organizational, and strategic domains.

A further purpose of the paper is to place SMEs at the center of the analysis. This focus is important because smaller accommodation firms are often treated as a residual category within broader hospitality studies, despite their central role in tourism systems. SMEs face specific constraints in terms of financial resources, digital skills, data availability, and access to technological expertise. At the same time, they may rely on flexibility, entrepreneurial orientation, local embeddedness, and close customer relationships as distinctive strengths. The paper therefore aims to clarify how AI adoption may generate opportunities and risks for SMEs, and under which conditions it can support rather than undermine their competitive and relational advantages.

By addressing these issues, the paper intends to contribute to debates on digital transformation, AI in management, and tourism competitiveness. It also aims to provide a conceptual bridge between research on AI applications in hospitality and broader management debates on dynamic capabilities, socio-technical change, service innovation, and responsible governance.

4. Theoretical background and conceptual framework. The evolution of AI in tourism and hospitality can be interpreted as part of a broader trajectory moving from digitalization toward intelligent, autonomous, and adaptive socio-technical systems (Buhalis, 2003; Gretzel, 2011). Earlier studies tended to frame intelligent technologies as components of digital infrastructures and smart tourism ecosystems. More recent research emphasizes their transformative role in reshaping value creation, personalization, organizational learning, and managerial decision-making across the tourism value chain (Gretzel et al., 2015; Mariani et al., 2023; Verma et al., 2022). This evolution reflects a shift from viewing technology as a support function to understanding it as a constitutive force in organizational and strategic change.

Several theoretical lenses contribute to understanding AI adoption in accommodation firms. The resource-based view and dynamic capabilities perspective conceptualize AI as a strategic resource that can enhance firms' ability to sense environmental change, seize opportunities, and reconfigure routines in turbulent contexts (Barney, 1991; Teece, 2007). From this perspective, AI does not create value simply because it is acquired or implemented. Its value depends on complementary capabilities, including data quality, managerial interpretation, organizational learning, process redesign, and the capacity to translate algorithmic outputs into action (Mikalef et al., 2019; Huang & Rust, 2021).

Technology adoption approaches, including the Technology Acceptance Model, emphasize perceived usefulness, ease of use, trust, and risk perceptions in shaping the acceptance of AI systems by managers, employees, and customers (Pillai & Sivathanu, 2020; Nookhao & Homsud, 2026). These factors are particularly relevant in hospitality, where service experiences depend not only on efficiency but also on empathy, authenticity, reliability, and relational quality. In this context, the success of AI-enabled services depends on both functional performance and social legitimacy.

Service-dominant logic provides an additional perspective by interpreting AI as an enabler of value co-creation. Recommendation engines, conversational agents, sentiment analysis tools, and predictive interaction systems can help firms personalize experiences and engage customers across multiple touchpoints. At the same time, this perspective highlights the tension between automation and human hospitality, since excessive technological mediation may weaken emotional connection, perceived authenticity, and relational value (Tussyadiah et al., 2020; Verma et al., 2022).

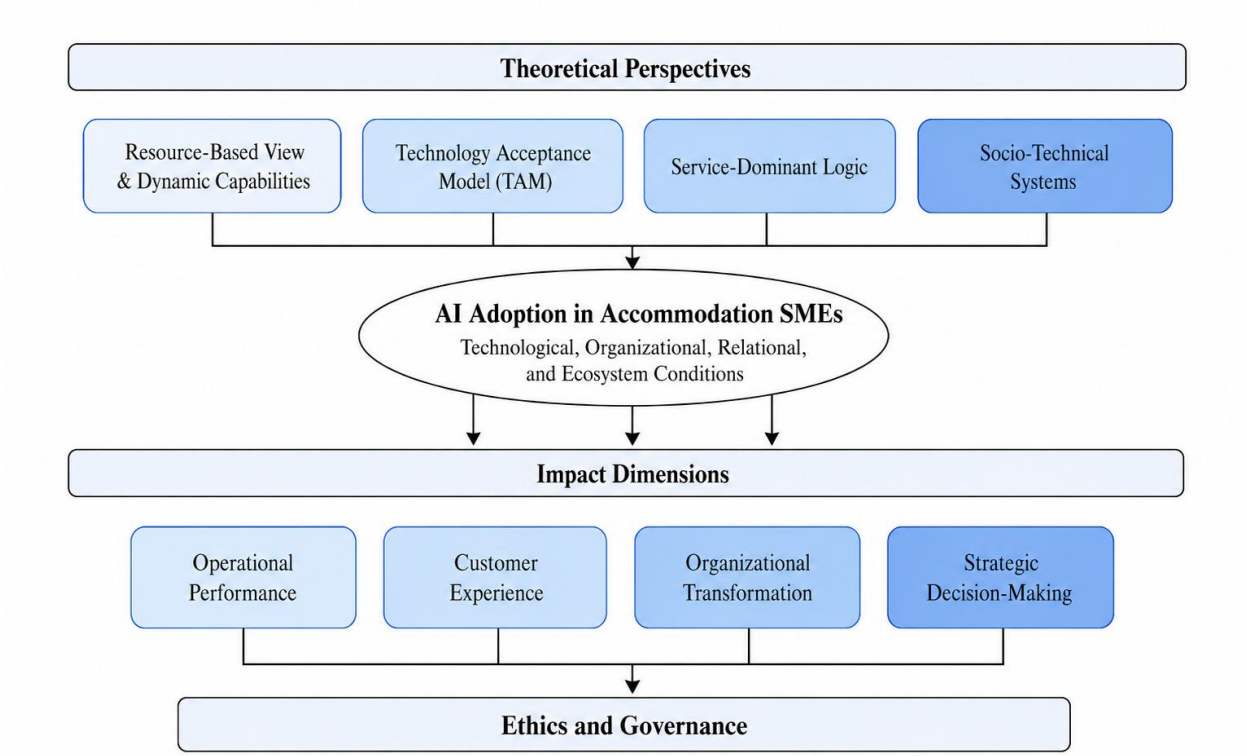
Socio-technical perspectives further suggest that AI is not a neutral instrument added to existing organizations, but a component that reshapes roles, routines, decision architectures, and forms of agency between humans and technologies (Kabadayi et al., 2019). This perspective is especially useful in accommodation firms, where AI adoption affects both back-office processes and customer-facing interactions. It also helps explain why similar technologies may produce different outcomes depending on organizational readiness, employee involvement, governance structures, and customer expectations.

An additional element emerging from this theoretical debate concerns the role of external ecosystems in shaping AI adoption. Accommodation SMEs rarely develop AI capabilities internally and often access them through property management systems, online travel agencies, booking platforms, software providers, destination management organizations, and consultancy networks. This condition suggests that AI adoption is not only a firm-level process but also an ecosystem-mediated phenomenon. For smaller accommodation firms, the availability of external technological infrastructures may reduce adoption barriers, but it may also generate dependence on external actors and limit control over data, customer relationships, and strategic choices. Integrating this ecosystem perspective into the theoretical

background is therefore important to understand why AI adoption depends not only on resources and acceptance, but also on the quality of interorganizational relationships and the governance of digital infrastructures (Gretzel et al., 2015; Pencarelli, 2022; Tavanxhiu et al., 2026).

Building on these perspectives, this paper conceptualizes AI adoption as a multi-level phenomenon involving technological, organizational, relational, and ecosystem dimensions. The proposed framework interprets AI as an intermediate transformational mechanism linking enabling conditions to four interconnected outcomes: operational performance, customer experience, organizational transformation, and strategic decision-making. The framework does not claim to introduce entirely new theoretical constructs. Its originality lies in integrating existing theories into a sector-specific and SME-sensitive model that clarifies how AI reshapes accommodation firms rather than merely listing technologies or application areas. This perspective is especially relevant for accommodation SMEs, where AI adoption depends on the interaction between internal capabilities, customer relationships, and external digital infrastructures. The framework therefore interprets AI not as an isolated technological input, but as a process through which firms transform technological solutions into managerial value. The conceptual framework developed from this theoretical integration is presented in Figure 1, which links the main theoretical perspectives to AI adoption conditions, impact dimensions, and transversal governance issues in accommodation SMEs.

Figure 1. Conceptual framework of AI adoption in accommodation SMEs



Source: our elaboration based on Barney (1991), Teece (2007), Pillai and Sivathanu (2020), Tussyadiah et al. (2020), Huang and Rust (2021), Kabadayi et al. (2019), and recent AI in hospitality literature.

5. Methodology. This study adopts a systematic literature review (SLR) methodology to synthesize the role of AI in the accommodation sector from a managerial and economic perspective. The SLR approach is appropriate because research on AI in tourism and hospitality is expanding rapidly but remains fragmented across disciplines and research traditions (Erdös et al., 2025; Tuo et al., 2025). The review design follows PRISMA and SPAR-4-SLR principles to improve transparency, rigor, and replicability (Page et al., 2021; Paul et al., 2021). The aim is not only to summarize prior studies, but also to develop an interpretive synthesis capable of explaining how AI affects managerial and organizational dynamics in accommodation firms.

In line with the SPAR-4-SLR protocol, the review process was structured around three main phases: assembling, arranging, and assessing. The assembling phase concerned the definition of the research domain, databases, search strings, and inclusion criteria; the arranging phase involved duplicate removal, screening, eligibility assessment, and corpus refinement; and the assessing phase included coding, descriptive bibliographic analysis, thematic synthesis, and robustness checks.

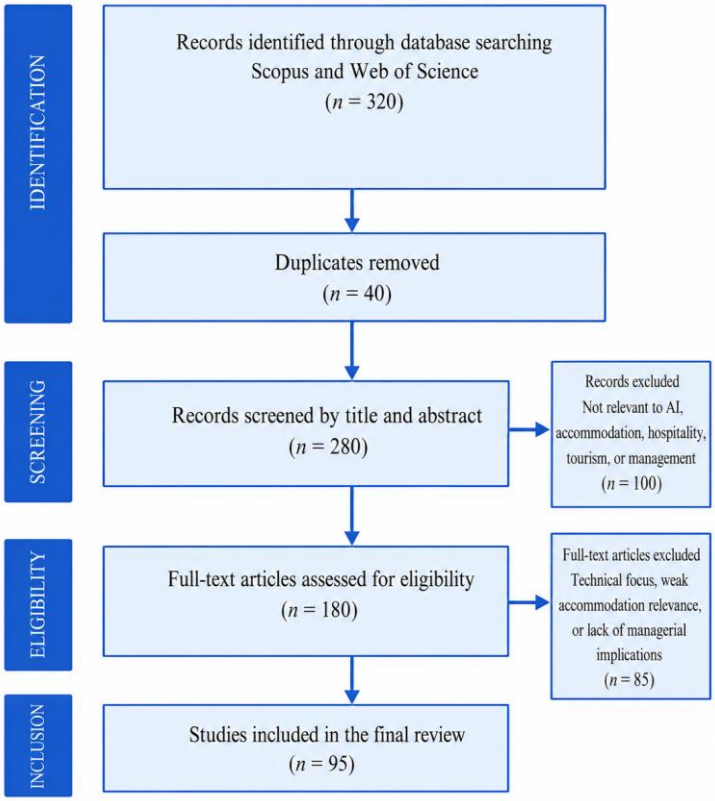
The review was conducted in Scopus and Web of Science, selected because of their broad coverage of management, tourism, hospitality, and information systems journals, and was updated during manuscript preparation to include publications available up to early 2026. The search strategy combined AI-related terms with tourism, hospitality, accommodation, and management/SME terms. The final search logic was: ((“artificial intelligence” OR “AI” OR

"machine learning" OR "generative AI" OR "intelligent systems" OR "service robots" OR "chatbots" OR "predictive analytics") AND ("hospitality" OR "tourism" OR "accommodation" OR "hotel" OR "lodging sector") AND ("SME" OR "small and medium enterprise" OR "firm" OR "organization" OR "management" OR "strategy")). Boolean operators and alternative terminology were used to capture the conceptual variety of the field while maintaining coherence with the research question.

The review included peer-reviewed journal articles published in English between 2010 and early 2026. This time frame was selected to capture the contemporary phase of AI diffusion in tourism and hospitality. Articles were retained when they addressed managerial, organizational, strategic, economic, adoption-related, or customer-related dimensions of AI in tourism, hospitality, or accommodation. Technical studies without explicit managerial implications, conference papers, book chapters, editorials, dissertations, and non-peer-reviewed documents were excluded.

The initial search identified 320 records. After removing 40 duplicates, 280 records were screened by title and abstract. At this stage, 100 records were excluded because they were not sufficiently relevant to AI, accommodation, hospitality, tourism, or management. The remaining 180 articles were assessed in full text, leading to the exclusion of 85 articles mainly due to technical focus, weak accommodation relevance, or lack of explicit managerial implications. The final sample consisted of 95 articles. Exclusions at the full-text stage mainly concerned technical focus, weak relevance to accommodation, or lack of managerial implications. The main steps of the article selection procedure are summarized in Figure 2.

Figure 2. PRISMA-based study selection process



Source: our elaboration based on PRISMA logic

Additional details on the search strategy, inclusion and exclusion criteria, and coding scheme are reported in the methodological appendices.

A structured coding scheme was developed to extract descriptive variables, theoretical perspectives, methodological features, AI applications, firm or sector focus, outcome dimensions, managerial implications, and research gaps. The coding process combined deductive and inductive logic. Deductive coding reflected the research question and conceptual framework, while inductive coding allowed additional themes to emerge from the selected studies. The analysis combined a descriptive bibliographic overview and thematic synthesis. The descriptive overview was used to identify publication trends, leading journals, dominant methods, and recurring AI technologies, while thematic analysis supported the interpretation of recurring mechanisms, contradictions, and conceptual patterns. The coding procedure directly informed the structure of the results section: AI applications were synthesized in Table 3, outcome dimensions guided the thematic subsections, evidence strength informed Table 4, and SME relevance was discussed across the results, discussion, and managerial implications. To further enhance transparency, Appendix G reports the thematic distribution of the 95 studies included in the review. Each article was assigned to one dominant topic according to the coding scheme, while

acknowledging that several studies informed more than one analytical dimension. This appendix provides an aggregate bridge between the coding procedure and the thematic synthesis presented in the results section.

6. Results. The review shows that AI is reshaping the accommodation sector through interrelated operational, experiential, organizational, and strategic mechanisms. The literature does not present AI adoption as a homogeneous or linear process. Instead, it reveals differentiated patterns depending on firm size, technological readiness, managerial capabilities, customer expectations, and ecosystem conditions.

Research has accelerated markedly since the mid-2010s, reflecting the diffusion of machine learning, smart tourism ecosystems, online review analytics, conversational agents, and service automation (Gretzel et al., 2015; Xiang et al., 2017; Ivanov et al., 2020; Tyagi et al., 2026). Customer-facing technologies receive substantial attention, while the organizational and strategic implications of AI adoption in accommodation SMEs remain less developed.

Before presenting the thematic synthesis, a descriptive bibliographic overview was conducted to clarify the structure of the corpus. Table 2 summarizes the main bibliometric indicators emerging from the 95 selected articles. The overview shows a strong acceleration of publications after 2017 and confirms the interdisciplinary nature of the field, with contributions concentrated in hospitality management, tourism studies, service management, and information systems journals.

Table 2. Descriptive bibliographic overview of the reviewed corpus

BIBLIOMETRIC INDICATOR	MAIN EVIDENCE
PUBLICATION PERIOD	Strong acceleration after 2017
MAIN JOURNALS	IJCHM, IJHM, Tourism Management, Annals of Tourism Research, JHTT
DOMINANT METHODS	Reviews, surveys, conceptual papers, bibliometric studies
DOMINANT TECHNOLOGIES	Chatbots, service robots, predictive analytics, online review analytics
UNDERDEVELOPED AREAS	SME-specific adoption, longitudinal studies, governance tools

Source: our elaboration

These indicators confirm that AI adoption in accommodation is not a purely technological issue, but an emerging managerial research field shaped by multiple disciplinary traditions. At the same time, the reviewed studies remain unevenly distributed across themes: customer-facing applications and service automation are more frequently examined than organizational redesign, strategic decision-making, and SME-specific implementation processes. This imbalance calls for a thematic synthesis linking AI applications to managerial implications. Table 3 therefore summarizes the main dimensions emerging from the coding process, distinguishing representative corpus studies from theoretical anchoring references.

Table 3. Thematic synthesis of AI adoption in the accommodation sector

THEMATIC DIMENSION	DOMINANT AI APPLICATIONS	MAIN MANAGERIAL FOCUS	REPRESENTATIVE CORPUS STUDIES	THEORETICAL ANCHORING	INTERPRETIVE INSIGHT
OPERATIONAL PERFORMANCE	Revenue management, demand forecasting, predictive analytics, energy management, process automation	Efficiency, cost reduction, productivity, resource allocation	Millauer and Vellekoop (2019); García et al. (2020); Ivanov et al. (2020); Sánchez-Medina and C-Sánchez (2020)	Dynamic capabilities; analytics capabilities	AI enhances operational performance when forecasting, pricing, and automation tools are integrated with managerial routines and data capabilities rather than adopted as stand-alone technologies.
CUSTOMER EXPERIENCE	Chatbots, virtual assistants, recommendation systems, sentiment analysis, personalization engines	Satisfaction, trust, service responsiveness, personalization, perceived empathy	Pillai and Sivathanu (2020); Tussyadiah et al. (2020); Aransyah et al. (2026); Akhtar et al. (2026)	Service-dominant logic; technology acceptance perspectives	AI improves responsiveness and personalization but may generate discomfort when transparency, customer control, and human warmth are insufficient.
ORGANIZATIONAL TRANSFORMATION	Digital capabilities, data-driven routines, human-AI	Capability development, workforce	Kabadayi et al. (2019); Mikalef et al. (2019); Verma et al.	Socio-technical systems theory;	AI adoption requires complementary organizational change,

THEMATIC DIMENSION	DOMINANT AI APPLICATIONS	MAIN MANAGERIAL FOCUS	REPRESENTATIVE CORPUS STUDIES	THEORETICAL ANCHORING	INTERPRETIVE INSIGHT
	collaboration, service robot integration	redesign, cross-functional integration, organizational learning	(2022); Sharma et al. (2026); Tavanxhiu et al. (2026)	dynamic capabilities	particularly in SMEs where resource constraints, digital skills, and dependence on external providers shape implementation pathways.
STRATEGIC DECISION-MAKING	Business intelligence, strategic analytics, dynamic pricing, market sensing, ecosystem participation	Competitive positioning, innovation, strategic agility, business model renewal	Mariani et al. (2023); Verma et al. (2022); Nookhao and Homsud (2026); Tavanxhiu et al. (2026); Tuo et al. (2025)	Resource-based view; dynamic capabilities; strategic AI perspectives	AI supports market sensing and strategic adaptation when algorithmic insights are combined with managerial interpretation, contextual knowledge, and the ability to reconfigure resources.
ETHICS AND GOVERNANCE	Algorithmic transparency, data privacy, bias control, robot accountability, responsible AI	Trust, legitimacy, accountability, regulatory compliance, human oversight	Akhtar et al. (2026); Wang et al. (2026); Sharma and Mattila (2026); Kabadayi et al. (2019)	Responsible AI governance; socio-technical theory	The managerial value of AI depends on governance mechanisms that balance automation, accountability, privacy, transparency, and service legitimacy.

Source: our elaboration

Operational performance is the most consolidated area of AI application. AI-enabled revenue management, demand forecasting, process automation, predictive maintenance, and energy management can improve efficiency, reduce uncertainty, and support resource allocation (Millauer & Vellekoop, 2019; García et al., 2020; Ivanov et al., 2020). Revenue management is particularly relevant because accommodation services are perishable and demand fluctuates according to seasonality, booking windows, customer segments, and competitive dynamics. However, performance benefits depend on data quality, managerial interpretation, and the integration of AI outputs into organizational routines (Davenport et al., 2020; Mikalef et al., 2019). For SMEs, modular tools such as review analytics, AI-supported pricing, and automated communication may be more realistic than complex integrated systems.

Customer experience is another dominant theme. Chatbots, recommendation engines, sentiment analysis, and virtual assistants can improve response speed, personalization, and service availability (Pillai & Sivathanu, 2020; Aransyah et al., 2026). These tools are useful for managing repetitive and time-sensitive requests concerning availability, check-in procedures, amenities, cancellation rules, or local information. Yet the literature also shows tensions between efficiency and relational quality. In hospitality, customers value empathy, authenticity, control, and trust. AI-mediated interactions may therefore generate discomfort or "creepiness" when they appear intrusive, opaque, or excessively automated (Tussyadiah et al., 2020; Akhtar et al., 2026). For SMEs, AI should augment rather than replace human hospitality.

Organizational transformation emerges as a necessary condition for AI adoption. Firms need data literacy, analytical capabilities, employee adaptation, cross-functional coordination, and governance awareness. AI changes not only tasks but also roles, decision processes, and accountability structures (Kabadayi et al., 2019; Sharma et al., 2026). This is particularly relevant for SMEs, where decision-making is often centralized and digital skills are limited. At the same time, flexibility, proximity to customers, and entrepreneurial orientation may support selective experimentation (Pencarelli, 2022). The evidence suggests that AI adoption among SMEs depends not only on internal resources, but also on access to external providers, digital ecosystems, and managerial learning opportunities.

Strategic decision-making represents a growing research cluster. AI supports market sensing, competitor monitoring, customer segmentation, demand prediction, and business model innovation (Davenport et al., 2020; Huang & Rust, 2021; Mariani et al., 2023). It can make patterns visible and support more anticipatory management. Nevertheless, AI-generated insights require critical managerial interpretation, especially in accommodation SMEs, where strategy is often connected to local identity, family ownership, destination embeddedness, and experiential value. The strategic role of AI therefore depends on the ability to combine data-driven insights with contextual knowledge.

Ethics and governance cut across all dimensions. Privacy, transparency, algorithmic bias, accountability, and human oversight are increasingly relevant because AI systems process sensitive data and mediate customer relationships (Wang et al., 2026; Sharma & Mattila, 2026). SMEs may be particularly exposed because they often depend on external platforms

and software providers while lacking formal data governance structures. Responsible AI adoption therefore becomes both a technical and managerial issue.

Overall, the results confirm that AI adoption in the accommodation sector cannot be reduced to technological implementation. Operational gains depend on organizational capabilities; customer experience depends on trust and relational legitimacy; strategic value depends on managerial interpretation; and all dimensions are conditioned by governance and ethical considerations. This integrative interpretation supports the conceptual framework proposed in this paper. The findings also clarify why SMEs deserve specific attention within the broader AI in hospitality debate.

Table 4. Established findings, emerging trends, and research gaps

DIMENSION	ESTABLISHED FINDINGS	EMERGING TRENDS	RESEARCH GAPS
Operational performance	AI supports forecasting, pricing, and automation.	AI linked to sustainability and energy management	Limited evidence on long-term effects in SMEs.
Customer experience	AI improves responsiveness and personalization.	Growing attention to transparency, empathy and discomfort.	Limited research on authenticity in small firms.
Organizational transformation	AI requires skills, learning, and data capabilities.	Human-AI collaboration and socio-technical redesign.	Few longitudinal studies on workforce change.
Strategic decision-making	AI supports market sensing and adaptive decisions.	Ecosystems and AI-enabled business model renewal.	Need for stronger SME-specific theorization.
Ethics and governance	Privacy and accountability are central concerns.	Responsible AI and robot responsibility.	Lack of practical governance tools for SMEs.

Source: our elaboration

7. Discussion. The findings suggest that AI adoption in the accommodation sector should be interpreted as a systemic managerial transformation rather than as the implementation of isolated digital tools. The value of AI emerges from the interaction between technologies, organizational capabilities, customer relationships, managerial interpretation, and ecosystem conditions. This interpretation helps explain why AI adoption remains uneven across firms and why SMEs require specific attention within the broader hospitality debate.

The relationship between technology and capability development is central to this interpretation. The results show that AI can improve forecasting, pricing, automation, and resource allocation, but these effects depend on whether algorithmic outputs are translated into managerial routines and organizational action. This supports resource-based and dynamic capabilities perspectives, which suggest that technological resources generate advantage only when combined with complementary capabilities such as data quality, managerial learning, process redesign, and strategic flexibility (Barney, 1991; Teece, 2007; Mikalef et al., 2019). For accommodation SMEs, the relevant issue is not how to replicate the AI architectures of large hotel chains, but how to select scalable tools that match specific needs and available capabilities.

At the same time, AI adoption must be understood in relation to the distinctive nature of hospitality services. Customer-facing AI can increase responsiveness and personalization, but it may weaken perceived service quality when interactions become opaque, intrusive, or insufficiently human (Tussyadiah et al., 2020; Akhtar et al., 2026). This tension is particularly important for SMEs, whose competitive advantage often depends on authenticity, proximity, and personalized relationships. AI should therefore be interpreted through a logic of service augmentation: it can support employees, reduce repetitive tasks, and improve information flows, but it should not erase the relational dimension that remains central to hospitality.

The organizational implications of AI adoption are equally relevant. AI requires data literacy, digital coordination, employee involvement, and ethical awareness. Socio-technical perspectives are useful because they show that AI reshapes tasks, roles, decision authority, and accountability rather than simply improving existing processes (Kabadayi et al., 2019). SMEs may be constrained by limited resources and skills, but their flexibility and shorter decision chains may also facilitate experimentation when external support is available. This dual condition makes SMEs both vulnerable to digital gaps and potentially capable of agile adoption.

The findings also highlight the ecosystemic nature of AI adoption. Smaller accommodation firms often access AI through booking platforms, property management systems, review platforms, and technology providers. These relationships can reduce technological barriers but may also create dependency, data asymmetry, and reduced strategic autonomy. AI-related capabilities may therefore be distributed across networks rather than contained entirely within individual firms. This point is important because it connects firm-level adoption with destination-level and platform-level governance.

Ethics and governance represent a transversal condition of AI-enabled value creation. Privacy, bias, transparency, accountability, and human oversight directly affect customer trust and organizational legitimacy (Wang et al., 2026; Sharma & Mattila, 2026). This is especially relevant for SMEs, which may adopt AI tools through external providers

without having strong internal governance capabilities. Responsible AI adoption therefore requires practical rules, supplier accountability, and managerial awareness.

Taken together, these considerations support the conceptualization of AI in accommodation as a dynamic socio-technical capability. AI is dynamic because it supports sensing, seizing, and reconfiguring in uncertain environments; it is socio-technical because its effects depend on the interaction between technologies, managers, employees, customers, and ecosystems. This interpretation helps explain why similar AI applications may produce different outcomes depending on firm size, organizational readiness, service identity, and governance conditions.

8. Managerial implications. The findings suggest that accommodation firms should approach AI adoption as a staged and problem-driven process rather than as a one-off technological investment. Managers should identify specific needs, such as demand forecasting, price optimization, guest communication, review monitoring, energy efficiency, or customer segmentation, and select AI applications consistent with their resource base, data maturity, and service positioning. This approach is particularly important for SMEs, where indiscriminate adoption may generate costs and complexity without proportional benefits. For SMEs, low-complexity and high-impact tools may represent appropriate entry points. Automated guest messaging, AI-supported pricing, online reputation analytics, and basic demand forecasting can reduce administrative burdens and improve responsiveness without requiring radical restructuring. More advanced applications, such as predictive maintenance, personalization engines, or strategic analytics, can be introduced gradually as firms develop data literacy and digital confidence.

AI should also be used to augment hospitality rather than replace it. Chatbots and virtual assistants can handle standardized requests, multilingual communication, and after-hours assistance, but complaint management, emotional interactions, and high-value relational moments often require human involvement (Pillai & Sivathanu, 2020; Tussyadiah et al., 2020). This is especially important for SMEs, whose competitive advantage frequently relies on authenticity, customer proximity, and personalized service. Managers should therefore design an explicit division of labor between AI systems and employees, ensuring that automation strengthens service responsiveness without weakening trust and relational value.

Organizationally, AI adoption requires investment in employee skills, digital coordination, and ethical awareness. Employees should understand the purpose and limits of AI tools so that technology supports rather than threatens their work. Even small firms should define basic governance principles concerning customer data, automated interactions, human oversight, and responsibility for AI-mediated decisions (Wang et al., 2026; Sharma & Mattila, 2026). Policy actors can support this process by providing training, shared infrastructures, advisory services, ethical guidelines, and funding for experimentation. Destination management organizations, universities, chambers of commerce, and industry associations can help smaller firms adopt AI while preserving the relational, cultural, and territorial value of hospitality.

9. Research limitations and future research. This study has limitations. The review focused on English-language peer-reviewed journal articles indexed in Scopus and Web of Science. This supports rigor and replicability but may exclude relevant contributions in other languages, regional journals, industry reports, policy documents, and grey literature. This limitation is relevant because accommodation and tourism are strongly shaped by local contexts, national policy environments, and practitioner experimentation.

The review adopted a managerial and economic perspective. Technical and engineering studies were excluded when they lacked explicit managerial implications. This choice is consistent with the objective of the paper, but it may limit coverage of emerging AI architectures whose managerial implications are still developing. Future research could integrate management, tourism, information systems, and computer science perspectives to better capture the complexity of AI-enabled transformation.

The corpus is heterogeneous, including conceptual papers, empirical studies, bibliometric analyses, customer acceptance research, and strategic management contributions. The selected studies differ in methods, contexts, AI applications, and outcome measures. The synthesis should therefore be interpreted as an analytical review of patterns and gaps, not as evidence of causal effects. Moreover, AI technologies evolve rapidly, so future reviews should periodically update the evidence base.

Further empirical research is needed on accommodation SMEs. Existing studies often discuss barriers such as resource scarcity, skills gaps, and dependence on external providers, but fewer examine how SMEs adopt, adapt, govern, and evaluate AI over time. Longitudinal studies, qualitative case studies, surveys, and cross-country comparisons would be particularly useful for understanding how AI becomes embedded in routines and how its effects change across implementation phases.

Future research should also investigate the balance between automation and human hospitality. AI can improve efficiency and personalization, but it may also create concerns about authenticity, empathy, privacy, and discomfort. More research is needed to understand when customers prefer AI-mediated service, when they prefer human interaction, and how hybrid human-AI service models can be designed.

Ethics, governance, and platform dependence also deserve further attention. SMEs often access AI through external providers and booking platforms, which may reduce adoption barriers but also create data asymmetries and reduced strategic autonomy. Future studies should examine how value, data, power, and responsibility are distributed within AI-enabled tourism ecosystems.

10. Original contribution of the paper. Unlike prior reviews that mainly map AI applications across the broader tourism and hospitality domain, this paper advances a sector-specific and SME-sensitive interpretation of AI adoption in accommodation firms, emphasizing the managerial mechanisms through which AI reshapes performance, service relationships, organizational routines, strategic decision-making, and governance.

The contribution of the paper can therefore be specified at three levels. At the sectoral level, it isolates accommodation firms as a specific context within the broader hospitality and tourism literature, emphasizing their service intensity, experiential nature, operational complexity, and dependence on customer relationships. At the organizational level, it foregrounds SMEs as firms characterized by distinctive constraints and capabilities, rather than treating them as a residual category within general hospitality research. At the theoretical level, it connects fragmented perspectives into an interpretive framework that explains AI adoption as the outcome of interactions among technological conditions, organizational readiness, customer relationships, ecosystem participation, and governance mechanisms.

The main conceptual contribution is the interpretation of AI as a dynamic socio-technical capability. This perspective integrates strategic management, technology adoption, service-dominant logic, and socio-technical theory, showing that AI-enabled value creation depends on the interaction between technologies, managerial cognition, organizational learning, customer relationships, governance mechanisms, and ecosystem conditions.

The proposed framework clarifies how AI reshapes accommodation firms through four interconnected dimensions: the main operational, experiential, organizational, and strategic dimensions of AI adoption. In doing so, the paper moves beyond descriptive lists of AI applications and provides an integrated lens for understanding AI-enabled managerial transformation in tourism and hospitality SMEs.

11. Conclusions. This study examined how the management and economics literature explains the role of AI in the accommodation sector, with particular attention to SMEs. Through a systematic literature review, the paper synthesized a fragmented research field and proposed an integrated interpretation of AI adoption as a managerial transformation affecting operations, service relationships, organizational routines, strategic decision-making, and governance.

The findings show that AI can support forecasting, revenue management, automation, personalization, review analytics, market sensing, and adaptive responses to uncertainty. At the same time, its benefits depend on data quality, managerial interpretation, organizational learning, employee adaptation, customer trust, and responsible governance. These conditions are especially relevant for accommodation SMEs, which face resource constraints but may also benefit from flexibility, customer proximity, and local embeddedness.

A central conclusion is that AI should not be understood merely as a technological tool. Its value depends on the ability of firms to embed AI within organizational capabilities, managerial judgment, service relationships, and governance mechanisms. For accommodation SMEs, AI adoption is likely to be most effective when it is selective, incremental, and aligned with specific managerial problems rather than imitative of large hotel chains' digital strategies.

Overall, the paper contributes to the literature by showing that AI-enabled value creation in accommodation firms depends on the combination of digital innovation, organizational learning, human hospitality, ethical governance, and territorial value creation.

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Contributor statement

The corresponding author led the development of the manuscript and was primarily responsible for the conceptualization of the study, the design and implementation of the systematic literature review protocol, the identification and screening of articles, data extraction, coding, thematic interpretation, and the drafting of the manuscript. The co-author contributed through scientific supervision, theoretical

guidance and revision of the final version of the paper. Both authors approved the final manuscript and agree to be accountable for its content.

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Research references
The paper is positioned at the intersection of management, tourism and hospitality management, digital transformation, artificial intelligence in management, and systematic literature review research. Its main theoretical references include the resource-based view, dynamic capabilities, technology adoption perspectives, service-dominant logic, socio-technical systems theory, and responsible AI governance.

Methodological appendices

Appendix A. Search Strategy and Search Strings
Table A1. Search strings used for database extraction

DATABASE	SEARCH STRING	FIELDS SEARCHED
SCOPUS	TITLE-ABS-KEY (("artificial intelligence" OR "AI" OR "machine learning" OR "generative AI" OR "intelligent systems" OR "service robots" OR "chatbots" OR "predictive analytics") AND ("hospitality" OR "tourism" OR "accommodation" OR "hotel" OR "lodging sector") AND ("SME" OR "small and medium enterprise" OR "firm" OR "organization" OR "management" OR "strategy"))	Title, abstract, keywords
WEB OF SCIENCE	TS = (("artificial intelligence" OR "AI" OR "machine learning" OR "generative AI" OR "intelligent systems" OR "service robots" OR "chatbots" OR "predictive analytics") AND ("hospitality" OR "tourism" OR "accommodation" OR "hotel" OR "lodging sector") AND ("SME" OR "small and medium enterprise" OR "firm" OR "organization" OR "management" OR "strategy"))	Topic

Source: our elaboration

Appendix B. Inclusion and Exclusion Criteria
Table B1. Inclusion and exclusion criteria

CRITERION	INCLUSION CRITERIA	EXCLUSION CRITERIA
DOCUMENT TYPE	Peer-reviewed journal articles	Conference papers, book chapters, editorials, dissertations, reports, non-peer-reviewed documents
LANGUAGE	English	Non-English publications
TIME PERIOD	2010-early 2026	Publications before 2010
RESEARCH DOMAIN	Tourism, hospitality, accommodation, management, economics, information systems	Studies unrelated to tourism, hospitality, or accommodation
AI RELEVANCE	AI, machine learning, chatbots, service robots, predictive analytics, intelligent systems, automation, or generative AI	Studies using the term “digital” generically without explicit AI-related content
MANAGERIAL RELEVANCE	organizational, strategic, economic, customer experience, or adoption implications	Purely technical or engineering studies without managerial implications
SECTORAL RELEVANCE	Studies focused on or applicable to accommodation firms, hotels, hospitality organizations, or tourism SMEs	Studies with no clear relevance to accommodation or hospitality management

Source: our elaboration

Appendix C. PRISMA-Based Study Selection Process
Table C1. Study selection process

STAGE	DESCRIPTION	RECORDS
IDENTIFICATION	Records identified through Scopus and Web of Science	320
DUPLICATE REMOVAL	Duplicates removed before screening	40
SCREENING	Records screened by title and abstract	280
RECORDS EXCLUDED	Excluded for lack of relevance to AI, accommodation, hospitality, tourism, or management	100
ELIGIBILITY	Full-text articles assessed for eligibility	180
FULL-TEXT EXCLUSIONS	Excluded due to technical focus, weak accommodation relevance, or lack of managerial implications	85
INCLUDED	Articles included in the final review sample	95

Source: our elaboration

Appendix D. Coding Scheme
Table D1. Coding categories

CODING AREA	VARIABLES CODED	PURPOSE
DESCRIPTIVE INFORMATION	Author(s), year, journal, publication type, geographic focus	To map the structure and evolution of the literature
METHODOLOGICAL FEATURES	Conceptual, qualitative, quantitative, mixed-method, bibliometric, systematic review	To assess the dominant research designs in the field
THEORETICAL PERSPECTIVE	Resource-based view, dynamic capabilities, TAM, service-dominant logic, socio-technical theory, ecosystem perspective	To identify the conceptual foundations used to explain AI adoption
AI APPLICATION	Chatbots, service robots, machine learning, predictive analytics, recommendation systems, sentiment analysis, generative AI, revenue management, energy management	To classify the main technologies and use cases examined
FIRM AND SECTOR FOCUS	Accommodation, hotel, hospitality, tourism, SME, large firm, platform, destination ecosystem	To evaluate sectoral and organizational specificity
OUTCOME DIMENSION	Operational performance, customer experience, organizational transformation, strategic decision-making, ethics and governance	To connect the evidence to the conceptual framework
MANAGERIAL IMPLICATIONS	Capabilities, skills, adoption barriers, ecosystem participation, governance, value creation	To extract insights relevant to managers and SMEs
RESEARCH GAPS	Methodological, empirical, sectoral, theoretical and longitudinal gaps	To inform the future research agenda

Source: our elaboration

Appendix E. Thematic Analysis Procedure. The thematic analysis was conducted in three steps. The selected articles were initially read to identify their main research focus, theoretical orientation, AI application, and managerial relevance. Each article was then coded according to the categories reported in Appendix D. During this phase, studies were assigned to one or more thematic dimensions depending on their substantive contribution. Finally, the coded material was compared across studies to identify convergences, divergences, emerging trends, and research gaps.
The four main dimensions of the analysis, operational performance, customer experience, organizational transformation, and strategic decision-making, were derived from the research question and conceptual framework. Ethics and governance emerged as a transversal theme cutting across all four dimensions. This procedure allowed the review to move beyond a descriptive listing of AI applications and toward an interpretive synthesis of how AI reshapes accommodation firms, particularly SMEs.

Appendix F. Robustness and Bias Checks. Several procedures were adopted to improve the robustness of the review. A subset of articles was re-coded after the first round of analysis to verify consistency in category assignment. Ambiguous studies were revisited and compared with similar contributions to refine coding decisions. Particular attention was devoted to studies with broad tourism or hospitality scope, which were retained only when their findings were clearly applicable to accommodation management.
Potential sources of bias were also considered. The focus on English-language peer-reviewed articles may have excluded local or practitioner-oriented contributions. The use of Scopus and Web of Science may have limited the visibility of

research published in regional journals. The exclusion of technical studies without managerial implications may have reduced coverage of emerging AI architectures. Finally, the rapid evolution of AI technologies implies that some findings may require periodic updating as new applications and governance challenges emerge.

Appendix G. Thematic organization of the 95 reviewed articles. The following table summarizes the thematic distribution of the 95 articles included in the systematic literature review. Each article was assigned to one dominant topic according to the coding scheme. Since several studies address more than one theme, the classification should be interpreted as an analytical synthesis rather than as an exclusive categorization of the literature.

Table G1. Thematic distribution of the reviewed corpus

Topic cluster	Main inclusion logic	Main AI-related focus	Managerial / theoretical focus	Number of articles
Systematic reviews, bibliometric studies and state-of-the-art contributions	Articles retrieved through combinations of "artificial intelligence", "tourism", "hospitality", "review", "bibliometric", "future research agenda"	Mapping of AI applications, methods, trends and research trajectories in tourism and hospitality	Positioning of the field; identification of research gaps; methodological and theoretical consolidation	10
Smart tourism, digital platforms and tourism ecosystems	Articles addressing AI within smart tourism, digital infrastructures, online platforms, data flows and destination ecosystems	Smart tourism systems, online platforms, digital traces, user-generated content, platform-mediated interactions	Ecosystem conditions, platform dependence, data access, destination-level digital transformation	10
Operational performance, revenue management and forecasting	Articles focused on AI tools supporting efficiency, demand prediction, pricing, resource allocation and operational optimization	Revenue management, demand forecasting, predictive analytics, process automation, booking cancellation prediction	Efficiency, productivity, cost reduction, data-driven operational decisions	12
Customer experience, chatbots and personalization	Articles addressing customer-facing AI and AI-mediated service interactions	Chatbots, conversational agents, virtual assistants, recommendation systems, sentiment analysis, personalization engines	Customer satisfaction, trust, perceived empathy, service responsiveness, acceptance and discomfort	18
Service robots, automation and human–AI interaction	Articles focused on robotics, automation and hybrid human–technology service encounters	Service robots, robotic automation, intelligent service encounters, human–robot interaction	Automation, labor transformation, service quality, customer trust, human–AI collaboration	13
Organizational transformation, digital capabilities and SME adoption	Articles focused on organizational readiness, capabilities, barriers and adoption processes, especially in smaller firms	AI adoption, digital skills, data literacy, organizational learning, absorptive capacity, technology readiness	SME constraints, capability development, employee adaptation, managerial learning, implementation barriers	12
Strategic decision-making, dynamic capabilities and business model renewal	Articles examining AI as a support for strategy, market sensing and managerial decision-making	Business intelligence, market sensing, customer segmentation, strategic analytics, dynamic pricing, business model innovation	Strategic agility, decision support, competitive positioning, dynamic capabilities	8
Ethics, governance, privacy and accountability	Articles focused on responsible AI, algorithmic transparency, privacy, bias, accountability and robot responsibility	Data privacy, algorithmic bias, transparency, responsible AI, robot accountability, human oversight	Trust, legitimacy, governance, regulatory compliance, responsible innovation	7
Sustainability, rural tourism and territorial value creation	Articles connecting AI, sustainability, tourism development, territorial competitiveness and rural/accommodation contexts	AI for sustainability, energy efficiency, sustainable rural tourism, destination resilience, territorial innovation	Sustainable management, local development, territorial embeddedness, SME resilience	5
Total				95

Source: our elaboration based on the systematic literature review protocol

Concert Societies and the Future of Classical Music. Organisational Models and Sustainability in Contemporary Italy

MARTHA FRIEL[1], ANGELO MIGLIETTA[2], ANDREA SANGERMANO[3]

Abstract. *Concert societies represent one of the longest-standing and most significant organisational forms in the dissemination of classical music in Italy. Historically deeply rooted in the cultural fabric of cities and often born from civil society initiatives, these institutions have played a central role in the musical programming of large Italian cities, as well as small towns, for over a century, promoting the circulation of artists and audience development.*

In the contemporary context, however, these interesting and hybrid entities are facing necessary organisational and managerial transformations due to shifts in cultural consumption patterns, evolving funding channels, and the need to develop new audiences. Despite their widespread presence and role, these cultural organisations have received little attention in the academic literature. This study, therefore, aims to contribute to a greater understanding of these entities by analysing their organisational and economic characteristics.

The research is based on an empirical investigation conducted through questionnaires and financial statements collected from a sample of 20 Italian concert societies active in 2025. The collected data were analysed using descriptive techniques to explore the relationships between organisational characteristics, economic size, production capacity, and audience composition.

Preliminary data analysis—which does not yet include an examination of financial statements—highlights significant heterogeneity among the organisations analysed in terms of economic size, production capacity, and programming models, as well as a sustainability model heavily dependent on public funding, ticket sales and season ticket revenues. At the same time, the analysis highlights a number of patterns in audience composition and governance structures, characterised by strong stability and limited turnover in artistic direction. Overall, these findings suggest potential evolutions in the governance models and management practices of concert organisations, particularly with regard to diversifying funding sources, developing audiences, and strengthening organisational capabilities to ensure sustainability and continuity over time.

Keywords: *Concert societies; cultural management; governance; audience development; economic sustainability*

Framing of the research. *Concert societies represent one of the longest-standing and most significant organisational forms in the dissemination of classical music in Italy. Established between the second half of the 19th century and the early decades of the 20th century within a broader tradition of musical associations—which included academies, philharmonic societies, and cultural circles—they have played a fundamental role in promoting instrumental music and educating audiences about chamber music.*

From an organisational perspective, since their inception, concert societies have been organisations promoted by civil society and supported by local cultural elites, characterised by a membership-based or subscriber-based structure and ongoing artistic programming. This organisational model has, over time, favoured the dissemination of classical music even in cities lacking large, established musical institutions, contributing significantly to the development of Italian musical life and the circulation of artists from the 19th century to the present (Macchione, 2002; Carlini, 2006).

Historical studies of individual concert institutions show how these organisations have been a central element of the cultural life of numerous Italian cities for over a century, ensuring continuity of programming and strong local roots (Galla & Meneghini, 2010; Brighenti, 2012; Bossini, 2014).

From an organisational and economic perspective, concert societies can be considered organisations that manage portfolios of musical programs, whose sustainability depends - as also highlighted for other actors in the music sector - on the combination of artistic production, programming, and management of available resources (Mariani & Zan, 2011). In this framework, it can be said that they play a coordinating role between artistic production, cultural programming, and audience education, contributing to the structuring of local music markets and the circulation of artists. Their organisational model, based on a mix of public resources, private contributions, and member participation, represents a rather unique formula that combines civic initiative and professional management of artistic activities (Friel & Cavazzoni, 2014).

Despite their historical role in disseminating classical music and shaping local musical life, concert societies have so far been relatively understudied in the cultural management literature, which has devoted greater attention to other types of musical organisations, such as symphony orchestras, opera houses, and music festivals.

Like many other players in the "Classical Music industry" (Dromey & Haferkorn, 2018), however, concert societies are now called upon to innovate their organizsational models and audience development strategies to maintain their

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cultural and social relevance in a contemporary context of significant change in both demand (Kolb, 2001; Tong et al., 2016) and production and distribution (Dromey & Haferkorn, 2018). All of this, therefore, requires cultural organisations to develop new ways of engaging audiences and building cultural experiences (Kolb, 2013; Dollman, 2023) while also preserving their economic and organisational sustainability over time.

Purpose of the paper. *In this context, this study aims to contribute to the literature by analysing the organisational and economic characteristics of a sample of Italian concert societies active in 2025. Specifically, the study explores the organisational models and economic sustainability mechanisms that characterise these institutions, as well as their role in cultural production and distribution, and in audience building. Through this analysis, the article also aims to identify management recommendations to strengthen the sustainability and development of concert societies' activities in the contemporary context.*

Specifically, the research focuses on the following questions:

***RQ1**. What organisational models characterise contemporary Italian concert societies?*

***RQ2**. What are the main economic characteristics of these organisations, and what sources of funding support their activities?*

***RQ3**. How do concert societies contribute to musical programming and audience building in the contemporary Italian music context?*

Methodology. *Our study adopts an exploratory research design based on the collection and analysis of primary data relating to the organisational, cultural programming, and economic characteristics of Italian concert societies. The research builds on a 2014 study of concert societies operating in Italy, which aimed to describe the role of these institutions in the musical life of the regions and to identify their main organisational and management characteristics (Friel and Cavazzoni, 2014). The survey, conducted in 2025, was designed by repeating and expanding the structure of the 2014 survey, also to allow for observation of the evolution of the Italian concert scene.*

Data collection was conducted by administering a structured questionnaire to a sample of Italian concert societies via Google Forms. The questionnaire, comprising 74 closed- and open-ended questions, was divided into several sections covering the main organisational and management aspects of the institutions analysed. Specifically, the questionnaire collected information regarding: (1) general characteristics of the organisation, including legal form and year of foundation; (2) organisational structure and human resources; (3) concert activity and artistic programming; (4) audience characteristics and audience engagement initiatives; (5) communication and promotion methods. To complement the organisational analysis with an assessment of the financial characteristics, the participating organisations were also asked to provide their main accounting documents for the previous year.

The selection of organisations involved in the survey followed the sample defined in the 2014 study, which included 25 Italian organisations. The 2025 survey included 20 concert companies, 14 of which were already in the original sample. This partial overlap between the two samples provides a potentially useful information base for future comparative analyses on the evolution of the organisational and financial characteristics of Italian concert companies. The data collected through the questionnaire and accounting documents were analysed using descriptive techniques, and the preliminary results are presented in the following section.

Results.

***A descriptive analysis of organisational, economic, and management characteristics.** The organisations considered in many cases represent historic institutions of Italian musical life. 75% of the responding societies were founded between 1900 and 1989, 15% before 1900, and 10% after 1990. Among the oldest organisations is the Trento Philharmonic Society, founded in 1795, while the most recent organisation in the sample is Musikàmera of Venice, founded in 2016. Almost all societies have operated continuously over time, with interruptions limited mainly to the two world wars, and only 25% of the organisations reported periods of suspension of their activities. This data highlights the strong historical roots of concert societies in the Italian music system.*

From a legal perspective, the vast majority of organisations are established as associations, three are foundations; 60% have legal status, and approximately one-third have achieved Third Sector Entity (ETS) status.

Regarding infrastructure and material resources, most organisations do not have their own spaces: over 70% rent spaces for their concerts, while 20% provide free space. Only a small percentage own their own venues, and 90% of organisations use third-party musical instruments, indicating limited financial resources.

In terms of offerings, the organisations analysed offer a diverse musical program: in addition to traditional chamber music, 14 organisations offer symphonic repertoire, 13 choral performances, 12 jazz events, and 5 ballet performances. Only one institution in the sample maintains a program exclusively dedicated to chamber music, and it is interesting to note the near absence of early music in the programs. Overall, activities other than chamber music represent an average of 35.26% of the program, with a standard deviation of 23.33%, indicating considerable variability among organisations. Among the institutions with the greatest programming diversity are the Unione Musicale di Torino and the Società Aquilana dei Concerti.

During the 2023/2024 season, the analysed concert societies organised a total of 1,472 performances, averaging approximately 74 per organization; however, there is significant heterogeneity in production capacity among the institutions, and if some organisations have particularly busy schedules, such as the Mantua Chamber Orchestra with

250 events and Asolo Musica – Associazione Amici della Musica di Asolo with 168 events, others operate with more limited programs. Looking at the types of performances, 340 solo concerts and 861 chamber music concerts were organised, while the remaining events were in other musical genres (symphonic, jazz, dance, and others).

The analysis of production costs also highlights variability across the organisations analysed, with the average cost per performance in the 2023/2024 season at €5,434.

Regarding the composition of revenue, the central role of public funding in supporting concert organisations' activities emerges. Almost all of the organisations analysed benefit from contributions from various institutional levels, including the National Fund for Live Performances (FNSV), and regional and local governments funds. Alongside public contributions, the other main component of revenue is generated by the public through ticket and season ticket sales, which in many cases constitute a significant portion of the organisation's overall budget.

Conversely, revenue from sponsorships and other private funding sources is generally more limited and less widespread among the organisations studied this suggesting that the economic model of Italian concert societies remains predominantly based on a combination of public support and audience participation through ticketing and subscriptions, and that the use of structured forms of private fundraising appears less developed than for other cultural organisations.

Finally, the analysis of artistic governance highlights strong stability and low turnover rates in artistic leadership: only three organisations have an artistic director under the age of 50, and seven organisations have had no or only one artistic director change in the last twenty years. It is also interesting to note that 17 out of 19 organisations have a male artistic director.

Audiences and Communication Activities. *On the audience front, concert societies continue to rely on a system of members and season ticket holders. The average number of members is 72, with a standard deviation of 117.5, indicating a very uneven distribution across organisations. The highest number is recorded by the Fondazione Società del Quartetto di Milano ETS, with 423 members, while some organisations do not have a formal membership base. Looking at age, the audience is predominantly mature as the majority of members are in the 51-70 and over 70 age ranges, while the presence of young people under 25 appears marginal. Despite this fact, almost all organisations offer special offers for young people, including reduced or free season tickets.*

However, numerous efforts are being made in audience development and engagement. In addition to their concert programming, many organisations develop educational and outreach activities: 47% of organisations conduct training activities, while approximately 79% organize activities for or in schools, including educational concerts, workshops, and concert-lessons. Almost all organisations also promote initiatives to disseminate musical culture at their own offices or at partner institutions.

Regarding communication, all organisations have a website and use at least one social media platform to communicate with the public. Facebook remains the most popular platform, while Instagram is growing as a communication channel. A comparative analysis of followers on Facebook and Instagram (data from October 25, 2025) confirms the existence of different communication models. Facebook remains the predominant channel for most organisations: on average, Instagram followers account for approximately 45% of the Facebook base, with only two organisations recording a higher number of Instagram followers. Six organisations exhibit a nearly balanced profile between the two platforms (IG/FB ratio between 50% and 80%), a sign of a more mature and diversified digital presence, while seven remain heavily skewed toward Facebook (less than 30% followers on Instagram). Finally, four organisations do not have an Instagram profile.

These data give a picture of the digital transition in concert societies, and while Facebook remains the primary communication tool for a loyal, generally older audience, Instagram is emerging as a channel among younger organisations or those more oriented toward audiences under 35. Companies that invest in visual content, regular updates, and digital engagement strategies demonstrate a greater balance between the two platforms, signalling an evolution in their relationship with the public and a strengthening of the participatory dimension. Digitalisation thus emerges as an indicator of organisational capacity and openness to new audiences. The presence of multilingual materials, cultural content disseminated online, and integrated communication strategies demonstrates a growing focus on accessibility and the internationalisation of concert offerings.

A preliminary correlation analysis. *To further explore the relationships among the organisational, economic, and social dimensions, a correlation analysis was conducted using the quantitative variables collected via the questionnaire. The objective was to identify statistically significant relationships between economic-financial, production, audience composition, and internal structure aspects of the organisations. The analyses were conducted using the Pearson correlation coefficient, which measures the strength and direction of the linear relationship between two quantitative variables, with values ranging from -1 (perfect negative correlation) to +1 (perfect positive correlation). The adopted method considers only the available cases for each pair of variables (pairwise complete observations) to reduce the impact of missing data. Two areas of study were identified:*

1. *The financing and production area, which investigates the relationships between financial resources and artistic production capacity;*
2. *The social and organisational area, which analyses the connections between audience composition, youth presence, and staff structure. This division allowed for greater clarity of interpretation and a precise understanding of the internal dynamics within each area.*

In the financing and production area, the correlation analysis highlights a significant positive relationship between the main sources of public funding (FNSV, Municipality, Region) and parameters related to artistic production (number of performances, average concert cost, and the cost of the most expensive performance).

In particular, the companies that receive greater resources from the FNSV and local authorities are also those that schedule a greater number of performances and have higher average costs, a sign of a broader and more structured artistic programming. The positive correlation between the different funding channels (FNSV, Municipality, Region, and non-FNSV calls) suggests the presence of an integrated system of public support, in which entities that benefit from one source of funding tend to receive more than one. This confirms a tendency toward the concentration of resources in the most established entities.

An inverse relationship, albeit weak, is also observed between overall funding and the percentage of artistic costs to the total. This would seem to indicate that, as financial resources increase, concert societies tend to expand the organisational and management component (staff, promotion, facilities), reducing the proportion allocated exclusively to artistic costs. This trend suggests that the effectiveness of public support is not limited to the quantity of events produced, but also contributes to the quality and stability of cultural offerings in the area.

Regarding the social and organisational area, however, the correlation matrix highlights the relationships between the age composition of members, youth participation, and audience size, in relation to staff structure. The age groups of members (<25, 25–35, 36–50) show positive correlations, suggesting that organisations capable of engaging younger members tend to maintain a balanced demographic profile even in later age groups: a sign of turnover and continuity in the membership base.

The percentage of youth season tickets is positively associated with both the total number of season ticket holders and ticket sales, indicating that initiatives aimed at the under-30s not only foster loyalty among that segment but are also associated with a larger overall audience.

Regarding staff structure, the observed relationships between the number of temporary and permanent staff offer insights into organisational professionalisation: where a more structured workforce is present, there is generally a greater capacity to plan and support audience-oriented activities (season tickets and tickets). While not inferring causality, the covariation between youth attendance and audience indicators with staff structure suggests more mature organisational models in organisations with greater job stability.

Research limitations. *While these preliminary results reveal interesting and recurring characteristics of Italian concert societies, our study has several limitations that should be acknowledged. First, it should be noted that this short paper focuses primarily on the questionnaire analysis and does not delve into the findings of the ongoing analysis of accounting documents. Completing this analysis will certainly allow for a better understanding of the dynamics of economic and financial sustainability of concert societies.*

The analysis is also based on a relatively small sample of Italian concert societies: although it includes several historically significant institutions from different geographical areas, the results cannot be considered representative of the entire population of concert societies active in Italy, which, among other things, predominantly refers to organisations in Northern Italy.

The research also adopts an exploratory design, based primarily on descriptive analyses. Consequently, the results provide an initial overview of the organisational and economic characteristics of concert societies, but do not allow us to identify causal relationships between the variables considered, which could be explored further in future developments of our research.

Managerial implications. *Despite the aforementioned limitations, the research findings offer some useful insights for reflecting on the management dynamics of concert societies in the contemporary context. First, the analysis highlights significant heterogeneity among the organisations considered, both in terms of economic size and production capacity. This suggests that there is no single organisational model for these entities, but rather a multitude of possible configurations, determined by the combination of available resources, organisational structure, and local roots.*

The analysis, however, suggests the emergence of different organisational orientations among concert societies. While some organisations appear to maintain a more traditional model, characterised by stable governance structures, established audiences, and a strong reliance on public support, others appear more production-oriented, with broader artistic programming and greater organisational complexity. A third group appear more focused on audience development and community engagement, investing more significantly in educational activities, digital communication, and initiatives aimed at younger audiences. These profiles should not be interpreted as rigid categories, but rather as different strategic balances between artistic mission, organisational structure, financial sustainability, and audience engagement.

For managers of cultural organisations, this implies the need to develop flexible management models consistent with the specificities of the local contexts in which they operate.

What appears to be transversal, however, is an economic sustainability strongly tied to the contribution of public resources, particularly from the National Fund for Live Performances and local authorities. This finding underscores the importance of strengthening institutional relationships with public bodies and, at the same time, developing revenue diversification strategies by expanding public-facing activities and activating private support and fundraising. In particular, developing more structured relationships with donors, foundations, and local businesses could be an

important lever for reducing dependence on public resources and supporting the continuity of artistic programming. In this sense, fundraising should not be considered merely as an additional source of funding, but also as a tool for strengthening relationships between concert organisations and their communities. All this, however, requires managerial capabilities extending beyond artistic programming alone. Financial planning and resource management, fundraising, communication, partnership development, and audience management emerge as crucial dimensions of organisational sustainability, requiring dedicated organisational resources and specialised professional competencies.

Moreover, in the Italian context, obtaining Third Sector Entity (ETS) status may also facilitate fundraising activities and relationships with philanthropic actors through fiscal incentives.

Further insights emerge from the analysis of the correlations between the organisational, economic, and social variables considered in the study. First, the results suggest a positive relationship between the amount of public funding and the organisations' production capacity, measured by the number of scheduled performances and average costs per concert. This indicates that public support, for concert societies as well as other live performance organisations, not only impacts the institutions' survival but also contributes to the development of a broader and more structured artistic programming.

Second, the observed correlations indicate that organisations with a greater presence of young audiences tend to experience higher overall participation, as measured by the number of season ticket holders and tickets sold. This result, however, must be interpreted with caution, as it does not allow for causal relationships to be established and could be influenced by other factors, such as the size of the cities in which the organisations operate or the greater promotional capacity of more structured organisations. Nonetheless, the data suggest that strategies for engaging younger generations can be an important lever for strengthening concert societies' audience base.

Initiatives aimed at younger generations should therefore not be interpreted solely as educational or cultural missions, but also as long-term sustainability strategies aimed at encouraging audience renewal and strengthening participation over time.

This aspect appears particularly interesting also in light of the growing debate on the future of classical music and the ways in which musical institutions can expand and diversify their audiences. In this context, several studies highlight the importance of engagement and community relations activities as fundamental tools for fostering new forms of cultural participation and strengthening the bond between musical institutions and audiences (Dollman, 2023).

Finally, the findings suggest a relationship between staff structure and an organisation's ability to develop audience-oriented activities. Concert societies with a more stable organisational structure tend to demonstrate a greater ability to sustain programming and audience management activities. This highlights the importance of, where possible, investing in the professionalisation of organisational structures and the development of specific skills in cultural management.

Originality of the paper. *This study contributes to the literature on the management of cultural organisations by analysing a specific type of musical institution that has thus far received limited attention in management studies: concert societies. Despite their crucial historical role in disseminating classical music and shaping local musical life, and their widespread presence throughout the country, these organisations have rarely been the subject of systematic analysis.*

The originality of this study, therefore, lies primarily in its contribution to a better understanding of the functioning and activities of these organisations, which, like many others in the entertainment and music industry, currently face significant challenges to their survival, both in terms of audience regeneration and in securing the resources necessary for their operations. The study's originality also lies in its empirical approach, which integrates various analytical dimensions relating to organisational structure, artistic programming, audience characteristics, and the organisation's economic dimension. Specifically, the study combines analysis of data collected through questionnaires with an examination of the organisations' key accounting documents, allowing for an initial assessment of the concert societies' economic sustainability.

A further element of originality concerns the connection with a previous survey of concert societies conducted in 2014: the partial overlap between the two samples will allow, in future developments of this first short paper, a comparative reading of the data and will pave the way for future longitudinal analyses on the evolution of the organisational and economic models of Italian concert societies.

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Destination Management in Active Conflict Areas: Governing Tourism in Ukraine

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Abstract. *War tourism has progressively assumed a significant role in the destination management of territories previously affected by armed conflict. In the contemporary geopolitical scenario, however, digital communication and global interconnectivity enable the promotion of war-affected territories even before the formal conclusion of hostilities. This short paper examines how tourist destinations can be strategically managed during an active war, focusing on the Ukrainian context as an emblematic case of resilience and adaptive governance in conditions of instability.*

The research is based on the analysis of six semi-structured interviews conducted with four experts and representatives of two specialized organisations operating in Ukraine. The empirical material was examined through inductive thematic analysis, allowing for a systematic interpretation of the qualitative findings.

According to the perspectives gathered from the interviewed stakeholders, war tourism activities may be developed in territories previously impacted by armed conflict, and potentially even within the context of ongoing hostilities. The findings indicate that war tourism in this context is supported primarily as a narrative and governance instrument aimed at communicating the reality of the conflict internationally, while demand and supply patterns incorporate sustainability-oriented dimensions, including community-based engagement and solidarity-driven travel.

Keywords: *Destination Management; War Tourism; Tourism under Conflict Conditions; Sustainability; Russian-Ukrainian War; Semi-Structured Interviews*

Framing of the research. While war tourism encompasses multiple forms, including hot war travel, combat volunteering, non-combat volunteering, and virtual war travel, the present study takes the concept of "hot war" tourism (Williams et al., 2023) as its initial conceptual reference point, while acknowledging that the empirical phenomena examined extend beyond this single category. This form has been defined by Piekarz (2007) as travel to unstable destinations characterised by "the presence of high individual risks and where visitors experience the realities of war first-hand" and has also been associated with forms of voyeuristic engagement in war zones (Williams et al., 2023; Lisle, 2007). The present study examines it not through thrill-seeking motivations, but through the organisational, narrative, and socio-economic implications of tourism practices within active conflict settings.

Accordingly, the present study is theoretically positioned at the intersection of war tourism and destination management research, with destination management as the analytical lens. The study aims to investigate how governance mechanisms, stakeholder coordination, and strategic management practices operate within territories affected by ongoing armed conflict.

War tourism represents a broad and contested concept (Smith, 1998) that intersects with several related tourism typologies, including dark tourism (Lennon & Foley, 2000, p. 4), also referred to as thanatourism, as well as extreme and adventure tourism, and military tourism. Although these forms remain analytically distinct, the literature emphasises their conceptual overlap with war tourism, particularly in relation to travel to active or recently affected conflict zones and to practices associated with risk exposure, danger, and forms of political engagement. It may also display features commonly attributed to so-called "danger tourism" (Lisle, 2016; Mahrouse, 2016). Despite these intersections, the aforementioned tourism typologies cannot be treated as equivalent. Ethical and moral considerations, safety constraints, and logistical implications differentiate them substantially and require specific managerial approaches (Saribas, 2024). Tourism practices occurring within active conflict zones may not align fully with these typologies and may instead constitute broader forms of tourism taking place under conditions of conflict, characterised by mediated visits, solidarity-driven engagement, and narrative-oriented travel.

In this regard, destination management assumes a central role. According to the UNWTO (Fabricius et al., 2007), destination management is first defined as "the coordinated management of all elements that make up a destination", including attractions, amenities, access, marketing, and pricing policies. It should be implemented through collaboration between local authorities and other tourism stakeholders, in line with principles of good governance (Buhalis & Spada, 2000). The relationship between war tourism development and destination management is explicitly illustrated by Italian research conducted in the regions of Trentino and Alto Adige/Südtirol (Franch et al., 2016). The study highlights the relevance of destination management in the preservation of former battle sites and in the promotion of war heritage tourism among both domestic and international visitors, as well as the involvement of DMOs and local communities in shaping the collective perception of past conflict-related events.

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The role of stakeholders was widely explored in literature from different point of view (see e.g. Franch et al., 2010; Del Chiappa & Presenza, 2013; Presenza et al., 2005) and, in this specific context they are widely recognised as a fundamental component in the post-war recovery of destinations and in the pursuit of their sustainable development trajectories, including the reconstruction of the tourism sector (Johnson, 1999; Chronis, 2012; Jones and Shaw, 2012; Causevic & Lynch, 2011; Causevic & Lynch, 2013;). A shared and collaborative vision among different stakeholder groups regarding the development of war-affected territories shapes not only the strategic orientation adopted, but also the very possibility of structured development processes (Dissanayake & Samarathunga, 2021). For instance, following the end of the war in the territory of the former Yugoslavia, the Republic of Croatia, and particularly its governmental institutions, chose to abandon the prospect of developing war tourism and instead prioritised the revival of leisure tourism (Shchuka et al., 2024; Naef & Ploner, 2016). In contrast, the tourism development strategies proposed for Ukraine by Kiziun et al. (2023) emphasise collaboration between the state, local authorities, business actors, and foreign experts, highlighting the relevance of destination management practices even within a wartime context. Moreover, Manner-Baldeon and Li (2024) demonstrate that communication by residents significantly influences tourists' perceptions of visited territories. In line with this perspective, Buda et al. (2014) underline the importance of local community involvement in war tourism development, arguing that such participation contributes to the effective management of destinations affected by armed conflict. This involvement enables first-hand storytelling, strengthens the emotional dimension of the visitor experience, fosters bonds between tourists and residents, and supports a more authentic representation of both the destination and the conflict events that previously occurred.

On the other hand, war tourism activities may generate psychological distress among both tourists and local communities, as well as physical health risks when conducted within active or potentially dangerous zones (Manner-Baldeon & Li, 2024). Under such circumstances, war tourism can produce adverse effects on the socio-cultural dimension of the destination, requiring structured destination management strategies capable of mitigating risks in conflict-affected areas.

The economic dimension represents another central component of destination management that must be carefully considered in the context of war tourism promotion (Novelli et al., 2012; Reddy et al., 2020; Boyd et al., 2023). According to Tymoshenko et al. (2024), different post-war recovery models may function as destination management tools aimed at sustaining tourist flows, given that certain strategic approaches also demonstrate potential to stimulate broader economic growth. Reimann et al. (2023) conceptualise war tourism development as serving both narrative and economic objectives and support the advancement of war-related tourism forms, particularly dark and commemorative tourism, even before the formal conclusion of hostilities. In this perspective, such initiatives may operate as educational and national-patriotic instruments primarily oriented towards the domestic market. Furthermore, Currie et al. (2004) and Šuligoj (2017), in their analysis of the Croatian case, identify a relationship between war and tourism dynamics. Their findings indicate that economic downturns within the tourism sector may be reversed within a relatively short timeframe and that, in specific circumstances, tourism revenues may even increase during wartime.

Finally, a recent study by Tan and Cheng (2025), using Qualitative Comparative Analysis, has identified eight specific issues concerning this topic regarding the impact on tourists and tourism industry or humanitarian aid and travel restrictions.

Purpose of the paper. This study examines the relationship between destination management and contemporary war tourism, with particular emphasis on contexts characterised by ongoing armed conflicts. Although destination management cannot fully operate under wartime conditions due to security constraints and the potential destruction of attraction sites caused by missile attacks, it may nevertheless contribute to the configuration of a new type of destination and function as a political and narrative instrument requiring structured governance. In this sense, war tourism, understood as a broad tourism form that is not commonly recognised as part of the tourism sector in countries temporarily engaged in war, such as Ukraine, represents a dynamic, rapidly evolving, and adaptive phenomenon worthy of systematic investigation.

The potential integration between destination management practices and current war or recently affected post-war sites may provide an alternative mechanism for preserving tourism flows in countries experiencing armed conflict, while simultaneously fostering the development of new destination management features, including endurance-oriented approaches and innovative sustainable practices. Considering the profound economic and social consequences of war, it is relevant to assess the overall sustainability profile of war tourism practices implemented in territories characterised by ongoing conflict.

Ukraine has been selected as the case study for the present research for several reasons. First, the protracted nature of the Russian-Ukrainian war enables a clearer understanding of the structural characteristics of the conflict, including its interaction with and impact on the national tourism sector. Second, a review of the existing literature and sectoral practices has revealed the presence of tourism organisations offering war-related tours within the context of ongoing armed conflict.

This research addresses the following research questions:

RQ1: How do destination management strategies and governance mechanisms operate within territories characterised by ongoing armed conflict, and which stakeholder-driven approaches support their implementation?

RQ2: What patterns of war tourism demand and supply characterise active conflict contexts, and to what extent do these patterns incorporate sustainability-oriented dimensions?

Methodology. This study adopts a qualitative research design based on semi-structured expert interviews (Karatsareas, 2022; Fylan, 2005) to explore the governance and sustainability dimensions of war tourism in an ongoing conflict context. A purposive expert sampling strategy was employed to identify participants possessing direct professional, institutional, or experiential knowledge relevant to destination management and war tourism in Ukraine. Six interviews were conducted: four with representatives from the Ukrainian tourism and political sectors and two with organisations actively involved in providing war tourism services.

The empirical context of this study concerns tourism activities occurring within the territory of Ukraine during the ongoing Russian-Ukrainian armed conflict. Specifically, the investigation focuses on organised and mediated forms of war-related travel, including guided visits to areas previously affected by military operations, solidarity-driven tourism involving volunteering and donation-based engagement, and narrative-oriented tours designed to communicate the realities of the conflict to international audiences. The primary destinations examined include the capital city of Kyiv, the principal entry point for foreign visitors, and frontline areas such as the Mykolaiv and Kharkiv regions, where the security situation remains volatile and access requires structured coordination with local authorities and tourism organisations. The target market consists predominantly of international visitors, including journalists, volunteers, and individuals motivated by solidarity with Ukraine.

The expert interviews were conducted in July 2025 using a semi-structured format. Interviews took place via videoconference (Zoom) or telephone, were audio-recorded with participants' consent, and transcribed verbatim. Two tourism organisations provided written responses by email following the same interview protocol. The inclusion of multiple respondent types enabled data triangulation across institutional, operational, and experiential perspectives.

Participants were selected through purposive sampling to capture analytically distinct stakeholder categories directly involved in, or affected by, the destination management of war-affected sites in Ukraine. The selection aimed to ensure representation across governance, academic, community, and operational perspectives, thereby enabling a multi-level understanding of war tourism development during ongoing conflict.

Interviewee 1 is the director of an enterprise supporting internally displaced persons from the Donetsk region. This participant was included to reflect the perspective of local actors working with communities directly affected by occupation and displacement, and to assess how war tourism may intersect with social recovery and community resilience.

Interviewee 2 is a Professor of Political Science and International Relations at Mariupol State University. The inclusion of this participant was motivated by the need to examine the narrative, diplomatic, and international image dimensions of war tourism, particularly in relation to memorialisation, communication strategies, and geopolitical framing.

Interviewee 3 is an individual who has experienced two instances of internal displacement and is currently engaged in a professional capacity with the United Nations World Food Programme. The participant was selected to provide the perspective of internally displaced persons, combining the lived experience of displacement with professional experience in international organisations. This profile facilitated the integration of experiential insight with institutional awareness, particularly regarding dignity, trauma, and community boundaries.

Interviewee 4 serves as Vice Head of Governance and Head of the Department for Tourism, Resorts, and Cultural Heritage Protection of the Donetsk Regional State Administration. This participant was included to provide an institutional destination management perspective, focusing on policy coordination, infrastructure, security mechanisms, and regional planning.

Interviewees 5 and 6 were two tourism organisations selected to represent different operational models within the supply side of war tourism. "War Tours Ukraine" operates as a volunteer-based public initiative responding to foreign requests to observe war realities, thereby offering insight into solidarity-driven and narrative-oriented tourism practices. "Visit Ukraine", a non-governmental organisation promoting Ukrainian tourism domestically and internationally since 2018, was included to provide a structured, professionalised perspective on demand management, logistics, and communication during wartime. Together, these cases enable comparison between grassroots and institutionalised organisational approaches.

Data were analysed using an inductive thematic analysis. An initial open coding phase was conducted to identify meaningful segments within each transcript. Codes were developed iteratively and refined through constant comparison across interviews. Emerging themes were grouped into higher-order categories corresponding to the research questions.

The interview protocol was structured into two analytical blocks reflecting the dual nature of the inquiry: the strategic-governance dimension and the operational-implementation dimension. The first block addressed macro-level perceptions related to the development of war tourism under conditions of ongoing conflict. It explored how stakeholders conceptualize the role of war tourism within broader destination management strategies. Four interrelated thematic clusters were identified: national image; war tourism and economic recovery; development, timing, and sustainability; and management tools. This block aimed to capture normative positions, strategic priorities, and governance logics. The second block shifted to the meso- and micro-level, focusing on the operational practices of tourism organisations currently offering war-related experiences. Six thematic areas structured this section: national image; travel willingness and perceptions; risk perception; travel planning; tourism preferences and sustainability; and development, timing, and sustainability. Here, the objective was to examine how abstract strategic concepts are translated into concrete practices, including safety protocols, communication strategies, visitor management, and support for local communities.

The integration of findings across both blocks enabled a systematic comparison between strategic intentions and practical implementation, strengthening the analytical alignment between empirical evidence and the research questions.

The limited sample of six interviews requires explicit methodological justification. Given the exploratory nature of the study and the restricted accessibility of the research context, namely an active conflict zone with significant logistical and security constraints, the sample size was determined by the availability of knowledgeable informants rather than by a predefined numerical target. While full data saturation cannot be claimed, the thematic recurrence observed across interviews, particularly regarding the narrative function of war tourism, the centrality of safety, and the role of stakeholder coordination, suggests that the principal patterns within the investigated context were identified. It should further be acknowledged that the sample is composed primarily of stakeholders who are directly involved in or supportive of war tourism development, which may introduce a positive framing bias. The perspectives of critical voices, including those of local residents opposed to tourism in conflict areas, displaced populations not engaged in tourism-related activities, and international observers with reservations about the ethical implications of such practices, are not represented. The findings are therefore interpreted as exploratory accounts of supply-side and institutional viewpoints rather than as generalisable claims about the demand side or local communities at large.

Results. The findings indicate that both experts and representatives of tourism organisations support the development of war tourism during wartime. However, this support is not framed primarily in economic terms. Rather, war tourism is conceptualised as a strategic narrative instrument aimed at disseminating the Ukrainian perspective and communicating the reality of Russia's aggression on Ukrainian territory. Storytelling mechanisms are not treated as symbolic additions but as core governance tools, already embedded in practice and considered highly relevant within the sphere of international relations. At the same time, a central concern emerging from the interviews relates to the pain and grief experienced by Ukrainian citizens. This dimension was consistently emphasised as a non-negotiable ethical boundary that must guide decision-making processes and delimit acceptable forms of tourism development (RQ1).

The interviews conducted with the tourism organisations were designed to examine the perceived demand–supply configuration of war tourism in the Ukrainian context (RQ2). The data reveal a structured and mediated demand rather than spontaneous curiosity-driven travel. Both "War Tours Ukraine" and "Visit Ukraine" report that foreign visitors express a willingness to observe the reality of the war firsthand and to support Ukraine economically, including through volunteering and donation-based activities. The capital emerges as the primary entry point for first-time visitors, functioning as an introductory stage. In contrast, frontline areas such as Mykolaiv or Kharkiv are typically visited by individuals who have previously travelled to Ukraine and possess prior contextual knowledge. This differentiation indicates a staged demand structure, in which visitor engagement deepens over time. Furthermore, the organisations underline that clear safety procedures, structured coordination, and guided accompaniment positively influence visitors' willingness to travel, suggesting that demand is strongly mediated by institutional reassurance mechanisms.

Regarding the implementation dimension of RQ1, experts were asked which actions destination managers should undertake to support tourism in war-affected regions and how development can proceed without compromising dignity or safety. The responses converge around the centrality of security infrastructure, particularly the establishment of shelters near tourist attractions and the expansion of air-raid warning systems. Social media is identified as a rapid communication instrument for disseminating behavioural guidelines and informing visitors about risks. Beyond operational safety, interviewees emphasise the need for coordinated governance across vertical and horizontal institutional levels, alongside the development of clear behavioural and legislative regulations. With regard to dignity, the preservation of local boundaries and the avoidance of intrusive or sensationalist practices are treated as structural principles rather than optional considerations. Tourism organisations confirm that safety constitutes the primary concern of first-time visitors and report that continuous assistance, transparent information, and English-speaking guides are essential in mitigating perceived risk. These findings reinforce the argument that structured destination management practices are a prerequisite for tourism activity in recently affected territories.

These combined findings on governance relevance and implementation strategies can be situated within the existing literature. The narrative prioritisation identified in the Ukrainian case resonates with the argument of Reimann et al. (2023), who frame war tourism as serving both narrative and economic objectives, but extends it by demonstrating that under conditions of active conflict the narrative function assumes primacy over economic motivations. The ethical boundary articulated by respondents aligns with the concerns raised by Manner-Baldeon and Li (2024) regarding the emotional dynamics of travel to conflict zones, though the present findings indicate that this boundary operates not merely as an individual traveller response but as a structuring principle within destination governance. The emphasis on collaboration between local authorities and tourism stakeholders corroborates the principles outlined by Buhalis and Spada (2000) and the multi-stakeholder collaboration model proposed by Kiziun et al. (2023) for Ukraine.

Finally, the interviews indicate that destination management of war-affected sites incorporates multiple sustainability-oriented features supported by both stakeholders and local representatives (RQ2). Visitors are reported to deliberately choose locally operated businesses, participate in volunteering initiatives, and engage in donation-based tours, thereby reinforcing local economic resilience. In addition, many visitors demonstrate interest in local authenticity and Ukrainian culture, framing such engagement as an act of solidarity. Importantly, sustainability in this context is not limited to economic recovery but intersects with narrative positioning and ethical responsibility, suggesting that communicative, social, and economic dimensions operate as interconnected components of war-related destination management.

From a destination management perspective, the staged demand structure implies that coordination of tourism flows in war-affected territories cannot rely on conventional marketing instruments but requires the deliberate design of graduated visitor pathways, supported by institutional mediation and trust-building mechanisms. This observation extends the stakeholder coordination argument proposed by Kiziun et al. (2023) and Dissanayake and Samarathunga (2021) by identifying demand-side patterns that actively shape the governance requirements of war-affected destinations. The convergence of sustainability-oriented practices with narrative positioning and ethical responsibility extends the post-conflict tourism recovery frameworks proposed by Reddy et al. (2020) and Boyd et al. (2023) by demonstrating that sustainability-oriented dimensions can emerge and function not only in post-conflict recovery phases but also during active hostilities.

Research limitations. Both methodological and temporal limitations characterise this research.

First, the topic under investigation and the empirical analysis are situated within a body of literature largely centred on past or "cold phase" conflict events. In contrast, academic contributions addressing ongoing conflicts remain limited and are often closely connected to researchers with specific territorial affiliations.

Second, a methodological limitation derives from the context-dependent nature of semi-structured interviews. While this approach has enabled the achievement of the research objectives, implementing a more extensive survey design could provide a broader basis for identifying and systematising potential destination management tools. In particular, future studies may examine the differences between the emotional and ethical perceptions of local populations and those of foreign visitors regarding the same war-affected sites.

Third, the dynamic and evolving nature of the conflict context constitutes an additional limitation. The absence of a post-recovery phase in the Russian-Ukrainian war restricts the scope of data analysis, as well as the formulation of recommendations and predictive assessments. The sensitivity of the context was also considered during data interpretation to avoid normative bias.

Finally, these six interviews represent a first exploratory step that precedes a future quantitative analysis. The limited sample size limits the generalisability of the findings and confines the present contribution to a preliminary mapping of recurring themes rather than a statistically representative account. A future phase of the research will extend the empirical base through semi-structured interviews addressed to a wider population of operators, institutional actors, and visitors.

Managerial implications. The findings indicate that destination management strategies retain their relevance and necessity even during the active phase of armed conflict. Given the function of war tourism as a narrative and communicative instrument, destination managers should deliberately integrate storytelling and narrative management within tourism strategies, ensuring that tourism activities promote accurate representation while maintaining ethical sensitivity toward local experiences of pain and loss (Tsurkan & Kryvenkova, 2023).

Given that first-time visitors tend to concentrate on relatively safer destinations, whereas repeat visitors are more inclined to travel to frontline regions, destination managers and tour operators may design itineraries that progressively introduce visitors to the Ukrainian context according to their prior experience. Across all interviews, safety emerged as the principal managerial priority. The strategic use of social media and digital platforms was identified as a rapid and effective instrument for disseminating safety information, behavioural guidelines, and real-time updates.

Additionally, the results underline the necessity of establishing clear behavioural rules, ethical standards, and legislative frameworks to ensure the balanced coexistence of local communities and visitors within war-affected territories. Finally, the study demonstrates a strong connection between war tourism and sustainability-oriented practices. Visitors travelling to Ukraine during the ongoing war actively contribute to local economies by selecting community-based businesses, participating in volunteering initiatives, and engaging in donation-oriented tourism activities. These dynamics create opportunities for destination managers to promote sustainable tourism models centred on community participation, economic resilience, and cultural authenticity.

From a theoretical perspective, the findings contribute to destination management scholarship by demonstrating that governance frameworks designed for peacetime contexts require substantive adaptation when applied to active conflict settings. Specifically, the study identifies three areas in which destination management theory and practice require extension: first, the incorporation of narrative and diplomatic functions as core governance objectives alongside conventional tourism promotion; second, the integration of security coordination structures, including military and humanitarian protocols, within destination governance mechanisms; and third, the recognition of graduated visitor engagement as a demand-side pattern that shapes managerial decision-making regarding itinerary design, risk communication, and access management. For practitioners, these findings imply that destination management organisations operating in conflict-affected territories should establish formal coordination protocols with security authorities, develop tiered visitor itineraries calibrated to risk levels and visitor experience, and institutionalise ethical review processes to ensure that tourism activities respect community boundaries and do not instrumentalise local suffering for commercial or promotional purposes.

Originality of the paper. The present study aims to contribute to destination management scholarship in the context of recent and ongoing armed conflicts, with particular attention to war tourism development and sustainability. While existing literature predominantly addresses the ethical dimensions of war tourism, its historical and storytelling relevance,

and the economic damage associated with conflict, destination management in active war contexts remains comparatively underexplored.

In particular, the study advances the argument that destination management in active conflict contexts operates according to a distinct governance logic, in which communicative, diplomatic, and ethical functions assume priority over conventional tourism promotion and visitor attraction. This represents a theoretical extension of the UNWTO (Fabricius et al., 2007) destination management framework, which presupposes conditions of relative stability and does not account for the specific governance requirements of territories experiencing ongoing armed conflict. By positioning the analysis at the intersection of war tourism and destination management scholarship, the study addresses a gap in both research streams: war tourism research has given limited attention to governance and management mechanisms, while destination management scholarship has not systematically examined its applicability under conditions of active armed conflict.

Likewise, the research does not exclude the applicability of tourism practices within existing war zones, despite the unpredictability and instability generated by wartime hazards. In the current literature, sustainable features of war tourism are generally discussed as isolated elements rather than as components of an integrated sustainable development approach. The findings of the present study indicate that war tourism may be interpreted as incorporating sustainability-oriented dimensions, particularly when it contributes to the social and economic support of local businesses and communities.

Finally, the paper provides empirical insights into existing practices and highlights the specific relevance of war tourism activities during an ongoing and unresolved armed conflict in Ukraine, expanding the understanding of essential conditions for its development in unstable contexts. The findings support the conclusions of Reimann et al. (2023), who emphasise the need to revitalise Ukrainian tourism during the ongoing armed conflict. By contrast, studies by Shchuka et al. (2024) and Tymoshenko et al. (2024) do not address war tourism development within the broader framework of post-war tourism system renovation.

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Digital Transformation and Sustainability Paradoxes in Tourism: A Grounded Theory Study of the Italian Context

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Abstract. *The rapid digitalization of the Italian tourism sector presents both significant opportunities and complex sustainability challenges. While digital technologies – such as AI, Big Data, blockchain, and immersive solutions – enhance operational efficiency, visitor experiences, and market access, they also introduce sustainability paradoxes, including increased energy consumption, unequal access to technology, and fragmented governance. This paper presents an ongoing research project investigating the interplay between digitalization and sustainability in tourism, integrating economic, social, and environmental dimensions. Adopting a qualitative grounded theory approach, the study will examine selected case studies encompassing tourist destinations, enterprises, and public–private initiatives that implement innovative digital solutions. The research will identify emerging categories and recurring patterns to explain how digital technologies can facilitate or hinder sustainable practices, highlighting the roles of governance, contextual factors, and stakeholder interactions. The expected findings will contribute to an empirically grounded understanding of how digital transformation influences sustainability outcomes in tourism, providing actionable insights for policymakers, practitioners, and the design of more responsible digital interventions.*
Keywords: *digital transformation; sustainable tourism; sustainability; paradoxes; grounded theory; Italy*

Framing of the research. *Tourism is increasingly positioned at the intersection of technological innovation and sustainability imperatives, as destinations and tourism organizations confront growing pressures related to environmental degradation, social equity, and long-term economic viability (Polese et al., 2018; Troisi et al., 2023; Tuyen, 2025). In recent years, the rapid diffusion of digital technologies – including AI, the Internet of Things, blockchain, big data analytics, and immersive platforms – has profoundly transformed how tourism systems operate, how destinations are managed, and how tourists engage with places and communities (Kumar et al., 2024; Fatema et al., 2024). These technologies have enabled real-time monitoring of tourist flows, enhanced personalization of experiences, and improved coordination among heterogeneous stakeholders across tourism ecosystems.*

At the same time, sustainability has become a central concern in tourism research and practice. While digital tools are often presented as key enablers of sustainable tourism, emerging evidence suggests that their impacts are far from unidirectional. Digital technologies may simultaneously promote social inclusion, environmental awareness, and operational efficiency, while also reinforcing digital divides, increasing energy consumption, and generating new governance and ethical dilemmas (Pan et al., 2021; Abdoh, 2024; Socratous et al., 2025). In this respect, digitalization introduces a paradoxical condition in which technological innovation can both support and undermine sustainability objectives. This paradox is particularly evident when considering the environmental footprint of digital infrastructures. Although smart technologies can reduce resource waste and optimize destination management, they also rely on energy-intensive systems, data centers, and algorithmic processes that contribute to carbon emissions and electronic waste (Balsalobre-Lorente et al., 2023). Similarly, while digital platforms promise greater inclusivity and access to tourism services, unequal digital literacy and technological readiness among stakeholders may exacerbate existing socio-economic inequalities and marginalize smaller actors (Abdoh, 2024; Nassanbekova et al., 2023). As a result, the tourism sector increasingly faces a tension between the promise of digital sustainability and the risk of digitally induced unsustainability.

Despite growing scholarly interest in these issues, the academic discourse remains fragmented. Much of the existing literature continues to analyze the effects of digital technologies on isolated dimensions of sustainability, often treating economic, environmental, and social outcomes separately and neglecting their interactions and trade-offs (Fatema et al., 2024; Zeqiri et al., 2025). Although some scholars have begun to conceptualize tourism sustainability from a systemic and co-evolutionary perspective (Paniccia & Baiocco, 2020; Leoni & Cristofaro, 2022; Baiocco & Paniccia, 2023), the dual and paradoxical role of digital transformation has yet to be fully integrated into a multidimensional theoretical framework capable of capturing the complexity of contemporary tourism systems. Furthermore, existing conceptual models often lack contextual sensitivity. Destinations are frequently treated as homogeneous entities, overlooking differences in digital maturity, institutional capacity, governance arrangements, and socio-cultural characteristics. This limitation reduces the explanatory power of current frameworks and constrains their usefulness in guiding context-specific digital sustainability transitions. Such shortcomings are particularly salient in tourism systems characterized by strong territorial embeddedness and structural heterogeneity. In this respect, the contribution by Kürüm Varolgüneş et al. (2025) provides a clear and timely research agenda. These authors explicitly argue that future research should

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incorporate qualitative analyses and empirical case studies to validate the practical impact of digital technologies on sustainable tourism. They further identify the development of integrated theoretical models linking digital transformation and sustainability frameworks, as well as the analysis of success cases and barriers in the adoption of smart tourism technologies across different destination types, as key priorities for advancing the field. Responding directly to these calls, the present study conducts a qualitative analysis of Italian tourism case studies to identify the main enablers and barriers shaping the adoption of smart tourism technologies in urban and rural contexts.

Italy represents a particularly fertile empirical setting for this investigation. The Italian tourism system is characterized by significant variation in digital maturity across destinations, with advanced digital platforms in major urban areas coexisting alongside rural and community-based initiatives operating with lower levels of technological sophistication. At the same time, Italy is internationally recognized for its long-standing commitment to sustainable tourism practices, ranging from protected natural areas and responsible tourism festivals to certified sustainable villages. This combination of digital heterogeneity and sustainability richness makes Italy an ideal context for examining how digital transformation interacts with sustainability outcomes in practice.

Thus, this paper seeks to address a critical research gap by developing a multidimensional framework that integrates digital innovation with sustainable tourism development. Drawing on an ongoing qualitative research project, the study adopts a grounded qualitative approach to capture the complexity, paradoxes, and governance dynamics that characterize digitally mediated sustainability transitions in contemporary tourism systems.

Theoretical Background. The advent of digital technologies has catalyzed a paradigm shift in the tourism sector, profoundly reshaping destination management, tourist behavior, and stakeholder engagement. Digitalization in tourism should be understood not as a linear process of technology adoption, but as a socio-technical system, in which technological infrastructures, organizational practices, governance arrangements, and stakeholder relations co-evolve (Rodrigues et al., 2023; Schönherr et al., 2023). The diffusion of AI, big data, IoT, blockchain, and immersive technologies has accelerated this reconfiguration by embedding algorithmic decision-making and data-driven coordination into tourism value chains, transforming information asymmetries, coordination mechanisms, and power relations across tourism ecosystems (Asif & Fazel, 2024; Kürüm Varolgüneş et al., 2025). This shift reflects the growing conceptualization of tourism destinations as complex adaptive systems, where digital technologies act as structuring forces rather than neutral tools, and where sustainability outcomes depend on contextual, institutional, and organizational conditions rather than technological sophistication alone (El Archi et al., 2023; Paniccia & Baiocco, 2020; Leoni & Cristofaro, 2022).

Within this socio-technical perspective, digital technologies such as artificial intelligence, blockchain, the Internet of Things, virtual reality, and metaverse platforms have been widely recognized for their potential to enhance operational efficiency and sustainability performance. IoT-based systems allow destinations to monitor tourist flows and environmental indicators in real time, supporting more efficient resource allocation and mitigating ecological pressures (Gössling, 2020; Aguirre et al., 2023; Zhang & Deng, 2024). Blockchain technologies facilitate secure and transparent transactions, reinforcing trust among stakeholders and enabling more equitable participation by small and medium-sized enterprises (Ali, 2022; Polukhina et al., 2025). Immersive technologies such as virtual and augmented reality offer alternative experiential pathways that may reduce the environmental footprint of tourism by limiting physical travel while enhancing environmental education and awareness (Go & Kang, 2023; Rather, 2025). Through informational, coordination, and behavioral mechanisms, digital tools can enable predictive analytics, destination-wide integration, and responsible tourist conduct, thereby supporting sustainability-oriented innovation trajectories (Rahmadian et al., 2022; Rodrigues et al., 2023; Kummitha, 2025). An overview of the main digital technologies currently adopted in the tourism sector, together with their key characteristics and principal applications, is reported in Table 1, adapted from Monda et al. (2023).

However, the literature increasingly emphasizes the ambivalent nature of digital transformation in tourism. The infrastructure demands associated with digital ecosystems generate new environmental challenges, including rising energy consumption, electronic waste, and carbon emissions, while digital platforms intensify risks of monopolization, algorithmic bias, platform dependency, and data exploitation (Parra-Sanchez & Viviescas-Jaimes, 2025; Nassanbekova et al., 2023). Automation and algorithmic management enhance operational efficiency but may simultaneously undermine decent work, skills development, and employment stability, exacerbating socio-economic vulnerabilities (Myrovali et al., 2025). These dynamics give rise to sustainability paradoxes, in which the same digital technologies simultaneously generate sustainability gains and risks, captured by the emerging notion of digitainability (Myrovali et al., 2025). From this perspective, sustainability in tourism emerges not as a static outcome but as a dynamic balancing process, shaped by governance capacity, stakeholder alignment, and organizational learning mechanisms (Rodrigues et al., 2023; Schönherr et al., 2023).

From a multidimensional sustainability perspective, digital technologies influence tourism outcomes across interconnected economic, environmental, and social dimensions. Economically, digital platforms stimulate innovation and competitiveness by enabling SMEs to access global markets and develop new business models, contributing to inclusive growth and regional development (Ali, 2022; Kaur et al., 2024; Chen et al., 2025). Environmentally, data-driven solutions facilitate resource-efficient destination management by optimizing energy and water use and monitoring environmental pressures in real time (Rahmadian et al., 2023; Zhang & Deng, 2024). Socially, enhanced digital infrastructure fosters inclusivity by improving access to tourism services and enabling participation by marginalized groups, while digital communication of sustainability practices empowers more informed tourist choices (Tiago et al., 2021; Popova et al., 2023).

Table 1. Main digital technologies and related applications in the tourism field

Technology	Description	Main Application	References
Cloud computing	Delivery of computing resources – including servers, storage, databases - over the internet	• Data storage about tourist experiences and preferences as well as audio/video streaming, pictures/images regardless of video or image size • Data synchronization between platforms • Various cloud-based apps (e.g., car rental, hotel, airline reservation apps, map location guide app, journey planner app, weather information app) useful for tourism firms to provide tourists with personalized information to design and plan their holiday	Imhanwa *et al.* (2015) Nadda *et al.* (2020)
Big Data	Collection of large data (generated by users, devices, and operations), even unstructured and fast-moving, which cannot be managed with traditional approaches	• Big data analytics (e.g., tourist sentiment analysis; tourist spatial-temporal behavior analysis; effect estimation of weather on tourism) • Tourism marketing • Search engine optimization	Li *et al.* (2018)
Artificial Intelligence (AI)	Ability of a computer to perform cognitive functions (i.e., learning, reasoning, self-correction) usually associated with the human mind	• Voice assistant • Face detection and recognition • Self-service for information/check-in/check-out • Chatbots • Robots carrying out routine tasks (e.g., booking, managing rooms, drink preparation, information offering)	Grundner and Neuhofer (2021)
Internet of Things (IoT)	Variety of things or objects – such as Radio-Frequency Identification (RFID) tags, sensors, actuators, mobile phones – able to connect physical and digital entities (making them interact each other and exchange information)	• Internet-enabled appliances (e.g., for heating, lighting, and television) that can be turned on or off by tourists through a centralized device • Sensors and IoT devices for various services, including: – environmental monitoring – warning passengers at the airports about the localization of their luggage or restaurant staff when guests arrive – sending electronic key cards to hotel guests' phones, which, when used, automatically check them in – real-time information about the current status of essential devices to be repaired or replaced before they stop functioning	Ordóñez *et al.* (2022)
Immersive technologies	Virtual Reality: Use of computer-generated 3D realistic navigable virtual environments, that the user can interact with. Visualization, immersion, and interactivity are the three key elements of VR Augmented reality: Adds digital elements to a live view, that the user can interact with often using the camera on a smartphone equipped with GPS technology	Creation of virtual environments: • complementing real tourist experiences • creating virtual tourist experiences • planning and management purposes • promoting a destination or a site • getting access to information about places, restaurants, hotels, cultural monuments, tours • educational purposes • heritage preservation • gaming	Guttentag (2010) Beck *et al.* (2019) Loureiro *et al.* (2020)
Contactless technologies	Radio Frequency Identification (RFID) Remote data sending and receiving system through electromagnetic fields that automatically identify and track tags attached to objects Near Field Communication (NFC) Data transfer through electromagnetic fields that enable two devices (e.g., a smartphone and a payments terminal) to communicate with each other Beacon technology Wireless transmitters using Bluetooth and GPS that transmit signals to other smart devices nearby (e.g., smartphones).	• Access authorization • Cashless payments • Data collection • Deep analytics • E-ticketing • Data exchange (e.g., about transportation schedules, waiting times for arrivals) • E-wallets • Boarding passes, and ratings • Proximity marketing • Location-based services • Gaming	Egger (2013) Buhalis (2020)
3D printing	Existing objects are replicated in three-dimensional manner in various materials depending on the 3D printer used.	3D personalized souvenirs (mass produced, printed at a facility and also at home)	Anastasiadou and Vettese (2019)

Source: Monda *et al.* (2023, pagg. 401-402)

Recent scholarship has further expanded the sustainability framework by emphasizing the relevance of additional dimensions. Civic participation and democratic governance have emerged as critical components, as digital platforms increasingly mediate interactions between citizens, policymakers, and tourism organizations. E-participation tools and open-data initiatives can enhance transparency, accountability, and collective decision-making, aligning digital transformation with local values and social cohesion (Errichiello & Micera, 2021; Ivars-Baidal, 2024). Similarly, culture and identity are increasingly recognized as integral to sustainable development. Digital technologies support the preservation and reinterpretation of cultural heritage through digital archives, virtual heritage experiences, and storytelling platforms, fostering cultural continuity and intercultural dialogue (Duxbury & Jeannotte, 2012; Nurse, 2006; UNESCO, 2015).

The effective integration of digital technologies into sustainable tourism systems ultimately depends on governance arrangements and organizational learning processes capable of managing complexity, mediating trade-offs, and fostering stakeholder alignment. Fragmented policymaking, limited data-sharing incentives, and legacy bureaucratic structures often inhibit the development of coherent digital sustainability strategies (Jokom et al., 2025; Socratous et al., 2025). Conversely, inclusive and adaptive governance models that engage public authorities, private firms, civil society, and local communities can align digital innovation with sustainability objectives, fostering trust, legitimacy, and collective learning (Allen et al., 2023; El Archi et al., 2023; Rahmadian et al., 2023). At the organizational level, sustainability-oriented digital transformation depends on human capital, absorptive capacity, and inter-organizational learning, which enable tourism firms to translate technological potential into concrete sustainability practices (Schönherr et al., 2023; Sharma & Sethi, 2025).

Despite the rapid expansion of digital tourism research, significant theoretical gaps persist. Existing studies remain fragmented across technological, managerial, and sustainability perspectives, often focusing on isolated technological implementations and short-term performance outcomes, with limited integration of governance dynamics, stakeholder interactions, and contextual contingencies (El Archi et al., 2023; Kürüm Varolgüneş et al., 2025). This fragmentation constrains theory development and limits the explanatory and prescriptive power of existing models. Addressing these limitations requires qualitative, inductive, and process-oriented approaches that uncover how digital technologies facilitate or hinder sustainable tourism practices across economic, social, environmental, cultural, and governance dimensions. In response to recent calls for empirically grounded qualitative research, this study adopts a grounded theory approach to develop an integrated, multidimensional framework explaining the paradoxical effects of digital transformation on sustainable tourism development.

Purpose of the paper. *The purpose of this paper is to investigate how digital transformation shapes sustainability outcomes in the tourism sector, with particular attention to the paradoxical effects that emerge from the adoption of smart tourism technologies. Rather than assuming a linear or inherently positive relationship between digitalization and sustainability, the study adopts a critical, exploratory perspective that conceptualizes digital technologies as socio-technical infrastructures embedded within complex tourism systems. Specifically, the paper aims to respond to recent calls in the literature for qualitative, empirically grounded research capable of validating the practical impact of digital technologies on sustainable tourism (Kürüm Varolgüneş et al., 2025). As part of an ongoing research effort, the study seeks to develop an integrated, multidimensional framework that links digital transformation with economic, social, environmental, cultural, and governance dimensions of sustainability, moving beyond fragmented and dimension-specific analyses that currently dominate the field (Fatema et al., 2024; Zeqiri et al., 2025). A further objective of the paper is to identify the key enablers and barriers influencing the adoption of smart tourism technologies across different destination types. By focusing on Italian case studies spanning urban and rural contexts, the research aims to capture how variations in digital maturity, institutional capacity, and governance arrangements shape sustainability trajectories. In doing so, the paper explicitly addresses the need to analyze success cases and obstacles in smart tourism adoption across heterogeneous destinations, as highlighted by Kürüm Varolgüneş et al. (2025). More broadly, the paper seeks to advance theoretical understanding of sustainable tourism research by reframing digital transformation as both an opportunity and a source of tension. Through a grounded theory approach, the study aims to uncover the mechanisms through which digital technologies simultaneously enable sustainable practices and generate sustainability paradoxes, thereby offering a more nuanced and realistic understanding of digitally mediated sustainability transitions in tourism systems. Finally, the paper aims to generate insights that are not only theoretically relevant but also actionable for practitioners and policymakers. By illuminating the conditions under which digitalization contributes to (or undermines) sustainable tourism development, the study seeks to inform the design of more responsible, context-sensitive digital interventions that balance innovation with long-term sustainability goals.*

Methodology. *This study adopts a qualitative research design grounded in grounded theory, which is particularly suitable for investigating complex, context-dependent, and under-theorized phenomena, such as the relationship between digital transformation and sustainability in tourism. The choice of a qualitative, inductive approach responds directly to recent calls for practice-based and empirically grounded research capable of validating the real-world implications of digital technologies for sustainable tourism development (Kürüm Varolgüneş et al., 2025). Grounded theory allows for the emergence of conceptual categories from empirical data, rather than imposing pre-defined theoretical constructs, thereby enabling a nuanced understanding of sustainability paradoxes and governance dynamics.*

Case Selection and Sampling Strategy. Cases will be selected through purposive theoretical sampling to capture variation across governance arrangements, levels of digital maturity, and sustainability orientations within the tourism sector. This sampling strategy is consistent with the logic of grounded theory, as cases will be chosen not for representativeness but for their potential to illuminate analytically relevant patterns and contrasts. In particular, the study will focus on tourism destinations, firms, and public–private initiatives that have implemented digital or are implementing innovations such as artificial intelligence, big data analytics, blockchain solutions, and immersive technologies, including virtual and augmented reality. Selection will be guided by observable impacts on economic, social, and environmental sustainability, as well as by the availability of rich qualitative data, including interviews, policy documents, strategic plans, and publicly accessible digital materials. Attention will also be paid to contextual diversity, ensuring the inclusion of cases operating in both urban and rural settings and encompassing different organizational forms, such as destination management organizations, tourism enterprises, and collaborative projects. By incorporating multiple actor perspectives within each case, the study aims to uncover sustainability paradoxes and governance mechanisms that tend to remain obscured in large-scale quantitative or bibliometric analyses. At the time of writing, specific cases are being identified in line with these criteria to build a comparative qualitative dataset that reflects the heterogeneity of digitally mediated sustainability practices within the Italian tourism ecosystem.

Rationale for Focusing on Italian Case Studies. The decision to focus exclusively on Italian case studies is theoretically and empirically motivated. Italy offers a particularly fertile context for examining the interplay between digital transformation and sustainable tourism, driven by a combination of structural, institutional, and practical factors. First, Italian tourism destinations exhibit substantial variability in digital maturity. Large metropolitan destinations and national-level platforms often exhibit advanced levels of digital adoption. At the same time, rural areas and community-based initiatives often operate with low to medium levels of technological sophistication. This variability creates favorable conditions for comparative qualitative analysis, enabling the examination of how different degrees of digital readiness shape sustainability outcomes and adoption trajectories. Second, Italy is internationally recognized for its rich and diverse sustainability practices in tourism. The presence of protected natural areas, national parks, responsible tourism festivals such as IT.A.CÀ, and certified sustainable villages under schemes such as Bandiera Arancione provides a wide range of empirically observable contexts in which economic, social, and environmental sustainability objectives are actively pursued. This richness enables a holistic investigation of sustainability outcomes and the paradoxes arising from integrating digital technologies into sustainability-oriented tourism models. Third, Italy's multi-level governance structure, encompassing national, regional, and municipal tourism policies, offers a valuable setting for exploring the role of institutional and policy enablers in shaping digital sustainability initiatives. Focusing on a single country enhances analytical comparability across cases while controlling for broader regulatory, cultural, and socio-economic conditions that could otherwise confound cross-national comparisons. Finally, practical considerations related to feasibility and data access support the exclusive focus on Italy. The physical presence of some authors in the country facilitates in-depth qualitative data collection, including semi-structured interviews with local stakeholders, site visits, and access to policy and strategic documents. This enables the development of a contextually rich and fine-grained understanding of the mechanisms, enablers, and paradoxes associated with sustainable digital transformation in tourism, which would be more difficult to achieve in a multi-country design.

Data Collection. Data will be collected using multiple sources to ensure triangulation and enhance the robustness of the analysis. Primary data will consist of semi-structured interviews with key stakeholders involved in digital and sustainability initiatives, including destination managers, tourism entrepreneurs, public officials, technology providers, and representatives of local communities. In addition to interviews, the study will employ a structured questionnaire primarily addressed to Destination Management Organizations (DMOs). The questionnaire is designed to explore the perceived advantages and disadvantages of adopting different digital technologies. For each technology considered (e.g., artificial intelligence, big data, IoT, immersive technologies), respondents will be asked to evaluate potential benefits and challenges across the three pillars of sustainability. This instrument aims to capture practitioners' perceptions of the trade-offs and tensions associated with digital innovation in tourism destinations. In addition to primary data, the study will draw on policy and strategic documents such as tourism development plans, digitalization strategies, and sustainability reports, as well as secondary data including organizational websites, digital platforms, and social media content.

Data Analysis. Data analysis will follow the iterative and inductive procedures of grounded theory. In the first phase, open coding will be employed to identify initial concepts and categories emerging from the data, with particular attention to digital practices, sustainability outcomes, governance arrangements, and perceived tensions. In the second phase, axial coding will be used to explore relationships among categories, focusing on conditions, actions, interactions, and consequences associated with digital transformation processes. Finally, selective coding will enable the integration of categories around core themes, resulting in a coherent conceptual framework that explains how digital technologies shape sustainability outcomes in tourism. Throughout the analytical process, constant comparison will be applied across cases and data sources, and analytical memos will document emerging interpretations and theoretical insights. This iterative approach will support theory building that is firmly grounded in empirical evidence and sensitive to contextual variation.

Results. *Preliminary insights from the ongoing analysis suggest that digital transformation may influence sustainability in tourism through a set of interconnected mechanisms that cut across economic, environmental, social, cultural, and governance dimensions. Rather than assuming uniform outcomes, the emerging evidence indicates that digital technologies tend to generate ambivalent effects and sustainability paradoxes, shaped by contextual conditions and governance arrangements. Across the cases, digital tools such as data analytics platforms and smart destination systems are expected to contribute to economic sustainability by improving operational efficiency, optimizing demand management, and enabling small and medium-sized tourism enterprises to access broader markets. These technologies may support innovation and competitiveness, particularly in destinations where digital strategies are aligned with broader sustainability objectives. At the same time, preliminary observations suggest that economic benefits may be unevenly distributed, with digitally advanced actors capturing disproportionate value, thereby potentially reinforcing existing inequalities within tourism ecosystems.*

From an environmental perspective, digital technologies may facilitate more sustainable resource management by enabling real-time monitoring of tourist flows, energy consumption, and environmental pressures. Smart mobility solutions and data-driven visitor management systems can reduce congestion and mitigate ecological impacts in sensitive areas. However, these gains may be partially offset by the environmental costs associated with digital infrastructures, including increased energy consumption and reliance on data-intensive systems. This emerging tension points toward a potential sustainability paradox in which digital efficiency coexists with digitally induced environmental burdens.

Socially, digital platforms may enhance accessibility, transparency of information, and stakeholder engagement, foster more inclusive tourism experiences, and enable community participation in destination management. Nevertheless, disparities in digital literacy and access may generate new forms of exclusion, particularly in rural and peripheral contexts. These preliminary insights highlight the importance of addressing digital divides as a prerequisite for socially sustainable digital transformation.

Governance appears to emerge as a critical mediating factor across all dimensions. Initial evidence suggests that cases characterized by strong public–private collaboration, participatory governance mechanisms, and strategic alignment between digitalization and sustainability objectives tend to display more balanced and resilient outcomes. Conversely, fragmented governance structures and weak institutional coordination may limit the transformative potential of digital technologies and exacerbate sustainability paradoxes.

Research limitations. *This study has several limitations. The qualitative and exploratory nature of the research limits the generalizability of the findings beyond the Italian context. The reliance on case studies may also introduce selection bias, as cases with visible digital initiatives are more likely to be included. Furthermore, the study focuses on perceived and processual sustainability outcomes rather than quantitatively measured impacts.*

Future research could address these limitations by adopting mixed-methods approaches, conducting comparative cross-country analyses, and integrating longitudinal data to assess the long-term sustainability effects of digital transformation in tourism.

Managerial implications. *The findings offer important implications for managers and policymakers. Digital transformation strategies should be explicitly aligned with sustainability objectives rather than pursued as isolated technological upgrades. Managers need to recognize and actively manage sustainability paradoxes, particularly those related to energy consumption, social inclusion, and governance fragmentation. Investments in digital literacy and capacity-building are essential to ensure that digital innovation contributes to inclusive and equitable tourism development.*

For policymakers, the results highlight the importance of governance frameworks that foster coordination, participation, and accountability. Supporting collaborative platforms, data-sharing mechanisms, and participatory decision-making processes can enhance the sustainability impact of digital initiatives and mitigate unintended consequences.

Originality of the paper. *This paper contributes to the literature by providing a grounded, empirically informed analysis of the paradoxical relationship between digital transformation and sustainability in tourism. By integrating multiple sustainability dimensions and emphasizing the role of governance and context, the study advances existing theoretical frameworks and responds directly to recent calls for qualitative, integrative research. The focus on the Italian tourism system offers nuanced insights into digitally mediated sustainability transitions in a structurally complex and territorially embedded context.*

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Emerging Green Professions in Cultural and Creative Organizations

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Abstract. *Cultural organizations are increasingly expected to reduce their environmental impact and embed sustainability into their operational practices. Yet the internal organizational conditions that support this transition remain poorly understood. This paper examines the organizational and contextual factors associated with the adoption of green human resource management (GHRM) practices − specifically, green staffing and green training provision − in the Italian cultural and creative sector.*

The study draws on data from the 4C−Cultural and Creative Carbon Cut questionnaire (Fondazione Santagata ETS, 2024), administered to a net sample of 634 Italian cultural and creative organizations. Associations between two independent variables − organizational size and network membership − and the two GHRM outcome variables were examined through chi-square tests and adjusted standardized residual analysis, following an exploratory data analysis approach.

Green staffing and training remain limited across the sector. Organizational size is positively associated with both practices, with micro-organizations significantly underrepresented despite their numerical dominance. Network membership is significantly associated with training provision, with networked organizations more than twice as likely to report offering it.

The non-probability sampling design limits generalizability. The cross-sectional structure precludes causal inference. Findings are exploratory and limited to two variables and the Italian context.

Professional networks represent an already-embedded, cost-effective mechanism for disseminating sustainability training. For micro-organizations, hybrid capacity-building strategies combining internal learning with sector-level support structures are the most realistic pathway toward developing green competencies.

This paper provides, to the best of the authors' knowledge, the first large-scale quantitative analysis of GHRM practices in the Italian cultural and creative sector, contributing an empirically grounded foundation for a dedicated research agenda at the intersection of cultural management, green skills, and organizational sustainability.

Keywords: *cultural and creative sector; GHRM; green staffing; green training; networks*

Framing of the research. *In recent years, literature on the cultural and creative sectors has highlighted the central role of human capital as a key factor in cultural organizations' ability to innovate, adapt to changing contexts, and generate economic and social value. Unlike many other productive sectors, cultural organizations have historically been characterized by a high intensity of skilled labor, creative skills, and symbolic capital, elements that make human resources a strategic component of their operations. In this context, cultural professionals tend to be hybrid and multidimensional, combining artistic, managerial, and entrepreneurial skills, and often operating in small organizations characterized by limited resources and a strong reliance on collaborative networks (Menger, 2006; Comunian & England, 2020; Borrione et al., 2024).*

From a broader perspective, the role of skills and human capital is increasingly important in contemporary knowledge-based economies. In such contexts, knowledge, skills, and competences (KSC) represent strategic resources for organizations, contributing to their capacity for innovation, adaptation, and competitiveness (Nuccio & Mogno, 2023). The development and updating of professional skills, therefore, become fundamental elements to enable organizations to respond to the major economic and social transformations underway, including digitalization and the transition to more sustainable development models.

This is particularly true, for example, in the context of the growing focus on environmental sustainability and the ecological transition that is also characterizing the world of cultural organizations and the creative industries, as well as, of course, many other sectors of the economy (ICOMOS, 2019). Indeed, a broad international debate has developed around the concepts of green jobs and green skills, which identify the set of knowledge, skills, and abilities necessary to support the transition to more sustainable production and consumption models (OECD, 2019; OECD, 2025).

In the case of cultural organizations, the relationship between culture and sustainability has progressively gained greater relevance both in academic debate and in cultural policies and organizational strategies (JULIE'S BICYCLE, 2021). In particular, museums and cultural organizations are increasingly called upon not only to promote environmental awareness through their cultural and educational activities, but also to reduce their environmental impact and adopt more sustainable management practices (Duxbury et al., 2017; Ernst et al., 2016).

However, the effectiveness of this process depends largely on the organizations' ability to integrate sustainability into their internal governance models, decision-making processes, and daily organizational practices (Domingues et al., 2023), also within the broader managerialization processes that are characterizing them (Palumbo et al., 2022). Without such integration, there is a risk that the commitment to sustainability will remain predominantly symbolic and will not translate into concrete changes in the operational activities of cultural organizations.

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In this context, one of the still relatively underexplored aspects concerns the role of human resource management practices in developing internal sustainability-oriented competencies. The literature on green human resource management (GHRM) highlights how practices such as green staffing − the introduction of roles or responsibilities dedicated to sustainability − and green training, understood as staff training on environmental issues and sustainable practices, can play a key role in supporting ecological transition processes within organizations (Renwick et al., 2013; Dumont et al., 2017). However, these practices have been studied primarily in industrial sectors or technology-intensive services, while they remain poorly explored in the cultural and creative sectors. This represents a significant gap in the literature, considering that cultural organizations present specific organizational characteristics − including often small size, heavy reliance on public or philanthropic resources, and hybrid professional structures − that can significantly influence the ways in which sustainability-oriented competencies are developed and integrated into organizational practices.

In light of these considerations, this study sits at the intersection of the literature on human capital in cultural sectors, that on green skills, and that on green human resource management practices. Specifically, the study aims to explore, with a focus on the Italian cultural sector, the extent to which cultural organizations are developing internal sustainability-oriented skills and which organizational and contextual characteristics are associated with the diffusion of these practices.

Purpose of the paper. *This paper presents preliminary findings from an ongoing study examining the organizational and contextual factors associated with the adoption of green human resources practice, in particular the presence of sustainability-oriented staff (green staffing) and the provision of sustainability training (green training). The study is guided by two research questions, approached as an exploratory agenda given the preliminary nature of the present paper:*

RQ1: What organizational characteristics are associated with the adoption of green human resource practices in Italian cultural and creative organizations?

RQ2: What contextual characteristics are associated with the adoption of green human resource practices in Italian cultural and creative organizations?

The study aims to map the current state of green human resources practices in the Italian cultural sector and to identify the organizational and contextual conditions under which such practices are more likely to be present. The specific objectives of the present paper are: (1) to describe the distribution of sustainability staffing and training provision across the sample; (2) to explore associations between two organizational and contextual characteristics − organizational size and network membership − and the two outcome variables; and (3) to identify which characteristics show the strongest exploratory signal, as a basis for future explanatory research across the full set of variables.

Methodology. *This study draws on data from the 4C−Cultural and Creative Carbon Cut questionnaire, conducted by Fondazione Santagata ETS (2024). The questionnaire is distributed online through a multichannel strategy. The questionnaire is structured into eight sections. The first one covers internal organizational characteristics, including size, legal form, and network membership, and contextual factors, including geographical area, municipal marginality code (defined according to the National Strategy for Inner Areas, 2020), share of university graduates in the region, and cultural sector. The remaining sections measure seven environmental dimensions on which cultural organizations can have an impact. One of these dimensions, Internal Processes, focuses on the organizational elements needed to manage activities sustainably. The present study examines variables from this dimension. Two variables capture the adoption of green human resources practices: 1) the presence of sustainability-oriented staff, and 2) the provision of sustainability training. We ask organizations reporting the absence of either practice to rate its perceived importance on a five-point Likert scale. Instead, organizations reporting the provision of sustainability training answer two follow-up questions: one on the topics covered, and one on the frequency of delivery. Both follow-up questions are closed, with pre-coded response categories.*

The cultural and creative sectors are delineated using the synoptic table developed by the Italian National Institute of Statistics (ISTAT) that maps economic activities according to the ATECO 2007 classification (updated 2022) across three perimeters: ISTAT 2022, ESSNet Culture, and Symbola. Sectoral composition follows the ESSNet Culture framework, operationalized through NACE Rev. 2 codes, adopted for data falling within the 2008–2024 reference period.

Organizational size is measured by adapting the Eurostat size classifications to the Italian landscape (Symbola & Unioncamere, 2024). Eurostat (2023) classifies enterprises with fewer than ten employees as micro, those with ten to forty-nine employees as small, those with fifty to two hundred forty-nine employees as medium-sized, and those with two hundred fifty or more employees as large. Since the Italian cultural sector is predominantly composed of micro and small enterprises (Symbola & Unioncamere, 2024), the original micro and small categories were further subdivided as follows: micro (fewer than five employees), micro-small (six to ten employees), small (eleven to twenty-five employees), and small-medium (twenty-six to fifty employees).

The analysis proceeded in two stages. During the first stage, we follow Tukey's (2018) exploratory data analysis (EDA) approach to identify patterns and distributional features before formal testing. During the second stage, we examine associations between the organizational and contextual characteristics and the two outcome variables. The three-category staffing variable was recoded into a binary measure (Field, 2018). The response categories "exclusively dedicated" and "not exclusively dedicated" were collapsed into a single "yes" category, yielding a 5×2 contingency

table. To identify which cells drove each significant association, adjusted standardized residuals were inspected (Field, 2018). Only statistically significant associations are reported in the Results. We conduct all analyses in IBM SPSS Statistics (version 29).

Results. *The gross sample comprised 804 organizations. Following two exclusion criteria−duplicates (C1) and organizations falling outside the ESSNet Culture perimeter (C2)−the net sample was reduced to 634 organizations. Primary acquisition channels included the Fondazione Santagata newsletter and a provider-sourced email list (44.3%, N = 281) and FAMU (39.0%, N = 247). Supplementary outreach was conducted via sector-specific intermediaries, including TrovaFestival (3.8%) and Ateatro (3.6%).*

Respondents predominantly occupied senior decision-making roles: legal representatives (19.4%), directors (15.9%), and project managers (9.8%); nearly half (46.4%) reported a tenure exceeding ten years. Self-identified green managers constituted only 3.0% of the sample (N=19). The sample achieves national coverage across all 20 Italian regions, with a greater concentration in the North (52.8%), followed by the Centre (27.6%) and the South and Islands (19.6%). Specifically, the highest regional concentrations are in Piedmont (17.2%, N=109), Lombardy (13.7%, N=87), Tuscany (13.1%, N=83), and Emilia-Romagna (7.4%, N=47). Organizations are almost evenly split between those operating at a regional scale (51.6%, N = 327) and those with national reach (48.4%, N = 307). The majority are located in category A areas (62.3%, N = 393), denoting relatively central and well-connected contexts. Category C accounts for 18.0% (N=114), while only 0.6% (N = 4) fall within the most marginal category F. Public institutions represent the largest governance category (28.9%, N=183), followed by Third Sector Organizations (18.1%, N=115), Social Promotion Associations (13.1%, N=83), and Foundations (11.7%, N=74). For-profit entities account for less than 15% of the sample. Foundation dates range from 1088 to 2024. Table 1 describes the sample's composition in terms of its cultural sector and summarizes the two variables used in the analysis, including organizational size and network membership. Cultural heritage organizations represent the dominant sectoral category (61.5%, N=390), followed by performing arts (24.8%, N=157), education (5.8%, N=37), visual arts (3.5%, N=22), audiovisual and multimedia (2.5%, N=16), and publishing and printing (1.9%, N=12). It is worth noting that micro- organizations predominate. Those with fewer than five employees account for 37.5% (N = 238); those with six to ten employees account for a further 28.1% (N = 178). Together, they comprise nearly two-thirds of the sample. Medium-sized organizations (51-100 employees) are marginal (11.5%, N=73). Finally, a majority of organizations (60.1%, N = 381) belong to at least one network; sectoral networks are the most prevalent type (49.1%).

Table 1. Sample Characteristics (N=634)

	Total	*%*
Cultural sector (ESSNet Culture)		
Cultural heritage	*390*	*61.5%*
Performing arts	*157*	*24.8%*
Education	*37*	*5.8%*
Visual arts	*22*	*3.5%*
Audiovisual and multimedia	*16*	*2.5%*
Publishing and printing	*12*	*1.9%*
Total	*634*	*100%*
Organizational size (number of employees)		
<5	*238*	*37.5%*
6-10	*178*	*28.1%*
11-25	*88*	*13.9%*
26-50	*57*	*9%*
51-100	*73*	*11.5%*
Total	*634*	*100%*
Network membership		
Yes	*381*	*60.1%*
No	*253*	*39.9%*
Total	*634*	*100%*

Source: authors on data from Fondazione Santagata, 2024

Research limitations. *The vast majority of organizations (78.7%, N=499) report no staff dedicated to sustainability. A further 19.9% (N=126) have staff who address sustainability among other responsibilities. Only 1.4% (N = 9) employ exclusively dedicated personnel. Among organizations without dedicated green staff, the perceived importance of such a role was rated at a mean of 3.00 (SD=1.181), corresponding to "Moderately important" as both the median and modal response (28.2%). Whereas "Very important" was selected by 17.0% and "Almost irrelevant" by 10.7%. Sustainability training is similarly limited. Only 22.1% of organizations (N=140) report providing it. The most covered topics are waste material reduction (N=84, 13.2%), waste management (N=82, 12.2%), and environmental education (N=71, 11.2%). The most common format is the workshop (9.8%); the most frequently cited provider is external consultancy (N=69, 10.9%). Annual delivery is the most prevalent frequency (10.6%, N=67). Among organizations not currently providing*

training, perceived importance was rated at a mean of 3.37 (SD=1.181), with "Moderately important" as the modal response (24.0%), followed by "Very important" (20.8%) and "Fundamental" (15.8%). Almost irrelevant was selected by 6.0% (N=38).

Table 2 shows significant associations between organizational and contextual characteristics, such as organizational size and network membership, and GHRM practices, such as green staffing and training.

***Organizational Size and GHRM Practices (RQ1)**. Organizational size is significantly associated with both outcome variables. The chi-square test reveals a significant association between organizational size and the presence of sustainability-oriented staff (χ^2=40.768, df=4, p < 0.001; Cramer's V=0.254), indicating a small-to-medium effect size.*

Row percentages range from 11.9% among organizations with 26−50 employees to 24.4% among those with fewer than five. Adjusted residual analysis nuances this picture. Micro-organizations with fewer than five employees are significantly underrepresented (adjusted residual = -2.5). Small- medium organizations with 26−50 employees (adjusted residual= +3.4) and medium-sized organizations with 51–100 employees (adjusted residual=+3.4) are significantly overrepresented, both exceeding the ±1.96 threshold. It is worth noting that the highest raw prevalence of sustainability staffing (24.4%) is observed among the very smallest organizations (fewer than five employees); this apparent paradox is resolved by the adjusted residual analysis, which reveals that such organizations are in fact significantly underrepresented given their numerical dominance in the sample, confirming that size is positively associated with green staffing when distributional weight is accounted for. A significant association is similarly observed between organizational size and sustainability training provision (χ^2= 10.775, df= 4, p= 0.029; Cramer's V= 0.130), indicating a small effect size. Row percentages range from 9.3% among organizations with 26–50 employees to 31.4% among those with fewer than five. No individual cell exceeds the ±1.96 threshold. The strongest tendency towards overrepresentation is observed among organizations with 26–50 employees (adjusted residual= +2.1); micro-organizations with fewer than five employees tend towards underrepresentation (adjusted residual= -1.2), neither reaching cell-level significance.

***Network Membership and Green Training (RQ2).** Network membership is significantly associated with green training provision (χ^2= 7.351, df= 1, p= 0.007; Phi= 0.108), reflecting a small effect size. Among non-networked organizations, 30.0% (N= 42) report providing training (adjusted residual= -1.9). Among networked organizations, this figure rises to 70.0% (N= 98, adjusted residual= +1.5).*

Table 2. Associations between Organizational/Contextual Characteristics and GHRM Practices

*Panel A - Organizational size * Green Staffing*					
Size categories	*Green Staff "Yes"*	*Green Staff "No"*	*Total*	*%Row*	*Adjusted Residuals*
<5 employees	*58*	*180*	*238*	*24.4%*	*-2.5*
6-10 employees	*38*	*140*	*178*	*21.3%*	*-0.2*
11-25 employees	*19*	*69*	*88*	*21.6%*	*-0.1*
26-50 employees	*7*	*50*	*57*	*11.9%*	*+3.4**
51-100 employees	*13*	*60*	*73*	*17.8%*	*+3.4**
Total			*634*		
χ^2 = 40.768, df = 4, p < 0.001, Cramer's V = 0.254.					
** Significant at p < 0.05 (|residual| > 1.96).*					
Panel B- Organizational size Green Training*					
Size categories	*Training Provided*	*No Training*	*Total*	*%Row*	*Adjusted Residuals*
<5 employees	*42*	*196*	*238*	*17.6%*	*-1.2*
6-10 employees	*38*	*140*	*178*	*21.3%*	*-0.3*
11-25 employees	*27*	*61*	*88*	*30.7%*	*+1.9*
26-50 employees	*18*	*39*	*57*	*31.6%*	*+2.1*
51-100 employees	*15*	*58*	*73*	*20.5%*	*-0.3*
Total			*634*		
χ^2 = 10.775, df = 4, p = 0.029, Cramer's V = 0.130.					
Note: No individual cell reached statistical significance (|residual| > 1.96).					
Panel C- Network membership Green Training*					
Network Status	*Training Provided*	*No Training*	*Total*	*%Row*	*Adjusted Residuals*
Networked	*98*	*283*	*381*	*25.7%*	*+1.5*
Non- Networked	*42*	*211*	*253*	*16.6%*	*-1.9*
Total			*634*		
χ^2 = 7.351, df = 1, p = 0.007, Phi = 0.108.					
Among networked: 70.0% of training providers.					
Among non-networked: 30.0% of training providers.					

Source: authors on data from Fondazione Santagata, 2024.

Research limitations. *Several limitations of the present study should be acknowledged. First, the sample is a non-probability sample, which constrains the generalizability of the findings to the broader population of Italian cultural and creative organizations. Second, the cross-sectional design of the 4C survey does not allow causal inferences to be drawn from the associations observed. Third, the present paper reports exploratory findings for two variables−organizational*

size and network membership−as part of a broader ongoing study. Analyses for other variables, including legal form, territorial marginality, cultural sector, university graduates, and the perceived importance, will be reported in future work. Moreover, the operationalization of green human resources practices is narrow, focusing on staffing and training as observable organizational practices. Future studies should also move toward a more granular investigation of both green staffing and green training. The green staffing measure is based on a single survey item asking whether the organization employs personnel responsible for "the planning, implementation, management, and communication of activities aimed at reducing the ecological impacts associated with its operations." This generic operationalization does not capture the actual green-related tasks carried out by staff members, the distribution of environmental responsibilities within the organization, or the informal contributions of employees who engage in green activities without formally designated role. As concerns the green training variable, individual-level dimensions − such as managers' and employees' educational background in relation to Education for Sustainable Development (ESD), as well as their beliefs and attitudes toward sustainability − were not captured by the survey instrument. Incorporating such variables in future research would allow for a more comprehensive assessment of green HRM and its antecedents at the individual level. Finally, the study is limited to the Italian context, which, whilst distinctive in its sectoral composition and institutional framework, may limit comparability with cultural sectors in other national contexts.

Managerial implications. *The findings carry practical implications for cultural managers, sector intermediaries, and policymakers. The study is ongoing; the evidence presented here remains exploratory. The first implication concerns organizational size. In highly fragmented sectors such as the cultural and creative industries, the development of green human resources practices is unlikely to depend solely on organizations' internal resources. Rather, it is shaped by the broader availability of external support structures (Cles & Associazione Economia della Cultura, 2021). Micro-organizations are particularly exposed to this structural condition: given their limited internal capacity, sustainability competence development will rarely be achievable through internally driven strategies alone. Hybrid approaches−combining internal learning processes with shared services, subsidized training, and sector-level capacity-building initiatives- are therefore more realistic pathways for strengthening sustainability competences at this organizational scale. For cultural managers in micro and micro-small organizations, this implies that such external scaffolding is likely a necessary precondition for progress, rather than a supplementary option.*

The second implication concerns network membership. Networked organizations are more than twice as likely to provide sustainability training (70.0% vs. 30.0%). Professional networks are therefore already functioning as diffusion channels for green knowledge and practices, even if unintentionally.

Two distinct but complementary diffusion pathways can be identified. The first operates through sector-specific networks, which disseminate green knowledge horizontally among organizations sharing the same cultural domain. In the Italian context, ICOM Italia has developed guidelines and best practices for the integration of environmental sustainability into museum operations, promoting peer knowledge exchange across the national museum sector. At the international level, the Network of European Museum Organizations (NEMO), through its dedicated Working Group on Sustainability and Climate Action, has developed training programs on sustainable cultural management, facilitating cross-national knowledge exchange among museum professionals. Similarly, the European Theatre Convention (ETC), a network of European theatres, has adopted sector-specific sustainability standards and launched dedicated training programs for its member organizations, explicitly positioning the network as the primary vehicle through which green competencies are built and diffused. In the visual arts sector, Gallery Climate Coalition (GCC) brings together galleries, artists, curators, and cultural professionals around shared green standards and practices tailored to the national context, while the international coalition provides its members with free sector-specific guidelines, tools, and a dedicated carbon calculator.

A second pathway is represented by cross-sectoral networks, including the ECO Network, which has developed free capacity-building programs targeting organizations operating across the performing arts, visual arts, and cultural heritage sectors, providing shared methodologies and practical tools for green management.

The prevalence of sectoral networks in the sample (49.1%) suggests that Italian cultural organizations privilege the horizontal diffusion pathway.

The direct implication for sector intermediaries and policymakers is that existing cultural networks represent a cost-effective and already-embedded mechanism through which sustainability training content can be systematically disseminated rather than building a completely new infrastructure.

Originality of the paper. *This paper makes three original contributions to cultural management literature. First, it addresses a significant gap at the intersection of three areas of scholarship: human capital in cultural organizations, green skills, and green human resource management. Despite developing in parallel, these areas have rarely been brought into dialogue with one another, particularly with cultural and creative organizations, which remain largely absent from the empirical landscape. This study directly addresses this issue by providing, to the best of the authors' knowledge, the first large-scale empirical mapping of green human resource management practices, focusing specifically on sustainability staffing and training, across a nationally representative sample of Italian cultural and creative organizations.*

Secondly, the paper makes an empirical contribution that is both geographically and institutionally distinctive. Italy is a particularly relevant national context for this line of enquiry due to the scale and institutional complexity of its cultural sector, the prevalence of micro and small organizations, and the significant involvement of public institutions and third sector organizations in cultural governance (Symbola & Unioncamere, 2024). The findings suggest that there are conditions that substantially shape the adoption pathways of sustainability-oriented human resource practices. This institutional and structural specificity is an analytical asset in itself, enabling the study to examine how characteristics at the sector level — including organizational size and network embeddedness — mediate the diffusion of green practices.

Thirdly, the study contributes to practical and policy literature on cultural management by offering evidence based on empirical research that professional networks already function as channels for disseminating knowledge about sustainability. This suggests that intermediaries and policymakers in the sector need not develop new infrastructures from scratch, but can instead use existing network architectures as cost-effective ways of systematically building capacity.

Taken together, these contributions position the paper as an early but substantive step toward a dedicated research agenda on green human resource management in the cultural and creative sectors. Drawing on the full set of organizational and contextual variables collected in the 4C survey, future explanatory studies will extend the work.

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Exploring governance in cultural cities: A comparative analysis of three cases in Italy

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Abstract. *Over the last few years, several scholars recognised the potential of cultural heritage and cultural organisations for shaping new trajectories of development in cities. However, limited attention has been paid to the role they play in shaping governance structures, although recent literature underlines the potential of their soft power. This paper aims to explore how governance operates in cultural cities and how cultural resources influence governance dynamics and management strategies. Building on the literature on governance and studies on the management of cultural heritage, the study proposes an analytical framework to examine governance configurations in heritage-rich contexts. Through an extensive review of the literature, the article develops an analytical framework that identifies crucial elements and dimensions of governance in cultural cities and empirically tests them through a comparative qualitative analysis of three Italian cities—Florence, Brescia and Pistoia. Data collection is based on semi-structured interviews with key stakeholders involved in the city governance. The results reveal how different configurations of actors, coordination mechanisms, and strategic priorities lead to distinct governance models. The paper contributes to the literature by identifying empirically grounded governance models that help explain how cultural resources shape strategies, objectives and priorities.*

Keywords: *governance; cities of art; cultural cities; cultural heritage management; Italy.*

Framing of the research. *In cities of art and culture, governance is not only guided by local government, but cultural organisations also play a crucial role in helping to shape the city's development trajectories and the management of cultural heritage, involving a multi-agentic perspective in the decision process.*

In the study of cultural and creative organisations, the topic of governance has been studied, focusing on different levels of organisational configurations, such as cultural and creative districts or clusters, cities of art or creative city (Costa, 2008; Sacco et al., 2009; Andres and Chapain, 2013; Pill et al., 2025). Among these systems, several elements have been considered from the relationships and roles among actors, forms of coordination, distribution of resources or the potential tensions that may arise (Lazzeretti and Cinti, 2009). According to this perspective, the governance of cultural cities can be analysed as a system in which cultural resources contribute to structuring priorities and relationships and developing policy instruments. Moreover, focusing on governance dynamics and processes can contribute to reorienting cultural heritage management strategies towards more sustainable approaches. This issue is particularly relevant for cities of art, where policymakers increasingly prioritise the sustainable management of tourism and visitor flows (Della Lucia, 2018; Pasquinelli and Trunfio, 2023).

The concept of city governance is multidisciplinary and concerns, among others, the fields of management, public administration, and urban studies. Urban governance, specifically, can be defined as the process through which collective objectives at the local level are formulated and achieved (Pierre et al., 2012). It can also be considered as a set of arrangements resulting from both formal and informal actions undertaken by governing bodies that guide the development of the city (Song et al., 2023). It identifies the relational process among a group of actors who jointly design actions aimed at public benefit (Redaelli, 2011), where this group of actors does not involve only the city hall (Hendriks, 2014). In a nutshell, urban governance refers to the process through which a set of key actors defines the developmental trajectories of the city.

Pierre (1999) distinguishes four main models of urban governance—managerial, corporatist, pro-growth, and welfare governance—which differ according to specific aspects such as participants, objectives, instruments, and outcomes. The managerial approach places market mechanisms at the centre, viewing local institutions as organisations that provide services to meet collective needs. The corporatist approach focuses on the interests of a group of organisations, while the pro-growth perspective is characterised by the structuring of concerted public–private actions aimed at boosting the local economy. Finally, welfare governance is typically associated with cities characterised by a passive style of politics and a stagnant local economy (Pierre and Peters, 2020; Branco et al., 2024).

Two additional crucial aspects of urban governance are its multilevel nature, which implies that local authorities maintain relationships with higher levels of government as well as with lower-level actors such as communities and neighbourhoods, and the political–administrative process, that is, the way decisions are implemented (Kearns and Paddison, 2000).

In the literature on cultural and creative cities, the issue of governance has mainly been addressed by examining aspects related to the management of cultural resources and strategies for urban development based on cultural and creative sectors (Lazzeretti, 2003). The role of cultural activities in cities can be interpreted by considering both the intrinsic value of culture and its importance for communities, as well as its capacity to regenerate declining sectors and

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support economic development, or its potential for cities' soft power and the contribution that cultural institutions give to political debate (Lazzeretti, 2023; Pill, 2025).

Research on governance in local contexts characterised by a strong presence of cultural resources and cultural and creative organisations—such as cultural districts and clusters, cities of art, and creative cities—has highlighted the importance of several elements. In this respect, governance in cultural and creative systems is shaped by heterogeneous organisational profiles whose roles and strategies differ in terms of actors, objectives and strategic orientation (Schieb-Bienfait et al., 2018).

A crucial aspect is related to the variety of actors involved in the governance process and the relationship among them. Lazzeretti and Cinti (2009) studied the multilevel governance of the city of Florence by observing the city's museum cluster. They describe a governance model in which cultural institutions and public institutions are complemented by a network of private actors—such as firms, spin-offs, and banking foundations—that are continuously involved in these relationships and perform complementary functions, including financial and technical support. These results are corroborated by recent research suggesting that, alongside local governments and cultural institutions, private actors can also play a crucial role as catalysts in shaping new development trajectories based on culture and creativity (Della Lucia and Trunfio, 2018). In parallel, empirical evidence also suggests a growing recognition of the need to extend governance processes to local communities, requiring the adoption of appropriate participatory mechanisms and tools (Sokka et al., 2005; Cerquetti, 2024). This plurality of agents contributes to increasing the complexity of objectives, interests and expectations among stakeholders (Gugu and Dal Molin, 2016), and consequently actions involved in the management of cultural heritage.

Moving beyond the typology of actors, part of the literature focuses on the strategies adopted to manage cultural heritage and cultural and creative organisations in order to support cities' development. Within this stream, scholars examine both the objectives of these strategies and the mechanisms through which they are implemented. A large part of research investigates cultural resources in supporting place rebranding or regeneration processes (Solima and Minguzzi, 2014; Brorström and Willems, 2023; Pasquinelli and Eshuis, 2025). From this perspective, the relationship between cultural resources and places appears to be mutually reinforcing and sometimes contested. On the one hand, cultural resources can be strategically mobilised to promote a new image of a place; on the other hand, the attractiveness and identity of a place can foster the emergence of new cultural and creative enterprises (Lazzeretti and Oliva, 2022; Pasquinelli et al., 2024). More recently, this perspective shifted toward the study of the city's reputation, showing that synergistic coordination among institutional, economic, and cultural agents may increase effective governance and positively influence the city's cultural reputation (Beccherle et al., 2025).

Finally, literature has identified the mechanisms that shape different typologies of governance in cultural and creative systems. According to Sacco et al. (2009), culture-based development can be represented through a bottom-up, self-organised model or through a top-down model in which cultural resources are mobilised through specific development strategies, often aimed at increasing attractiveness and tourism, with limited attention to impacts on the local community. Similarly, studying the Museums Quarter of Vienna, Abfalter and Piber (2016) evidence that a model based on a higher degree of flexibility in the strategic processes can lead to expected and innovative opportunities.

Costa et al. (2008) identify four approaches linking culture and creativity to territorial development. The first concerns explicit policies aimed at building the "creative city" through the promotion of creative industries, the attraction of talent, and the use of creativity as a development tool. The second includes broader interventions that use cultural activities—such as events, cultural spaces, and urban regeneration processes—to foster urban and regional growth. The third further broadens the perspective by considering cultural and creative activities as drivers of competitiveness and territorial dynamics, even independently of public intervention, emphasising clusters and local production systems. Finally, the broadest approach interprets culture in a wider sense, placing identity, heritage, urban image, and symbolic representation at the centre as key resources for territorial development.

Similarly, Smith and Warfield (2008) distinguish between a culture-centred approach, which prioritises public support for cultural and artistic institutions and a collaborative governance model, and an economy-centred approach, which focuses on strengthening cultural and creative sectors through the development of partnerships, networks, and collaborations (Andres and Chapain, 2013).

More recently, some scholars have focused on the issue of collaborative governance (Ansell and Gash, 2008; Ciangola and Giodano, 2025). In this perspective, the role of the local community becomes crucial for the governance of cities rich in cultural heritage. According to some authors, collaborative governance helps balance conservation and valorisation in heritage-rich contexts. In addition to the involvement of institutional, cultural, and economic actors, it also requires the active participation of the local community (Qiu et al., 2025).

Purpose of the paper. *Although effective governance can enhance efficiency and improve the allocation of resources, while enabling the development of strategies that balance diverse interests, such as those of local communities, government, and cultural organisations, the topic of governance in heritage-rich contexts has received limited attention.*

On the one hand, in the literature on governance, the role of cultural heritage and cultural organisations still remain marginal. Existing literature, however, highlights that urban development patterns are strongly shaped by the evolution of the sectors that historically characterise a city's economic structure, as well as by the broad set of institutions that support these sectors (Wolfe, 2010). Consequently, cities characterised by a strong presence of cultural organisations

may display specific features that shape their development trajectories in distinctive ways and, in turn, influence the forms of governance through which these trajectories are steered.

On the other hand, studies on cultural cities and creative cities have done little to investigate the context and elements of governance. Related to this aspect, however, globalisation has intensified competition among cities for resources, making distinctive local cultures increasingly important for attracting tourists, investments, and economic opportunities. As noted by Kearns and Paddison (2000), institutional fragmentation can foster innovative processes, and economic uncertainties can lead to the assertion and utilisation of local culture(s), values, and images.

Based on these considerations, the paper aims to fill this gap by answering the following research question: how does governance operate in cultural cities and what role do cultural resources play in shaping urban governance? Combining the literature on governance of cities and the field of culture and creativity, the study aims to define a model of governance for cultural cities and analyse it in the light of the case studies of three Italian cities, Florence, Pistoia and Brescia.

The paper wants to contribute to the literature by identifying the key dimensions that shape governance in cultural cities and by empirically analysing how these dimensions vary across three Italian cases, caracthereized by a specific context in terms of agents and cultural heritage management strategies. The theoretical contribution goes beyond the application of existing urban governance models to cultural cities but the paper proposes a revision and integration of these models including cultural heritage resources to identify how they shape governance configurations, actor coordination, and strategic objectives.

Methodology. *Based on the literature, the analysis firstly identifies some crucial dimensions in the governance of heritage-rich contexts that can shape local development trajectories and the relationship between actors involved in decision-making processes. These might involve the objectives of cultural policies (e.g., increasing competition, attracting tourism, engaging the community, etc.), the configuration of actors involved in decision-making processes, coordination mechanisms between actors (e.g., from top-down policy strategies to more network-based and collaborative forms of governance), and the role of the community.*

Secondly, the analysis adopts the methodology of comparative case studies to test the dimensions of governance on three Italian cultural cities, Florence, Brescia and Pistoia and identify crual theme among the dimsions. Data collection involved a total of 69 interviews collected between 2019 and 2024 among a set of different key-actors – local government, tourism and cultural organisations, firms and business associations - involved in the cultural heritage management and city governance. Interviewees were selected through a snowball sampling strategy (Noy, 2008). The research initially involved experts and professionals directly engaged in cultural heritage management and urban governance processes within the three cities. These initial informants subsequently suggested additional relevant stakeholders to be included in the study. The snowball process enabled the identification of a broad network of actors involved in governance dynamics allowed the research to progressively capture the plurality of perspectives and relationships. When no substantially new information emerged from additional interviewees during the data collection process, data saturation was considered achieved and no further actors were contacted (Bouncken et al., 2026; Elmholdt et al., 2026).

The three cases were selected through a most-different design within a shared national context. The cities of Florence, Brescia and Pistoia all recognise cultural resources as central to the development of new trajectories, yet they represent distinct strategies and governance configurations. While Florence represents a major international city of art facing intense tourism pressures, the cities of Brescia and Pistoia are medium-sized cities that have been recently appointed by the label of Italian Cultural Capitals and are experiencing two different paths in terms of culture-driven development. On the one side, Brescia is a post-industrial city that has strategically invested in culture as a repositioning strategy. On the other side, Pistoia is developing cultural initiatives to better define its identity, still fragmented. The differences between the three cases enable the identification of different governance models. The comparative logic aimed to identify how different governance configurations emerge under distinct development trajectories despite a shared national institutional context.

Interview data were analysed through a reflexive thematic analysis (Braun and Clarke, 2019; 2022). Reflexive thematic analysis is a qualitative method for identifying, analyzing, and interpreting themes within data. The analysis focused on identifying recurring themes among governance dimensions across the three cases, including actor configurations, strategic objectives, coordination mechanisms, and the role of communities.

Results. *The analysis reveals preliminary results that indicate significant differences in the governance of cities and the management of cultural heritage. A point of similarity is represented by the crucial role played by cultural heritage and cultural organisation in shaping the future development trajectories of the cities. The whole of the actors involved in the analysis highlight cultural heritage as a strategic asset in defining the identity of the place and past and present trajectories.*

In terms of strategic objectives, the three cities exhibit distinct trajectories shaped by their historical economic backgrounds and current tourism maturity. Brescia has embarked on a strategic process of repositioning, integrating its traditional industrial legacy with a new identity as a city of culture. This effort to diversify the city's image and global reputation led to the designation as the Italian Capital of Culture 2023 (Beccherle et al., 2024). Conversely, Pistoia has responded to the structural decline of its traditional manufacturing sectors by leveraging cultural resources to foster a new path of development. Following the year of Italian Capital of Culture in 2017, the city has focused on enhancing its heritage to increase tourism attractiveness, specifically positioning itself as a destination for niche and slow tourism and

an alternative to mass-market circuits (Oliva et al., 2026). In contrast, Florence, as a major global city of art, faces the pressures of overtourism. Its strategic focus is centred on the delicate reconciliation of heritage preservation and cultural valorisation, with an emphasis on achieving a more sustainable management of visitor flows with a large debate on carrying capacity and the role of new technologies in supporting a more effective governance and tourism management (Liberatore et al., 2023; Franco et al., 2026).

Regarding the configuration of actors and coordination mechanisms of the governance structure, significant differences emerge in their models (Table 1).

Table 1. Comparative governance dimensions across the three cases

Dimension	***Florence***	***Brescia***	***Pistoia***
Governance orientation	*Sustainable tourism and overtourism management*	*Culture-led repositioning strategy*	*Identity-building through culture*
Actor configuration	*Highly fragmented and multilevel stakeholder network*	*Coordinated network centred on cultural institutions*	*Weakly coordinated and fragmented local network*
Leading actors	*Public institutions and major cultural organisations*	*Museum foundation and local government*	*Museum and banking foundations*
Coordination mechanisms	*Complex negotiation among competing interests*	*Structured public–private coordination*	*Emerging and partially fragmented coordination*
Role of culture	*Heritage management and tourism regulation*	*Strategic tool for city branding and repositioning*	*Resource for territorial identity construction*
Community involvement	*Limited but increasingly debated*	*Moderately integrated through partnerships*	*Relevant but still weakly institutionalised*
Emerging governance model	*Fragmented multilevel governance*	*Strategic coordinated governance*	*Emerging identity-based governance*

Source: Authors' elaboration

The cities of Brescia and Pistoia are characterised by a relatively centralised governance framework for heritage management. In both cases, museum foundations serve as pivotal institutional actors, streamlining decision-making and coordination. On the other hand, the governance of Florence is notably more fragmented. It is defined by a complex stakeholder landscape where divergent—and often competing—interests between economic and institutional actors necessitate more sophisticated and multifaceted coordination efforts.

Research limitations. *The research has several limitations that can be summarised in three major considerations. First, although the study presents three different case studies, it remains largely context-specific and generalisation of the results can be limited. In respect to this point, given the qualitative nature of the study, the findings should are intended to provide an interpretative understanding of governance dynamics rather than statistically representative evidence. Second, even if the studies present a rich involvement of different typologies of agents among the key actors of the city governance, they may omit to take into account valuable city stakeholders. Further research should also include the citizen and community perspective, especially if collaborative governance and bottom-up processes are to be analysed. Third, the analysis mostly relies on qualitative data from interviews. This limitation can reflect subjective interpretation, and confirmation bias can emerge. For this reason, future development of the analysis should involve a rigorous triangulation of data sources.*

Managerial implications. *The preliminary results of the study suggest relevant managerial implications both in the context of cultural organisations management and on governance mechanisms. In the context of art and creative cities, cultural and creative organisations can be crucial actors in the city's governance model. In particular, they can act as a mediator, balancing the interests of the government, communities, and economic agents, and fostering collaboration between the different categories. In this regard, to consolidate their position within the city's governance, managers of cultural organisations should develop strategies aimed at actively participating in policy-making forums and continuously building relationships with local public institutions and businesses, in order to contribute effectively to the formulation of heritage management strategies. A further crucial aspect regards the need for coherent and continuous coordination mechanisms. The contemporary scenario, marked by fragmented, multilevel governance and short-term political cycles, increasingly requires city regions to have a clear and coherent long-term vision to guide their future development (Dixon et al., 2023). In the absence of the capacity to strengthen coordination mechanisms among public institutions, cultural organisations and economic actors, the risk is an increasing fragmentation and a disalignment between cultural objectives and local development strategies. Finally, effective governance in heritage-rich contexts requires drawing strategies to incorporate local communities in decision-making processes in order to balance economic development, heritage preservation and individuals' quality of life. It is therefore crucial for both cultural organisations*

and local institutions to define tools and strategies for stakeholder management, launching participatory projects and forms of collaboration with the community for the co-creation of value.

Originality of the paper. *The originality and innovative contribution of the paper are related to several aspects. First, the study combines two different strands of research, namely the literature on governance and the studies on the management of cultural heritage in cities. The merging of these perspectives allowed us to define an innovative analytical framework that identifies relevant dimensions of governance in cities characterised by a strong presence of cultural organisations. Moreover, the application to the context of cultural heritage suggests an innovative perspective on the role of culture-related factors in shaping governance configurations, coordination mechanisms, and development strategies. Finally, through a comparative analysis of three Italian cities, the research identifies distinct governance models that are empirically grounded and can further represent some ideal-types in the management of cities of art.*

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From Erasmus Mobility to Destination Loyalty: The Role of Satisfaction

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Abstract. *Erasmus+ mobility represents not only an educational experience but also a potential driver of future tourism and destination attachment. Students spending several months abroad experience the host country both as learners and temporary residents, which may influence their long-term relationship with the destination. This study investigates how Erasmus+ experiences translate into destination loyalty. Drawing on push–pull theory and the experience–satisfaction–loyalty framework, the research analyses survey data from 208 Erasmus+ students in Italy using a mixed-methods approach combining a qualitative phase and a path analysis. The results show that both push factors and pull factors positively influence students' satisfaction, while satisfaction strongly predicts destination loyalty. The findings suggest that Erasmus+ mobility can generate long-term connections between international students and host destinations, potentially transforming study abroad experiences into future tourism flows.*
Keywords*; Erasmus+ mobility; push and pull factors; student satisfaction; destination loyalty; tourism behaviour.*

Framing of the research. *International student mobility has become a central component of higher education internationalisation strategies. Over the past decades, universities and governments have increasingly promoted cross-border mobility programmes in order to enhance intercultural competencies, academic collaboration and global knowledge exchange. Within Europe, the Erasmus+ programme (hereafter Erasmus+) represents one of the largest and most successful initiatives supporting temporary student mobility. Since its introduction, Erasmus+ has enabled millions of students to spend a period of study abroad, fostering both educational development and intercultural integration (Teichler, 2012; Van Mol, 2014).*

Beyond its academic dimension, Erasmus+ also has important implications for the attractiveness of host countries and cities. Students who participate in Erasmus+ often experience the destination not only as learners but also as temporary residents and visitors. During their stay, they interact with the social, cultural and economic environment of the host location, forming perceptions that may influence their future behavioural intentions toward the destination and may contribute to future revisits and destination recommendation. In this sense, international students can be considered a hybrid category between traditional students and tourists, as their experience combines educational, cultural and lifestyle elements (Lesjak et al., 2015). After their mobility period, students may return to the destination as tourists, recommend it to others, or promote it within their social networks, thus contributing to the long-term visibility and attractiveness of the host location.

For this reason, research on international student mobility has increasingly drawn on theoretical frameworks originally developed in tourism and migration studies. Among these, the push and pull theory (Crompton, 1979) represents one of the most widely adopted approaches to explain mobility decisions (Eder et al., 2010). According to the theory, individuals' decisions to study abroad are influenced by two sets of factors. Push factors refer to internal motivations or circumstances that encourage individuals to leave their home country, such as the desire for international experience, personal development or academic opportunities. Pull factors, on the other hand, refer to the attributes of the host destination that attract students, including the reputation of universities, cultural heritage, lifestyle, climate and perceived quality of life (King & Ruiz-Gelices, 2003; Mazzarol & Soutar, 2002). Building on this framework, previous research has begun to explore the role of push and pull factors as direct determinants of destination loyalty (Prete et al., 2021).

Tourism and service research has developed the experience–satisfaction–loyalty framework, which suggests that visitors' evaluations of their experiences strongly influence their satisfaction and subsequent behavioural intentions toward a destination. According to this perspective, satisfaction represents a key mediator linking individuals' expectations and perceptions with future loyalty, such as the intention to revisit a destination or recommend it to others (Baker & Crompton, 2000; Yoon & Uysal, 2005). This framework has also been applied to heritage destinations in Italy, confirming the central role of satisfaction in shaping tourists' behavioural intentions (Piper et al., 2022).

Despite the conceptual similarities between these research streams, relatively few studies have integrated push and pull factors with the satisfaction–loyalty framework in the context of international student mobility. Most existing research focuses either on the determinants of students' decisions to study abroad or on the academic outcomes of mobility experiences, while less attention has been devoted to understanding how the overall experience shapes students' long-term attachment to the host destination.

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Integrating these perspectives is particularly relevant in the case of Erasmus+. Exchange students typically spend several months in the host country, interacting extensively with local communities, cultural institutions and urban environments. Their perceptions therefore go beyond purely academic factors and include broader aspects of the destination experience. As a result, the mechanisms shaping their satisfaction and loyalty may resemble those observed in tourism contexts (Lesjak et al., 2015). In this respect, Italy represents a particularly interesting empirical context, as it is consistently one of the most popular Erasmus+ destinations in Europe, attracting large numbers of international students every year thanks to its combination of cultural heritage, lifestyle, climate and academic opportunities.

Purpose of the paper. *Building on the outlined theoretical background, this study aims to investigate the mechanisms through which Erasmus+ students develop satisfaction with their mobility experience and loyalty toward Italy as destination. While previous studies have largely focused on the determinants of students' decisions to study abroad, less attention has been devoted to understanding how initial motivations and destination attributes translate into students' evaluations of their experience and subsequent behavioural intentions toward the destination.*

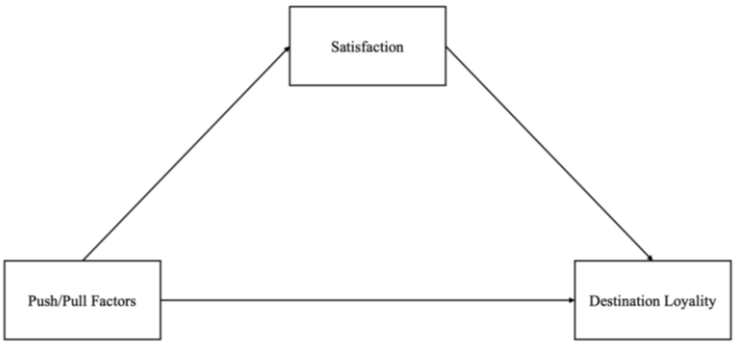
In particular, this research integrates the push and pull theory commonly adopted in international student mobility studies with the experience–satisfaction–loyalty model developed in tourism and service research. By combining these perspectives, the study seeks to provide a more comprehensive explanation of how Erasmus+ students evaluate their experience in the host country and how these evaluations influence their future relationship with the destination.

Specifically, the paper examines the role of push factors and pull factors in shaping students' satisfaction with their Erasmus+ experience in Italy. Italy represents one of the most popular Erasmus+ destinations in Europe and therefore provides a particularly relevant empirical context for analysing how international mobility experiences may translate into satisfaction and destination loyalty (Mazzarol & Soutar, 2002).

In addition to examining their direct effects, the study investigates the mediating role of satisfaction in the relationship between motivations and destination loyalty. In line with the experience–satisfaction–loyalty framework, satisfaction is expected to play a central role in translating students' motivations and perceptions of the host environment into long-term behavioural intentions toward the destination, such as the intention to revisit the country, recommend it to others, or maintain a positive attachment to the host location (Yoon & Uysal, 2005).

By addressing these research objectives, the paper aims to contribute to the literature on international student mobility by bridging tourism and higher education perspectives and by providing empirical evidence on the determinants of Erasmus+ students' satisfaction and destination loyalty in the Italian context.

Figure 1. Conceptual framework



Methodology. *This study was based on qualitative research aimed at identifying push and pull factors among Erasmus+ students and on quantitative research aimed at examining the relationships between push factors, pull factors, satisfaction, and destination loyalty among Erasmus+ students who have spent a mobility period in Italy. For the qualitative phase, data were collected through a focus group involving eight participants (four males, four females; mean age = 24 years), all of whom had completed or were completing an Erasmus+ mobility period in Italy. During the session, participants were asked to reflect on their Erasmus+ experience and to respond in writing to two open-ended questions. First, the participants were invited to identify at least seven personal reasons or motivations that had led them to choose Italy as their Erasmus+ destination, with reference to internal aspects such as interests, emotions, goals, or personal needs (push factors). Second, they were required to list at least seven characteristics or features of Italy that had attracted them to the destination, with reference to external attributes such as cultural heritage, environment, events, or available opportunities (pull factors). The responses were analyzed by calculating the frequency of each factor mentioned across participants. Factors mentioned by at least 50% of participants were retained for inclusion in the quantitative phase of the study.*

The quantitative phase was conducted through an online questionnaire administered to international students participating in Erasmus+ at Italian universities. A total of 208 valid responses were obtained and used for the empirical analysis. The questionnaire included three sections. The first section asked participants to rate the importance of the

factors identified through the qualitative phase on a seven-point Likert scale ranging from 1 ("Not at all important") to 7 ("Extremely important"). Push factors were measured through six items capturing the internal drivers for choosing Italy as an Erasmus+ destination: creating a wider social life and peer influence, personal growth and independence, willingness to experience different academic opportunities, Italian language learning, attitude to travel and connectivity, and personal openness to cultural experiences. Pull factors were measured through six items related to the attractiveness of Italy as a host destination: cultural heritage, food and cuisine, a hospitable community fostering social interaction and student engagement, beautiful landscapes and proximity to the sea, academic reputation and opportunities, and Mediterranean climate.

The second section measured satisfaction and destination loyalty on a seven-point Likert scale ranging from 1 ("Strongly disagree") to 7 ("Strongly agree"). Satisfaction was operationalized through four items capturing students' overall evaluation of their decision to undertake an Erasmus+ experience in Italy, namely: the perception of having made a wise decision, the sense of having done the right thing in choosing the Erasmus+, the sense of having done the right thing in choosing Italy as a destination, and the perception that Italy was exactly what was needed for the experience, drawing on Oliver (1980). Destination loyalty was operationalized through seven items reflecting behavioural intentions toward both the Erasmus+ and Italy as a host destination: saying positive things about the Erasmus+ experience in Italy to others, saying positive things about Italy to others, recommending the Erasmus+ experience in Italy to someone seeking advice, recommending Italy as a destination to someone seeking advice, encouraging friends and relatives to do an Erasmus+ experience in Italy, encouraging friends and relatives to visit Italy, and the intention to make the same choice again, drawing on Bigne et al. (2001).

The third section collected sociodemographic information, including age, gender, nationality, and field of study — classified as STEM or non-STEM. Participants also provided information on their self-assessed academic performance, the approximate amount of their Erasmus+ grant, and their average annual family income, which were included in the analysis as control variables.

The internal consistency of the measurement scales was initially evaluated using Cronbach's alpha coefficient. All constructs exceeded the recommended threshold of 0.70 (Nunnally, 1978), indicating a satisfactory level of reliability for the scales used. To further validate the measurement model, a Confirmatory Factor Analysis (CFA) was conducted. The results of the CFA confirmed that the observed variables significantly loaded onto their respective latent constructs, providing evidence of the adequacy of the measurement structure. All factor loadings were significant.

Following the validation of the measurement model, the hypothesised relationships between push factors, pull factors, satisfaction, and destination loyalty were tested using a Path Analysis. This approach allowed for the simultaneous estimation of direct and indirect relationships between latent constructs and proved particularly suitable for testing mediation mechanisms within behavioural models. In the model (Figure 1), push factors and pull factors were specified as antecedents of satisfaction, while satisfaction was modelled as the main predictor of destination loyalty. Furthermore, the push and pull factors were also allowed to exert direct effects on destination loyalty, in order to evaluate both direct and mediated relationships.

Results. *Table 1 presents the correlations among the main variables included in the analysis. The results show that all constructs are positively and significantly correlated. In particular, satisfaction and destination loyalty show the highest correlation ($r = 0.833$, $p < 0.001$), providing initial empirical support for the existence of a strong relationship between students' evaluation of the experience and their behavioural intentions towards the host destination. Positive and significant correlations were also observed between push factors and satisfaction ($r = 0.598$, $p < 0.001$), between pull factors and satisfaction ($r = 0.650$, $p < 0.001$), and between push factors and destination loyalty ($r = 0.610$, $p < 0.001$). Similarly, pull factors show a positive correlation with destination loyalty ($r = 0.656$, $p < 0.001$). These results provide initial evidence supporting the hypothesised relationships in the research model.*

Table 1. Correlations

Variable	1	2	3	4
1. Push factors				
2. Pull factors	0.664			
3. Satisfaction	0.598	0.650		
4. Destination loyalty	0.610	0.656	0.833	

To rigorously test the proposed relationships, a Path Analysis was conducted. The results (as reported in Table 2) show that both push factors and pull factors significantly influence students' satisfaction with the Erasmus+ experience. In particular, the pull factors show the strongest effect ($\beta = 0.520$, $p < 0.001$), while the push factors also exert a positive and significant influence ($\beta = 0.297$, $p < 0.001$). These results indicate that both internal motivations and the characteristics of the host destination contribute to shaping the overall evaluation of the mobility experience by students.

Satisfaction, in turn, significantly predicts destination loyalty ($\beta = 0.658$, $p < 0.001$), confirming the central role of experiential evaluation in determining students' behavioural intentions towards the host destination.

The model also highlights more contained but still significant direct effects of push factors ($\beta = 0.108$, $p < 0.05$) and

pull factors (β = 0.166, p < 0.01) on destination loyalty. However, the analysis of indirect effects indicates that both push factors and pull factors influence destination loyalty primarily through satisfaction, highlighting the mediating role of the latter in the relationship between motivations and destination loyalty. In particular, the indirect effect of push factors on loyalty through satisfaction is significant (β = 0.196, p < 0.001), as is the indirect effect of pull factors (β = 0.342, p < 0.001).

The results support the proposed conceptual model and confirm the joint importance of motivational and experiential factors in determining the satisfaction of Erasmus+ students and their loyalty to the host destination.

Table 2. Path Analysis results

Relationship			β	p-value
Push factors	→	Satisfaction	0.297	<0.001
Pull factors	→	Satisfaction	0.520	<0.001
Push factors	→	Destination loyalty	0.108	<0.05
Pull factors	→	Destination loyalty	0.166	<0.01
Satisfaction	→	Destination loyalty	0.658	<0.001

Research limitations. *Despite the contributions of this study, several limitations must be acknowledged when interpreting the findings. First, the empirical analysis focuses exclusively on Erasmus+ students studying in Italy. Although this allows for a deeper understanding of the Italian context as a host destination, the results may not be fully generalizable to other countries participating in the Erasmus+. Host destinations differ significantly in terms of academic structures, cultural environments, and living conditions, which can influence students' mobility experiences and perceptions (Teichler, 2012; Van Mol, 2014).*

Second, the study is based on cross-sectional data, capturing students' perceptions at a specific moment during or shortly after their mobility experience. Although this approach provides useful information on the relationships between pus and /pull factors, satisfaction, and loyalty, it does not allow for the analysis of how these perceptions evolve over time. Longitudinal studies would be particularly valuable to assess whether the loyalty intentions expressed by students translate into actual behaviours, such as revisiting the destination, continuing studies abroad, or developing long-term professional ties with the host country (Rindfleisch et al., 2008).

Third, the research relies on self-reported survey data, which may be subject to response bias. Students who had particularly positive experiences may have been more inclined to participate in the survey, which could lead to an overestimation of satisfaction levels. This limitation is common in studies based on voluntary participation in surveys within Erasmus+ (Van Mol, 2014). Moreover, the study does not account for the potential moderating role of negative experiences, which have been shown to significantly affect tourist loyalty (de Cosmo et al., 2023).

Overall, addressing these limitations in future research would contribute to developing a more comprehensive understanding of the dynamics shaping international student mobility and their long-term implications for host destinations.

Managerial implications. *The results of this study offer several managerial implications for universities, public policymakers, and destination managers interested in strengthening the long-term impact of Erasmus+. In particular, the results highlight the central role of student satisfaction in determining their loyalty towards the host destination. Although both push factors and pull factors influence the overall evaluation of the mobility experience, satisfaction emerges as the main predictor of destination loyalty. This suggests that attracting international students through promotional campaigns or the academic reputation of universities is not sufficient on its own. Universities and local institutions must also ensure that the experience actually lived by students during the mobility period is consistent with their expectations or even exceeds them. In practical terms, this implies investing in the quality of academic support, the efficiency of administrative services, and the creation of opportunities for social and cultural integration during the stay.*

The results also show how pull factors related to the destination play a particularly relevant role in determining student satisfaction. Elements such as cultural heritage, lifestyle, quality of life, and the overall attractiveness of the city significantly contribute to the evaluation of the mobility experience. This suggests that universities should not act in isolation, but develop forms of collaboration with local stakeholders, including local administrations, tourism organisations, and cultural institutions, in order to enhance the overall attractiveness of the destination for international students.

Another relevant element concerns the fact that push factors and pull factors influence destination loyalty both directly and indirectly through satisfaction. This indicates that the initial motivations of students in participating in the Erasmus+ continue to influence their experience even after the start of mobility. Universities could therefore benefit from a better understanding of students' expectations before their arrival, by developing orientation programs and communication strategies capable of aligning the academic offerings and mobility experience with those expectations.

Furthermore, an important implication concerns the potential role of Erasmus+ students as long-term ambassadors of the host destination. Students who report high levels of satisfaction and loyalty are indeed more likely to recommend

the destination to others and to return in the future, both as tourists and for further study or professional opportunities. From a strategic perspective, this implies that Erasmus+ can contribute not only to the internationalisation of higher education but also to broader place branding and talent attraction strategies.

Overall, the results suggest that the long-term benefits of Erasmus+ depend not only on the ability to attract international students but also on the management of the overall quality of their experience during their stay. Improving both the academic and experiential dimensions of mobility can help enhance student satisfaction and transform a temporary study experience into a lasting bond with the host destination.

Originality of the paper. *This study contributes to the literature on international student mobility by offering an integrated perspective on the dynamics connecting students' motivations, the mobility experience, and their subsequent behavioural intentions towards the host destination. In particular, the work connects two lines of research that have often been examined separately: on one hand, the push and pull framework, widely used to explain students' motivations to undertake study abroad experiences, and on the other hand, the experience–satisfaction–loyalty model, traditionally applied in tourism and service studies. The integration of these perspectives allows for a more comprehensive understanding of how individual motivations and destination characteristics contribute to influencing the overall evaluation of the mobility experience and the subsequent behavioural intentions of students.*

The study also contributes to the emerging literature that considers international students not only as students but also as temporary residents and visitors of the host destination. Analysing the satisfaction and loyalty of Erasmus+ students through a behavioural framework typically used in tourism studies, the research brings into dialogue two fields of study that are rarely integrated: that of the internationalisation of higher education and that of destination management.

An additional element of originality concerns the fact that the analysis is based on primary empirical data collected from Erasmus+ students in Italy, one of the main destination countries of the Erasmus+. While many previous studies have primarily focused on the motivations that drive students to participate in Erasmus+, this study shifts the attention to the phase following their arrival at the destination, highlighting the role of satisfaction as a key mechanism that connects students' initial motivations to their loyalty towards the destination.

Overall, the study proposes an innovative perspective on Erasmus+, showing how the integration of motivational and experiential factors can help generate long-term bonds between international students and host destinations, transforming a temporary study abroad experience into a lasting relationship with the territory.

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How do the use of colors and emotional connections influence the image of rural destinations on Instagram? An AI-Based Analysis of Institutional and Visitor-Generated Visual Narratives

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Abstract. *In today's social media landscape, the image of tourist destinations is increasingly influenced by the interaction between official institutional communication and visual narratives created by visitors. This dynamic is particularly significant for rural destinations, whose identity is closely linked to heritage, authenticity, and emotional connection. Based on the distinction between institutional visual governance and experiential narratives, this study explores how colors and the emotions they evoke contribute to shaping the cognitive, affective, and conative dimensions of the image of rural destinations on Instagram.*

The research adopts an AI-based image analysis approach to examine 660 Instagram photographs shared by municipalities and visitors in 33 rural villages located in Italy and France. A machine learning AI BOT was designed to extract the dominant color palettes from each image and associate them with emotional dimensions derived from color-emotion theory.

The results highlight a consistent divergence between institutional visual narratives and those generated by visitors. Institutional communication relies predominantly on neutral and desaturated color palettes, including gray, brown, and black, which reinforce a cognitive representation focused on heritage preservation and historical continuity. In contrast, images shared by visitors tend to feature brighter and warmer tones, particularly green, blue, beige, and yellow, which emphasize natural environments, relaxation, and the experiential aspects of rural tourism.

These findings suggest that, although both narratives contribute to the formation of the destination's image, their partial misalignment reflects a tension between identity preservation and experiential storytelling. This divergence appears more pronounced in Italian villages than in French ones.

The study contributes to the literature on destination image and visual storytelling by conceptualizing color as a pre-cognitive narrative mechanism through which destination identity is negotiated within digital environments. From a management perspective, the results indicate that rural destinations can benefit from a more strategic alignment between institutional visual communication and visitor-generated narratives to promote more consistent and emotionally engaging representations of the destination.

Keywords: *destination image; color psychology; visual narratives; Instagram; rural tourism; BOT AI*

Framing of the research. *The image associated with a tourist destination is not static; it evolves over time and is the result of the growing role of social media in shaping the perception of tourist destinations (Garay, 2019). In the context of social media, the identity of a destination is strongly influenced by multiple narratives, both institutional and those of tourists, who increasingly contribute to the creation of destination images through the content they generate (Hays et al., 2013). As a result, destination narratives are no longer produced exclusively by institutional communication but rather emerge from the interaction between multiple actors within digital environments (Lund et al., 2018).*

The image of a destination has been widely recognized in literature as a subjective and multidimensional construct, as it reflects individuals' perceptions, beliefs, and emotional responses to a place (Pike, 2017). According to Gartner (1994), the image of a destination consists of three interconnected dimensions: cognitive, affective, and conative (Stylidis et al., 2017; Tasci et al., 2007). The cognitive dimension refers to the knowledge and beliefs that individuals have about the characteristics of a destination, such as its landscapes, cultural heritage, or infrastructure. The affective dimension reflects emotional responses to the destination, including feelings such as relaxation or nostalgia. The conative dimension represents behavioral intentions, such as the desire to visit, recommend, or revisit a destination over time. Although these components are often described sequentially, recent research suggests that emotional responses may precede cognitive evaluations, particularly in visually mediated contexts (San Martín & Del Bosque, 2008). Emotional reactions to visual stimuli operate through rapid and largely automatic processes that influence attention, memory, and decision-making (Trauer & Ryan, 2005).

In the social media landscape, visual communication has become increasingly important (Qian, 2025). Social platforms such as Instagram favor images as the primary mode of communication (Leung et al., 2013), influencing travel decisions (Joyner et al., 2018) and destination perception, as well as shaping the cognitive and affective image of the destination (Garay, 2019). Social media platforms allow a multitude of actors to participate in the storytelling of the destination, thereby reducing the control previously exercised by institutional authorities (Lund et al., 2018; Zhao & Agyeiwaah, 2024).

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Among the elements that characterize visual communication, color is one of the most powerful stimuli capable of influencing perception and emotional response (Barnes, 2022; Yu et al., 2020). Research in the fields of marketing and psychology has shown that colors can influence purchasing intentions (Bagchi & Cheema, 2013; Huang & Lu, 2016), shape product evaluations (Labrecque et al., 2013; Puzakova et al., 2016), and contribute to the perception of brand personality (Labrecque & Milne, 2012). In digital contexts, color also affects how users interact with online content, including browsing behavior and click-through rates (Jalali & Papatla, 2016). Colors in images can elicit emotional responses in viewers, often through automatic and unconscious processes (Poels & Dewitte, 2019). Through these mechanisms, visual storytelling can convey symbolic meanings, evoke emotional states, and promote lifestyles or cultural values (Salazar, 2012). Recurring color patterns in visual images help define how destinations are interpreted and remembered. These patterns can reinforce brand identity and influence the perceived attractiveness of places (Legendre et al., 2019; Poels & Dewitte, 2019). Among different colors, for example, blue is commonly associated with calm and serenity, while yellow evokes happiness and optimism. Red is often associated with passion and intensity, while green is linked to nature, safety, and environmental harmony (Labrecque et al., 2013; Singh, 2006).

According to Plutchik's theory of emotions (1980, 1985, 1994), emotional responses can be classified into eight primary emotions that interact to generate more complex affective states. These emotional associations have been widely applied in research exploring the relationship between colors and emotions (Mohammad & Turney, 2010). Brighter, more saturated colors are typically associated with positive emotional responses such as joy and relaxation, while darker or desaturated tones can evoke emotions related to sadness or nostalgia (Jonauskaite et al., 2020; Bruno et al., 2022). Thus, such signals and color palettes can influence visitor engagement by shaping the emotional interpretation of destinations (Yu et al., 2020).

Rural tourism is often characterized by landscapes rich in natural, historical, and cultural resources (Carneiro et al., 2015; De Aranzabal et al., 2009). These destinations are commonly perceived as places where slower rhythms of life persist, allowing tourists to temporarily escape the pressures of urban environments (Xu & Chan, 2010). Such experiences often evoke emotional responses related to well-being, tranquility, and nostalgia (Kim et al., 2015). Nostalgia itself represents a complex emotional state that combines both positive and negative feelings, including warmth, longing, and reflection on the past (Holak & Havlena, 1998). Rural destinations often elicit nostalgic emotions because they preserve traditions, lifestyles, and landscapes associated with earlier historical periods (Christou et al., 2018). Through visual storytelling on social media, these symbolic meanings are incorporated into digital narratives that shape how rural destinations are perceived by a wider audience.

Despite the growing attention devoted to visual communication in tourism research (Arefieva et al., 2021; Filieri et al., 2021; Lee, 2020; Picazo & Moreno-Gil, 2019), studies focusing on the use of colors remain highly descriptive and fragmented. Building on these considerations, this study contributes to the emerging literature on visual destination communication by investigating the role of color as a key narrative and emotional cue in social media imagery, while also providing insights that may support destination management organizations in developing more coherent and emotionally resonant communication strategies. Accordingly, the following research questions are proposed:
RQ1: What are the dominant colors in images shared by municipalities and visitors on Instagram relating to Italian and French rural villages?
RQ2: What emotional cues are associated with these visual representations?
RQ3: To what extent are institutional and visitor-generated visual narratives aligned or divergent?

Purpose of the paper. *The purpose of this article is to explore the visual narrative generated between institutional channels and visitors to a destination to see which aspects coexist and overlap and which diverge. The context taken as a reference is the rural context.*

Rural destinations represent an interesting context for the study of visual storytelling, as they are characterized by strong symbolic identities linked to nature, heritage, and authenticity (Royo-Vela, 2009). At the same time, these destinations often face structural constraints, such as limited marketing resources and reduced visibility in global tourism markets. Social media platforms are therefore important tools for promoting rural tourism and improving the visibility of destinations (Kasemsarn & Nickpour, 2025). In recent years, municipalities and tourists have increasingly shared images of rural villages on social media platforms, simultaneously contributing to the formation of the destination's image (Marchesani & Testa, 2026; Trunfio et al., 2022). However, it is still unclear how these different visual narratives align or diverge in their representation of rural destinations. To address this goal, this study investigates how colors used in Instagram photographs shared by municipalities and visitors influence the perception of rural tourism destinations.

By combining tourism theory with artificial intelligence–based image analysis, the study aims to contribute to the understanding of how visual elements shape destination identity in digital environments. The study focuses on small Italian and French villages, analyzing them using an innovative methodological approach based on a BOT AI that uses machine learning to extract the dominant colors within images. The study aims to contribute to the theory of destination imagery by conceptualizing color as a narrative tool.

Methodology. *The empirical context of the study consists of rural villages located in Italy and France. These villages were selected because they possess a rich cultural and historical heritage that has led to their recognition by prestigious associations such as I Borghi più belli d'Italia (The Most Beautiful Villages in Italy) and Les Plus Beaux Villages de la*

France (The Most Beautiful Villages in France). These associations identify villages characterized by high architectural, historical, and cultural value.

The overall sample contains 33 villages, located in different geographical areas of the two countries to ensure regional diversity. One village was chosen for each Italian and French region and macro-area, resulting in a selection of 20 Italian and 13 French villages.

To maintain consistency in the analysis of rural contexts, the selection process gave priority to villages with a relatively small population. This criterion ensured that the sample represented small rural communities rather than larger centers. However, if the smallest village did not have an official Instagram profile, the next smallest village was selected to ensure the availability of institutional visual content. The population of the villages included in the study ranges from less than 100 inhabitants to approximately 9,000 residents. This sampling strategy allows the research to capture variations in tourism development, economic context, and geographic location, while maintaining a consistent focus on rural destinations.

The empirical analysis focuses on visual content shared on Instagram, a platform that favors image-based communication (Poels & Dewitte, 2019; Varkaris & Neuhofer, 2017). Unlike other social platforms where textual communication plays a central role, Instagram emphasizes visual representation through images as the primary mode of communication. On this platform, institutional actors such as municipalities and visitors simultaneously contribute to the creation of narratives about destinations (Jansson, 2018).

Municipalities use official accounts to promote their territories, while visitors share personal experiences through geotagged images and hashtags. This coexistence of narratives allows us to explore the visual narrative developed by these multiple actors.

For each village included in the sample, two types of visual content were collected: 1) images shared by the municipality's official Instagram account; 2) images shared by visitors using the village's location as geotagging.

For each category, the ten most recent and most popular images were selected. Instagram's algorithm determines the visibility of posts based on engagement metrics such as likes, comments, and interactions, as well as recency and relevance (Cotter, 2019). To ensure consistency in the dataset, several inclusion and exclusion criteria were applied. Images containing large amounts of text, advertising content, or promotional material were excluded from the sample. Photo albums and commercial posts related to product marketing were also removed. When an image was excluded, the next available image was selected. After applying these criteria, the final dataset consisted of 660 photographs, of which 330 images were shared by municipalities and 330 images were shared by visitors. Of these, 400 images correspond to Italian villages and 260 to French villages. All images were archived and cataloged for subsequent analysis.

To analyze the visual characteristics of the collected images, the study uses an artificial intelligence-based methodology designed to extract the dominant colors present in each photograph. Traditional visual content analysis often relies on manual coding by researchers, introducing subjectivity and limiting scalability. In contrast, machine learning techniques allow for systematic analysis of large datasets while reducing potential observer bias.

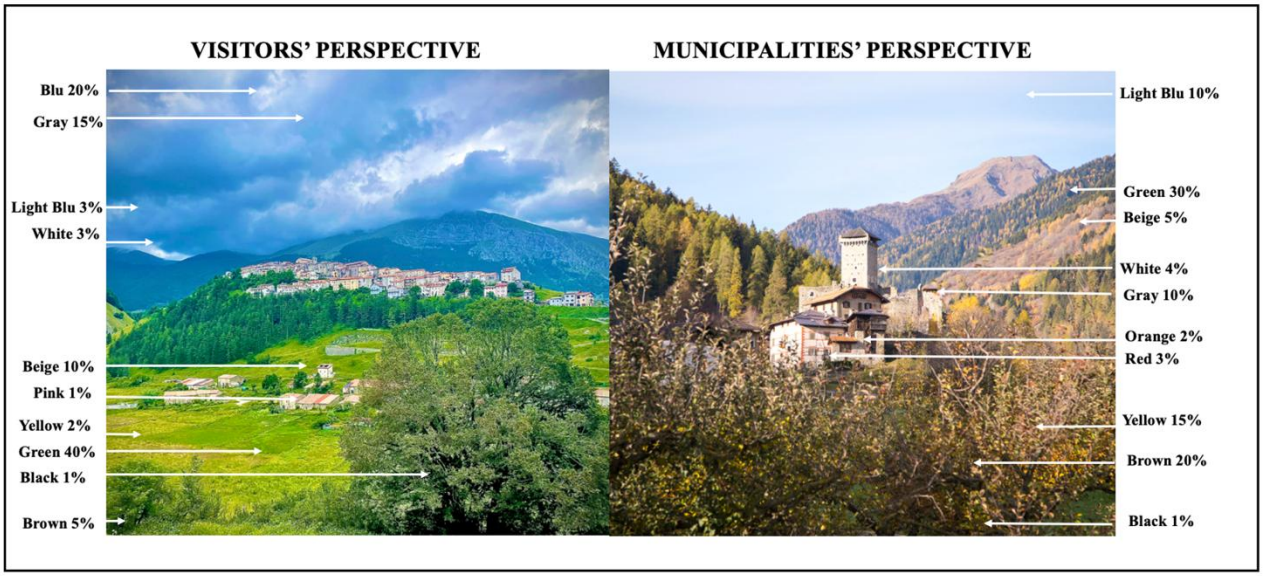
For this study, an AI BOT called "Detecting_Color" was developed to automatically identify the dominant color palette of each image. The BOT was trained using a color classification system capable of recognizing a wide range of color variations.

The analysis process consists of several steps. First, the BOT scans each image and divides it into smaller segments to evaluate the color composition. Second, the algorithm calculates the proportion of each color within the image. Third, the system identifies the ten most visually dominant colors based on their relative coverage within the image.

To improve analytical accuracy, the BOT incorporates a weighted scoring mechanism that prioritizes colors that occupy larger portions of the visual frame. If an image contains fewer than ten relevant colors, the remaining positions are assigned a value of zero percent. This automated procedure allows for consistent extraction of color information from the entire dataset, minimizing human interpretation.

In addition, thanks to the learning and testing phase, the BOT has also made it possible to classify different shades of colors in a similar way, managing to understand the visual elements included in an image (such as different shades of green for vegetation, different shades of blue for the sky, etc.). Figure 1 shows the extraction of colors for each image.

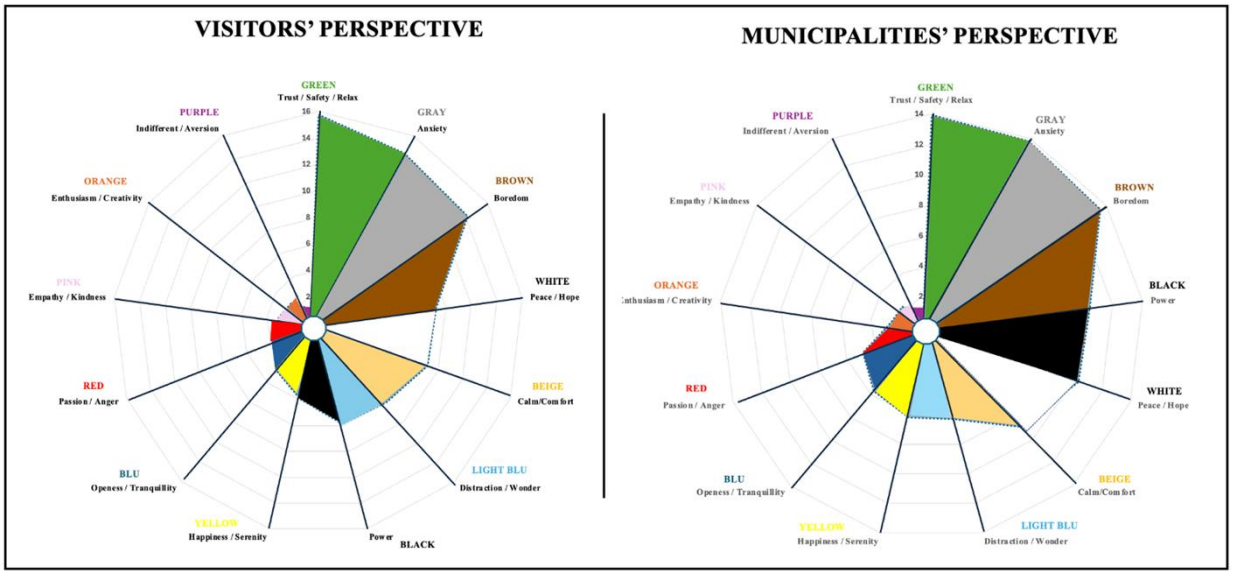
Figure 1. Example of colors extracted from Instagram photos posted by visitors and municipalities



Source: *Authors' elaboration based on AI BOT Detecting_Color*

Results. *Figure 2 reveals different patterns related to the use of colors in Instagram images shared by municipalities and visitors. Across the entire dataset, the most frequent colors are green, gray, brown, black, and white, followed by secondary colors such as beige and light blue. These colors reflect the natural landscapes, architectural elements, and atmospheric characteristics typical of rural villages. However, significant differences emerge when comparing institutional visual narratives with those generated by visitors.*

Figure 2. Percentage of colors collected from the total images published by visitors and municipalities



Source: *Authors' elaboration based on AI BOT Detecting_Color*

Municipal images tend to be based on neutral and desaturated color palettes. Gray, brown, and black appear particularly frequently, while green is mainly used to represent the surrounding landscapes. Black and white also appear in a relatively high percentage of institutional photographs. This color composition reflects the types of scenes emphasized by municipalities. Many images depict historic buildings, churches, traditional streets, and architectural monuments. These representations highlight the cultural heritage and historical identity of the villages. Municipal accounts also often share photographs related to traditional events, festivals, and cultural celebrations. These events are often represented

through formal or documentary images that emphasize historical continuity rather than experiential engagement. In addition, municipalities often publish black-and-white photographs, including historical images that illustrate how little the villages have changed over time. This visual strategy reinforces narratives about heritage preservation and timeless identity.

In contrast, images shared by visitors show a different visual emphasis. Visitor photographs feature more vibrant and saturated colors, particularly green, blue, beige, and yellow. These colors are commonly associated with natural landscapes, outdoor activities, and leisure experiences. Green appears as the most prominent color in visitor-generated content, reflecting the strong presence of forests, fields, and natural environments surrounding rural villages. Blue is also more visible in visitors' images, often representing open skies, water features, or scenic viewpoints. Visitors' images often depict activities such as hiking, biking, outdoor dining, or relaxing in natural settings. These scenes emphasize the experiential and emotional aspects of rural tourism. Beige and brown tones are often associated with seasonal landscapes, particularly during autumn, when fields and forests display warm natural colors. These colors help to represent rural destinations as spaces of tranquility and authenticity.

Although the overall distribution of colors does not differ significantly between institutional and visitor narratives, the interpretation and emotional meaning of these colors differ significantly. Institutional images tend to emphasize the historical and symbolic identity of the destination, while visitor images highlight the experiential and emotional dimension of rural tourism.

The findings suggest that the visual narratives produced by municipalities and visitors reflect different communicative priorities.

Institutional communication often focuses on preserving and promoting the cultural heritage of rural villages. This emphasis is reflected in the predominance of neutral and desaturated colors, which convey stability, tradition, and historical continuity. However, these color palettes may also create a sense of emotional distance. Cooler tones such as gray and brown can evoke feelings of detachment or nostalgia rather than excitement or engagement (Bruno et al., 2022). The use of black-and-white images further reinforces narratives of tradition and historical memory. Monochromatic photographs often evoke nostalgia by connecting viewers with the past (Boyd & Gorman-Murray, 2023; Grainge, 1999). While these representations strengthen the cognitive dimension of destination image, they may not fully capture the experiential potential of rural tourism.

In contrast, visitor-generated images emphasize colors associated with nature and emotional warmth. Green landscapes, blue skies, and warm natural tones communicate feelings of relaxation, safety, and well-being. These visual narratives highlight the experiential dimension of rural tourism by portraying activities and lifestyles associated with slower rhythms and outdoor leisure. Research suggests that images featuring brighter and more saturated colors tend to generate higher engagement and more positive attitudes among viewers (Yu et al., 2020). Consequently, visitor narratives may play an important role in stimulating interest in rural destinations.

The coexistence of these two narratives illustrates how destination image emerges through multiple visual interpretations rather than through a single coherent narrative. If institutional communication remains disconnected from visitor experiences, the resulting destination image may become fragmented. In such cases, municipalities risk losing control over how their destinations are represented in digital environments (Munar & Jacobsen, 2014).

Research limitations. *Future research could extend the analysis to other cultural contexts where color symbolism may differ significantly, for example by extending the sample to neighboring countries such as Spain and Germany, or even countries further afield such as China and Japan, to highlight potential differences in color interpretation depending on cultural differences or similarities.*

Further studies could explore the reaction to these images by examining the number of likes, comments, and shares to understand which narrative is most appreciated by the public and whether certain differences may be particularly appreciated by specific consumer targets (e.g., based on age, gender, interests, etc.).

In addition, future studies could go beyond color analysis to examine the elements depicted in the images (e.g., forests, sea, rivers, museums, churches) to better understand the narrative and the most frequently depicted objects. This analysis could also be shifted to the perspective of videos to explore the digital narrative developed on social media such as TikTok or YouTube.

Managerial implications. *From a managerial standpoint, the results suggest that rural destinations could benefit from integrating institutional and visitor-generated narratives more strategically. Municipalities and destination management organizations may enhance their communication strategies by incorporating visual elements that better reflect the experiential and emotional dimensions of rural tourism. Greater attention to the chromatic composition of visual content may help communicate specific atmospheres and values associated with rural experiences, such as authenticity, tranquility, and connection with nature. Encouraging a more structured dialogue between institutional communication and visitor storytelling may therefore contribute to the development of more coherent and emotionally engaging destination narratives across social media platforms.*

By exploring how color palettes embedded in Instagram images contribute to the construction of destination image, this study provides both theoretical insights into visual destination communication and practical guidance for destination

managers seeking to align institutional visual storytelling with visitor-generated narratives and to leverage color-based visual cues as a strategic component of digital destination branding.

Originality of the paper. *This study investigated how colors and visual narratives shared on Instagram contribute to the formation of rural destination image. By comparing images shared by municipalities and visitors, the research demonstrates that destination identity in digital environments emerges through the interaction of institutional communication and experiential storytelling.*

Institutional visual communication primarily reinforces the cognitive dimension of destination image by emphasizing heritage, authenticity, and historical continuity. Visitor-generated content, on the other hand, activates the affective dimension by highlighting emotional experiences associated with nature, relaxation, and well-being. These affective representations may ultimately influence the conative dimension of destination image by encouraging travel intentions and word-of-mouth communication.

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Human Receptionist or AI-Chatbot? Trust-Based Effects on Hotel Check-In Evaluation and Purchase Responses

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Abstract. *This research examines whether replacing a human receptionist with an AI chatbot at hotel check-in changes guests' purchase-related responses and, more importantly, through which psychological mechanism this effect occurs. Drawing on a Stimulus-Organism-Response perspective, we conceptualize service agent type as the stimulus, trust and related internal evaluations as organismic states, and purchase intention and purchase behavior tendencies as responses. We test the model through a between-subjects scenario-based experiment comparing chatbot-based and human receptionist check-in in a five-star hotel context. Results show that the human receptionist condition generates significantly higher trust than the AI-chatbot condition. Performance expectancy and perceived quality also emerge as strong antecedents of trust. Serial mediation analyses further show that the impact of service agent type on purchase intention and purchase behavior tendencies is fully indirect: higher trust strengthens attitude toward the check-in service, attitude increases purchase intention, and purchase intention predicts behavioral tendencies such as first-choice preference and willingness to pay more. The study contributes causal evidence to the hospitality AI literature by clarifying that trust is the key lever through which frontline automation affects commercially meaningful outcomes. Managerially, the findings suggest that chatbot check-in should be designed not only for efficiency but also to signal reliability, service quality, accountability, and seamless human fallback. The paper further differentiates itself from the broader literature on service robots and AI-driven purchase intentions by focusing on a high-contact hotel check-in touchpoint and by showing that the commercial consequences of AI substitution are not direct, but operate through a trust-attitude-intention sequence that culminates in purchase behavior tendencies.*
Keywords: *hospitality digitalization; AI-chatbots; trust; attitude; purchase intention; hotel check-in.*

Framing of the research. *Hospitality firms are redesigning frontline service systems through digital technologies intended to increase efficiency, accessibility, and consistency. At the same time, AI-enabled interfaces such as chatbots, service robots, and voice assistants are increasingly entrusted with customer-facing interactions once handled by employees (Buhalis & Moldavska, 2022; Ali & Ali, 2025). In hospitality, however, technology adoption cannot be assessed only in terms of process speed or labor savings. Customer evaluations are strongly shaped by relational and psychological elements that emerge during salient moments of truth, and hotel check-in is among the most consequential because it frames first impressions of service quality (Viglia & Dolnicar, 2020; Kim et al., 2023).*

Check-in is not merely an administrative task. It involves identity verification, reservation confirmation, room allocation, information exchange, and the management of uncertainty at the start of an experience-intensive service process. When a hotel replaces a receptionist with a conversational agent, it changes both the delivery mode and the symbolic cues surrounding accountability, empathy, and reassurance. Prior studies suggest that consumers evaluate human and nonhuman service agents differently because human employees are perceived as more responsive and socially present, whereas chatbots may be seen as less capable of handling exceptions or nuanced requests (Markovitch et al., 2024; Tsai et al., 2021).

Recent studies highlight that research on robots and AI in hospitality and tourism is expanding rapidly and already addresses several outcome domains, including forgiveness after robot service failures (Wang et al., 2025), customers' autonomous behaviors in tourism services (Liu et al., 2025), users' intellectual experiences with humanoid service robots (Wu et al., 2025), service automation in tourism and hospitality more broadly (Sharma et al., 2026), and revisit intentions in hybrid human-robot service settings (Zhang et al., 2026).

Recent research in tourism and hospitality also highlights trust as a pivotal issue in interactions with AI-enabled service agents. Trust matters because customers must decide whether the system is reliable, safe, and worthy of reliance in contexts where personal data, service outcomes, and experiential quality are at stake (Park, 2020; Della Corte et al., 2023). At the same time, trust in AI-mediated services is not built through social cues alone. It also depends on competence-related and quality-related inferences, such as whether the system appears useful, accurate, efficient, and professionally designed. This resonates with research showing that performance beliefs and trust jointly shape technology acceptance and reliance (Venkatesh et al., 2003; Venkatesh et al., 2012; Gefen et al., 2003; Pavlou, 2003).

Despite the rapid diffusion of conversational AI, two limitations remain visible in the literature. First, many studies are correlational and do not establish whether chatbot deployment causally changes commercially relevant responses in hospitality settings (Viglia & Dolnicar, 2020). Second, prior work often focuses on adoption or satisfaction without

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clearly isolating the mechanism through which service agent type translates into downstream behavior. Responding to calls for stronger experimentation and mechanism-based testing in hospitality and tourism research (Viglia & Dolnicar, 2020; Kim et al., 2023), this paper develops a trust-centered process model suited to a frontline context in which both reassurance and operational confidence matter. Therefore, against this increasingly crowded background, the present paper sharpens its contribution by moving from the general question of whether customers accept robots or AI to the more specific question of how substituting a receptionist with an AI chatbot at hotel check-in affects purchase-related responses through trust.

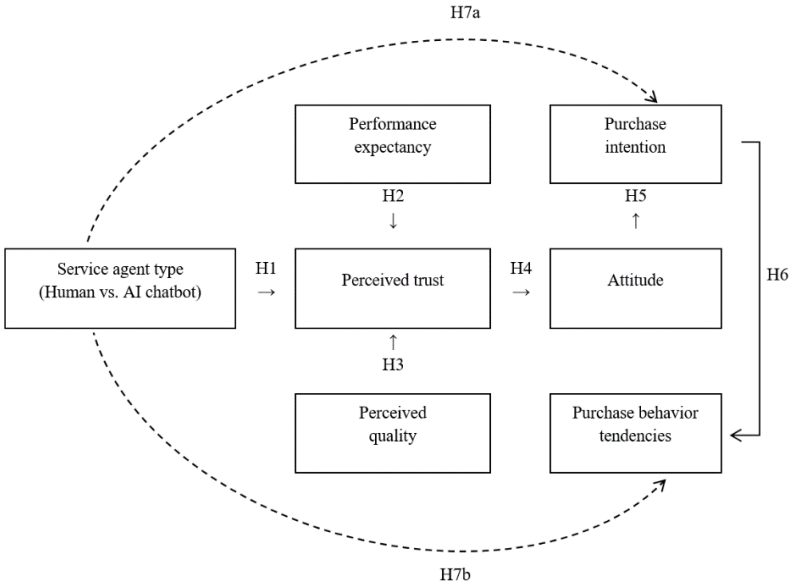
Purpose of the paper. *Although previous studies have examined robot and AI effects on purchase intentions, less is known about the trust-based psychological chain that connects a specific frontstage substitution decision - human receptionist versus AI chatbot - to commercially meaningful outcomes in the check-in phase. Then, the purpose of the paper is to examine the causal impact of AI chatbot-based hotel check-in, compared with human receptionist-based check-in, on guests' purchase-related responses and to clarify the psychological sequence through which this impact unfolds. The study asks whether chatbot substitution changes purchase intention and purchase behavior tendencies directly, or whether these outcomes depend on a trust-centered chain involving attitude formation.*

To address this objective, we adopt a Stimulus-Organism-Response framework. Service agent type (AI-chatbot vs. human receptionist) is conceptualized as the stimulus. Trust represents the central organismic state because it captures the guest's willingness to rely on the check-in service in a context characterized by uncertainty and service dependency. Performance expectancy and perceived quality are modeled as antecedents of trust because they reflect competence-related and excellence-related signals that can strengthen perceived reliability. Downstream, trust is expected to enhance attitude toward the check-in service, attitude should increase purchase intention, and purchase intention should predict purchase behavior tendencies.

Based on this logic, seven hypotheses are advanced. H1 predicts that a receptionist-based check-in increases trust relative to an AI-chatbot-based check-in. H2 and H3 predict that performance expectancy and perceived quality positively influence trust. H4 states that trust positively affects attitude toward the check-in service. H5 predicts a positive effect of attitude on purchase intention, while H6 predicts a positive effect of purchase intention on purchase behavior tendencies. Finally, H7 proposes that the effect of service agent type on purchase intention and purchase behavior tendencies is indirect, operating through the sequential path trust → attitude → purchase intention → purchase behavior tendencies (see Figure 1 for the conceptual model).

This research, therefore, aims not only to determine whether chatbot-based check-in works, but also to explain why it works better or worse than human service at a critical hospitality touchpoint. This explanatory goal is especially relevant when hotels must decide whether to automate frontstage interactions that are highly visible to guests and potentially consequential for revenue generation.

Figure 1. Conceptual model



Indirect effects
H7a: Service agent type → Perceived trust → Attitude → Purchase intention
H7b: Service agent type → Perceived trust → Attitude → Purchase intention → Purchase behavior tendencies

Methodology. *The empirical study relies on a 2 x 1 between-subjects scenario-based experiment implemented in Qualtrics. Participants were informed that they would evaluate a tourism service scenario and were asked to imagine themselves in the described situation. They were then randomly assigned to one of two conditions: AI chatbot check-in or human receptionist check-in. Both scenarios described the arrival at a five-star hotel for a one-night stay and were*

matched in wording, sequence, and outcome. The only substantive difference concerned the service agent delivering the interaction (i.e., an AI-chatbot vs. a human receptionist). The full wording of both experimental stimuli is reported in the Appendix.

All focal constructs were measured using established multi-item 7-point Likert scales. Purchase intention, purchase behavior tendencies, and attitude toward the service were adapted from Zhong et al. (2020). Performance expectancy was measured using items adapted from Zhang et al. (2021). Perceived quality drew on Snoj et al. (2004) and Arreza (2022). Trust was measured through two items adapted from Ohanian (1990), capturing confidence in and reliability of the hotel service. The questionnaire also included manipulation checks for perceived agent type and basic socio-demographic items.

Data were collected in February 2026 through a non-probability recruitment strategy combining convenience sampling and snowball sampling. This approach facilitated access to respondents but also introduced the usual trade-offs in terms of representativeness and possible network homophily (Etikan et al., 2016; Biernacki & Waldorf, 1981; Bornstein et al., 2013). A total of 476 questionnaires were obtained. After screening and removal of incomplete responses, 342 usable questionnaires remained, corresponding to a retained response rate of 71.8%. With this sample size, the two-condition design offers adequate statistical power to detect small-to-moderate effects (Cohen, 1988).

The analytical strategy followed three main steps. First, manipulation checks verified whether respondents correctly identified the service agent condition. Second, reliability was assessed through Cronbach's alpha, with all scales exceeding accepted thresholds (Nunnally & Bernstein, 1994; DeVellis, 2016). Composite scores were then computed for each construct, consistent with common practice in multivariate analysis (Hair et al., 2019; Kline, 2016). Finally, to test H1-H3, an ordinary least squares regression predicted trust from agent type, performance expectancy, and perceived quality. To test H4-H7, serial mediation analyses were conducted with Hayes' PROCESS macro (Model 6) using 5,000 bootstrap resamples. One model estimated purchase intention as the dependent variable, while a second model estimated purchase behavior tendencies.

Results. *The manipulation checks confirmed that participants correctly perceived whether the check-in service was delivered by an AI chatbot or by a human receptionist. Reliability levels were high across all constructs, supporting the internal consistency of the measures. The regression and mediation analyses then provided coherent support for the trust-centered process model.*

The OLS regression predicting trust explained a substantial share of variance ($R^2 = .748$; $F(3, 338) = 334.36$; $p < .001$). In line with H1, the human receptionist condition generated significantly higher trust than the chatbot condition ($b = .586$, $p < .001$). Supporting H2 and H3, performance expectancy ($b = .377$, $p < .001$) and perceived quality ($b = .485$, $p < .001$) were both positively associated with trust. Trust, therefore, appears to be shaped by both relational cues linked to the service agent and competence-related evaluations linked to usefulness and service excellence.

The first serial mediation model examined purchase intention as the dependent variable. Trust positively predicted attitude toward the check-in service ($b = .7666$, $p < .001$), and attitude positively predicted purchase intention ($b = .7499$, $p < .001$), supporting H4 and H5. The direct effect of service agent type on purchase intention was not significant ($b = .0730$, $p = .3887$). Bootstrap analyses showed that the serial indirect effect through trust and attitude was significant (indirect effect = .3764; 95% bootstrap confidence interval [.1895, .5707]). The evidence indicates that the human condition improves purchase intention primarily because it fosters trust, which then generates a more favorable attitude toward the service.

The second serial mediation model extended the mechanism to purchase behavior tendencies. Trust again positively predicted attitude, attitude predicted purchase intention, and purchase intention positively predicted purchase behavior tendencies ($b = .2735$, $p = .0003$), supporting H6. The direct effect of service agent type on purchase behavior tendencies was not significant ($b = .0701$, $p = .5434$), whereas the full serial indirect effect was significant (indirect effect = .1029; 95% bootstrap confidence interval [.0278, .1999]). In other words, the effect of service agent type on behavioral tendencies is fully indirect and unfolds through the chain trust → attitude → purchase intention → purchase behavior tendencies. The following Table 1 summarizes the main results.

Overall, the results support a consistent interpretation. Human receptionist check-in does not outperform chatbot check-in because of a simple residual preference for human service. Rather, it performs better because it creates stronger trust, and this higher trust propagates through attitude and intention to influence commercially meaningful outcomes.

The pattern of results is theoretically meaningful because it suggests that service agent type is not acting as a simple preference cue. Once trust and the attitudinal-intentional sequence are modeled, the direct paths from agent type to purchase-related outcomes disappear. This means that frontline automation influences outcomes insofar as it changes the internal states through which customers interpret the service encounter. In the present context, trust is the primary gateway. This interpretation is consistent with work arguing that customers rely on trust to reduce uncertainty in technology-mediated and robot-enabled service encounters (Park, 2020; Della Corte et al., 2023).

The results also clarify the role of competence-related evaluations. Performance expectancy and perceived quality do not simply coexist with trust; they contribute to building it. This is important because hospitality managers may be tempted to frame chatbot adoption in purely utilitarian terms, focusing on speed or 24/7 availability. The findings instead suggest that competence signals matter because they help guests infer whether the service is safe and dependable. In other words, usefulness and quality become commercially relevant partly through the trust they enable, which echoes the broader information systems literature on technology acceptance and electronic exchange (Gefen et al., 2003; Pavlou, 2003).

Table 1. Summary of hypothesis testing

Hypothesis	Path / Effect Tested	Evidence	Supported
H1	Human (vs. chatbot) → Trust	b = .586, p < .001; 95% CI [.422, .751]	Yes
H2	Performance expectancy → Trust	b = .377, p < .001; 95% CI [.289, .465]	Yes
H3	Perceived quality → Trust	b = .485, p < .001; 95% CI [.405, .566]	Yes
H4	Trust → Attitude	b = .7666, p < .001	Yes
H5	Attitude → Purchase intention	b = .7499, p < .001	Yes
H6	Purchase intention → Purchase behavior tendencies	b = .2735, p = .0003	Yes
H7a	Agent type → Trust → Attitude → Purchase intention	Indirect = 0.3764; BootCI [.1895, .5707]	Yes
H7b	Agent type → Trust → Attitude → Purchase intention → Purchase behavior tendencies	Indirect = 0.1029; BootCI [.0278, .1999]	Yes

Source: Authors' elaboration

Research limitations. *The study has some limitations that should guide interpretation. First, the use of convenience and snowball sampling supports feasibility but limits statistical generalizability beyond the recruited pool. The sample may underrepresent guest segments with different levels of digital familiarity, service expectations, or cultural norms regarding automated interaction. Future research should therefore test the model across more diverse populations and in cross-cultural settings. In addition, the effects identified in this study may not be uniform across customer profiles. Socio-demographic and individual characteristics, such as age, may act as relevant boundary conditions, as they can proxy different levels of familiarity, confidence, and prior experience with AI-based solutions. Other customer-level variables, including digital literacy, technology readiness, innovativeness, and prior exposure to automated services, may also moderate the proposed relationships. Future studies could therefore employ multigroup analyses to examine whether the effects of service agent type, perceived trust, attitude, and downstream behavioral outcomes differ across guest segments.*

Second, the design is scenario-based, and the dependent variables are self-reported intentions and behavioral tendencies rather than observed transactions. Although such proxies are common in hospitality experiments and are theoretically meaningful when actual purchase data are difficult to capture (Viglia & Dolnicar, 2020; Kim et al., 2023), further work should validate the model using field experiments, transactional data, or post-stay longitudinal outcomes. Future studies could therefore observe actual choices in booking platforms or hotel apps, experimentally manipulate AI-chatbot versus human check-in in a field setting, and measure revealed outcomes such as completed reservations, upgrade purchases, ancillary spending, complaint behavior, revisit behavior, and willingness to pay based on actual transactions.

Third, the experimental manipulation compares only two service configurations in a five-star hotel context. This setting is strategically relevant because reassurance may be especially important in luxury hospitality, yet it may also accentuate the relative advantage of human delivery. Future studies should examine lower-category hotels, mixed-service formats, and moderators such as chatbot anthropomorphism, transparency about AI identity, privacy assurances, or the visibility of human fallback.

Managerial implications. *The findings indicate that chatbot-based check-in should not be evaluated solely as an efficiency device. For managers, it is a trust-management decision. In this study, the human receptionist condition produced stronger trust, and that difference ultimately shaped purchase intention and purchase behavior tendencies. Hotels should therefore assess chatbot deployment not only through completion times or labor savings, but also through post-interaction confidence, perceived reliability, and guests' willingness to continue the relationship.*

If trust is the crucial lever, chatbot interfaces should visibly communicate control, competence, and reassurance at each step of the process. This includes clear reservation validation, explicit confirmation of guest identity and payment status, unambiguous room allocation messages, transparent progress indicators, and immediate reassurance about data security and error handling. The interface should make its capabilities and limits legible rather than opaque, because ambiguity can quickly undermine confidence at a high-stakes touchpoint.

The strong effects of performance expectancy and perceived quality on trust also suggest that technical and experiential design should be treated together. A chatbot that is fast but confusing, or accurate but impersonal, may still fail to produce downstream commercial benefits. Hotels should invest in dialogue quality, frictionless task completion, coherent wording, and professional interface design, while preserving a seamless escalation path to a human employee. Even when rarely used, a visible human fallback can function as a reassurance cue and reduce perceived risk.

Originality of the paper. *This paper contributes to the hospitality and tourism literature in three main ways. First, it provides experimental evidence on a frontline AI application that is operationally important yet underexamined with mechanism-based causal designs. In doing so, it responds to methodological calls for stronger experimentation and process testing in hospitality research (Viglia & Dolnicar, 2020; Kim et al., 2023).*

Second, the study advances a parsimonious trust-centered explanation of how service agent type affects downstream commercial outcomes. Rather than treating chatbot check-in as a purely technological feature, the model shows that its consequences depend on whether it can generate sufficient trust to support favorable attitudes and intentions. This

positions trust as the pivotal organismic state linking frontline automation to behavior, while clarifying the supporting role of performance expectancy and perceived quality as trust-building cues.

Third, the paper translates these insights into a managerial logic that is especially relevant in the current phase of AI diffusion in hospitality. The results suggest that successful automation at check-in depends less on substituting labor and more on designing credible, reassuring, and high-quality interactions. By integrating service evaluation, trust, and purchase-related responses in a single process model, the study offers a compact framework that future research can extend to other touchpoints and service contexts.

More specifically, the paper contributes beyond existing studies on robots, AI and purchase intentions in three respects: it isolates a precise hospitality touchpoint rather than treating automation as a generic service feature; it compares AI-chatbot and human receptionist check-in under experimentally controlled conditions; and it signals that the effect on purchase-related responses is fully indirect, with trust functioning as the key mechanism through which service agent type becomes commercially relevant.

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APPENDIX

AI-chatbot check-in scenario

You have booked a one-night stay at V Hotel (a five-star hotel), where you have not stayed before. When you arrive at the hotel, you approach the AI-chatbot service to check in. You have the following conversation with the service robot:
AI-chatbot: "Welcome! What can I do for you?"
You: "I have made a reservation for one night at this hotel, so I would like to check in."
AI-chatbot: "Okay, now I need to confirm your check-in information. Please insert your ID card into the reader."
(You take your ID card and insert it into the reader)
AI-chatbot: "Good. I have checked your reservation information. The room has been paid for one night. Your room number is 209, and our facial recognition system will allow you to enter the room."
You: "Okay, thank you."
AI-chatbot: "You're welcome. Have a pleasant stay."

Human receptionist check-in scenario

You have booked a one-night stay at V Hotel (a five-star hotel), where you have not stayed before. When you arrive at the hotel, you approach the receptionist to check in. You have the following conversation with the receptionist:
Receptionist: "Welcome! What can I do for you?"
You: "I have made a reservation for one night at this hotel, so I would like to check in."
Receptionist: "Okay, now I need to confirm your check-in information. I will need your ID card."
(You take out your ID card and show it to the receptionist)
Receptionist: "Good. I have checked your reservation information. The room has been paid for one night. Your room number is 209, and these are the keys to enter the room."
You: "Okay, thank you."
Receptionist: "You're welcome. Have a pleasant stay."

I nuovi frequentatori della montagna: aspettative degli ospiti pernottanti e ruolo dei rifugi per la salvaguardia dell'ecosistema alpino

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Abstract. *Il paper presenta i risultati preliminari di una ricerca – attualmente in progress – che mira a cogliere, dal lato della domanda (obiettivo 1), tendenze e comportamenti che caratterizzano i nuovi frequentatori della montagna, e, dal lato dell'offerta (obiettivo 2), scelte di gestione e pratiche di sostenibilità adottate nei rifugi di montagna. Il tema affrontato dalla ricerca si inserisce nel più ampio dibattito scientifico volto a cogliere nuove tendenze della domanda turistica a seguito dei numerosi cambiamenti macroeconomici e di stili di vita che hanno interessato il contesto turistico montano, nonché le scelte di gestione adottate dalle imprese per acquisire, mantenere e difendere il vantaggio competitivo.*

In tale scenario l'attenzione ai rifugi di montagna attribuisce originalità alla ricerca, permettendo di indagare scelte strategiche e l'adozione di pratiche di sostenibilità da parte di imprese ibride inserite in contesti tanto fragili quanto complessi. La prima fase di ricerca, finalizzata alla ricostruzione dei profili motivazionali e comportamentali dei frequentatori della montagna che pernottano in rifugio, è stata condotta in Trentino nell'estate 2025. I questionari somministrati presso 19 rifugi, selezionati avvalendosi di un piano di campionamento che garantisse rappresentatività geografica, sono stati 861. Un primo livello di analisi ha permesso di analizzare: a) motivazioni, esperienze e percezioni dei frequentatori della montagna; b) scelte organizzative e comportamenti dichiarati; c) sensibilità ai temi della sostenibilità e della fragilità della montagna. Il contributo evidenzia le implicazioni manageriali della ricerca nonché gli elementi di originalità e le limitazioni dello studio.

Keywords: *turismo montano; nuovi trend; profili di domanda; rifugi alpini; Trentino*

Framing of the research. *Negli ultimi anni il turismo montano ha fatto registrare una crescita significativa e costante (UNWTO, 2025), alimentata da una complessa interazione di dinamiche sociali, culturali, ambientali ed economiche. Tale tendenza espansiva risulta particolarmente evidente nell'arco alpino e, nello specifico, nell'area dolomitica, la quale ha riportato uno dei più consistenti incrementi post-pandemici negli arrivi turistici in Italia (ISTAT, 2024).*

Un fattore primario alla base di tale espansione è rappresentato dal progressivo sviluppo e ammodernamento delle infrastrutture di trasporto e di accesso (Paunović & Jovanović, 2017; Bausch & Gartner, 2020). Il miglioramento dell'accessibilità ha ridotto le barriere fisiche e logistiche, ampliando così il bacino di potenziali visitatori e attraendo segmenti di domanda non tradizionalmente legati agli ambienti montani. Parallelamente, le piattaforme social (Tang et al., 2024; Leung et al., 2013) hanno svolto un ruolo determinante nel ridefinire la visibilità delle destinazioni. Attraverso la rapida diffusione di contenuti visivi d'impatto e narrazioni esperienziali, località un tempo periferiche hanno acquisito risonanza internazionale, trasformandosi in mete turistiche di alto profilo, mentre le mete già consolidate hanno spesso trovato una nuova e più forte forma di promozione e diffusione della propria notorietà e capacità di attrazione.

Questo trend è ulteriormente consolidato dai mutamenti negli stili di vita contemporanei (Steiger et al., 2024): l'accelerazione dei ritmi quotidiani, l'aumento dei livelli di stress e la crescente urbanizzazione hanno intensificato il desiderio di evasione temporanea dai contesti metropolitani (Juschten et al., 2019), e le aree montane vengono progressivamente percepite come spazi di rigenerazione fisica e psicologica, in grado di offrire silenzio, isolamento, contatto diretto con la natura ed esperienze in netto contrasto con gli ambienti altamente antropizzati.

Un ulteriore fattore di accelerazione è riconducibile alla pandemia da COVID-19 (Romeo et al., 2021), che ha profondamente rimodellato le percezioni del tempo libero e di tutte le forme del turismo outdoor. L'emergenza sanitaria ha favorito, infatti, un rinnovato apprezzamento per l'ambiente naturale, considerato essenziale per il benessere psicofisico individuale, incentivando la preferenza verso destinazioni percepite come più sicure, meno affollate e maggiormente orientate alle attività all'aperto, tra cui spicca l'ambiente montano (Lukoseviciute et al., 2024).

Infine, anche il cambiamento climatico (Steiger et al., 2022) e il conseguente innalzamento delle temperature medie estive stanno influenzando in modo significativo le scelte turistiche. In particolare, la crescente frequenza delle ondate di calore sta orientando una quota crescente della domanda verso località caratterizzate da una percezione termica più moderata, come le aree montane e le zone d'alta quota, sempre più configurate come forme di "rifugio climatico naturale".

Grazie anche ad un'offerta turistica diversificata e adattabile, il contesto montano emerge perciò come una destinazione capace di soddisfare motivazioni eterogenee (Romeo et al., 2021). Esso accoglie un ampio spettro di

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esperienze, che spaziano dall'escursionismo ricreativo alle discipline tecniche come l'arrampicata, dalla ricerca di solitudine e immersione nella natura al coinvolgimento nelle tradizioni locali, nel patrimonio culturale e nella vita di comunità. Infine, la dimensione della convivialità e dell'ospitalità - spesso percepita come autentica e distinta dalle routine urbane - rafforza ulteriormente l'attrattività delle destinazioni montane nei mercati turistici contemporanei.

Tutti questi fattori hanno contribuito ad aumentare significativamente il numero dei visitatori in molte delle località alpine più note, mettendo talvolta a dura prova la capacità di carico di un territorio montano già caratterizzato dalla fragilità geologica ed ecosistemica. I fenomeni di imitazione e le nuove forme di sightseeing legate ai social media (Urry e Larsen, 2011), il desiderio di vivere e condividere alcune esperienze specifiche, fino a provare una forma di ansia sociale derivante dalla percezione che gli altri stiano vivendo esperienze gratificanti dalle quali si è esclusi, come accade se non si vedono determinati hot-spot o si vivono certe esperienze (concetto psicologico racchiuso nell'acronimo FoMO, Fear of Missing Out, Przybylski et al., 2013; Tandon et al., 2021), hanno provocato fenomeni sempre più diffusi di overtourism, ancorché localizzati in spazi ristretti del territorio montano, e un significativo aumento del carico antropico nelle alte quote.

Si considerino, a titolo esemplificativo, le Dolomiti - e in particolare paesaggi iconici quali le Tre Cime di Lavaredo - intese come caso paradigmatico di come una morfologia suggestiva e l'unicità geologica possano determinare un riconoscimento e una forza di attrazione globale. In misura crescente negli ultimi anni, i flussi turistici non sono alimentati esclusivamente dalle opportunità legate all'alpinismo e alle discipline sportive outdoor, bensì dal valore estetico intrinseco del paesaggio stesso. I turisti ricercano con frequenza esperienze immersive focalizzate su diverse declinazioni del turismo (gastronomia, benessere, contemplazione e fotografia), e il contesto alpino dell'alta quota diviene un contenitore simbolico in cui inserire varie attività ed esperienze (Arnberger et al., 2018; Ruzzo et al., 2021).

Emerge quindi un nuovo profilo dei visitatori della montagna, non più attratti dall'attività alpinistica tout-court, quindi adeguatamente preparati e attrezzati, come accadeva nel recente passato, ma alla ricerca di esperienze a diretto contatto con la natura, grazie al fascino dell'alta quota e dei panorami alpini, fino al desiderio di immersione nelle tradizioni culturali ed enogastronomiche non solo nei paesi del fondovalle alpini, ma anche nei rifugi. Un cambiamento nel profilo del visitatore che genera conseguenze evidenti non solo nel concetto di "servizio atteso", ma anche in termini di impatto sulla sostenibilità ambientale, in un contesto caratterizzato da elevatissima fragilità ecosistemica, nel quale l'impronta ecologica di una fruizione di massa rischia di essere del tutto insostenibile (Río-Rama et al., 2019).

In questo processo di trasformazione nella frequentazione delle alte quote, il rifugio alpino riveste un ruolo centrale e strategico. Storicamente, tali strutture sono nate come presidi di supporto per l'alpinismo: luoghi di ricovero e punti di riferimento per alpinisti ed escursionisti, destinati a fornire ospitalità essenziale, approvvigionamenti e protezione dalle avverse condizioni meteorologiche. La loro funzione originaria era primariamente legata alla sicurezza e al soccorso in ambiente montano. Di conseguenza, i primi rifugi erano organizzati in modo semplice ed essenziale, privi di complessità architettonica o di una marcata elaborazione estetica, riflettendo sia la loro funzione primaria sia le necessità pratiche per cui erano stati concepiti (Duglio & Beltramo, 2019; Romeo et al., 2021).

Con l'evoluzione del turismo montano e il consolidamento delle tendenze precedentemente descritte, il ruolo del rifugio è progressivamente mutato, così come la sua percezione da parte dei visitatori e, in una certa misura, dei gestori stessi. Oggi, il rifugio può essere considerato a tutti gli effetti un attore economico, tenuto a perseguire la sostenibilità finanziaria per garantire continuità operativa e redditività nel lungo periodo. Parallelamente, esso continua ad assolvere una funzione fondamentale di accoglienza, presidio territoriale e tutela ambientale e sociale. Ne deriva, che il rifugio manifesta una natura intrinsecamente ibrida (Haigh & Hoffman, 2014), collocandosi tra una logica orientata al profitto e una vocazione non-profit radicata nei valori del servizio, della conservazione e della responsabilità territoriale. Il rifugista opera, pertanto, all'interno di una complessa dualità, ulteriormente intensificata dai numerosi vincoli imposti dal contesto ambientale e sociale, tra cui l'isolamento geografico, le difficoltà logistiche, la fragilità degli ecosistemi, la stagionalità, i rigidi quadri normativi e le crescenti aspettative della domanda turistica.

La mutazione del profilo del visitatore, alimentata dal fenomeno del FoMO e dalla ricerca di esperienze estetiche altamente notiziabili sui social media, genera una tensione diretta con la gestione tradizionale dei rifugi. L'utente contemporaneo, spesso appartenente ai nuovi segmenti di domanda meno avvezzi ai contesti d'alta quota, tende a traslare in montagna le aspettative di servizio tipiche dei contesti urbani (Romeo et al., 2021). Tale fenomeno costringe il rifugio a un delicato equilibrismo: da un lato, la necessità di rispondere a standard di ospitalità sempre più elevati (comfort, connettività, offerta gastronomica ricercata) per garantire la propria sostenibilità economica; dall'altro lato, l'imperativo di preservare la propria identità di presidio territoriale e la propria vocazione alla semplicità e alla sicurezza, elementi che definiscono la sua natura intrinsecamente ibrida.

Purpose of the paper. *Alla luce delle trasformazioni descritte, l'obiettivo del presente studio, che si propone come un working progress, è duplice. In primis la ricerca mira ad analizzare come l'emergere di nuovi segmenti di visitatori, spesso motivati da esperienze estetiche, ricreative e socialmente condivisibili attraverso i social media, stia modificando le aspettative nei confronti dei rifugi e influenzando, di conseguenza, scelte di gestione dei rifugisti. Il passaggio da una frequentazione prevalentemente legata all'alpinismo tradizionale a una domanda più ampia ed eterogenea richiede, infatti, una ridefinizione delle modalità di gestione, dell'offerta di servizi e dei modelli organizzativi, scelta che non sempre è facilmente e socialmente accettata dai gestori dei rifugi anche in luce del fatto che il contesto alpino, seppur condividendo una serie di fattori comuni e distintivi, non è omogeneo, pertanto richiede scelte e decisioni differenti a seconda dei fattori strutturali e contestuali specifici che caratterizzano i singoli gruppi di rifugi.*

Parallelamente, il secondo obiettivo della ricerca è investigare le scelte gestionali adottate dai gestori dei rifugi alpini proprio in risposta a questo mutamento del profilo dei frequentatori della montagna. L'analisi muove dal presupposto che il rifugio alpino operi all'interno di un contesto organizzativo eterogeneo, ma intrinsecamente ibrido, nel quale la sostenibilità economica deve necessariamente conciliarsi con l'obiettivo principale del rifugio ovvero quello di essere presidio della montagna e quindi tutelarla dal punto di vista ambientale e della responsabilità sociale, soprattutto in ecosistemi d'alta quota caratterizzati da elevata fragilità. Di conseguenza, la ricerca approfondisce come i gestori dei rifugi alpini affrontino le tensioni generate da tali trasformazioni e quali strategie adottino per bilanciare le esigenze di sostenibilità economica con la necessità di preservare l'integrità ambientale e il valore sociale e culturale del contesto montano.

Attraverso l'analisi dell'intersezione tra evoluzione della domanda turistica e scelte manageriali, lo studio intende contribuire innanzitutto ad arricchire la letteratura relativa all'evoluzione del turismo montano, evidenziando quali siano oggi le nuove tendenze e i nuovi profili dei frequentatori della montagna. Conseguentemente, sulla base di tali evidenze, il lavoro mira a sviluppare una maggiore comprensione del ruolo dei rifugi alpini come attori chiave nella gestione sostenibile delle destinazioni turistiche montane, chiamate a confrontarsi con questo nuovo elemento della domanda che enfatizza la complessità del contesto competitivo nel quale operano.

Methodology. *La prima fase della ricerca mira a rispondere al primo obiettivo, ossia identificare i profili motivazionali e comportamentali dei nuovi frequentatori della montagna al fine di comprendere se e come essi impattano sulle scelte di gestione dei rifugisti. La ricostruzione dei profili dei frequentatori della montagna si è focalizzata specificatamente sugli ospiti che pernottano presso il rifugio. La considerazione di tale target permette infatti di approfondire motivazioni, comportamenti e percezioni del frequentatore della montagna cogliendo informazioni e valutazioni di individui che hanno potuto usufruire di molteplici servizi offerti dal rifugio (considerandone pertanto sia le aspettative, sia le percezioni) ed hanno altresì avuto la possibilità di interagire con il rifugista e gli altri ospiti del rifugio. Questo permette di cogliere informazione riguardo alla dimensione relazionale dei frequentatori della montagna contribuendo in modo significativo alla ricostruzione dei profili. Oltre alla rilevazione di informazioni che permettono di ricostruire il profilo sociodemografico dei pernottanti in rifugio, la ricerca approfondisce tre focus principali:*

a) *Motivazioni, esperienze e percezioni: il primo focus approfondisce il motivo principale connesso alla scelta di trascorrere la notte in un rifugio, rileva informazioni riguardo al tipo di esperienza (es. un solo pernottamento o tappa di un trekking in alta quota) e all'attitudine a sperimentare vacanze in quota, percezioni riguardo al livello di esperienza in ambiente montano e alle proprie capacità.*
b) *Scelte organizzative e comportamenti dichiarati: il secondo focus analizza composizione del nucleo turistico, modalità di raccolta delle informazioni, fonti utilizzate, processo di prenotazione del pernottamento in rifugio, importanza attribuita a specifici servizi offerti dal rifugio, utilizzo dei social media per raccogliere e/o diffondere informazioni.*
c) *Sensibilità ai temi della sostenibilità e della fragilità della montagna: il terzo focus indaga il livello di consapevolezza rispetto a specifiche tematiche ambientali che impattano sullo svolgimento dell'attività in alta quota e rilevano percezioni riguardo agli escursionisti incontrati durante l'itinerario per raggiungere il rifugio.*

L'area di indagine della ricerca coincide con il territorio del Trentino che, oltre ad essere una destinazione turistica che presenta elementi distintivi del contesto alpino, è anche la destinazione italiana con il maggior numero di strutture alpinistiche (oltre 180 se si considerano rifugi alpini, rifugi escursionistici e bivacchi)[1].In Trentino si rileva altresì una crescita dei flussi turistici nella stagione estiva (ISPAT, 2026) connessi anche alle nuove tendenze di fruizione della montagna oggetto di dibattito scientifico internazionale (come richiamato in apertura del presente lavoro).

La ricerca sul campo è stata condotta attraverso una survey nell'estate del 2025. Per la rilevazione si è definito un questionario composto da 32 domande a risposta chiusa (domande multiple-choice e domande con utilizzo di scale di valutazione), predisposto in lingua italiana, tedesca e inglese, in coerenza con i principali mercati incoming (turismo domestico e mercato tedesco) ed emergenti. Per la somministrazione è stata fondamentale la collaborazione dei rifugisti, che hanno somministrato personalmente il questionario ai frequentatori pernottanti, consegnandolo in coincidenza con la fase di registrazione per il check-in. Il questionario è stato erogato in forma cartacea poiché, essendo la connessione wi-fi in alta quota non garantita, la somministrazione online avrebbe precluso la raccolta capillare dei dati.

Unità di rilevazione sono state i rifugi alpini del Trentino (complessivamente 149). A garanzia della rappresentatività dei dati raccolti, il piano di campionamento è stato definito considerando, oltre alla disponibilità di posti letto dei rifugi, la distribuzione geografica (in modo da coprire proporzionalmente l'area orientale, occidentale e meridionale del Trentino) e l'accessibilità (raggiungibilità a piedi, in auto, con utilizzo di impianti a fune).

Le unità di rilevazione (rifugi) così identificate sono state 19. I questionari raccolti dal 14 giugno al 19 ottobre 2025 sono stati 861. Coerentemente con i criteri di selezione adottati in fase di campionamento, il Trentino orientale concentra il 50,87% dei questionari, il Trentino occidentale il 27,29% e il Trentino meridionale il 21,84%.

L'analisi dei dati è attualmente in progress. Nella sezione che segue si presentano i primi risultati emersi dall'analisi delle frequenze e da alcuni approfondimenti condotti con analisi bivariata. L'adozione di tecniche di analisi statistica

[1] Si veda quanto riportato sul sito della Provincia autonoma di Trento nella sezione dedicata alle "Strutture alpinistiche" www.provincia.tn.it/Argomenti/Turismo-e-sport/Strutture-alpinistiche

multivariata permetterà di ricostruire i profili degli ospiti pernottanti nei rifugi considerando i focus di approfondimento oggetto della ricerca.

Results. *I frequentatori della montagna che hanno pernottato nei rifugi del Trentino si distribuiscono in modo equilibrato rispetto al genere (48,28% uomini; 47,46% donne) e alla nazionalità (52,4% italiani; 47,6% stranieri). Rispetto ai mercati esteri, la Germania è il bacino principale (38% degli ospiti internazionali), seguono Olanda (15,5%), UK (8,3%) e Stati Uniti (15,5%). A questi si aggiungono frequentatori pernottanti provenienti da aree geografiche prettamente alpine (come l'Austria e la Svizzera) e dalle aree scandinave. Minori sono invece le presenze di ospiti provenienti dall'Europa orientale e meridionale e da Paesi extraeuropei.*

Da un punto di vista anagrafico prevalgono i rispondenti nati tra il 1966 e il 1980 (32%) e tra il 1981 e il 1994 (29,3%). Circa un quarto dei rispondenti (23,50%) è composto da frequentatori più giovani, nati tra il 1995 e il 2007. Con riferimento alle principali generazioni, si osserva che tra gli ospiti pernottanti nei rifugi vi è una presenza significativa di escursionisti appartenenti alle generazioni Gen X, Gen Y e Gen Z, alle quali si affiancano i nati prima del 1965 (Baby Boomer), che rappresentano circa il 14% dei rispondenti.

Con riferimento ai tre focus di approfondimento, i risultati preliminari della ricerca sono sintetizzabili come segue:

a) *Motivazioni, esperienze e percezioni: la maggioranza dei rispondenti dichiara esperienza consolidata rispetto al pernottamento in rifugio: il 47% vi ha soggiornato, infatti, "molte volte". La scelta del rifugio è guidata principalmente da fattori tecnico-funzionali, come il percorso o l'obiettivo alpinistico (indicato come prioritario dall'85,2%), mentre gli aspetti di socialità sono considerati secondari. La maggior parte si autodefinisce trekker (32,2%) o escursionista di alta quota (22,5%); meno ricorrente, invece, la definizione di alpinista (13,7%).*
b) *Scelte organizzative e comportamenti dichiarati: il nucleo turistico si compone in prevalenza di amici (43,76%) o di componenti della famiglia (23,53%). Le prenotazioni si polarizzano su due canali dominanti: il contatto diretto con il gestore (34,40%) e il sito web della struttura (30,10%). Dato quest'ultimo, avvalorato anche dall'elevata importanza attribuita alla prenotazione online, che si colloca tra i servizi offerti dal rifugio considerati più rilevanti. Oltre il 20% dichiara di non aver gestito la prenotazione in prima persona, evidenziando una chiara tendenza alla delega o all'organizzazione di gruppo. Marginali risultano invece le prenotazioni attraverso altri canali, social network inclusi.*

   La maggior parte dei rispondenti raggiunge il rifugio a piedi e dichiara di aver sostenuto uno sforzo fisico alla portata delle proprie capacità. La pianificazione dell'escursione (itinerario e livello di difficoltà) avviene in modo accurato, con la raccolta di informazioni gestita direttamente dai frequentatori della montagna pernottanti (che si avvalgono anche dell'esperienza maturata in precedenti escursioni) o con l'ausilio di accompagnatori. Le principali fonti utilizzate per raggiungere il rifugio sono Internet (23,21%), carte di sentieri e rifugi (21,53%) e la segnaletica (21,17%). La tipologia di percorso e l'obiettivo alpinistico sono elementi determinanti per la scelta del rifugio (85,12%), ai quali si affiancano la collocazione geografica e il panorama in cui il rifugio è inserito (78,1%). Minore attenzione rivestono invece le dimensioni connesse alla ricerca di socialità (conoscenza di nuove persone; condivisione dell'esperienza con appassionati) che guidano la scelta di una percentuale contenuta di rispondenti (circa il 20%). Le caratteristiche del rifugio (in termini di comfort e stile) si pongono in posizione intermedia, così come la proposta culinaria e l'interazione con il rifugista, che rappresenta, per la maggior parte, un interlocutore esperto (49,11%) o una persona del luogo in grado di fornire informazioni (21,56%).
c) *Sensibilità ai temi della sostenibilità e della fragilità della montagna: i rispondenti dichiarano che accoglierebbero favorevolmente limiti alla frequentazione della montagna, in particolare riferiti all'obbligo di riportare a valle i propri rifiuti e all'introduzione di controlli sul rispetto della natura. Pareri favorevoli si riscontrano anche in merito a limitazioni all'accesso dei veicoli nel fondovalle. Pareri meno favorevoli emergono invece con riferimento all'accesso ai parcheggi e al rifugio solo previa prenotazione.*

   I frequentatori della montagna, infine, dichiarano un alto livello di consapevolezza riguardo ai problemi nella gestione dei rifugi connessi alla scarsità d'acqua, al riscaldamento climatico e allo scioglimento dei ghiacciai, al cambiamento delle stagioni e dell'andamento meteorologico, così come al costo dell'energia e dei trasporti. Con riferimento ai soggetti che possono contribuire ad attenuare tali problematiche, la maggior parte dei rispondenti (45,4%) identifica nelle istituzioni locali (Regioni, Province, Comuni) i principali referenti. Segue, con il 34%, il riconoscimento di una responsabilità diretta in capo ai frequentatori stessi, sottolineando l'importanza dei comportamenti individuali e collettivi nell'affrontare tematiche di tale portata.

Le prime evidenze basate sull'analisi bivariata delineano alcune differenze tra i frequentatori della montagna con riferimento alla nazionalità e all'organizzazione dell'esperienza in rifugio. Gli italiani prediligono le escursioni di prossimità e il pernottamento in rifugio partendo da casa. Il rifugio rappresenta pertanto, la meta dell'esperienza, ed essi si identificano prevalentemente con la figura dei trekker o dei turisti occasionali. Per gli stranieri, invece, si delinea uno scenario diverso, in cui i frequentatori pernottanti, che si identificano principalmente con l'escursionista di alta quota o l'alpinista, sono coinvolti in percorsi di trekking plurigiornalieri che prevedono il soggiorno in rifugi diversi.

Alla luce di questi primi risultati, che richiedono ulteriori approfondimenti avvalendosi di analisi statistiche multivariate, emergono specificità degli ospiti pernottanti nei rifugi, che avvalorano l'interesse scientifico ad approfondire le motivazioni e le aspettative maturate in relazione alla fruizione della montagna e alla scelta del rifugio come luogo di soggiorno, al fine di cogliere nuove tendenze della domanda e indagarne le implicazioni manageriali per le imprese.

Research limitations. *Lo studio presenta alcune limitazioni connesse prevalentemente alla fase in progress di analisi dei dati. Ulteriori approfondimenti sono necessari per indagare relazioni e associazioni tra variabili, avvalendosi di analisi statistiche multivariate al fine di ricostruire in modo articolato i profili degli ospiti pernottanti nei rifugi in ambiente alpino. Ulteriore limitazione è connessa alla focalizzazione dell'analisi sugli ospiti che pernottano in rifugio che non necessariamente esprimono motivazioni, comportamenti e attenzione alla salvaguardia dell'ambiente alpino in linea con il più ampio segmento dei frequentatori della montagna. Si ritiene tuttavia che la ricerca sia un primo step di analisi che può contribuire a mettere in luce evidenze che potranno trovare ulteriore approfondimento ampliando l'analisi anche ad un bacino più ampio di frequentatori della montagna.*

Una terza limitazione riguarda la natura relativamente recente e in evoluzione del fenomeno oggetto di indagine. L'espansione del turismo montano e l'emergere di nuovi segmenti di visitatori, influenzati da dinamiche legate ai social media, ai cambiamenti negli stili di vita contemporanei e alle trasformazioni delle pratiche turistiche successive alla pandemia, rappresentano processi ancora in fase di consolidamento. Di conseguenza, anche il quadro teorico e le evidenze empiriche disponibili nella letteratura scientifica risultano ancora parziali. In relazione a ciò, anche la comparazione dei risultati con studi precedenti presenta alcune criticità.

Infine, la ricerca si concentra sul contesto territoriale del Trentino, che, pur presentando caratteristiche tipiche del sistema alpino, può essere influenzato da specificità strutturali, organizzative e culturali non necessariamente generalizzabili ad altri contesti montani. Pertanto, l'estensione dell'analisi ad altre aree alpine potrebbe rappresentare un utile sviluppo futuro della ricerca, contribuendo a rafforzare la robustezza risultati.

Managerial implications. *Comprendere come i gestori dei rifugi alpini si confrontano con il mutamento dei trend del turismo montano e quali decisioni strategiche adottano in un contesto organizzativo di natura imprenditoriale ibrida, consente di sviluppare strumenti di supporto alla gestione più strutturati e orientati alla sostenibilità. In particolare, l'analisi delle pratiche manageriali adottate dai rifugisti permetterà di individuare approcci gestionali capaci di integrare la sostenibilità economica con la tutela ambientale e la responsabilità sociale, tenendo conto delle specificità operative e territoriali che caratterizzano il contesto dell'alta quota.*

In questa prospettiva, l'identificazione dei profili motivazionali e comportamentali dei frequentatori della montagna rappresenta un passaggio cruciale, poiché consente di comprendere più accuratamente le aspettative della domanda e di interpretare le logiche che orientano le scelte gestionali dei rifugisti.

Le evidenze del lavoro possono contribuire alla definizione di linee guida manageriali utili a supportare i gestori nel bilanciare le crescenti aspettative della domanda con la necessità di preservare l'equilibrio ecologico e culturale dei territori montani. In questo senso, il contributo dello studio non si limita al contesto specifico dei rifugi alpini, ma si inserisce in un più ampio filone di ricerca sul turismo sostenibile e sulla gestione dell'ospitalità in contesti caratterizzati da elevata fragilità ambientale e da vincoli logistici e infrastrutturali rilevanti.

Le implicazioni emerse possono inoltre essere trasferibili ad altri contesti turistici emergenti o in fase di sviluppo, nei quali la crescita della domanda non è ancora pienamente consolidata, ma nei quali risulta comunque necessario adottare modelli di gestione attenti alla sostenibilità e alla capacità di carico del territorio. In tali situazioni, l'esperienza dei rifugi alpini può rappresentare un laboratorio particolarmente significativo per comprendere come coniugare sviluppo turistico, sostenibilità e gestione responsabile di ambienti naturali sensibili.

Originality of the paper. *Nonostante il crescente interesse scientifico per il turismo montano e le trasformazioni che stanno interessando le destinazioni alpine, la letteratura ha finora dedicato un'attenzione limitata all'analisi sistematica dei profili emergenti dei frequentatori della montagna, in particolare alla luce delle recenti dinamiche che stanno ridefinendo le modalità di fruizione degli ambienti d'alta quota. La crescente diffusione dei social media, i cambiamenti negli stili di vita contemporanei e la ricerca di esperienze immersive in contesti naturali stanno infatti contribuendo a modificare progressivamente le motivazioni, le aspettative e i comportamenti dei visitatori della montagna.*

In questo contesto, la presente ricerca si propone di contribuire al dibattito scientifico attraverso l'analisi dei profili motivazionali e comportamentali dei nuovi frequentatori della montagna, con particolare riferimento agli escursionisti che pernottano nei rifugi alpini. L'identificazione e la comprensione di tali profili rappresentano un passaggio fondamentale per interpretare l'evoluzione della domanda in alta quota e per comprendere come essa possa influenzare le dinamiche di gestione e le scelte organizzative delle strutture di accoglienza alpine.

A partire da questa prospettiva, lo studio contribuisce inoltre ad ampliare la riflessione sul ruolo dei rifugi alpini interpretandoli attraverso la lente delle imprese ibride. Tale approccio consente di considerare il rifugio non soltanto come infrastruttura di supporto al turismo montano, ma come un attore organizzativo complesso, chiamato a conciliare sostenibilità economica, tutela ambientale e responsabilità sociale all'interno di un contesto territoriale caratterizzato da elevata fragilità ecosistemica.

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Luxury Brands as Cultural Actors. Heritage, Creative Cities, and Tourism Ecosystems in the Luxury Economy

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Abstract. *Luxury brands are increasingly operating at the intersection of cultural production, heritage valorisation, and tourism development within global creative cities. Moving beyond their traditional role as producers of high-end goods, they act as culturally embedded actors that mobilise heritage resources and artification strategies to generate symbolic value and institutional legitimacy.*

This paper examines how luxury brands integrate intangible cultural heritage into branding practices and how these processes contribute to the development of tourism ecosystems. Adopting an institutional and cultural perspective, the study conceptualises luxury brands as actors embedded in networks of cultural production, symbolic legitimisation, and destination development. A qualitative multiple case study approach is employed, focusing on two Italian firms—Buccellati and Molteni Group— to illustrate heritage-based branding practices.

The findings show that heritage serves as an institutionalised organisational resource, embedded in archives, museums, and structured cultural practices, while artification functions as a mechanism for constructing legitimacy at the field level, aligning brands with institutionalised cultural frameworks. Furthermore, corporate cultural spaces and heritage initiatives enhance the symbolic appeal of creative cities and contribute to the development of tourism ecosystems.

This study makes three key contributions to the literature: (1) it reconceptualises intangible cultural heritage as an institutional resource; (2) it advances the understanding of artification as a mechanism of legitimacy construction; and (3) it bridges luxury branding and tourism research through an ecosystem-based perspective. In doing so, it positions luxury brands as cultural mediators operating between cultural production and destination development.

Framing of the research. *The luxury industry has undergone significant transformations as globalisation, digitalisation, and evolving consumer expectations have reshaped brand management strategies. Luxury brands now compete not only through product quality and exclusivity but also through symbolic value, cultural meaning, and experiential engagement (Kapferer & Bastien, 2012).*

As competition intensifies, firms are differentiating themselves more through narratives that convey authenticity, creativity, and cultural depth. Consequently, luxury consumption has therefore evolved beyond product acquisition to encompass experiences, and storytelling (Batat, 2019; Kumar & Swain, 2025). In response, companies are integrating craftsmanship traditions, historical archives, and cultural collaborations into their branding strategies. This links contemporary products to cultural identities and reinforcing authenticity and distinctiveness (Beverland, 2005; Dion & Borraz, 2014).

Within this context, luxury brands operate as cultural actors that contribute to the creation and dissemination of meaning (Holt, 2004). Rather than functioning solely as commercial organizations, they engage with museums, cultural institutions, artists, and creative communities, positioning their products within the aesthetic and symbolic frameworks traditionally associated with the arts. This shift reflects a broader transformation in which luxury firms extend their role beyond market activities to become participants in cultural ecosystems.

A key resource enabling this transformation is intangible cultural heritage, which includes craftsmanship traditions, artisanal knowledge, and cultural practices transmitted across generations (UNESCO, 2003). In luxury industries, such heritage functions both as a production resource and as a source of symbolic value, reinforcing authenticity, cultural depth, and legitimacy (Kapferer, 2014; Throsby, 2001).

At the same time, luxury brands operate within creative cities—urban environments where cultural production, creative industries, and tourism intersect (Richards, 2011). These cities host dense networks of designers, cultural institutions, and tourism infrastructures that shape global cultural economies. Within these contexts, luxury brands contribute to cultural life through exhibitions, heritage spaces, and collaborations with artistic and institutional actors.

These initiatives increasingly form part of urban tourism ecosystems. From an ecosystem perspective, tourism can be understood as a configuration of interdependent actors whose interactions co-create value at the destination level (Richards, 2011; Richards, 2021). Recent studies further emphasise that such ecosystems are structured through economic and relational interdependencies linking industrial activities, cultural production, and territorial development (Platania et al., 2025).

The concept of artification is particularly useful for interpreting these dynamics. Artification refers to processes through which objects or practices originally perceived as non-art acquire artistic legitimacy through aesthetic framing and institutional recognition (Shapiro & Heinich, 2012). In luxury industries, it reinforces perceptions of rarity,

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creativity, and symbolic value, as brands collaborate with artists, organise exhibitions, and curate heritage spaces (Massi & Turrini, 2020). These practices blur the boundaries between commerce and art and position luxury products within cultural frameworks associated with artistic production. Artification can be interpreted as a field-level mechanism through which organizations align with institutionalised cultural frameworks, thereby reinforcing legitimacy and symbolic value. It can also be understood as a form of boundary work through which luxury brands negotiate the distinction between art and market domains. Despite growing scholarly interest in luxury branding, cultural heritage, and creative cities, limited research has examined how luxury brands simultaneously contribute to cultural production and tourism ecosystems. Existing research remains fragmented across branding and tourism studies, calling for more integrative approaches (Zhang et al., 2026). Much of the existing literature has focused on brand authenticity, heritage branding, or consumer perceptions, while less attention has been devoted to the broader cultural and territorial role of luxury firms. Similarly, tourism studies have often analysed destination attractiveness and cultural experiences without fully considering the role of luxury brands as actors shaping cultural infrastructures and tourism imaginaries.

This paper advances a theoretical reframing of luxury brands by conceptualising them not merely as cultural actors, but as institutional producers of cultural legitimacy. In this perspective, heritage infrastructures and artification processes are not simply branding strategies, but organisational and field-level mechanisms through which firms stabilise symbolic value and actively shape cultural and tourism ecosystems.

This study addresses this gap by examining how luxury brands mobilise heritage resources, artification strategies, and cultural initiatives to position themselves within creative city ecosystems. Adopting a cultural and institutional perspective, the paper investigates how heritage-based branding practices are embedded in organisational structures and how they contribute not only to symbolic legitimacy but also to tourism ecosystem development.

The present study makes three key contributions to the existing literature. Firstly, it reconceptualises intangible cultural heritage as an institutionalised infrastructure embedded in organisational practices, which stabilises legitimacy over time. Secondly, it advances the understanding of artification by interpreting it as a field-level mechanism of institutional alignment and legitimacy transfer across cultural and market domains. This enables luxury brands to embed their products within recognised cultural frameworks. Thirdly, it combines luxury branding and tourism research by adopting an ecosystem-based perspective, demonstrating how luxury brands actively shape tourism ecosystems by co-producing symbolic value. The study provides a comprehensive framework that integrates these perspectives, establishing a clear link between branding, cultural legitimacy and territorial value creation.

Purpose of the paper. *Building on an ecosystem-based and institutional perspective, this paper examines how luxury brands mobilise intangible cultural heritage within branding strategies and how these practices contribute to tourism ecosystems in creative cities. In particular, the study investigates how heritage resources are embedded in organisational practices, how artification processes support the cultural positioning and legitimacy of luxury brands, and how these dynamics shape their role within urban cultural and tourism systems.*

By analysing the cases of Buccellati and Molteni Group, the research explores how craftsmanship traditions, design heritage, and corporate cultural spaces function as strategic resources that strengthen brand legitimacy while simultaneously contributing to the symbolic and experiential attractiveness of urban destinations.

To address these issues, the study is guided by the following research questions:

RQ1. How do luxury brands mobilise intangible cultural heritage as an institutionalised resource within branding strategies?

RQ2. How do artification strategies function as mechanisms of cultural positioning and legitimacy construction in luxury markets?

RQ3. How do heritage-based branding practices contribute to tourism ecosystems in creative cities?

Methodology. *Following the literature review, this study adopts a qualitative multiple case study approach to examine how luxury brands mobilise cultural heritage within creative cities and tourism ecosystems (Yin, 2018).*

The empirical analysis focuses on two Italian luxury brands: Buccellati, operating in high jewellery, and Molteni Group, operating in luxury furniture and design. These cases were selected through purposive sampling (Eisenhardt, 1989), as both firms actively integrate cultural heritage and creative production into their branding strategies while operating within the Milan design ecosystem. Although they belong to different sectors, they are analytically comparable in their use of heritage to connect brand identity, cultural production, and territorial attractiveness.

The unit of analysis consists of the organisational practices through which luxury brands mobilise cultural heritage and engage with cultural and tourism ecosystems. In particular, the study focuses on practices such as the development of corporate archives, museum initiatives, exhibitions, cultural collaborations, and heritage spaces, which allow observation of how heritage and artification are operationalised within organisational contexts.

Data were collected from multiple sources, including semi-structured interviews with communication and brand managers, corporate reports and publications, archival materials, exhibitions and cultural initiatives, academic literature, and industry reports. The use of multiple sources enables data triangulation and strengthens the reliability of the analysis (Yin, 2018). Interviews provide insights into managerial interpretations of heritage and cultural initiatives, while corporate documents and archival materials offer evidence on historical narratives, design traditions, and heritage infrastructures. Exhibitions, museums, and cultural spaces are analysed as organisational manifestations of artification and cultural positioning.

Data analysis follows an iterative and comparative process (Eisenhardt, 1989). First, empirical material is coded to identify practices related to heritage mobilization, artification strategies, and tourism-related initiatives. The coding process is structured around three analytical dimensions derived from the research questions: (1) heritage mobilization practices, (2) artification strategies, and (3) tourism-related initiatives. First-order codes emerging from the data (e.g., archives, exhibitions, museum activities) are subsequently grouped into broader themes reflecting recurring organisational mechanisms.

Second, within-case analyses are conducted to examine how each company institutionalises heritage and positions itself within cultural and urban ecosystems. Third, cross-case comparison enables the identification of recurring patterns and differences, with particular attention to how similar practices generate comparable outcomes in terms of legitimacy and cultural positioning.

Recurrent patterns—such as the institutionalization of heritage through archives and museums and the use of exhibitions as artification mechanisms—support the identification of mechanisms connecting heritage mobilization, legitimacy construction, and integration into tourism ecosystems. This approach allows findings to be grounded in empirical observations while contributing to theory development.

Literature review.

Intangible Cultural Heritage and Craftsmanship. *Intangible cultural heritage includes practices, knowledge, and skills transmitted across generations (UNESCO, 2003). Within creative industries, craftsmanship traditions represent a key form of such heritage, combining technical expertise, aesthetic sensibilities, and cultural continuity. In luxury industries, these traditions are central to brand identity, enabling the production of unique objects characterised by quality, rarity, and refinement (Kapferer, 2014).*

Artisanal knowledge develops through long-term learning processes, apprenticeships, and workshop-based transmission. Luxury brands increasingly invest in preserving this knowledge through archives, training programs, craft schools, and documentation initiatives, highlighting its role as both a production resource and a strategic cultural asset.

Beyond technical expertise, craftsmanship also functions as a storytelling resource. Narratives centred on artisanal knowledge, handwork, and historical continuity allow brands to communicate authenticity and cultural depth (Beverland, 2005). In this sense, intangible cultural heritage operates as both cultural capital and a mechanism of differentiation (Bourdieu, 1984; Dion & Borraz, 2017).

Artification and Cultural Legitimacy. *Artification is the process by which objects, practices, or activities not initially regarded as art are progressively constructed as art through material, symbolic, and institutional shifts, eventually attaining cultural legitimacy (Shapiro & Heinich, 2012). In luxury industries, it plays a central role in reinforcing perceptions of rarity, creativity, and symbolic value. Firms increasingly adopt artification strategies through collaborations with artists, museum exhibitions, and the curation of heritage spaces (Massi & Turrini, 2020; Green, 2025).*

When luxury products are exhibited in cultural institutions, they acquire meanings that extend beyond functional value. Research shows that artification enhances symbolic prestige and perceived legitimacy (Chailan, 2018), while also influencing consumer evaluations of durability and uniqueness (De Angelis et al., 2020).

Kapferer (2014) argues that artification represents a key strategy through which luxury brands recreate rarity and cultural value in markets characterised by increasing globalization, standardization, and competitive pressure. Artification contributes to positioning luxury brands within wider creative ecosystems, allowing products to be framed as cultural artifacts rather than purely commercial goods.

Creative Cities and Tourism Ecosystems. *Creative cities are urban environments where culture, creativity, and economic activities intersect, supported by dense networks of creative industries, cultural institutions, and tourism infrastructures (Richards, 2011). Events such as fashion weeks, design festivals, and art fairs enhance their international visibility and attract diverse audiences.*

Within these contexts, luxury brands contribute to cultural life through exhibitions, collaborations, and heritage spaces. From a tourism perspective, such initiatives form part of tourism ecosystems, where firms, institutions, creative professionals, and visitors interact (Richards, 2011; Richards, 2021; Platania et al., 2025). Brand museums, flagship spaces, and exhibitions increasingly become elements of cultural itineraries within creative cities.

Recent tourism research highlights the role of storytelling, heritage interpretation, and symbolic coherence in shaping visitor engagement and destination attractiveness (Guo et al., 2024; Sinha & Chinki, 2025). In this perspective, heritage should be understood not only as a cultural asset but also as a driver of tourism experiences, whose interpretation and staging contribute to experiential value creation within tourism ecosystems.

These dynamics are particularly relevant to luxury brands, as heritage spaces operate as hybrid environments combining storytelling, experience, and cultural consumption. At the same time, critical tourism studies underline that heritage valorisation may involve selective representation and commodification, especially when cultural resources are mobilised for market purposes (Richards, 2021; Kumar & Swain, 2025).

Recent contributions further emphasise the importance of integrated approaches linking heritage, branding and tourism development (Kumar & Swain, 2025), highlighting the need for systemic perspectives in analysing the role of luxury brands within tourism ecosystems.

Empirical cases.

Buccellati. *Founded in Milan in 1919, Buccellati represents a prominent luxury heritage brand deeply rooted in craftsmanship and artistic tradition. Its identity is strongly linked to goldsmith techniques such as rigato, telato, ornato, and segrinato, which create textile-like textures on precious metals. These techniques embody forms of intangible cultural heritage transmitted across generations and embedded in the firm's identity.*

Beyond craftsmanship, Buccellati integrates artification strategies into its branding approach. Drawing on artistic references from Renaissance and Byzantine traditions, the brand positions its jewellery as culturally significant artifacts rather than purely decorative objects. Heritage preservation plays a central role in this process. The Buccellati Historical Archive documents the company's legacy through sketches, historical pieces, and documentary materials, functioning both as a repository of the past and as an organisational resource supporting authenticity and continuity.

The brand also engages with cultural institutions through exhibitions and museum collaborations, with pieces displayed in venues such as the Museo degli Argenti in Florence and the Museo del Gioiello in Vicenza. These initiatives reinforce the perception of Buccellati's creations as cultural artifacts and illustrate how artification is operationalised through institutional recognition and aesthetic framing.

Empirical evidence from interviews and documentary sources indicates that these practices are strategically mobilised to reinforce legitimacy. Craftsmanship heritage is not only communicated symbolically but institutionalised through archives, cultural programming, and curated initiatives.

Located in Milan, Buccellati operates within a dynamic creative ecosystem characterised by fashion, design, and cultural production. Through exhibitions, collaborations, and participation in cultural events, the brand contributes to the symbolic landscape of the city and becomes relevant to visitors interested in Italian craftsmanship. These activities suggest its integration into broader tourism ecosystems.

Molteni Group. *Founded in 1934 in the Brianza design district, Molteni Group is a leading company in the luxury furniture sector, whose identity is shaped by collaborations with renowned architects and designers such as Gio Ponti, Aldo Rossi, Jean Nouvel, and Foster + Partners. Unlike Buccellati, whose heritage is rooted in artisanal craftsmanship, Molteni mobilises design heritage and architectural culture as the foundation of its cultural positioning.*

The company emphasises the historical significance of modern Italian design through initiatives such as the Heritage Collection, which includes re-editions of iconic furniture pieces. A central element of its strategy is the Molteni Museum, inaugurated in 2015 at the company's headquarters in Giussano. The museum preserves and communicates the firm's design heritage while hosting exhibitions and cultural events, functioning as both an archive and a platform for cultural engagement.

Molteni also collaborates with cultural institutions, including the Museo Poldi Pezzoli in Milan, and has developed Palazzo Molteni, a flagship cultural space in central Milan designed by Vincent Van Duysen. This space combines showroom, exhibition venue, and cultural hub, offering immersive environments where visitors experience design within curated domestic settings.

These practices support the interpretation of Molteni as a cultural actor embedded in Milan's design ecosystem. The company frames design as a cultural language and positions itself as a custodian of design heritage. As in the Buccellati case, legitimacy emerges from the organisational embedding of cultural resources rather than from symbolic narratives alone.

At the same time, Molteni's museum and flagship spaces contribute to the experiential attractiveness of Milan by offering visitors access to curated design environments that connect brand identity with urban cultural experience. Interview data and corporate documentation further indicate that these initiatives function as institutional platforms through which design culture is formalised and communicated to broader audiences.

The comparative analysis of Buccellati and Molteni Group highlights recurring patterns in how luxury brands mobilise cultural resources, engage in artification processes, and position themselves within urban cultural and tourism ecosystems. While the two cases differ in their sectoral focus—craftsmanship-based luxury versus design-driven production—they show converging organisational mechanisms through which heritage is institutionalised, artification is operationalised, and cultural initiatives contribute to broader ecosystem dynamics.

These patterns provide the basis for identifying key analytical dimensions that structure the findings of this study. In particular, the analysis focuses on (1) the institutionalization of heritage as an organisational resource, (2) the role of artification as a mechanism of legitimacy construction, and (3) the integration of luxury brands into tourism ecosystems within creative cities.

Results. *The findings provide insights into the evolving role of luxury brands within contemporary cultural and urban ecosystems. The analysis of Buccellati and Molteni Group shows that luxury brands operate not only as producers of high-end goods but also as culturally embedded actors within networks of cultural production, heritage preservation, and tourism development.*

While product quality, exclusivity, and craftsmanship remain central, contemporary strategies increasingly emphasise cultural meaning, heritage narratives, and experiential engagement (Kapferer, 2014; Batat, 2019). Luxury brands therefore extend their role beyond traditional marketing by engaging in exhibitions, cultural initiatives, and collaborations with artistic institutions.

The cases illustrate how intangible cultural heritage functions as a strategic resource generating symbolic value and institutional legitimacy. In both firms, heritage is embedded in formal organisational structures—such as archives, museums, and curated cultural initiatives—rather than being limited to symbolic narratives. Legitimacy is strengthened when heritage is institutionalised across organisational practices.

From a theoretical perspective, heritage and artification emerge as complementary mechanisms operating at different levels. Heritage supports authenticity and continuity at the organisational level, while artification operates at the field level by aligning firms with cultural institutions and symbolic systems. Together, these mechanisms enable luxury brands to achieve legitimacy within both market and cultural domains.

Interview data highlight that managers explicitly frame archives and exhibitions as tools for reinforcing brand legitimacy rather than mere communication devices.

Proposition 1 (heritage). *Luxury brands that institutionalise intangible cultural heritage through organisational infrastructures (e.g., archives, museums, formalised practices) transform heritage from a symbolic narrative into a legitimacy-stabilising mechanism, thereby reinforcing their institutional positioning within luxury fields.*

The analysis also highlights the role of artification in shaping contemporary luxury branding strategies. Both cases show how exhibitions, museum collaborations, and cultural programming position products within artistic contexts and connect brands with institutions that confer symbolic recognition. Artification operates as a mechanism of legitimacy construction by embedding products within institutional cultural networks. In this sense, artification enables luxury brands to align with broader cultural frameworks and access sources of symbolic recognition beyond the market domain.

Proposition 2 (artification). *Artification strategies—such as exhibitions, museum collaborations, cultural programming, and curated heritage spaces—function as mechanisms of institutional alignment, enabling luxury brands to transfer legitimacy from the cultural field to the market by embedding their products within recognised artistic and institutional frameworks.*

The findings further highlight the integration of luxury brands within urban tourism ecosystems. In Milan, both companies contribute to cultural life through exhibitions, heritage spaces, and institutional collaborations. Corporate museums and flagship spaces increasingly form part of cultural itineraries, attracting visitors interested in design, craftsmanship, and creative industries. These initiatives participate in the co-production of symbolic value within urban cultural ecosystems and contribute to shaping tourism experiences. At the same time, they influence the visibility of heritage by privileging specific narratives of taste, exclusivity, and cultural value. This suggests that heritage is not simply preserved but selectively constructed, raising questions about which cultural narratives are legitimised, which remain excluded, and how market logics shape these processes.

Proposition 3 (ecosystem). *By developing heritage infrastructures and cultural spaces, luxury brands act as institutional intermediaries within urban ecosystems, contributing to the co-production of symbolic value and the structuring of tourism experiences in creative cities.*

Finally, the findings emphasise the role of authenticity and historical continuity in sustaining luxury brand legitimacy. In both cases, heritage operates as a dynamic institutional resource that is continuously reinterpreted through exhibitions, collaborations, and curated spaces. This enables firms to balance tradition and innovation, maintaining relevance in highly competitive markets and reinforcing legitimacy over time.

Discussion. *The findings deepen the understanding of luxury brands as actors embedded within cultural and urban ecosystems by showing that heritage and artification operate as complementary mechanisms of legitimacy construction across organisational and field levels.*

Intangible cultural heritage emerges not merely as a narrative resource, but as an institutionalised infrastructure embedded in organisational practices such as archives, museums, and curated cultural initiatives. These infrastructures stabilise legitimacy over time by anchoring brand identity in historically grounded and socially recognised cultural forms. At the same time, artification operates at the field level as a mechanism of institutional alignment, enabling luxury brands to embed their products within recognised cultural frameworks and to access sources of symbolic recognition beyond the market domain.

Together, these mechanisms allow luxury brands to extend their role beyond market exchange and position themselves within broader systems of cultural production. In this sense, legitimacy is not only constructed through symbolic communication, but also through the organisational and institutional embedding of cultural resources.

The analysis also highlights the integration of luxury brands within tourism ecosystems in creative cities. Through heritage infrastructures and cultural initiatives, firms contribute to the co-production of symbolic value and to the structuring of tourism experiences. Corporate museums, flagship cultural spaces, and exhibitions increasingly function

as institutional interfaces between brands, cultural institutions, and visitors, shaping how heritage is interpreted and experienced within urban contexts.

The findings suggest that luxury brands should not be understood as passive participants in cultural and tourism ecosystems, but as institutional intermediaries that actively structure the production, interpretation, and circulation of cultural meaning. Through heritage infrastructures and artification processes, luxury brands contribute to defining the symbolic boundaries of cultural value and to shaping the experiential and representational dynamics of creative cities.

At the same time, this role is inherently ambivalent. The integration of luxury brands into cultural tourism may involve processes of selective representation, privileging certain forms of heritage aligned with exclusivity while marginalising others. Moreover, the transformation of heritage into curated experiences may lead to forms of commodification, raising questions about accessibility, inclusiveness, and the broader societal implications of market-driven cultural production.

These findings support an ecosystem-based interpretation of luxury branding, in which value creation emerges from the interactions among multiple actors embedded within destination systems. However, they also extend this perspective by highlighting the active role of luxury brands as institutional agents shaping the structure and meaning of these ecosystems. In doing so, luxury brands emerge not only as market actors, but as institutional agents that actively shape the production and valuation of culture within contemporary economies.

Research limitation. *This study presents some limitations that should be acknowledged. First, the research is based on a qualitative multiple case study focusing on two Italian luxury firms operating within the Milan context. While this approach enables in-depth analysis and theory building, it limits the generalizability of the findings to other geographical contexts, industries, or types of luxury brands.*

Second, the study relies on a combination of interviews, corporate documents, and publicly available materials. Although data triangulation strengthens the robustness of the analysis, access to internal strategic processes remains partial, and interpretations may reflect the perspectives of key informants and curated organisational narratives. In addition, the study does not directly examine audience reception, as it does not include empirical data on how visitors or consumers perceive and interpret heritage-based and artification practices in terms of legitimacy and symbolic value.

Third, the research adopts a cross-sectional perspective, focusing on current practices of heritage mobilization and cultural initiatives. Future studies could adopt longitudinal approaches to examine how these strategies evolve over time and how they influence long-term brand legitimacy and destination development.

Future research could extend this study by comparing luxury brands across different cultural and institutional contexts, exploring the role of digital technologies in heritage communication, and investigating the perspectives of visitors and consumers to better understand how heritage-based experiences are perceived and valued within tourism ecosystems.

Managerial implications. *The findings offer several implications for managers operating in luxury industries. First, they highlight the strategic importance of intangible cultural heritage as an organisational resource. Firms should move beyond symbolic storytelling and invest in the institutionalization of heritage through archives, museums, training programs, and structured cultural initiatives. This approach strengthens authenticity and supports long-term brand legitimacy.*

Second, the study emphasises the role of artification as a strategic mechanism for positioning luxury brands within broader cultural frameworks. Collaborations with cultural institutions, curated exhibitions, and artistic partnerships enable firms to reinforce symbolic value and gain institutional recognition beyond traditional market boundaries.

Third, the results suggest that heritage spaces and corporate cultural initiatives can function as platforms for engaging with tourism ecosystems. By developing museums, flagship cultural spaces, and experiential environments, luxury brands can contribute to the attractiveness of creative cities and attract visitors interested in craftsmanship, design, and cultural production.

At the same time, managers should be aware of the potential risks associated with heritage commodification and selective representation. Balancing cultural authenticity with market-oriented strategies is essential to avoid over-commercialization and to maintain credibility within both cultural and tourism contexts.

Originality and contribution of the paper. *This paper contributes to the literature by offering an integrated perspective on luxury branding, cultural heritage, and tourism ecosystems. It advances existing research by reconceptualising intangible cultural heritage as an institutionalised organisational resource embedded in structured practices, rather than as a purely symbolic narrative.*

Furthermore, the study extends the concept of artification by interpreting it as a field-level mechanism of legitimacy construction. This perspective highlights how luxury brands align with institutionalised cultural frameworks and gain recognition within broader cultural fields.

Finally, the paper bridges luxury branding and tourism research by adopting an ecosystem-based approach. It demonstrates how heritage-based branding practices contribute to tourism ecosystems in creative cities and positions luxury brands as cultural mediators operating between cultural production, symbolic value creation, and destination development.

By integrating these dimensions, the study responds to calls for more cross-disciplinary research and provides a coherent framework for understanding the intersection between branding, cultural legitimacy, and territorial value creation.

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Managing Data in Tourism Systems: The Italian Tourism Digital Hub

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Abstract. *Data plays an important role in every industrial sector nowadays, and tourism destination management is not an exception. However, despite the increasing availability of digital tools, tourism data remain highly fragmented, dispersed across heterogeneous systems and controlled by multiple actors with limited coordination. Effective long-term sustainable tourism destination management requires a diverse set of reliable tourism data on consumption, production, and impact. However, significant gaps persist between the data required for strategic decision-making and the data actually collected and shared by tourism stakeholders, resulting in limited visibility over key dynamics of the tourism ecosystem. In this study, we explore the Digital Tourism Hub (DTH) developed by the Italian Ministry of Tourism as part of the effort to develop a data platform that integrates different data sources to ensure evidence-based managerial decisions. Employing an exploratory case study methodology, this research aims to untangle the DTH's complexity by analysing its stakeholders and their interactions within the data ecosystem. Preliminary findings show how data are governed as well as how multiple stakeholders interact with and exchange data at different levels, of different types and regarding different tourism components.*

Keywords: *Data Governance, Data sharing, Data Ecosystem, Smart Tourism Ecosystem, Case Study, Research in progress*

Framing of the research. *Tourism destinations are complex multi-product and multi-market system entities that need extensive data on tourist spatial production and consumption to effectively plan long-term sustainable governance and management (Gonzalez-Reverte, 2019; Coca-Stefaniak, 2021). However, many destinations suffer from low levels of information on tourism characteristics, market profile, key supporting infrastructures, and tourism impact which leads to public institutions to be uninvolved and unaware of the full cycle of tourism activities (Pradhan et al., 2018). The fragmented tourism data make tourism management a challenge, often resulting in issues such as strong discontent among residents who are most vulnerable to the impacts of tourism activities (Aleshinloye et al., 2021). For example, residents protests in many tourism destinations show how the consequences of inadequate tourism management are reflected in a diminished quality of life for the citizenship (Armas-Díaz et al., 2024; Liberatore et al., 2023).*

To this end, previous research advocate for the pressing need to have reliable, updated and integrated tourism data to develop evidence-based decisions and policies and promote a proactive and systemic approach to tourism management which is leading to many destinations to develop tourism data ecosystems (Gobierno de España, 2024; McLeod, 2024; Xu et al., 2025). These data ecosystems are based on data retrieved from tourism destinations which are complex systems where actors develop a plurality of interconnected relationships (Iandolo et al., 2019; Bellato et al., 2022; Hartman, 2023) and therefore have a high level of qualitative and quantitative complexity (Bianchini, 2023). Data ecosystems are defined as being complex systems because they entail a large number of components that are strongly interrelated among each other (Bianchini, 2023). This study aims to untangle the complexity of a data ecosystem by analyzing its stakeholders interaction within the ecosystem. In particular, this study aims to show how data can be governed in complex data ecosystems in which different organizations interact and exchange data at different levels and of different types.

To structure the initial phase of our analysis and provide a coherent lens through which to examine the DTH, we began by clarifying the foundational elements of the ecosystem. We first mapped the actors involved and their respective roles, as this represents a necessary step for beginning to untangle the complexity of the data ecosystem under investigation. At this stage of the research we adopted the destination competitiveness framework (Boes et al., 2016; Başer et al., 2019) to start investigating the typology of tourism data exchanged in the ecosystem. This framework describes a destination as being structured into 6 main components: Attractions (natural, artificial or cultural), Accessibility (entire transportation network), Amenities (all services that ensure a comfortable stay, from accommodation to dining), Available packages (service bundles offered by intermediaries), Activities (available experiences) and Ancillary services (services not explicitly intended for tourists). This conceptual structure served as an analytical anchor for interpreting the data exchanges, enabling us to link specific stakeholder interactions to distinct dimensions of destination competitiveness and to develop an initial understanding of how governance mechanisms emerge within such a complex, multi-actor environment.

Purpose of the paper. *Through an exploratory approach, this research in progress analyses the case of the Digital Tourism Hub (DTH), a tourism data ecosystem developed by the Ministry of Tourism in Italy. The project started in 2021 and currently involves more than 20 thousand tourism operators as well as a diverse set of public and private entities (Italiadomani, 2025). This study will contribute to the call of Grewatsch et al. (2023) for research to go beyond*

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reductionist thinking and to embrace a systemic lens to understand the interactions among multiple actors within complex ecosystems. Moreover, this study contributes to the data governance literature by offering empirical insights on how data are governed within large-scale, multi-stakeholder ecosystems. It reveals how governance arrangements emerge, evolve and adapt over time, how responsibilities and decision rights are distributed across public and private actors, and how different types of data, i.e. open, proprietary, institutional and value-added, are integrated, shared and controlled in practice. In doing so, the study enriches current debates on data management by illustrating the concrete mechanisms, challenges and trade-offs involved in governing data in a complex, interoperable tourism platform.

Through the Next Generation EU funding, the ministry of Tourism in Italy allocated 114 mln euros to build the DTH (Senato della Repubblica, 2023; Camera di Commercio Genova, 2024; Italiadomani, 2025). This hub aims to enhance the competitiveness of Italy as a tourism destination, hence the ability of Italy to provide an improved travel experience for the tourist while building a better living environment for its residents through the use of data (Butler, 2017; Dioko and So, 2017; Senato della Repubblica, 2023).

To this end, the DTH will help develop a unified and cohesive branding strategy across Italy with authenticity and sustainability as guiding principles (Ministero del Turismo, 2025). In addition, the new hub aims to reduce the digital divide that affects Italian tourism businesses and the lack of knowledge regarding tourism systems activities (Pradhan et al., 2018). Proper destination branding and management needs a comprehensive knowledge of both tourism spatial consumption and production (Coca-Stefaniak, 2021). Indeed, if tourism products (either endowed or created) are crucial components for the appeal of a destination, tourism services are just as important given that they greatly impact the tourism experience and the quality of life in destinations (Goffi et al., 2023).

Italy´s destination branding has been particularly fragmented in its storytelling (Angeloni, 2013). To develop a cohesive and unified destination branding, Italy needs to face many challenges such as having a tourism business ecosystem with a significantly lower number of employees per firm compared to the European average which affects the ability of tourism businesses to innovate. In addition, many Italian tourism stakeholders lack the digital skills necessary to adopt advanced functionalities in their internet sites and social networks to attract visitors and promote their attractions (Goffi et al., 2023; OECD, 2025). A smart tourism ecosystem like the DTH could help Italian tourism ecosystem to enhance its competitiveness in terms of destination branding, destination management and governance by helping on the one hand tourism stakeholders to interact, exchange information, and promote their existing tourism offer and on the other hand policy makers to gain knowledge on the tourism system they aim to manage and promote (Boes et al., 2016; Baggio et al., 2020; Buhalis et al., 2023). According to the Ministry of Tourism (2023), the DTH represents a bridge between tourism supply and demand connecting the whole tourism sector through one platform (OECD, 2025).

Methodology. *This research employs a case study methodology with an exploratory design focused on gathering rich, qualitative data (Yin, 2017). We collected secondary data and semi-structured interviews with key actors of the data ecosystem to triangulate data ensuring a comprehensive and credible analysis (Ridder, 2017). In terms of primary data, this research will collect semi-structured interviews to enable participants to express their insights in an open and comprehensive manner (Creswell & Creswell 2018). At the moment of submission, 4 interviews have been conducted with stakeholders from the DTH: 4 interviews with groups of Ministry Officials (Interviewee 1, 2, 3, 4, 5, 6, 7) and one interview with a Tourism Operator (Interviewee 8). Additional interviews are being scheduled for the upcoming months with an expected number of 15 interviews with groups of ecosystem stakeholders to be completed before the Conference which will allow us to reach a sample of 20 interviewees.*

For secondary data, we collected data from different sources, such as ministry reports, official websites, and academic publications to help triangulate and integrate primary data, enhancing the contribution and robustness of the case study analysis (Table 1). We also included 6 official reports, 2 ministry websites and the national tourism platform Italia.it.

This research analyses primary and secondary data through a content analysis that will entail identifying codes within the data that reveal patterns in the content, whether manifest or latent (Krippendorf, 2018). The preliminary analysis of the data allowed to identify the relationship between different stakeholders in the ecosystem together with the kind of data and the type of tourism data exchanged.

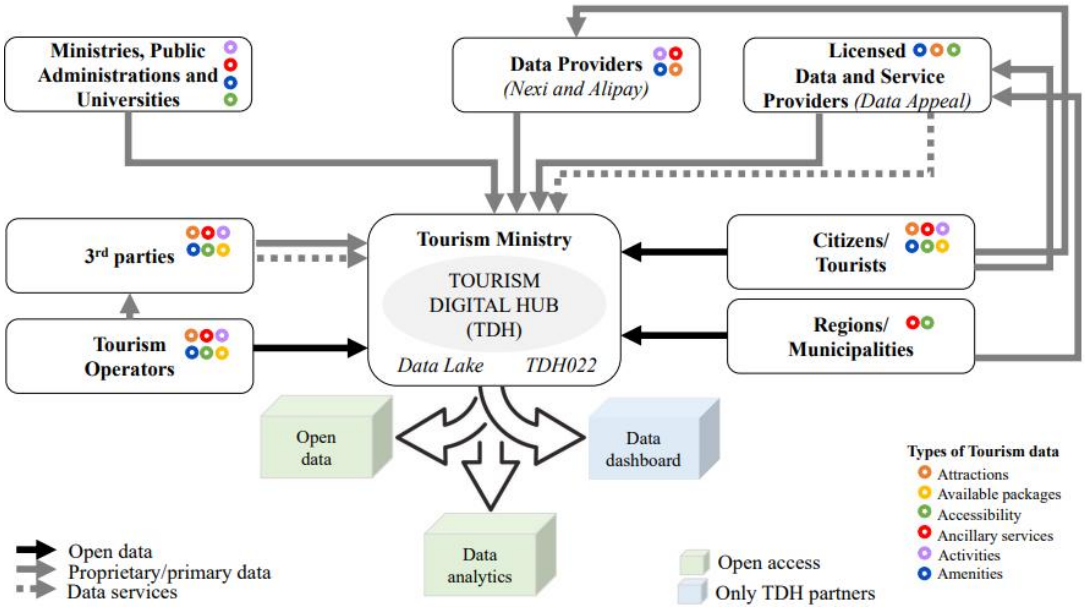
Table 1. Secondary sources employed in this study

N.	*Type*	*Source*	*Reference*	*N. of pages*
1	*Website*	*Italia.it platform*	*ITALIA.IT (2024) ITALIA.IT. Retrieved, 7/08/2025 from: https://www.italia.it/en.*	*/*
2	*Website*	*ItaliaDomani*	*Italiadomani. (2025). Hub del Turismo Digitale. Retrieved [8/08/2025] from: https://www.italiadomani.gov.it/it/Interventi/investimenti/hub-del-turismo-digitale.html.*	*/*
3	*Website*	*Camera di Commercio Genova*	*Camera di Commercio Genova (2024). Hub Digitale del Turismo TDH. Retrieved, [9/08/2025] from: https://www.ge.camcom.gov.it/it/promuovi/turismo/hub-digitale-del-turismo-tdh/hub-digitale-del-turismo-tdh.*	*/*
4	*Official report*	*OECD*	*OECD (2025). Promoting the digitalisation of the tourism ecosystem in Italy: A focus on SMEs. OECD Tourism Papers, 2025/13, OECD Publishing, Paris. Retrieved, [2/08/2025] from http://dx.doi.org/10.1787/63616a85-en.*	*45*

5	*Official report*	*Ministry of Tourism*	*Ministero del Turismo (2023). Il piano strategico del turismo 2023-2027. Retrieved [1/08/2025] from: https://www.ministeroturismo.gov.it/piano-strategico-del-turismo-2/.*	*165*
6	*Official report*	*Ministry of Tourism*	*Ministero del Turismo (2024). Tourism Digital Hub. Retrieved [8/08/2025] from: https://www.ministeroturismo.gov.it/wp-content/uploads/2024/04/ITA_Documento-linee-guida-Editoriali_v12.pdf*	*58*
7	*Official report*	*Ministry of Tourism*	*Ministero del Turismo (2025). Turismo digitale, nasce l'elenco dei tourism content creator del Tourism Digital Hub. Retrieved from: https://www.ministeroturismo.gov.it/turismo-digitale-nasce-lelenco-dei-tourism-content-creator-del-tourism-digital-hub/*	*15*
8	*Official report*	*Docs Italia*	*Docs Italia (2022). Tourism Digital Hub – Interoperability Guidelines. Retrieved (10/08/2025) from: https://docs.italia.it/italia/mitur/gl-tourism-digital-hub-interoperabilita-docs/it/main/chapter-1-introduction/1-background.html.*	*41*
9	*Official Report*	*Italian Senate*	*Senato della Repubblica (2023). Schema del Piano strategico di sviluppo del turismo per il periodo 2023–2027. Retrieved from: https://www.senato.it/service/PDF/PDFServer/BGT/01375440.pdf*	*35*

Results. *In terms of outcomes, the DTH performs two essential activities: destination branding and destination management. Figure 1 provides a visual representation of the complexity of the DTH data ecosystem in terms of type of data and tourism data as well as number and interconnectedness of the stakeholders involved in the ecosystem.*

Figure 1. Visual representation of the DTH (Own elaboration)



The DTH collects primary data from more than 20 thousand tourism operators (Camera di Commercio Genova, 2024; Italiadomani, 2025). These operators share tourism data that pertains to multiple destination components (accommodation, activities, amenities, available packages, accessibility and attractions). The process of data collection from these tourism operators is done by a third-party entity that the Ministry of Tourism appoints to select the most relevant information useful for developing destination branding and destination management strategies. The data involved in this process is primary data that is afterwards shared with tourists under the form of destination components offering and to regions and municipalities that use this data to enhance their tourism management strategies.

The DTH is also fuelled by interinstitutional data provided by other Ministries and public entities (universities) and proprietary data from private entities such as Nexi and Alipay. Finally, the Hub is fuelled by Value-added services from private entities such as Data Appeal that provide services that can be integrated into the data destinated to both destination management and branding. The relationship with stakeholders such as Data Appeal changed in the development process of the DTH due to the influence of regulatory entities such as the European Data Space. Indeed, due to regulations imposed by the European Data Space, the relationship in terms of interactions and exchanges with stakeholders such as Data Appeal shifted from a data provider to service provider kind of relationship which reflects the complexity of the ecosystem. This data relates to airport arrivals, bookings, tourism value, tourism sentiment, and seasonality.

However, the interconnectedness of the ecosystem is visible by the additional manifest and latent exchanges of data happening in the DTH. Indeed, stakeholders such as tourists, regions, municipalities and tourism operators also provide data to the ecosystem either directly under the form of open data integrated in the Hub or indirectly through private

entities such as Nexi and Alipay or Data Appeal that gather data through tourism activities. Our analysis shows that the Ministry has the main authority and responsibility for making decisions about data products. DTH has developed three data products to support destination branding and management for different stakeholders. The first was open data on accommodations, tourism professions, and religious paths, with the aim not only of increasing transparency but also of fostering innovation. The second was analytics in the format of reports and infographics for destination management (e.g., the report on the tourist tax). The third was a data dashboard to provide a detailed analysis of the Italian tourism sector. While the first two data products are publicly accessible, the third was accessible only to partner organizations. However, we observed strong interactions and collaboration between the Ministry and other stakeholders for other data-related decisions. The Ministry aimed to align the interests of a diverse set of actors.

As for governance mechanisms, the Ministry developed a new boundary resource known as TDH022 to ensure interoperability. The Ministry of Tourism held responsibility for defining, sharing, and updating interoperability technologies and the API management framework. Moreover, the Ministry provided detailed guidelines for data creation. The aim was to ensure that all data inserted by tourism operators is of high quality and appealing for tourists. These guidelines acted as a coordination mechanism to standardize data creation practices.

The main incentive structure adopted by the Ministry was the provision of value. Indeed, all stakeholders, such as tourists, regions, municipalities, and tourism operators, could enhance their decision-making processes by accessing data, data analytics, and data dashboard made available through the TDH platform.

Being innovation oriented, the Ministry seeks to promote the use of existing TDH services and providing new services. However, the findings show that data governance is not static. Any decisions about data come with trade-offs that, over time, need to be addressed. For instance, acquiring licensed data made sense at the development phase of TDH. But this decision is re-evaluated to ensure continuity of the platform. Another instantiation of continuous data governance was the effort to involve tourism operators, but also to make active participants on platforms to create real value.

Research limitations. *This study is limited by its exploratory case methodology, which constrains the generalizability of findings beyond the Italian tourism context. Another limitation of the study is that, at the moment, the findings are relying mostly on secondary data as the primary collection is still in progress. However, this limitation will be overcome in the upcoming months as we are currently scheduling and conducting multiple interviews.*

Managerial implications. *The findings highlight the need for destination managers and policymakers to prioritize data governance frameworks that enhance interoperability and trust among stakeholders. Managers can benefit from the DTH model to design more integrated and transparent data-sharing infrastructures that support sustainable tourism decision-making. In addition, this study can help destination managers to understand the typology of data available and how it can help in building evidence-based proactive management strategies (Leung et al., 2025).*

Originality of the paper. *This paper offers one of the first academic analyses of the Italian Digital Tourism Hub, contributing to understanding how national tourism data ecosystems function in practice. By applying a stakeholder-oriented lens, it extends current knowledge on digital transformation and data governance in destination management.*

Our study aims to underscore the need to move beyond static, top-down conceptions of data governance and instead consider it as a dynamic, relational process that unfolds through situated interactions among actors. In the upcoming months, this study will be enhanced by enlarging the primary data collection from 3 interviews to 15 interviews that will provide an interesting representation of the ecosystem. This addition will allow us to have a more in-depth and nuanced understanding of the data ecosystem and its role in enhancing destination branding and management. Additionally, the next step of this research will entail an in-depth study of the interactions and interconnections between ecosystem stakeholders employing a stakeholder theory lens together with an investigation of latent tourism data flows in the DTH and to unveil stakeholders' interactions and exchanges within these data flows.

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Oleoturismo come strategia di rigenerazione territoriale: uno studio esplorativo sulle PMI agricole in Campania

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Abstract. *Il presente studio esplorativo indaga l'oleoturismo come strategia per la rigenerazione rurale, inquadrandolo all'interno del paradigma emergente del turismo rigenerativo. Nello specifico, la ricerca esamina il potenziale dell'oleoturismo attraverso le percezioni dei produttori in merito a valori identitari, cura territoriale e criticità implementative. Lo studio adotta un disegno a metodi misti multifase (multiphase mixed methods design) a dominanza qualitativa, coinvolgendo 18 imprese agricole locali distribuite nelle province della Campania. La prima fase concorrente ha affiancato interviste semi-strutturate a un'auto-valutazione quantitativa sulle principali attività oleoturistiche; la seconda fase sequenziale ha previsto l'analisi documentale delle proposte progettuali di sviluppo elaborate dai partecipanti. I risultati indicano un elevato interesse verso l'oleoturismo come opportunità di diversificazione economica e destagionalizzazione, confermando la fattibilità di esperienze come visite guidate, degustazioni sensoriali e laboratori interattivi. L'analisi tematica riflessiva rivela, inoltre, la centralità di dimensioni quali la cura del territorio, il mindset rigenerativo, lo storytelling place-based e la necessità di superare la frammentazione attraverso reti collaborative locali. Lo studio contribuisce alla letteratura manageriale sui modelli di business ibridi agro-turistici, suggerendo che l'oleoturismo, se supportato da un'adeguata governance territoriale integrata e allineato ai principi rigenerativi, può fungere da catalizzatore per la rivitalizzazione sistemica delle aree rurali e per la competitività delle PMI agricole.*

Keywords: *turismo rigenerativo; oleoturismo; rigenerazione rurale; PMI agricole; governance territoriale; place-based storytelling*

Framing of the research. *Il turismo rigenerativo si sta affermando come paradigma avanzato nello sviluppo turistico, spostando l'attenzione dalla sostenibilità alla rigenerazione attiva dei territori in modo da generare impatti netti positivi sui sistemi sociali, culturali ed ecologici locali, promuovendo al contempo modelli economici più inclusivi e resilienti (Inversini, Saul, Balet & Schegg, 2024; Bellato, Frantzeskaki e Nygaard, 2023; Sheldon, 2022). Il turismo rigenerativo può essere definito come un modello di sviluppo turistico che mira ad aumentare la capacità rigenerativa di comunità ed ecosistemi attraverso pratiche integrate e trasformative, radicate in una visione ecologica dei sistemi viventi. Le radici epistemologiche del turismo rigenerativo si fondano sulla teoria dei sistemi viventi, che concepisce i territori come organismi complessi interconnessi con capacità intrinseche di auto-rigenerazione (Bellato, Frantzeskaki, Briceño Fiebig, Pollock, Dens & Reed, 2022; Mang & Reed, 2012), e si riflettono concretamente nella necessità di adottare modelli di business e governance capaci di generare trasformazioni positive sui territori (net positive impact), stimolando la rigenerazione del capitale naturale, sociale e culturale anziché la mera sostenibilità (Bellato & Pollock, 2025). L'approccio rigenerativo si distingue dal paradigma della sostenibilità poiché si orienta non solo verso la mitigazione degli impatti ma verso il ripristino degli ecosistemi e il rafforzamento del capitale sociale. Esso valorizza le identità culturali, incoraggia il coinvolgimento attivo delle comunità e adotta metriche di benessere collettivo (Bellato et al.,2023; Hes & Du Plessis, 2014). Le esperienze internazionali dimostrano come tali pratiche possano attivare economie circolari, integrare saperi locali e generare benefici condivisi, promuovendo esperienze trasformative e un rinnovato senso di appartenenza (Cave & Dredge, 2021).*

In questa prospettiva, diventa fondamentale analizzare concretamente le dinamiche dello sviluppo turistico rigenerativo, con particolare attenzione al settore agricolo come ambito privilegiato per sperimentare modelli di business e di governance condivisa (Tomassini & Cavagnaro, 2022; Mang & Reed, 2020). Diversi studi mostrano come il turismo rigenerativo richieda approcci collaborativi e interdisciplinari, integrando tecniche di gestione dei sistemi complessi e un rinnovato senso di responsabilità etica verso i luoghi e le persone coinvolte (Cave & Dredge, 2020; Pollock, 2019).

In tale quadro, l'oleoturismo rappresenta un interessante campo di applicazione dei principi del turismo rigenerativo, poiché unisce pratiche agricole sostenibili, valorizzazione del territorio e coinvolgimento diretto delle comunità locali. Esso rappresenta un fenomeno in espansione nell'ambito più ampio del turismo rurale e gastronomico, con particolare attenzione alla valorizzazione dei prodotti tipici e dei saperi locali (Millán-Vázquez de la Torre, Arjona-Fuentes, & Amador-Hidalgo, 2017; Alonso & Northcote, 2010). L'olio d'oliva si configura, infatti, non solo come prodotto alimentare ma come simbolo culturale fortemente radicato nel territorio mediterraneo, intriso di valori identitari, sociali e paesaggistici che hanno la capacità di veicolare narrazioni territoriali e di attrarre nuovi flussi turistici (Millán-Vázquez de la Torre et al. 2017). Diversi studi analizzano la tipologia di domanda e il profilo dell'oleoturista,

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*individuando cluster motivazionali multipli - legati alla ricerca di autenticità, curiosità culturale, esperienze enogastronomiche e interesse per la natura - e segmenti prevalenti composti da individui di medio-alto livello culturale attratti da offerte di esperienze diversificate (Murgado-Armenteros, Parrilla-González & Medina-Viruel, 2021; López-Guzmán, Cañero Morales, Moral Cuadra & Orgaz-Agüera, 2016). L'oleoturismo costituisce, quindi, un'opportunità per la diversificazione economica e la promozione dello sviluppo sostenibile delle aree agricole, combinando la tradizione produttiva dell'olio d'oliva con attività turistiche esperienziali e culturali (*Casado-Montilla, Pulido-Fernández, Carrillo-Hidalgo & Durán-Román, 2023). *Tuttavia, resta ancora poco indagato il ruolo attivo dei produttori nella definizione e nella trasmissione dei valori e delle narrazioni che sostengono tali esperienze (Di-Clemente, Campón-Cerro, Folgado-Fernández & Hernández-Mogollón, 2023).*

All'interno di questa cornice, l'oleoturismo può essere inquadrato come pratica concreta di turismo rigenerativo per una serie di ragioni. Da un lato, l'oleoturismo valorizza le produzioni agricole tipiche, intrecciando la promozione del prodotto con la conservazione dei saperi tradizionali e dei paesaggi rurali (Casado-Montilla et al., 2023; Millán-Vázquez de la Torre et al., 2017). Dall'altro, l'oleoturismo favorisce il rispetto dei cicli naturali, coinvolgendo attivamente le comunità locali come custodi dell'identità e della memoria territoriale, stimolando la rinascita economica e culturale dei territori marginali (Di Clemente et a., 2023). Tali pratiche che combinano produzione agricola, turismo enogastronomico esperienziale e processi di rigenerazione socio-ambientale sono paradigmatiche del turismo rigenerativo, affinché le comunità rurali possano prosperare sostenendo la memoria storica e migliorando la resilienza territoriale (Casado-Montilla et al. 2023; Millán-Vázquez de la Torre et al. 2017).

Come modello di business ibrido, l'oleoturismo integra produzione agricola, commercializzazione diretta e offerta turistica esperienziale. L'importanza di una pianificazione strategica e di marketing integrato diventa fondamentale per il successo di questi modelli (Millán-Vázquez de la Torre et al. 2017). Oltre a rafforzare la diversificazione economica degli imprenditori agricoli attraverso nuove fonti di reddito l'oleoturismo ha un impatto positivo anche sulla rivitalizzazione in chiave turistica delle aree rurali, spesso marginali. I casi studio di Spagna, Croazia e Australia confermano la capacità di attrarre nuovi segmenti di domanda e incrementare la notorietà delle destinazioni tramite prodotti enogastronomici esperienziali (Casado-Montilla et al., 2023; Čehić, Mesić & Oplanić, 2020; Alonso & Northcote, 2010).

Purpose of the paper. *Nonostante il potenziale riconosciuto, la letteratura evidenzia una scarsa integrazione degli imprenditori agricoli rispetto al coinvolgimento nella governance turistica locale, nonostante sia essenziale per la sostenibilità e la coesione dei sistemi territoriali. Molte aziende olivicole si avvicinano all'oleoturismo in modo non professionalizzato e/o con scarsa pianificazione strategica, limitandone l'efficacia e la fattibilità. La mancanza di formazione specifica e di analisi preliminari limita la capacità dei produttori di governare efficacemente le iniziative turistiche collaterali alla produzione agricola (Casado-Montilla et al., 2023). Studi empirici in contesti extra-italiani mostrano la necessità di una maggiore integrazione tra produttori agricoli e sistemi di governance turistica (DMO) per favorire la competitività e la valorizzazione locale (Casado-Montilla et al. 2023; Di Clemente et al. 2023; Millán-Vázquez de la Torre et al. 2017).*
L'obiettivo del presente working paper è duplice. In primo luogo, lo studio vuole verificare se nelle percezioni dei produttori lo sviluppo oleoturistico possa essere un vettore privilegiato di rigenerazione per le PMI agricole, in grado di offrire nuove opportunità di reddito, favorire la destagionalizzazione e costruire reti collaborative territoriali (Dancausa Millán, Sanchez-Rivas García & Millán Vázquez de la Torre, 2023). In secondo luogo, mira ad approfondire percezioni degli imprenditori agricoli rispetto all'adozione dell'oleoturismo, con particolare attenzione ai valori identitari, all'etica della cura territoriale, alle reti collaborative, oltre ad indagare le principali criticità percepite nell'implementazione di attività legate al turismo dell'olio.

Methodology. *Lo studio adotta un disegno a metodi misti multifase (multiphase mixed methods design) a dominanza qualitativa (Creswell, 2017), che appare particolarmente indicato per lo studio di ecosistemi turistici emergenti e complessi. La ricerca si articola in due fasi principali interconnesse. Nella prima fase, si è utilizzato un approccio concorrente nidificato (concurrent embedded design), in cui la raccolta di dati quantitativi di supporto (schede di auto-valutazione tramite scala Likert) è stata integrata simultaneamente all'indagine qualitativa primaria (interviste semi-strutturate), con l'obiettivo di misurare la fattibilità percepita e arricchire l'esplorazione (Creswell et al., 2003). Nella seconda fase sequenziale, si è proceduto con l'analisi documentale (document analysis) delle proposte progettuali di sviluppo oleoturistico redatte dai partecipanti. Questo disegno multifase ha permesso di triangolare i dati narrativi, le valutazioni numeriche e gli output progettuali pratici, garantendo una maggiore profondità interpretativa e una superiore robustezza analitica (Fetters et al., 2013).*

Context of research. Il settore olivicolo rappresenta una componente strutturale dell'agricoltura italiana e, in particolare, delle regioni del Mezzogiorno. Tra queste la Regione Campania occupa una posizione rilevante, contribuendo al 4% della produzione nazionale di olio. Il paesaggio olivicolo è un elemento strutturante del contesto campano dove il 12% della superficie agricola regionale è occupato dell'olivicoltura (Ismea, 2022). A livello economico, il 37% delle aziende agricole campane è costituito da aziende olivicole, che si concentrano nelle province di Salerno (21,3%) e Benevento (12%) (ISTAT, 2020). A questo si aggiunge una crescente tendenza alla diversificazione delle attività agricole: tra le aziende con attività connesse, il 39% si configura come agriturismo, segnalando così a livello regionale

una progressiva integrazione tra produzione agricola e offerta turistica. Questa dinamica si inserisce nel più ampio sviluppo del turismo enogastronomico in Italia, che negli ultimi anni ha assunto un ruolo sempre più rilevante nei processi di valorizzazione dei territori rurali e delle produzioni agroalimentari locali. Tra il 2021 e il 2024 la partecipazione ad attività oleoturistiche a livello nazionale è aumentata del 37,1% (Garibaldi, 2026). Le esperienze turistiche legate all'olio raccolgono anche l'attenzione di visitatori stranieri, in particolare tedeschi (57%), francesi (50%) e provenienti dall'area Austria-Svizzera (45%). La rilevanza dell'oleoturismo è riconosciuta anche a livello istituzionale. Le politiche di sviluppo rurale, sostenute dalla Politica Agricola Comune (PAC), hanno progressivamente incentivato la diversificazione delle attività agricole e la valorizzazione multifunzionale delle aziende olivicole. In Campania, nel corso dei diversi cicli di programmazione, sono stati destinati più di 25 milioni di euro per la valorizzazione e l'ammodernamento dei frantoi più rilevanti (Regione Campania, 2025).

Sample and data collection. La raccolta dati si è articolata attraverso interviste semi-strutturate somministrate a 18 partecipanti di PMI olivicole campane, selezionate mediante purposive sampling nell'ambito di un corso regionale sull'oleoturismo. Il campione garantisce copertura delle cinque province campane, catturando diversità paesaggistica e socio-economica. Gli intervistati ricoprivano ruoli diversi all'interno delle imprese (imprenditori, coadiuvanti familiari, collaboratori e tecnici), garantendo così una pluralità di prospettive sul tema.

Le interviste, condotte in presenza, sono state registrate e trascritte verbatim. La traccia di intervista è stata articolata in tre sezioni tematiche (contesto aziendale e territoriale, motivazioni e percezione dell'oleoturismo e barriere sistemiche e reti di collaborazione) e ha permesso di approfondire sia gli aspetti identitari e culturali legati alla produzione dell'olio, sia le dinamiche organizzative e relazionali connesse alla possibile integrazione di attività turistiche.

A integrazione delle interviste, ciascun partecipante è stato invitato a compilare una scheda di rilevazione volta a misurare il grado di interesse e la fattibilità percepita di diverse attività oleoturistiche (es. visite guidate, degustazioni sensoriali, laboratori di cucina, percorsi naturalistici, esperienze immersive o multimediali). La matrice di valutazione, strutturata su una scala Likert a cinque livelli (da "per nulla" a "moltissimo"), ha consentito di combinare dati qualitativi e quantitativi, facilitando una prima mappatura delle attività considerate più attrattive e sostenibili dagli operatori locali.

Parallelamente, per rafforzare la robustezza del quadro analitico e la triangolazione dei dati, sono stati considerati anche i materiali delle presentazioni dei progetti e delle proposte di sviluppo oleoturistico, utilizzati come ulteriori documenti qualitativi di supporto per arricchire l'analisi delle dinamiche e delle prospettive dell'oleoturismo. Questi documenti hanno consentito di verificare la coerenza tra le intenzioni dichiarate e le strategie di attuazione ipotizzate.

Data analysis and results. *L'analisi del corpus (n=18 interviste) ha seguito la reflexive thematic analysis (RTA), approccio iterativo e costruttivista (Braun & Clarke, 2006, 2022) che appare particolarmente indicato per analizzare narrazioni sulla rigenerazione territoriale. I risultati delineano pattern semantici emergenti, non generalizzabili statisticamente. La familiarizzazione è avvenuta tramite letture multiple dei dati accompagnate da note riflessive; è seguita una fase la generazione di codici induttivi iniziali, assistita da Skimle (skimle.com - piattaforma AI per highlighting tematico automatico, soggetta a revisione umana). Si è proceduto poi con la costruzione di temi candidati dall'aggregazione dei codici (ad esempio, "custodia e tutela"), la loro revisione per coerenza con l'intero dataset, la definizione e denominazione di cinque macro-temi finali e la produzione del report finale. Questa approccio ha permesso di esplorare le dimensioni valoriali, identitarie e sistemiche che caratterizzano la relazione tra produzione olivicola, territorio e potenziali percorsi di sviluppo oleoturistico. I risultati presentati rappresentano la prima fase di analisi con l'elaborazione del corpus narrativo raccolto attraverso le interviste; l'integrazione completa con le ulteriori fasi del disegno di ricerca, mediante elaborazione quantitativa e triangolazione con gli altri dati qualitativa, sono tuttora in corso per completare il quadro empirico complessivo. Di seguito si presenta una tabella che presenta esemplificazione del processo di coding delle interviste (Tabella 1).*

Tabella 1 - Esemplificazione del processo di coding

Estratti	*First-order themes**	*Second-order themes*	*Aggregate dimensions*
Io non sono più il produttore, ma io sono il contadino custode, quello che custodisce degli esseri viventi, ne prende i frutti con rispetto e li trasforma sempre con dolcezza	*Custodia e tutela*	*Cura e gestione sostenibile del territorio*	*Cura del territorio e rapporto uomo-natura*
Nasce dal recupero di un terreno di famiglia che dopo la morte di mio padre era finito completamente in stato di abbandono	*Recupero dei terreni agricoli abbandonati*	*Recupero e rigenerazione dei territori*	
Per quanto riguarda l'aspetto della cultura e la sua diffusione […] su questo ci credo tantissimo, per trasmettere alle future generazioni il sapere	*Trasmissione del sapere*	*Trasmissione generazionale e saperi tradizionali*	*Approccio sistemico e mindset*

Lavoriamo molto con i volontari, con [prodotti] buffer, per esempio, con tutte queste piattaforme di scambio di conoscenza sull'agricoltura organica e rigenerativa	*Pratiche sostenibili e tutela ambientale*	*Consapevolezza del valore della rigenerazione territoriale*	*rigenerativo*
Raccontare la storia fa sempre piacere perché noi raccontiamo la storia per immagini, con fotografie facendo vedere il frantoio vecchio *L'olio comunque porta con sé una storia che è quella del prodotto ma è quella anche dell'azienda, nonché quella del territorio*	*Eredità familiare e culturale* *Valore culturale e simbolico dell'olio*	*Narrazione e storytelling* *Identità e unicità territoriale*	*People place & Intelligence*
La sinergia tra i settori è una cosa molto utile, cosa che però nelle mie zone non si riesce ad ottenere perché sono sempre scontri continui *Perché penso che l'olio non è solo parlare di quello che fai tu, ma è collaborare tutti insieme*	*Frammentazione e difficoltà di collaborazione territoriale* *Propensione a fare rete*	*Ostacoli alla collaborazione* *Coordinamento e governance*	*Reti locali e collaborazioni territoriali*
Con l'oleoturismo si crea un indotto, resta qualcuno in più… *I bandi sono dispersivi, si focalizzano troppo su altre cose [...] La definizione del prodotto standard che era la condizione fondamentale per poter aumentare il punteggio, è stato un incubo…*	*Opportunità dell'oleoturismo* *Burocrazia e complessità amministrativa*	*Potenziale economico e territoriale* *Barriere burocratiche, normative e amministrative*	*Barriere percepite e prospettive di sviluppo*

**sono riportati solo le categorie di first- and second-order riferite agli estratti*

Cinque sono le dimensioni aggregate che sono state ricavate dal processo:

1. Cura del territorio e rapporto uomo-natura

Molti intervistati hanno sottolineato il legame profondo con la terra e la responsabilità di preservarne l'equilibrio ecologico. Il concetto di cura emerge come valore identitario e come prerequisito etico per qualsiasi forma di sviluppo turistico. Analogamente, altri partecipanti evidenziano come il lavoro agricolo non possa essere disgiunto dal rispetto dei cicli naturali, configurando una visione simbiotica e non estrattiva del rapporto uomo-natura.

2. Approccio sistemico e mindset rigenerativo. Dalle narrazioni emerge la tendenza a superare una logica puramente economica per abbracciare un approccio purpose-driven, orientato alla rigenerazione del capitale naturale e sociale. Emerge questo cambio di paradigma implica il passaggio da un modello di turismo sostenibile, focalizzato sulla riduzione dell'impatto, a un modello di turismo rigenerativo, orientato al net-positive impact: la creazione di valore aggiunto per l'ambiente, la comunità e le generazioni future. Tale prospettiva richiama i principi dell'agricoltura rigenerativa e del "living systems thinking", in cui l'impresa è intesa come parte di un ecosistema sociale e ambientale più ampio.

3. People e Place Intelligence. La dimensione umana e territoriale è percepita come nucleo generativo del progetto oleoturistico. L'attenzione alla formazione del personale locale, alla crescita comunitaria e alla narrazione identitaria dei luoghi rappresentano elementi chiave di autenticità. Il place-based storytelling diventa così uno strumento di rigenerazione culturale, capace di connettere visitatori e comunità attraverso esperienze trasformative e narrative autentiche.

4. Reti locali e collaborazioni territoriali. Un tema trasversale riguarda la necessità di costruire reti tra attori locali (aziende agricole, enti pubblici, operatori turistici, associazioni di categoria). Le interviste rivelano la consapevolezza diffusa dell'importanza di una "regia" istituzionale o comunitaria in grado di coordinare le iniziative e favorire sinergie e superare la frammentazione vista come ostacolo principale allo sviluppo delle attività.

5. Barriere percepite e prospettive di sviluppo. Accanto agli aspetti valoriali, gli intervistati hanno evidenziato criticità sistemiche legate a burocrazia, carenza di infrastrutture e accesso limitato ai finanziamenti. Tuttavia, la motivazione e la volontà di cooperazione appaiono forti, suggerendo un potenziale di crescita significativo se accompagnato da politiche territoriali mirate.

Tutte le aziende intervistate hanno espresso un interesse molto elevato ad aprirsi all'oleoturismo, identificando nell'offerta turistica una strategia chiave per diversificare il reddito e mitigare la stagionalità insita nella produzione olivicola. L'interesse degli intervistati verso attività oleoturistiche si esprime soprattutto nei format esperienziali quali visite guidate, degustazioni, laboratori interattivi, percorsi narrativi e multimediali, benché permanga una preferenza per l'esperienza reale rispetto a soluzioni tecnologiche avanzate. Gli intervistati evidenziano inoltre una crescente

consapevolezza dell'importanza di reti collaborative e una visione resiliente dell'agricoltura. Gli intervistati confermano la centralità del valore identitario dell'olio e del paesaggio olivicolo, sottolineando la necessità di coinvolgere il visitatore tramite la narrazione della storia aziendale, delle pratiche produttive, ed offrendo esperienze sensoriali autentiche e momenti rituali come la raccolta delle olive, laboratori di cucina tipica e degustazioni immersive.

Research limitations. *Questo studio presenta diversi limiti che devono essere riconosciuti. In primo luogo, la natura preliminare dei risultati deriva dalla prima fase di analisi qualitativa delle interviste raccolte, mentre l'integrazione completa con gli altri dati metodologici (schede di fattibilità, materiali progettuali) è ancora in corso, limitando al momento la completezza del quadro empirico. L'approccio qualitativo esplorativo, sebbene appropriato per indagare percezioni e significati, limita la generalizzazione a popolazioni più ampie di imprenditori agricoli.*

In secondo luogo, il focus geografico sulla Campania, pur fornendo approfondimenti contestuali dettagliati, potrebbe limitare l'applicabilità ad altre regioni italiane o contesti internazionali con diverse tradizioni olivicole, strutture di governance e stadi di sviluppo turistico. Tuttavia, questa delimitazione è coerente con il contesto di sviluppo dell'oleoturismo, che richiede condizioni abilitanti specifiche quali l'immersione nella natura d'impresa, la prossimità ai paesaggi rurali e una vocazione agricola radicata; tali precondizioni rendono particolarmente rilevante l'analisi di contesti come la Campania, dove tali elementi sono presenti, rispetto a territori in fasi avanzate di industrializzazione che presentano minori spazi per l'avvio di tali pratiche.

In terzo luogo, il campione estratto da partecipanti a un corso di formazione sull'oleoturismo introduce potenzialmente un bias di auto-selezione verso imprenditori già predisposti alla diversificazione economica mediante il turismo, sebbene questi attori rappresentino quegli agenti economici che fungono da "pionieri", fungendo da catalizzatori per l'avvio e la diffusione di tali pratiche e l'attivazione di rete territoriali a supporto.

Managerial implications. *I risultati offrono diverse implicazioni pratiche per le PMI agricole, i policy maker e le organizzazioni di gestione della destinazione. Per gli imprenditori agricoli, i risultati suggeriscono che l'oleoturismo rappresenta una strategia di diversificazione praticabile che richiede pianificazione strategica, formazione e approcci collaborativi. La priorità dovrebbe essere data alle attività esperienziali (visite guidate, degustazioni, laboratori) emerse come più attrattive e fattibili, sfruttando lo storytelling place-based per creare offerte autentiche e differenziate.*

In una prospettiva territoriale più ampia, lo sviluppo dell'oleoturismo può contribuire anche ad affrontare alcune criticità strutturali delle aree rurali, come lo spopolamento e il progressivo declino. La creazione di offerte turistiche legate al turismo culturale ed esperienziale, insieme allo sviluppo di forme di soggiorno alternative, può favorire una maggiore permanenza dei visitatori nei territori rurali e stimolare la scoperta delle loro peculiarità ambientali, culturali e paesaggistiche. In questo senso, l'oleoturismo può contribuire alla rigenerazione economica e alla rivalutazione dei luoghi, generando dinamismo e attrattività attraverso esperienze specifiche che, al contempo, promuovono la cura del territorio. Lo sviluppo di nuove forme di turismo con segmenti turistici di nicchia può inoltre favorire la creazione di destinazioni alternative e meno congestionate, contribuendo indirettamente a mitigare il fenomeno dell'overtourism nelle destinazioni turistiche più note e promuovendo modelli di turismo più sostenibili e distribuiti.

Per i policy maker e gli attori della governance territoriale, lo studio evidenzia la necessità di affrontare le barriere sistemiche attraverso procedure burocratiche semplificate, supporto infrastrutturale, meccanismi di finanziamento accessibili e programmi di capacity building allineati ai principi del turismo rigenerativo. Facilitare la creazione di reti tra produttori, DMO e altri stakeholder territoriali emerge come cruciale per costruire offerte oleoturistiche integrate e sostenibili. Per le DMO e i pianificatori turistici in aree a vocazione rurale, i risultati sottolineano l'importanza di integrare attivamente i produttori agricoli nelle reti di governance turistica, riconoscendoli come attori strategici capaci di contribuire alla competitività territoriale e all'identità autentica della destinazione rurali.

In questa prospettiva, lo sviluppo di framework integrati di valutazione, monitoraggio e controllo, che combinino indicatori di performance di marketing con metriche sociali e ambientali, può rafforzare i processi di miglioramento continuo delle iniziative oleoturistiche e delle altre connesse riguardanti il turismo enogastronomico. L'adozione di sistemi di reporting periodico potrebbe inoltre supportare le organizzazioni di gestione della destinazione e le associazioni di categoria nel valutare lo stato di avanzamento delle iniziative, individuare eventuali criticità e affinare progressivamente i modelli di sviluppo, favorendo nel tempo la definizione di pratiche e modelli replicabili per pratiche simile.

Originality of the paper. *Questo studio contribuisce alla letteratura sul turismo rigenerativo in chiave manageriale, proponendo indicazioni di governance per realizzare modello ibridi integrati che coniugano produzione agricola tradizionale, commercializzazione diretta mediante filiere corte ed economie circolari, e offerta turistica esperienziale.*

In primo luogo, lo studio adotta la prospettiva dei produttori agricoli sulla governance turistica, colmando un gap significativo nella letteratura che si è prevalentemente concentrata sull'analisi della domanda o su prospettive istituzionali, marginalizzando le voci dei produttori olivicoli nei processi di sviluppo turistico. La letteratura recente evidenzia infatti la scarsa comprensione del ruolo di questi attori nelle reti di governance locale, nonostante il loro contributo essenziale per la sostenibilità e lo sviluppo di determinate aree (Casado-Montilla et al., 2023). Questa ricerca esplora direttamente percezioni, valori e barriere riferite dagli operatori olivicoli campani, fornendo una base empirica per comprendere meglio il loro contributo strategico e le criticità sistemiche esistenti.

In secondo luogo, la ricerca inquadra esplicitamente l'oleoturismo nel paradigma rigenerativo, andando oltre gli approcci tradizionali di sostenibilità. Questa connessione teorica arricchisce la comprensione di come specifiche tipologie di turismo agroalimentare possano operazionalizzare principi rigenerativi attraverso pratiche concrete.

In terzo luogo, lo studio identifica temi emergenti di cura territoriale, mindset rigenerativo, place intelligence e collaborazione sistemica negli approcci degli imprenditori agricoli, offrendo insight preziosi sulle dimensioni culturali e valoriali sottostanti al successo delle iniziative di rigenerazione rurale e turistica.

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Rethinking Sustainable Tourism in Protected Areas through Arts and Cultural Heritage: A Comparative Study of National Parks in Italy and the United States

MARA CERQUETTI, LEAH HAMILTON, SIMONE SPLENDIANI

Abstract. *Climate change is profoundly reshaping protected areas, altering ecosystems, landscapes, and tourism dynamics through rising temperatures, extreme events, and natural disasters. Existing research has examined vulnerability assessments and human-wildlife interactions, as well as strategies to address climate change, such as stakeholder engagement, sustainable entrepreneurship, and climate adaptation. However, limited attention has been paid to the role of arts and cultural heritage in fostering sustainable tourism transitions. This study aims to fill this gap through a comparative case analysis of the National Park of Monti Sibillini (NPMS, Italy) and Cumberland Gap National Historical Park (CUGA, USA), both recently affected by major natural disasters. Drawing on document analysis and qualitative interviews with park directors and key stakeholders, the research explores how climate change affects tourism, which adaptation strategies are implemented, and how cultural resources contribute to resilience. Preliminary findings highlight culture's dual role as both a vulnerable asset and a transformative driver, supporting integrated governance approaches that bridge environmental conservation, community engagement, and sustainable tourism development in protected areas.*

Framing of the research. *The United Nations' Intergovernmental Panel on Climate Change (IPCC) noted that "widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere" are creating notable weather and climate extremes around the world (IPCC, 2023, p. 5). Warming temperatures, more frequent and intense hurricanes, wildfires, and longer-lasting droughts are drastically altering protected areas and their fragile ecosystems. In this context, natural parks are called to revise and innovate their tourism strategies towards sustainability, also leveraging cultural resources.*

In recent years, scientific literature on sustainable tourism management has devoted increasing attention to strategies and actions, policies and practices to face this challenge through climate mitigation and adaptation. When coming to protected areas, scholars have focused on integrated vulnerability assessment (Mkiramweni et al., 2016; Jamaliah, Powell, 2019), the management of human-wildlife interactions (Moyle et al., 2022; Kupika et al., 2024; Mupunga, Shoko, 2024; Weststrate et al., 2025), the involvement of local communities and stakeholders (Le, Nguyen, 2023; Chambwe, Shereni, 2024; Vandermale, Mason, 2024), and the study of visitors' perceptions (McCreary et al., 2018). Scientific research has also enhanced the role of sustainable entrepreneurship (Buzzao et al., 2023), social sciences (Sharp et al., 2014) and the Theory of Change (ToC) as a mechanism for sustainable financing (O'Flynn et al., 2022). However, a few studies have examined the potential role of arts and cultural heritage in rethinking and reshaping sustainable trajectories for managing tourism in protected areas (Fig. 1).

Indeed, climate change, culture, and tourism are tightly linked by a two-way relationship. On the one hand, climate change is a threat for cultural heritage and tourism: these two resources and sectors, along with biodiversity and natural heritage, are among the most affected by climate change (e.g., the erosion of archaeological sites and historic buildings, migration of communities forced to abandon their physical cultural heritage, risking the loss of place-specific customs, traditions, and habits) (UNESCO, 2016; European Commission, 2022; UNESCO, 2023; European Parliament, 2024). On the other hand, culture and tourism are resources for addressing climate change: cultural institutions can play a leadership role in the fight against it (see the actions taken by climate activists, ICOM, 2022). The cultural and creative sectors can inspire change towards the green transition (Voices of Culture, 2023; ICOM, 2025), while arts and cultural heritage can help preserve cultural landscapes and promote traditions, practices, and knowledge systems (Eiter, 2007; Esfehani, Albrecht, 2018; Wessels, Dougals, 2020).

Purpose of the paper. *To address the identified gap, this paper investigates the role of cultural assets in rethinking and reshaping sustainable tourism strategies in protected areas, while balancing conservation needs with tourism development. Focusing on the cultural resources present in two parks – one in Italy and one in the United States – the research examines their potential contribution to answer the following research questions:*

RQ1. How do arts and cultural heritage function within tourism management frameworks in protected areas?

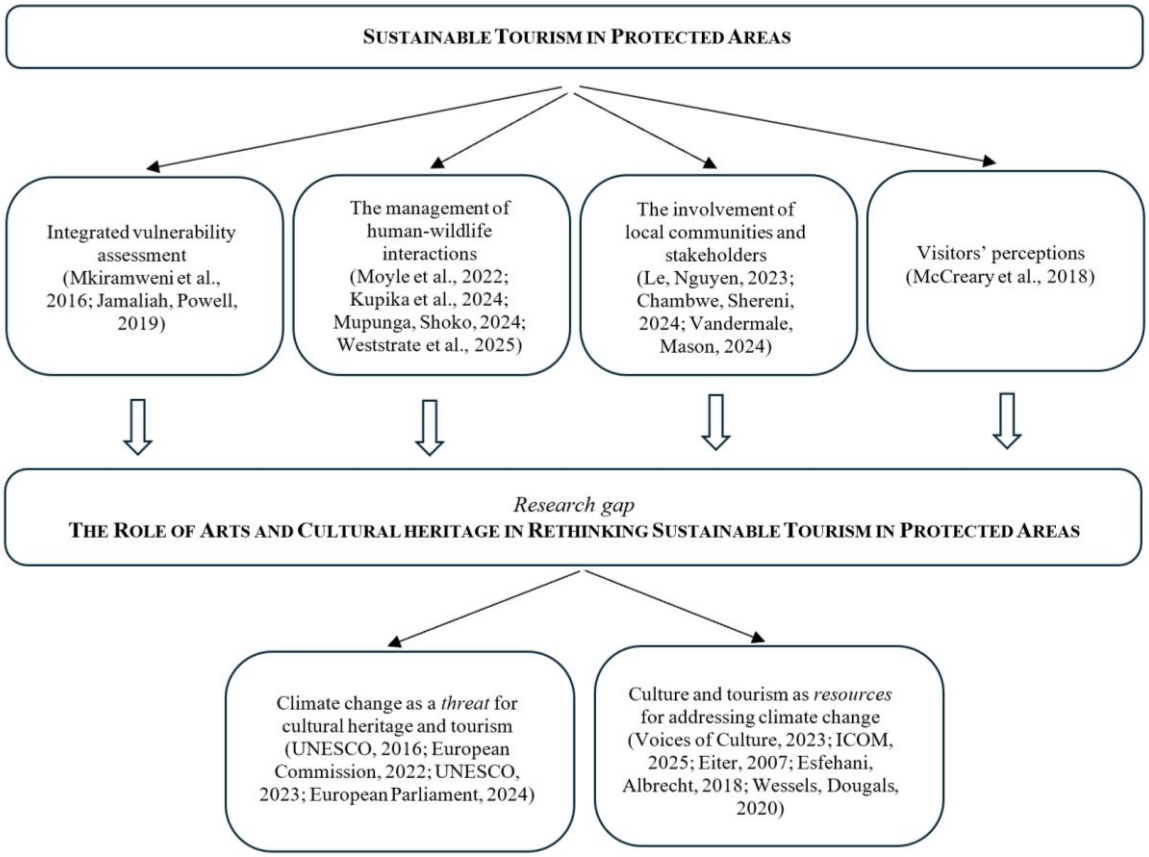
RQ2. What management approaches are used to balance conservation with tourism, particularly in relation to arts and cultural resources in and around protected areas?

RQ3. How are these management approaches reshaped in response to natural and climate-related disasters?

The findings will contribute to a deeper understanding of the role of arts and cultural heritage in sustainable tourism, highlighting the best practices and challenges in its management. Additionally, the research will offer policy insights to support the integration of arts and cultural heritage into broader management and adaptation strategies for protected areas. By bridging the gap between cultural and environmental conservation, this study aims to inform policymakers,

heritage managers, and tourism stakeholders on developing more holistic and sustainable approaches to heritage and nature conservation in the face of climate challenges.

Fig. 1. Theoretical framework (Source: own elaboration)



Methodology. *This research applies a comparative case study analysis (Knight, 2011; do Amoral, 2022) based on two protected areas—the Sibillini Mountains in the Marche and Umbria regions of Central Italy and Cumberland Gap National Historic Park in the tri-state region of Kentucky, Tennessee, and Virginia in the Southeastern United States. Both sites are federally protected areas and promote cultural heritage sites and community arts events to encourage visitors to engage with the parks' cultural and natural resources. Both areas have also been affected by recent natural disasters, including earthquakes in the Sibillini Mountains (2016/2017) and flooding caused by Hurricane Helene in Cumberland Gap (2024).*

Analysis of existing resources (e.g., websites, technical reports, etc.) and qualitative field research provides insights into existing conservation frameworks and their effectiveness in balancing cultural heritage preservation, sustainable tourism, and climate resilience. Qualitative field research is in progress and conducted through interviews with park directors and key stakeholders (e.g., local authorities, guides, cultural associations).

Interviews with the park directors are designed to explore the following areas: 1) The park governance, roles and responsibilities; 2) Arts and cultural heritage in the park, i.e., cultural heritage and artistic events; 3) Management strategies, sustainable tourism and climate change, such as strategies for balancing conservation needs and sustainable tourism development, impact of climate change, national/federal policies, impact of natural disasters; 4) Challenges and opportunities for the future.

Interviews with key stakeholders explored the roles of public and cultural actors, focusing on their relationships with natural and cultural assets, responses to previous crises and disasters, perceptions of tourists' awareness, forms of territorial collaboration, suggestions for innovating the cultural offer, and everyday challenges.

Results. *The Cumberland Gap National Historical Park (CUGA) in the United States and the National Park of Monti Sibillini (NPMS) in Italy represent two important protected areas that combine environmental conservation with the preservation of historical and cultural heritage. Although they share some common goals, their characteristics differ in terms of extension and location, mission, institutional framework, governance structure, and cultural heritage activities.*

Regarding extension and location, CUGA covers approximately 24,000 acres (9,712 hectares) and extends across three U.S. states: Kentucky, Tennessee, and Virginia. In contrast, the NPMS is significantly larger, covering 71,437 hectares across 16 municipalities and two Italian regions: Marche and Umbria.

The missions of the two parks reveal similar priorities, with some differences related to the typology of heritage they preserve. CUGA aims to preserve the cultural and natural resources of an area in and around "the Gap", a natural break in the Cumberland Mountain range that provided passage for animals, hunters, and early explorers of America in westward migration and expansion. In addition to conservation efforts of its natural ecosystems, CUGA's 80 miles of horse and foot trails, plus five backcountry camping areas provide recreational opportunities for visitors (NPS, 2025). CUGA also plays an important role in supporting the local economy, as visitor spending generates substantial economic benefits and employment for surrounding communities. In 2023, visitor spending at CUGA generated over $25.6 million in local community spending, supporting 312 jobs, and had a cumulative economic benefit of over $27.8 million to the local economy (NPS, 2024). Similarly, the NPMS focuses on environmental conservation, but emphasizes the protection of the landscape as historically and culturally shaped by human action. The park promotes sustainable development by preserving ecosystems, supporting traditional productive practices, and encouraging high-quality local social and economic activities.

In terms of its institutional framework, CUGA is a protected federal land area under the supervision of the National Park Service (NPS), a bureau within the US Department of the Interior (NPS, 2022). The NPS was established on August 25, 1916, when US President Woodrow Wilson signed the "Organic Act", which created a federal bureau within the Department of the Interior designed to protect and manage the nation's parks and monuments (NPS, 2022). The "Organic Act" established a dual mandate to conserve natural, historic, and wildlife resources while ensuring their enjoyment by future generations (NPS, 2022). By contrast, the NPMS is administered by the Ente Parco Nazionale dei Monti Sibillini, founded by Presidential Decree on 6 August 1993. The park authority has legal personality and operates under the supervision of the Italian Ministry of the Environment according to the Law of 6 December 1991 n. 394.

While both parks are publicly managed protected areas, they are embedded in different administrative systems—federal in the United States and national-regional in Italy, as confirmed by their governance structures. The Bodies of the CUGA Park Authority are the National Park Service (NPS) Director, the Deputy Directors (based on Regions), and the CUGA Park Superintendent. Management of the park and its resources is carried out by staff with various roles, including visitor and resource protection, interpretation and education, maintenance, science and resources management, and administration. The governance of the NPMS Authority is more complex and includes several governing bodies: a President, who is the legal representative of the Authority and coordinates the activities, carries out delegated functions and presides over the collegiate bodies; a Board of Directors, that outlines the programmatic guidelines for the management of the Park; an Executive Board, that supports the President in his functions; a Board of Auditors, an administrative and financial control and verification body; the Park Community representing local municipalities, and a Director responsible for technical and administrative management. This structure highlights the stronger involvement of local communities and multiple administrative bodies in the Italian park's decision-making process. Indeed, the governance of the NPMS is based on a collaborative and multi-level approach involving several institutional actors.

Finally, the two parks differ in terms of cultural heritage and activities. The US National Park Service, in its Climate Change Strategy for Cultural Resources, categorizes cultural resources as archeological sites, cultural landscapes, ethnographic resources, museum collections, and buildings and structures (Rockman et al., 2016). Within this framing, CUGA manages two primary ethnographic resources within its boundaries: the early Appalachian-living historic Hensley Settlement and Newlee's Iron Furnace. The remaining sites are cultural landscapes, including Gap Cave and its various Overlooks, with markers outlining historic events, people, and places. While CUGA organizes events such as guided tours and educational programs at its Visitor Center (NPS, 2024b), festivals and museums are organized and promoted through businesses and associations in neighboring communities. According to the Cumberland Gap Region Tourism Association, there are 11 Regional Arts and Cultural Heritage Sites (Cumberland Gap Region Tourism Association, n.d.a) managed by municipalities or nonprofit organizations around the Cumberland Gap National Park and 14 festivals/events managed by municipalities or nonprofit organizations around the Cumberland Gap National Park (Cumberland Gap Region Tourism Association, n.d.b). The NPMS, on the other hand, boasts a remarkable concentration of historical and cultural assets, including approximately 275 architectural and archaeological sites and museums, most of which belong to municipalities and the Church. More than 25 museums across 16 municipalities, along with castles and churches, form a widespread cultural network throughout the park. The park authority promotes events and celebrations that preserve and showcase local traditions and cultural identity.

Desk research shows that both parks integrate environmental protection with cultural and historical preservation, but they do so through different institutional models and territorial contexts. CUGA emphasizes preservation of historical heritage and natural ecosystems via regulated recreational use, e.g., restricted, seasonal guided tours, within its centralized federal management system (NPS, 2025b), while the NPMS highlights landscape conservation shaped by traditional activities and features a governance structure that strongly involves local institutions and communities.

At the current stage of the research, the Director of NPMS has also been interviewed (September 26, 2025; 2.5 hours). The interview was transcribed and then manually analyzed to identify key themes and insights and answer the research questions.

The management and development of tourism and cultural activities in the park involve a wide range of stakeholders. These include the park authority, responsible for regulation, planning, and coordination; the municipalities, which own and manage local infrastructure and many cultural assets; regional administrations, often in charge of organizing exhibitions and cultural initiatives; local associations and Pro Loco organizations, which promote and coordinate events

and festivals; museums and other cultural institutions; and tourism operators and park guides. Together, this network of actors contributes to the governance of tourism and cultural heritage, often through collaborative arrangements and shared initiatives. More specifically, the park authority plays a coordinating and regulatory role, while many operational activities are implemented in cooperation with local municipalities and other public bodies. In several cases, investment funds provided by the Ministry are allocated to municipalities, which are responsible for implementing projects such as energy efficiency improvements in public buildings, cycling infrastructure, and sustainable mobility initiatives. This governance model relies on agreements between the park authority and local administrations. When projects are implemented directly by the park, the authority manages the entire process; otherwise, municipalities handle implementation on public property using allocated funds. Planning and management are complicated by the high degree of land fragmentation and the presence of private properties, which can limit the development of infrastructure such as hiking trails or visitor routes. This context requires negotiation and compromises in planning the park's system of visitor access and environmental interpretation.

Focusing on the role of the arts and cultural heritage (RQ1), the Director first highlighted that the NPMS is considered one of the most significant among Italian protected areas for its rich tangible and intangible cultural heritage. Many heritage sites and museums are integrated into the park's visitor center network and play multiple roles, supporting scientific research, environmental education, and cultural dissemination related to the park's natural heritage. The park primarily promotes them through indirect forms of collaboration. It facilitates accessibility, integrates some of them into the visitor center network, and promotes them through communication channels such as the park website and media platforms. This creates forms of co-marketing that increase the visibility of both the park and the cultural sites. Cultural heritage is considered a key resource for the park's identity and attractiveness. The park itself takes its name from the Sybil, a legendary prophetic figure associated with the traditions and folklore of the central Italian Apennines and thus part of the region's intangible cultural heritage. In some cases, cultural heritage may even be as important as the natural heritage, which remains the primary conservation priority of the park authority. For this reason, heritage interpretation plays a crucial role in the park activities.

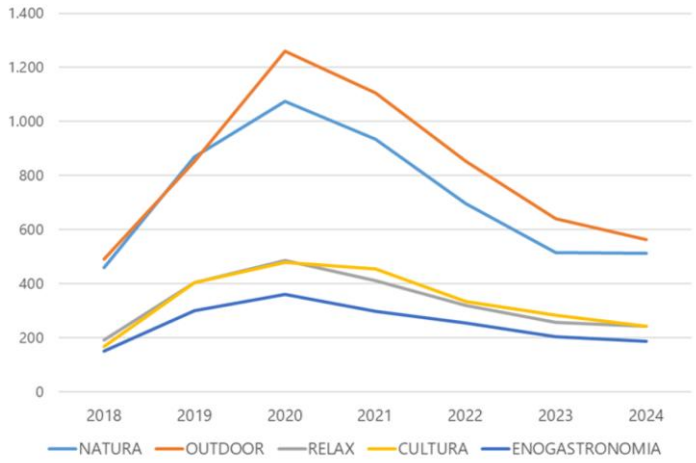
The integration of cultural activities, events and heritage sites into the visitor experience strengthens the park's appeal and diversifies tourism offerings. This approach helps attract broader audiences while supporting the socio-economic vitality of local communities. However, the park authority directly manages only a limited number of cultural events. Most exhibitions and cultural initiatives are organized by regional authorities, municipalities, local associations, or cultural organizations. In recent years, the number of artistic and cultural events taking place in natural environments has increased significantly. These include concerts, festivals, and other cultural manifestations organized by associations, local communities, and tourism stakeholders. Such events substantially enhance the area's attractiveness and draw visitors who might not otherwise visit the park. The park's role is mainly to authorize and support these initiatives while ensuring that they comply with environmental sustainability criteria. Events must respect the ecological carrying capacity of sites and avoid disturbing sensitive habitats, such as areas where birds nest on the ground. In some cases, the park collaborates with event organizers to identify suitable locations and time periods that minimize environmental impact. This collaborative approach has led to increasingly sustainable practices in event organization, such as reducing noise pollution and adopting renewable energy solutions (e.g., solar panels instead of diesel generators). These initiatives also help raise environmental awareness among visitors who may not usually frequent mountain environments.

Moving to RQ2, balancing conservation objectives with tourism development is a central challenge for the park. The NPMS is a member of the EUROPARC Federation. Through the awarding of the European Charter for Sustainable Tourism in Protected Areas, EUROPARC seeks to safeguard cultural and natural values by promoting high-quality sustainable tourism, fostering partnerships that support local livelihoods, raising awareness of the need for sustainability, and encouraging international cooperation (NPMS, 2024, Annex 1). Within this framework, the NPMS prioritizes protecting sensitive ecosystems while providing opportunities for visitor access and tourism experiences. Visitor management strategies aim to guide tourism flows toward suitable areas while avoiding excessive pressure on fragile ecosystems. In some cases, access to particularly sensitive sites is not formally prohibited but is intentionally not promoted through official signage or infrastructure. This approach allows the park to maintain ecological integrity while still supporting sustainable tourism. The park receives dedicated public funding, including resources specifically aimed at addressing climate change and sustainability measures. For example, more than €2 million were allocated for climate-related interventions in 2026, following similar investments in previous years. These funds support initiatives such as: energy efficiency improvements in public buildings; sustainable mobility solutions; cycling infrastructure; and environmental and climate adaptation measures. Investments are generally implemented through agreements between the park authority and municipalities.

When discussing the impact of natural and climate-related disasters (RQ3), the Director noted that the effects of climate change are not yet clearly evident in the NPMS, although several emerging trends are already observable. These include rising temperatures, milder winters, and reduced precipitation levels. The reduction in precipitation, particularly winter snowfall, is considered the most significant risk. Snow plays a crucial role in recharging groundwater and maintaining the hydrological balance of the area. A decrease in snow accumulation may therefore reduce water availability in springs and rivers. This reduction could have cascading impacts on ecosystems, habitats, and economic activities that depend on water resources, such as agriculture, hydroelectric production, and fish farming. Climate-related extreme events could also affect infrastructure and increase hydrogeological risks in certain areas of the park.

In this context, strengthening the integration of cultural heritage, artistic activities, and tourism is seen as a significant opportunity for the park's future development. Cultural resources can enhance visitor experiences and help diversify tourism beyond the still-dominant nature-based activities (Fig. 2), thereby transforming open-air activities into a more complete holiday experience and creating opportunities for visitors to engage with the local community. However, it is also necessary to develop new ways of experiencing these resources that go beyond post-earthquake reconstruction. The rebuilding process following the 2016 earthquake remains incomplete in some cases, and additional efforts are needed to promote initiatives that counteract the loss of local cultural traditions and knowledge (NPMS, 2024, p. 22). At the same time, integrating cultural events into protected natural environments requires careful planning to ensure environmental sustainability. This includes regulating visitor numbers, selecting appropriate locations and periods for events, and promoting low-impact organizational practices. If properly managed, cultural initiatives can contribute to both environmental awareness and the sustainable development of the territory.

Fig. 2. Product Cluster Selection – Historical Series 2018 – July 11, 2024 (Source: NPMS, 2024, p. 15)

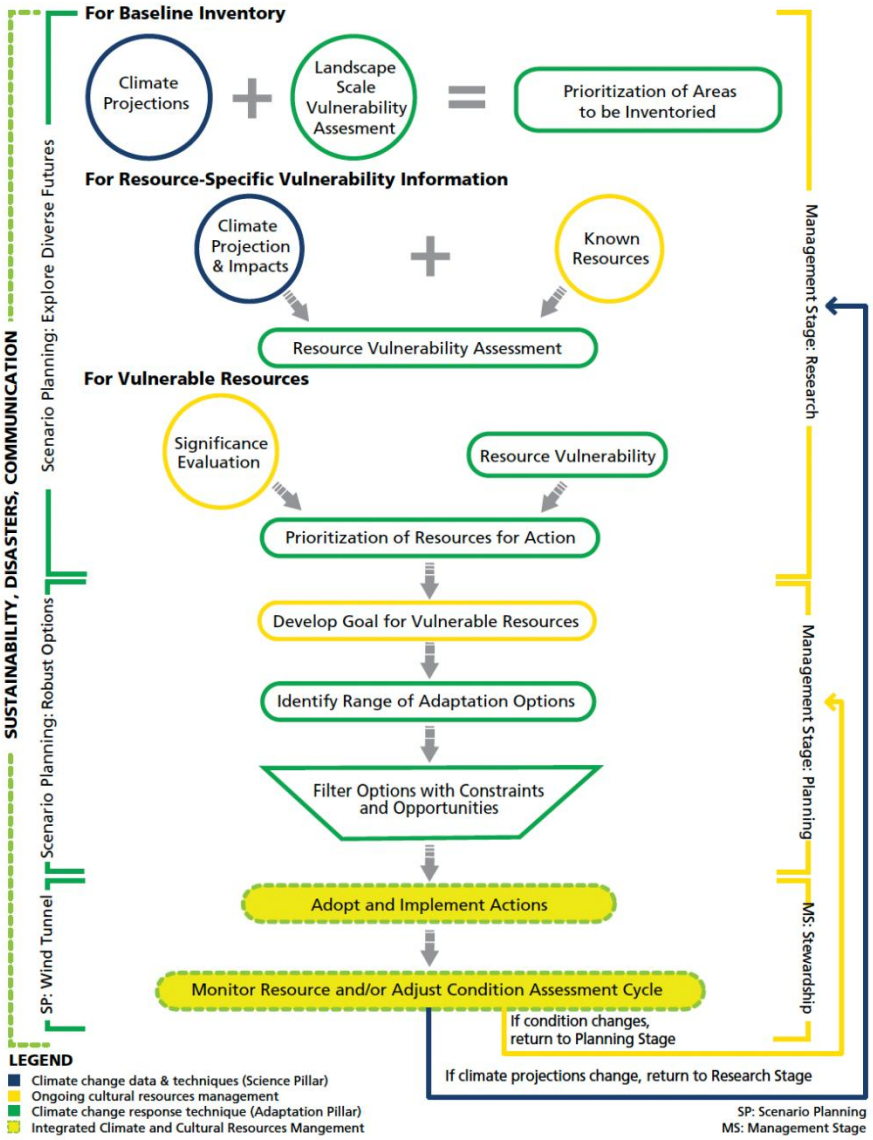


The NPMS's management approach reveals that climate adaptation is inextricably linked to socio-cultural resilience. The evidence suggests that the park's response to climate change is not merely reactive but integrated into a broader framework of territorial regeneration following the 2016 seismic events.

At the current stage in the research, CUGA's sustainable tourism management approach is viewed through the lens of the centralized management approaches outlined by the National Park Service in the "Cultural Resources Climate Change Strategy", released in 2016, which recognized "climate change as 'the greatest threat to the integrity of our national parks that we have ever experienced'"(Rockman et al., quoting Jon Jarvis, p. 1). In alignment with NPMS's recognition that cultural initiatives contribute to environmental awareness, NPS's climate change strategy explicitly identifies cultural resources as a key source of primary data for understanding how humans interact with and experience environmental changes, while also acknowledging that climate-related impacts affect how cultural resources are preserved and maintained (p. 8) (RQ1). While the policy document does not outline sustainable tourism approaches specifically, outside of a brief mention of marine tourism development as a "combined stressor" related to climate change (p. 24), it does provide a management strategy related to cultural resources in relation to climate adaptation and resiliency (Fig. 3). The strategy outlines localized assessment of cultural resources within each park, based on scientific projections and vulnerability indicators to highlight cultural areas of priority. Based on the identification of vulnerable cultural resources, seven adaptation options are provided, ranging in scale from removing or mitigating environmental stressors, e.g., reducing shore erosion or forest management to reduce wildfire risk, to relocating or moving the resource, to "interpret the change" as a method of acknowledging and sharing the impacts of climate change on a particularly vulnerable resource (RQ3). The next phase of this research will examine how these management approaches are implemented within CUGA's current strategies under a new federal administration, particularly regarding tourism activities and cultural resources (RQ2).

Research limitations. *The research is still ongoing, and the interviews have not yet been completed or fully analyzed. Therefore, a comprehensive assessment of the roles of the different actors involved in the activities of the two parks is not yet possible. While cultural assets present opportunities for tourism development, their strategic role in rethinking and reshaping sustainable tourism strategies requires further investigation, particularly in order to highlight the key differences between CUGA and NPMS.*

Fig. 3. Cultural Resources Management-Climate Change Integration Flow Chart (Source: Rockman et al., 2016, p. 27)



Managerial implications. *Preliminary findings offer several critical insights into the management of protected areas, particularly in contexts facing the dual challenge of climate change and post-disaster recovery.*

A primary implication concerns the necessity of adopting integrated governance models that transcend the administrative boundaries of a Park Authority. To effectively implement sustainability projects, managers should formalize collaborative agreements with local municipalities, fostering a multi-stakeholder environment where cultural assets and natural trails are promoted through joint strategies. This is particularly evident in the NPMS, where planning and management are complicated by high levels of land fragmentation and the prevalence of private property.

Secondly, in the NPMS, the research highlights the imperative to diversify the tourism offering to mitigate the "snow-dependency" threatened by rising temperatures. Management should prioritize heritage as a tool to transform landscape and intangible assets into year-round attractions. By shifting the focus from seasonal "nature-exclusive" to "culture-integrated" tourism experiences, protected areas can stabilize visitor flows throughout the year and reduce the ecological pressure concentrated during peak seasons.

Furthermore, the integration of arts and cultural events into natural settings requires the development of rigorous sustainability guidelines. This involves adopting low-impact practices and carefully scheduling events, ensuring that the transformative power of art does not compromise the park's primary conservation mission.

Ultimately, the research demonstrates that a resilient management strategy must bridge the gap between cultural preservation and environmental adaptation, creating a holistic framework for sustainable tourism development.

Originality of the paper. *The research highlights the key role of cultural resources in rethinking and reshaping tourism strategies in protected areas towards sustainability. When analyzing management approaches to the promotion and*

preservation of arts and cultural heritage, it identifies the dual roles of governmental agencies and private businesses, including nonprofit organizations.

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Slow storytelling in agritourism: insights on the design of coherent destination narratives

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Abstract. *Although the fundamental role of narratives in the pre-travel phase of tourism experiences is well established, limited research has examined their antecedents. In the tourism contexts, where multiple stakeholders with various interests and communication capabilities contribute to the development of destination narratives, understanding how coherent narratives emerge becomes particularly important. Drawing on the slow storytelling approach (Gasparin et al., 2022), this work-in-progress short paper investigates how visual and textual narratives in the agritourism sector are constructed and whether, and to what extent, they are developed coherently. The study adopts a qualitative multi-method approach, combining qualitative content analysis of selected agritourism Instagram accounts and webpage with semi-structured interviews with those agritourism owners. In addition, the local agritourism organization, Gallo Rosso, is included in the analysis. Preliminary findings show that agritourism narratives prominently highlight agricultural activities, farm life, heritage, and sustainability, while strongly emphasizing family identity and the cyclical nature of time. Images represent the primary storytelling medium, while captions generally support and contextualize the visual content. Preliminary results also suggest a degree of narrative coherence across agritourism establishments, despite revealing different communication styles and relationships with Gallo Rosso. Moreover, the narratives communicated by individual agritourism structures resemble those promoted by Gallo Rosso. This study contributes to agritourism and destination marketing literature by adapting the slow storytelling approach to specific contexts and digital visual narratives. Further analysis of the interviews will provide deeper insights into the constraints and facilitators shaping the construction of coherent destination narratives.*
Keywords: *narratives; agritourism; slow storytelling; narrative coherence*

Framing of the research. *Tourism narratives play an important role in the pre-travel experience, when tourists are looking for possible destinations for their travel (Pachucki et al., 2022). Indeed, stories influence emotions (Huang et al., 2025), attitudes (Pachucki et al., 2022), brand perceptions (Can et al., 2025), experiences (Servidio & Ruffolo, 2016), opinions (Moreira et al., 2025), and behaviors (Huang et al., 2025). Thus, they are key to conveying a destinations' unique brand proposition (Grillini & Volo, 2024; Hartman et al., 2019).*

"The tourist gaze" (Urry, 1990) has long been recognized as central to the tourism experience, emphasizing its predominantly visual nature. However, the importance of images in this field has been exacerbated by the increasing use of visual social media platforms. For instance, pictures are considered particularly useful in TripAdvisor reviews (Vidaurreta-Apesteguia et al., 2025). Moreover, Instagram is built around instant sharing of photos, videos, and stories, that have the potential to significantly transform destination image and influence tourist behavior (Volo & Irimias, 2021).

Narrativity refers to the process through which individual content elements are connected and organized into a logical sequence, creating a coherent and meaningful whole (Pearce & Moscardo, 2020; Pachucki et al., 2021). A narrative typically consists of key elements such as a credible plot, identifiable characters, and a structure that includes an introduction, a climax, and an outcome (van Laer et al., 2014).

By stimulating emotional engagement and supporting the interpretation of experiences, narratives contribute to making tourism experiences more meaningful and memorable (Ben Youssef et al., 2019; Moreira et al., 2025; Moscardo, 2020). Recent research has shown how this also includes stories around historical events, family stories and local legends (Khater et al., 2026). Storytelling enables destinations marketing managers to communicate values that create strong emotional bonds with potential tourists, extending beyond the presentation of functional attributes (Hartman et al., 2019). Through engaging stories tourists can envision the potential tourist experience, thereby creating anticipation in the pre-travel phase and consequent intention to visit (Pachucki et al., 2022). In addition, narratives are fundamental in destination branding, by shaping destination image, reinforcing place identity, and strengthening the emotional connections between consumer and brand (Pachucki et al., 2022), with possible impacts on tourists' behaviours (Moin et al., 2020). In this context, visual storytelling enhances the power of narratives by conveying complex meanings and effectively synthesizing multiple ideas (Volo & Irimias, 2021; Wegerer & Volo, 2021). Research on visual narratives in nature-based tourism has largely focused on visual attention, demonstrating that elements such as natural landscapes and human–nature interactions play a significant role in shaping perceived attractiveness (Li et al., 2023).

Despite the growing attention given to storytelling in tourism research, relatively little is known about the antecedents of storytelling, like the mechanisms that enable the construction of coherent destination narratives (Zhang & Ramayah, 2024). Previous research has shown that narrative coherence represents a key determinant of narrative effectiveness, as it enables audiences to follow a story more easily, enhances perceived realism, and reduces cognitive dissonance (Huang et al., 2025). It refers to the degree to which the elements of a narrative are logically connected and free from

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contradictions, allowing the story to form a consistent and meaningful whole. In a destination context, the construction of coherent narratives often requires cooperation and interaction among multiple stakeholders, highlighting the importance of coordination and alignment in shaping consistent and meaningful destination stories (Hyvärinen et al., 2010). However, little is known on the mechanisms that enable the construction of a coherent narrative across various stakeholders within a destination.

Agritourism refers to tourism activities hosted on operating farms and closely connected to agricultural production. (Barbieri, 2016). While some studies have shown that some farms tend to present luxury amenities, combining comfort with rural settings (Streifeneder et al., 2023), most research highlight how agritourism businesses primarily traditional farm life (Andehn et al., 2021). Moreover, visitors who chose agritourism experiences are particularly interested in landscapes traditionally linked to agriculture and farms (Dat et al., 2024). The identity of agritourism businesses is often rooted in the history of the farm and the families who manage it (Mei et al., 2020). Agritourism experiences are marked by interactions between hosts, visitors, and the rural environment, often highlighting sustainability, authenticity and local culture (Andehn et al., 2021; Joyner et al., 2018). Practical activities, like assisting with animal care or harvesting fruits and vegetables, are especially appreciated by visitors and contribute significantly to the overall experience (Rong-Da Liang et al., 2020).

Agritourism research has also examined the role of storytelling. For instance, Mei et al. (2020) emphasize how storytelling during farm visits enhances tourists' understanding of agricultural lifestyles, traditions, and values. However, most existing research has focused on on-site or experiential storytelling, leaving digital and visual narratives underexplored, especially in pre-visit communication channels like social media and websites.

Within this context, slow storytelling has been considered as a useful framework to understand agritourism narratives. Through this lens, rural life and local heritage can be portrayed in a more nuanced and context-sensitive manner (Gasparin et al., 2022).

Purpose of the paper. *Although narratives in the tourism context have been widely studied (Grillini & Volo, 2024), some niches of tourism experiences remain underexplored. For instance, a deeper understanding of stories around rural and nature-based tourism experiences is getting more important, given their increasing popularity (Haukeland et al., 2023; Richards, 2025). In this regard, the authors focused specifically on agritourism narratives. Agritourism provides the ideal context for examining narratives, as tourists often show a strong interest in the stories associated with this lifestyle (Engeset & Heggem, 2015; Mei et al., 2020). Given agritourism emphasis on place identity, rural experiences and lived heritage (Mei et al., 2020), the slow storytelling approach (Gasparin et al., 2022) was deemed appropriate to examine agritourism narratives in greater depth.*

Narrative design in tourism is a complex process that involves multiple actors. DMOs, tourism businesses, residents, and tourists all contribute to shaping and communicating a destination's story (Pachucki et al., 2022). This plurality of voices makes the construction of coherent and consistent narratives particularly challenging, especially in fragmented contexts characterized by diverse stakeholders and uneven communication capacities. Consequently, aligning these narratives into a cohesive destination image remains a key challenge in tourism marketing (Hartman et al., 2019).

This work-in-progress short paper aims to explore how narrative elements are structured within the agritourism sector. Focusing on South Tyrol (Italy), the study adopts a qualitative multi-method approach that combines content analysis of selected Instagram accounts and official websites (Camprubí & Coromina, 2016; Wegerer & Volo, 2021) with semi-structured interviews with agritourism managers, as well as representatives of the DMO and the local agritourism organization. Through this approach, the research investigates whether and how destination narratives are constructed coherently through the lens of slow storytelling (Gasparin et al., 2022).

Methodology. Context of the study*: South Tyrol, an Autonomous Province in Northern Italy, provides an adequate context for this study due to the central role of agriculture and the increasingly strong link between agriculture, hospitality, and destination branding. South Tyrol has the highest density of agritourism establishments in Italy and ranks second in total number of facilities, after Tuscany (ISTAT, 2022). This underscores both the structural importance of agritourism for the local economy and its prominent role within the national tourism landscape (Grillini et al., 2023). A key role in the creation and promotion of agritourism in the area is played by Gallo Rosso / Roter Hahn, the official association representing agritourism. Beyond certifying agritourism farms, the association shapes their communication strategies through coordinated branding, storytelling guidelines, and digital platforms. Consequently, South Tyrol provides a valuable context for investigating how agritourism narratives are constructed visually and textually using the slow storytelling across Instagram and websites. Finally, South-Tyrol's agritourism sector is marked by fragmentation. While the provincial DMO maintains a strong brand identity and a prominent online presence, Gallo Rosso actively disseminates narratives about agritourism. Alongside these organizations, numerous small and medium-sized enterprises also contribute to the region's storytelling, each adopting diverse communication strategies, digital capacities, and approaches to narrative construction.*

Methodology

This study adopts a qualitative multi-method approach, combining the examination of current agritourism narratives through content analysis to the analysis of the opinions of relevant stakeholders via semi-structured interviews.

In the first study, a content analysis is conducted to examine agritourism narratives. Content analysis allows for a systematic analysis of selected content to reveal underlying patterns, themes, meanings, and biases (Krippendorf, 2009) and is widely used in tourism studies (Camprubí & Coromina, 2016).

First, Instagram was selected as the ideal platform for examining agritourism narratives due to its popularity (Conti & Lexhagen, 2020) and its strong role for storytelling (Lim & Childs, 2020), particularly through visual content (Volo & Irimias, 2021; Wegerer & Volo, 2021). Facebook was excluded from the analysis, since fewer agritourism had an active account in this social media. Other social media, like TikTok, Pinterest and Flickr, were also excluded because very few agritourism had an active account on those social media. The authors limited the analysis to the Dolomites, elected for their prominence as a visually distinctive region. Moreover, agritourism structures affiliated with the Gallo Rosso association were chosen. To further ensure a relatively constant presence online and a commitment to storytelling, the final dataset included only Instagram accounts that had published at least 12 posts in 2024.

Since the study also involves conducting interviews, only accounts whose owners agreed to participate in the semi-structured interviews were selected for the content analysis. To date, the study has examined five Instagram accounts, with a total of 156 posts. In addition to the individual agritourism accounts, their official websites were also analyzed through content analysis. The Gallo Rosso Instagram account (30 posts) and its website were similarly included in the analysis. Although the initial plan included the official DMO Instagram account, during the period analyzed (2024) it published only 14 posts explicitly related to agritourism out of a total of 311. As a result, it was not considered a significant contributor to agritourism narratives in South Tyrol and its account was excluded from Study 1.

Both the textual and visual content of the posts were then analyzed through the Gioia methodology (Gioia et al., 2013). Using MaxQDA, two researchers identified first-order codes, themes, and dimensions, ensuring coding reliability through cross-validation and discussion to resolve discrepancies. Captions were written in English, Italian, and German and were analyzed in their original languages, given the authors' proficiency in all three. Only relevant excerpts were translated into English.

Study 2 involved semi-structured interviews. To date, four interviews with agritourism managers have been conducted, with two additional interviews planned. Interviews with representatives of Gallo Rosso have also been completed, and an interview with the IDM (provincial DMO) is scheduled.

Interviews were conducted preferably in person at the agritourism establishments. However, due to logistical constraints, one interview was conducted online. Interviews were held in Italian or German, depending on the participants' preferred language. At the beginning of each interview, the purpose of the study and the procedures were explained to the participants, and written consent was obtained. With their consent, all interviews were recorded and subsequently transcribed. Only relevant quotes were translated into English. The interview data are being analyzed using the Gioia methodology (Gioia et al., 2013).

Results. *The findings highlight a clear predominance of content related to agricultural work and everyday farm life (Rong-Da Liang et al., 2020), with a prominence of images and text presenting the natural environment, farm work, like harvesting and caring for animals, as well as Alpine heritage and traditions. Both visual and textual stories shared on Instagram include, for example, one post announces the birth of a calf with the caption:* "Once again, there's a new arrival in the pasture. Welcome small Kawasaki"*, and honey harvest, e.g.* "Our bees were very industrious again this year, and we can enjoy delicious honey"*. Heritage narratives include elements like architecture, traditional clothing, gastronomy, living traditions and languages (Andehn et al., 2021; Joyner et al., 2018). Stories not directly linked to farm life are strongly linked to South-Tyrol, for instance by depicting mountain outdoor sport activities, like* "cycling in South-Tyrol"*. Moreover, sense of place (Martinus et al., 2024) is also conveyed through hashtags or frequent references to specific locations in the captions (e.g.* Kronplatz, #kastelruth, #seiseralm, Dolomiten-Bergkulisse*). Sense of place is also strongly connected to narratives centered on the family owning the agritourism, including generational continuity, personal stories and traditions. Those stories contribute to creating meaningful and distinctive experiences, by anchoring tourism experiences to specific landscapes, cultural practices, and local identities (Martinus et al., 2024; Mei et al., 2020). Finally, only a small portion of the stories focus on accommodation or wellness facilities. This contrasts with previous research, which suggests that agritourism tends to emphasize luxury amenities over farm-related activities in their communications (Streifeneder et al., 2023).*

Preliminary interviews analysis confirms agritourism managers' importance of sharing content about agricultural and farm-related activities. Interviewees confirm how tourists like to hear stories about the history of the farm and to participate in work activities like harvesting and animal care (Andehn et al., 2021). Some interviewees noted that they also share photos of the accommodations to give tourists an anticipation of their experience.

*A recurring element across the dataset is the temporal framing of everyday activities. Posts frequently situate farm practices within seasonal cycles, highlighting how agricultural life is structured around recurring natural rhythms. Frequent examples include "*summer in the mountains*", "*autumn activities*", "*evenings in the mountains*". In such cases, images and captions generally work together, with written text often echoing the message conveyed by the photograph. For example, one post has the caption "*Winter is back*," and depicts blossoms covered with snow, which wants to present the unusual temporal overlap between spring and winter.*

The findings suggest that the narratives communicated by individual farms largely correspond with those promoted by the Gallo Rosso association.

The study further examines how agritourism narratives are structured, revealing that South-Tyrolean narratives can be interpreted through the lens of the slow storytelling approach (Gasparin et al., 2022). A defining feature of slow storytelling in this context is the role of the organization itself. On their websites, where farms have greater space to communicate, the selected establishments consistently foreground family-centered narratives, suggesting a strong overlap between organizational and family stories (Mei et al., 2020). These narratives are anchored in two primary pillars: heritage and sustainability. Sustainability encompasses practices such as energy management, waste reduction, organic farming, sourcing of local products, and cultural preservation. Within this framework, more specific narratives emerge that highlight distinctive agritourism elements, including slow food, place-based references, and interactions with animals (Dat et al., 2024). The narratives also emphasize the cyclical nature of time, reflecting the rhythms of farm life. However, unlike Gasparin et al.'s (2022) model, South Tyrolean agritourism appears to place less emphasis on storytelling aimed at enhancing or actively engaging the visitor experience.

While textual elements play a role to identify meaning, this study emphasizes the prominence of visual narratives, with captions usually reinforcing the visual content. For example, a post showcasing the apple harvest through high-quality photographs is captioned merely "Autumn activities," thereby emphasizing the seasonal rhythm of the event rather than adding new narrative elements.

The third objective of this research was to examine narrative coherence in greater depth. On the one hand, preliminary results indicate a strong alignment between the content shared on the official Instagram accounts and webpages of the analyzed agritourism establishments and the aspects that interviewees identified as important. All interviewees reported that they primarily share content related to agricultural and farm-based activities, suggesting a coherence across the structures included in the study.

On the other hand, agritourism structures show diverse approaches to social media communication. Some prefer highly professional photographs accompanied by engaging captions, while others post spontaneous images with brief texts or simply hashtags. This difference reflects the various ways in which agritourism operators communicate their identity. Some interviewees noted differences between their own storytelling practices and those of other agritourism businesses, citing factors such as posting frequency or the perceived quality of content. On the contrary, other interviewees observed that most farms tend to share similar narratives, focusing on farm life, Alpine landscape, and locally sourced products.

Regarding the role of Gallo Rosso in promoting narrative coherence, preliminary findings reveal contrasting perspectives. While all interviewees appreciated Gallo Rosso's support, particularly during the initial phases, such as help with the booking system or financial obligations, opinions diverged regarding its narrative guidance. One manager criticized Gallo Rosso for favoring narratives that emphasize high-end amenities, such as infinity pools or saunas, whereas others highlighted the association's recommendations on which aspects of the agritourism experience should be given particular importance, such as breakfast featuring farm-produced or locally grown products. These recommendations were consistently reflected across all agritourism Instagram accounts and websites. One interviewee also noted participating in branding and marketing courses organized by Gallo Rosso.

Finally, all interviewees reported having little to no contact with the provincial DMO, which aligns with the relatively limited attention given to agritourism content on the DMO's Instagram account and website.

Research limitations. *This short paper has several limitations that should be acknowledged. First, given the exploratory focus of the research, the analysis relied on a relatively limited dataset. Future research should address this limitation by analyzing larger datasets, potentially through big data approaches, to systematically explore broader patterns and mechanisms underlying slow storytelling in agritourism narratives. Second, this study does not assess the effectiveness of slow storytelling in shaping tourists' attitudes or behavioral intentions. Future studies should therefore investigate slow storytelling from the tourists' perspective, employing methods such as experimental designs, big data analysis, or netnography to evaluate its impact on visitor perceptions and behaviors.*

Managerial implications. *The findings of this study offer several implications for agritourism owners. Framing narratives around the slow-storytelling approach with a focus on family-centered stories, heritage, and sustainability can help farms communicate a distinctive identity and a strong sense of place, creating emotional connections with visitors. Managers should consider aligning visual and textual content across platforms, such as Instagram and websites, to enhance narrative coherence and facilitate tourists' understanding of the narratives. Furthermore, organizations like Gallo Rosso should promote coordinated initiatives and branding and marketing training to support the crafted of a coherent destination narrative across multiple and diverse stakeholders.*

Originality of the paper. *This work-in-progress short paper investigates how visual and textual narratives in agritourism are structured through the lens of the storytelling approach (Gasparin et al., 2022). By applying this framework to a context with distinct characteristics, the study adapts it by introducing a hierarchical structure and incorporating concepts specific to the agritourism setting. In this context, slow storytelling is closely tied to family and intragenerational stories, which serves as a key aspect of organizational identity, while sustainability and heritage act as foundational pillars supporting this narrative and its associated elements. Within these pillars, the proposed framework also emphasizes the centrality of time and its cyclical nature as key components of slow storytelling.*

Through this adaptation, the study aims to make a theoretical contribution to both destination and agritourism marketing literature by demonstrating how agritourism narratives are structured according to the slow storytelling approach. Preliminary findings indicate that agritourism narratives in South Tyrol exhibit considerable thematic similarity across accounts. Nevertheless, additional data collection and more in-depth analysis are needed to better understand the constraints and facilitators shaping coherent narratives.

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Slow Tourism and Digitalization: Enhancing Experiential Value Without Losing Authenticity – the Case of Apulia as an Emerging Slow Tourism Destination

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Abstract. *Tourism is currently undergoing profound transformations driven by sustainability concerns, technological innovation, and evolving tourist expectations. Among emerging paradigms, slow tourism has gained increasing relevance as an alternative to the accelerated consumption patterns associated with mass tourism. Slow tourism promotes longer stays, deeper engagement with local culture, environmentally responsible mobility, and meaningful travel experiences. At the same time, tourism systems are experiencing rapid digitalization through platforms, mobile technologies, and smart destination management systems. Although slow tourism and digitalization may appear conceptually contradictory – one emphasizing slowness and reflection, the other speed and connectivity – recent research suggests that digital technologies can support slow tourism ecosystems when appropriately designed. Digital tools may facilitate access to information, support sustainable mobility, enhance cultural interpretation, and strengthen connections between tourists and local communities. This paper explores the relationship between slow tourism and digitalization, examining how digital technologies can enhance slow tourism experiences without undermining their core values. The research combines literature review with a case study analysis of Apulia (Italy), a region that has experienced significant tourism growth and has invested in slow tourism infrastructures such as walking routes and cycling tourism. The empirical analysis draws on the SWG–ARET Apulia report on slow tourism (ARET, 2025). The findings highlight key motivations driving slow tourism demand, including nature immersion, cultural exploration, relaxation, and personal well-being. The paper proposes a conceptual framework integrating slow tourism principles with digitalization processes, showing how digital technologies can support sustainable mobility, destination storytelling, community engagement, and experience management.*

Keywords: *Slow tourism; Digitalization; Smart tourism; Cycling tourism; Walking tourism; Destination management*.

Framing of the research. *Tourism represents one of the most significant sectors of the global economy, contributing to economic development, employment generation, and cultural exchange. Over recent decades, global tourism flows have expanded considerably due to improved mobility infrastructures, technological innovation, and the globalization of tourism markets. However, the rapid growth of tourism has also produced significant environmental, social, and cultural challenges for destinations. The expansion of tourism flows has intensified pressure on natural resources, contributed to environmental degradation, and produced phenomena such as overtourism and the commodification of local cultures (Gössling et al., 2021; Hall, 2019). Traditional mass tourism models, characterized by accelerated travel patterns, standardized tourism products, and short stays, have increasingly proven unsustainable. These models often encourage the rapid consumption of destinations rather than fostering meaningful engagement with local environments and communities (Sharpley, 2020). Consequently, tourism scholars and policymakers have increasingly explored alternative tourism paradigms capable of promoting more sustainable forms of tourism development. Among these paradigms, slow tourism has emerged as a particularly relevant conceptual framework within contemporary tourism research. Slow tourism represents a response to the acceleration of modern lifestyles and consumption patterns. Instead of prioritizing speed and efficiency, slow tourism promotes a philosophy centered on immersion, mindfulness, and meaningful engagement with places (Fullagar et al., 2012). The origins of slow tourism can be traced to the broader slow movement, which emerged through initiatives such as the Slow Food movement and the Cittaslow network. These movements promoted sustainability, quality of life, and the preservation of local cultural traditions (Petrini, 2007). Within tourism studies, slow tourism has been conceptualized as a form of travel characterized by longer stays, reduced travel speed, and deeper interaction with local environments and communities. Dickinson and Lumsdon (2010) describe slow tourism as travel in which the journey itself becomes a meaningful component of the tourism experience. Slow tourism is closely linked to sustainable tourism principles. By encouraging low-carbon mobility practices such as walking and cycling tourism, slow tourism contributes to reducing tourism-related environmental impacts (Conway & Timms, 2012; Gössling & Peeters, 2015). Furthermore, slow tourism promotes stronger connections between tourists and local communities by encouraging the consumption of local products and participation in community-based experiences (Sharpley, 2020). Beyond sustainability considerations, slow tourism also reflects broader transformations in tourism demand. Contemporary travelers increasingly seek authentic and meaningful experiences that allow them to connect with local cultures, landscapes, and traditions (Richards, 2018). Slow tourism experiences often involve activities such as walking tourism, cycling tourism, rural tourism, and gastronomic tourism. These activities enable visitors to explore destinations*

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at a slower pace while fostering deeper emotional connections with places (Shang et al., 2020). Research on tourist motivations further highlights the psychological drivers underlying slow tourism behavior. Oh, Assaf, and Baloglu (2014) conceptualize slow tourism as a goal-driven behavioral process through which travelers pursue psychological goals such as relaxation, self-reflection, escape from routine, and personal enrichment. At the same time, the tourism sector is undergoing a profound digital transformation. Digital technologies have reshaped tourism systems by influencing how tourists search for information, plan trips, navigate destinations, and share travel experiences (Buhalis & Law, 2008). The emergence of smart tourism destinations represents one of the most important developments in contemporary tourism research. Smart tourism destinations integrate technologies such as big data analytics, Internet of Things (IoT), artificial intelligence, and mobile connectivity to enhance tourism experiences and improve destination management (Gretzel et al., 2015; Buhalis & Amaranggana, 2015). However, digitalization also raises questions regarding experiential authenticity and meaningful engagement with destinations (Zhu, 2012; Tussyadiah, 2016). This tension is particularly relevant in the context of slow tourism. Nevertheless, recent studies suggest that digital technologies can support slow tourism development when designed to enhance experiential engagement rather than accelerate tourism consumption (Sigala, 2018).

Purpose of the paper. *This paper investigates the relationship between slow tourism and digitalization, with the aim of understanding how digital technologies can support and enhance slow tourism experiences while preserving the core values that characterize this tourism paradigm. Slow tourism has emerged within the broader framework of sustainable tourism as an approach that prioritizes environmental responsibility, cultural authenticity, local engagement, and a slower, more meaningful pace of travel. At the same time, the rapid diffusion of digital technologies—including mobile platforms, social media, digital storytelling tools, and smart destination management systems—has profoundly transformed how tourists plan, experience, and share their journeys. Within this evolving landscape, an important question arises: whether digitalization represents a potential contradiction to the philosophy of slow tourism, or rather a complementary mechanism capable of facilitating deeper, more conscious forms of travel.*

In this perspective, the paper pursues three interrelated objectives. First, it analyses the theoretical evolution of slow tourism within the broader literature on sustainable tourism, highlighting the conceptual foundations of the slow movement and its growing relevance in contemporary tourism studies. Second, it explores the role of digital technologies in shaping tourism experiences and destination management practices, examining how digital tools can enable more personalized, immersive, and community-oriented forms of tourism without undermining the principles of slowness, authenticity, and territorial embeddedness. Finally, the study investigates the case of Apulia as an emerging slow tourism destination. The region represents a particularly relevant empirical context due to its strong cultural identity, rural landscapes, local food traditions, and increasing commitment to sustainable and experiential tourism models. By analysing the Apulian case, the paper aims to provide insights into how digitalization can be strategically integrated into destination development processes in order to support slow tourism pathways and strengthen the relationship between visitors, local communities, and territorial heritage.

Methodology. *This study adopts a qualitative research approach combining literature review and exploratory case study analysis. The first stage of the research consists of a review of academic literature related to slow tourism, sustainable tourism, and digital tourism transformation. The literature review draws on peer-reviewed publications indexed in international databases such as Scopus and Web of Science. The second stage involves a case study analysis of the Italian region of Apulia, which has experienced significant tourism growth and has invested in slow tourism infrastructures such as walking routes and cycling tourism initiatives. The empirical analysis is based on secondary data derived from the SWG–ARET Apulia report on slow tourism (2025). The report includes survey data collected from more than 2,300 Italian tourists as well as international samples from France, Spain, Germany, and the United States.*

Literature Review: The academic debate on slow tourism has expanded considerably over the past two decades, reflecting broader transformations within tourism studies and the growing interest in sustainable and experiential forms of travel. Slow tourism has been widely interpreted as a response to the limitations of conventional mass tourism models, which are often characterized by rapid mobility, standardized tourism products, and limited engagement with local cultures and environments. One of the earliest conceptualizations of slow tourism can be traced to Dickinson and Lumsdon (2010), who describe slow tourism as travel that emphasizes gradual movement, longer stays, and meaningful interaction with destinations. In this perspective, the journey itself becomes a central component of the tourism experience, rather than merely a means of reaching a destination. Travelers engaging in slow tourism often choose land-based transportation modes such as trains, bicycles, or walking, allowing them to experience landscapes and cultural contexts more directly. Slow tourism is closely connected to the broader "slow movement," which emerged through initiatives such as the Slow Food movement and the Cittaslow network. These initiatives promoted a lifestyle philosophy centered on sustainability, quality of life, and the preservation of local traditions (Fullagar, Markwell & Wilson, 2012). Within tourism studies, these principles have been translated into travel practices that encourage mindfulness, cultural immersion, and slower forms of mobility. A significant portion of the literature highlights the relationship between slow tourism and sustainable tourism development. By encouraging low-impact mobility practices and longer stays in destinations, slow tourism can reduce the environmental impacts associated with tourism activities. Conway and Timms (2012), for example, argue that slow travel practices can contribute to reducing tourism-related carbon emissions by promoting alternatives to air travel

and private car usage. Similarly, Gössling and Peeters (2015) emphasize the importance of sustainable mobility systems for reducing tourism's environmental footprint. Beyond environmental sustainability, slow tourism also contributes to the economic and social sustainability of destinations. By encouraging tourists to spend more time in destinations and engage with local businesses, slow tourism can support local economies and promote more equitable distribution of tourism benefits. This aspect is particularly relevant for rural and peripheral regions that may not benefit from conventional mass tourism flows. Another important research stream focuses on the experiential dimensions of slow tourism. Contemporary tourism demand increasingly reflects a shift toward experience-based consumption. According to Pine and Gilmore (1999), modern economies have evolved toward an "experience economy" in which consumers seek memorable and meaningful experiences rather than standardized products. In the tourism context, this shift has led travelers to prioritize authentic experiences that allow them to connect with local cultures, traditions, and landscapes (Richards, 2018). Slow tourism experiences often involve activities such as walking tourism, cycling tourism, rural tourism, and gastronomic tourism. These activities allow travelers to engage with destinations at a slower pace while fostering deeper emotional connections with places. Lin (2018) suggests that slow tourism experiences can enhance tourist well-being by promoting mindfulness, relaxation, and personal enrichment. Research on tourist motivations further highlights the psychological drivers underlying slow tourism behavior. Oh, Assaf, and Baloglu (2014) conceptualize slow tourism as a goal-driven behavioral process in which travelers pursue psychological goals such as relaxation, self-reflection, escape from routine, and personal revitalization.

Qualitative Analysis: The qualitative analysis focuses on interpreting the findings of the SWG–ARET Apulia report on slow tourism (ARET, 2025) and examining their implications for the development of slow tourism experiences within the regional context. The report provides valuable insights into tourist motivations, travel behaviors, and perceptions related to walking tourism and cycling tourism. One of the most significant findings emerging from the analysis concerns the motivations driving tourists to engage in slow tourism experiences. The report indicates that contact with nature represents the primary motivation for a large proportion of travelers participating in walking tourism activities. Approximately one-third of respondents reported that immersion in natural environments and outdoor landscapes constitutes the main reason for undertaking walking tourism experiences. This finding highlights the importance of natural landscapes in shaping slow tourism experiences. In the context of Apulia, the region's diverse environments – including coastal landscapes, rural countryside, and historical pathways – provide ideal conditions for slow mobility practices such as walking tourism and cycling tourism. Cultural exploration also emerges as a key motivational factor. Many respondents indicate that walking tourism allows them to explore the history and cultural heritage of destinations more deeply than conventional tourism experiences. Walking routes often pass through historical villages, archaeological sites, and rural settlements, allowing visitors to discover aspects of local identity that may remain invisible in more conventional tourism itineraries. In addition to environmental and cultural motivations, psychological factors also play an important role in slow tourism experiences. The report highlights that many travelers perceive walking tourism as an opportunity to slow down daily rhythms, reduce stress, and temporarily disconnect from the pressures of modern life. These motivations reflect broader trends in tourism demand, as travelers increasingly seek experiences that promote personal well-being and emotional engagement. The report also reveals a growing interest in walking tourism among Italian travelers. A significant proportion of respondents indicate that they have already participated in walking routes, while many others express interest in undertaking such experiences in the future. This trend suggests that slow tourism represents a growing segment within the broader tourism market. From a geographical perspective, Apulia appears to be increasingly recognized as a destination for slow tourism. The report indicates that approximately one-fifth of Italian walking tourists have undertaken walking experiences in the region. This result reflects the growing visibility of the region's slow tourism infrastructures, including pilgrimage routes, historical trails, and rural pathways connecting coastal and inland territories. Another relevant aspect emerging from the analysis concerns the importance of service quality and infrastructural support for slow tourism experiences. Tourists highlight the need for well-maintained routes, clear signage, and accessible support services such as accommodation facilities and water points along walking itineraries. These elements are essential for ensuring the safety and comfort of travelers engaging in slow mobility activities. Within this context, digital technologies may play an important role in supporting the development of slow tourism ecosystems. Digital tools such as route navigation applications, digital mapping platforms, and online information systems can facilitate access to slow tourism infrastructures while enhancing visitor experiences. For example, mobile applications can provide tourists with real-time information about routes, weather conditions, nearby services, and cultural points of interest. Digital storytelling platforms can also contribute to enriching slow tourism experiences by providing visitors with contextual information about local heritage, traditions, and landscapes. Through multimedia content, podcasts, and interactive maps, tourists can gain deeper insights into the historical and cultural significance of the places they visit. Overall, the qualitative analysis suggests that Apulia possesses significant potential for developing slow tourism experiences centered on nature, culture, and local identity. At the same time, the integration of digital technologies may further strengthen the accessibility, visibility, and experiential quality of slow tourism destinations.

Conceptual Framework: The conceptual framework developed in this study seeks to bridge the principles of slow tourism with the opportunities offered by digital innovation in contemporary tourism systems. While slow tourism is traditionally

associated with reduced mobility speeds, deeper engagement with places, and a stronger connection with local cultures and environments, the increasing digitalization of tourism raises important questions about how technological tools can support these values without undermining the philosophy of "slowness." In this perspective, digital technologies are not interpreted as accelerators of tourism consumption, but rather as enabling infrastructures capable of facilitating more informed, accessible, and meaningful travel experiences. Within this framework, digitalization contributes to the development of slow tourism through four interconnected mechanisms. First, digital tools support sustainable mobility practices by facilitating access to information about walking routes, cycling itineraries, and alternative low-impact transport solutions. Digital mapping platforms, GPS navigation systems, and dedicated tourism applications enable travelers to plan and navigate slow mobility routes more efficiently, thereby reducing informational barriers and encouraging environmentally responsible travel behaviours. Second, digital technologies enhance the experiential dimension of slow tourism through digital storytelling. Multimedia platforms, interactive maps, podcasts, and augmented informational content allow destinations to narrate the cultural, historical, and environmental significance of places. Through these interpretative tools, visitors can gain deeper knowledge of the landscapes they traverse, transforming the travel experience into a process of cultural discovery and place-based learning. Third, digital platforms facilitate forms of community engagement by strengthening connections between tourists and local actors. Online platforms, social media networks, and digital marketplaces can support interactions with local communities, enabling visitors to discover authentic experiences such as local gastronomy, artisanal production, or cultural initiatives. These forms of digital mediation can foster more participatory tourism dynamics while simultaneously supporting local economic ecosystems. Finally, digital technologies enable the development of experience analytics, providing destinations with valuable insights into tourist behaviour, mobility patterns, and experiential preferences. Data generated through digital platforms and tourism applications can inform destination management strategies, allowing policymakers and tourism organizations to improve service quality, optimize infrastructure, and design tourism experiences that are more closely aligned with sustainability objectives. Overall, the proposed framework suggests that digital technologies can act as strategic enablers of slow tourism development. By supporting sustainable mobility, enriching narrative interpretation, strengthening community interaction, and providing data-driven insights for destination management, digital innovation can contribute to enhancing the accessibility, visibility, and experiential quality of slow tourism destinations while preserving the core values that define the slow tourism paradigm.

Results. *The empirical evidence derived from the SWG–ARET Apulia report (ARET, 2025) provides valuable insights into the motivations, behaviors, and expectations of tourists participating in slow tourism experiences. One of the most relevant findings concerns the growing interest in walking tourism among Italian travelers. A considerable proportion of respondents indicated that they had already participated in walking routes, while many others expressed interest in undertaking similar experiences in the future. Nature immersion represents the primary motivation driving participation in walking tourism activities. Approximately one-third of respondents reported that contact with natural environments and outdoor landscapes constitutes the main reason for choosing walking tourism experiences. This result highlights the central role of natural landscapes in shaping slow tourism experiences and confirms the importance of environmental resources for the development of slow tourism destinations. Cultural exploration also emerges as a key motivational factor. Many respondents indicated that walking tourism allows them to explore local history, traditions, and cultural heritage in greater depth than conventional tourism experiences. Walking routes often pass through historical villages, rural settlements, and cultural landmarks, enabling tourists to discover elements of local identity that might otherwise remain unnoticed. Psychological and experiential motivations also play a significant role. Respondents frequently mentioned relaxation, stress reduction, and the opportunity to slow down daily routines as important reasons for engaging in slow tourism activities. These motivations reflect broader societal trends in which travelers seek experiences that promote well-being and personal fulfillment. From a geographical perspective, the report indicates that Apulia is increasingly recognized as a destination for walking tourism. Approximately one-fifth of Italian walking tourists report having undertaken walking experiences in the region. This finding highlights the growing visibility of the region's slow tourism infrastructures, including pilgrimage routes, rural trails, and cultural itineraries. Overall, the results suggest that Apulia possesses significant potential for the development of slow tourism experiences centered on landscape, culture, and local identity.*

Research limitations. *Despite its contributions, this study presents several limitations that should be acknowledged. First, the research relies primarily on secondary data sources, particularly the SWG–ARET Apulia report (ARET, 2025). Although these data provide valuable insights into tourist motivations and behaviors, future research could benefit from primary empirical investigations such as interviews, focus groups, or survey-based studies specifically designed to explore the relationship between slow tourism and digitalization. Second, the study focuses on a single regional case study. While Apulia represents an interesting example of a destination investing in slow tourism infrastructures, the findings may not be fully generalizable to other destinations with different tourism dynamics or development strategies. Comparative studies involving multiple destinations could provide broader insights into how slow tourism and digital technologies interact across different contexts. Third, the conceptual framework proposed in this study requires further empirical validation. Future research could test the proposed relationships between digital technologies and slow tourism experiences through quantitative methods, such as structural equation modeling or large-scale survey research. Such*

approaches would allow researchers to better understand the mechanisms through which digital technologies influence slow tourism experiences and destination development.

Managerial implications. *The findings of this study provide several relevant implications for destination managers, tourism policymakers, and local stakeholders involved in the development of sustainable tourism strategies. First, the increasing demand for slow tourism experiences suggests that destinations should invest in infrastructures that facilitate slow mobility practices. Walking routes, cycling paths, and rural tourism networks represent key elements for developing slow tourism ecosystems. Ensuring the quality and accessibility of these infrastructures – through proper maintenance, clear signage, and safety measures – is essential for improving visitor experiences and encouraging longer stays. Second, the integration of digital technologies represents an important opportunity for enhancing slow tourism experiences. Digital tools such as mobile applications, GPS-based navigation systems, and interactive maps can significantly improve the accessibility of slow tourism itineraries. These technologies allow tourists to obtain real-time information about routes, nearby services, accommodation facilities, and cultural attractions. By facilitating navigation and planning, digital technologies can reduce uncertainty and encourage more travelers to participate in slow tourism activities. Third, digital storytelling platforms can play a crucial role in enriching the cultural and experiential dimensions of slow tourism. Through multimedia content, podcasts, augmented reality applications, and location-based storytelling, destination managers can communicate local narratives and cultural heritage more effectively. Such digital tools can enhance visitors' understanding of the historical and cultural significance of destinations without replacing the direct experience of place. Fourth, digital platforms can strengthen collaboration between tourism stakeholders and local communities. Online platforms that connect tourists with local producers, artisans, and service providers can support local economies while promoting authentic tourism experiences. This approach aligns with the principles of community-based tourism and can contribute to more inclusive tourism development. Finally, integrated governance approaches are essential for managing slow tourism ecosystems effectively. Collaboration among public institutions, tourism businesses, technology providers, and local communities can help destinations design coherent tourism strategies that balance economic growth with environmental sustainability and cultural preservation. Overall, the effective integration of slow tourism principles with digital innovation represents an important opportunity for destinations seeking to develop sustainable and competitive tourism models.*

Originality of the paper. *This research bridges two rapidly evolving fields: slow tourism and digital tourism transformation. By proposing a conceptual framework integrating these domains, the study contributes to tourism management literature and provides insights for sustainable destination development.*

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Sostenibilità e turismo nautico: i risultati di una scoping review della letteratura economico-manageriale

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Abstract *Lo studio propone una scoping literature review sul tema della sostenibilità nel turismo nautico. Il turismo nautico rappresenta un comparto in crescita dell'industria turistica e svolge un ruolo sempre più rilevante per lo sviluppo economico delle comunità costiere; al contempo, solleva importanti questioni di sostenibilità sociale e ambientale, in ragione dei non trascurabili impatti generati. Alla luce di queste dinamiche, il presente contributo intende analizzare come la comunità accademica abbia esplorato l'area di ricerca che si colloca all'intersezione tra sviluppo sostenibile e turismo nautico, da una prospettiva di taglio economico-manageriale. A partire da un sample di 121 articoli (pubblicati tra il 1988 e il 2025), ci si propone di individuare i principali filoni di ricerca e i gap ancora presenti nella letteratura. I risultati evidenziano un corpus di articoli eterogeneo, caratterizzato da diverse prospettive: a numerosi studi di taglio ambientale o legati a problematiche di gestione delle risorse marine, si affianca un numero ancora troppo contenuto di lavori di taglio economico-manageriale. Tale carenza di studi si presenta con riferimento tanto ai soggetti dell'offerta (territori, attrattive, destinazioni e imprese del turismo nautico) quanto a quelli della domanda (turisti nautici). Nel complesso, la review mette in luce come numerose tematiche rilevanti per gli studiosi di management e marketing risultino ancora poco esplorate e costituiscano quindi potenziali direzioni di sviluppo per la ricerca.*
Keywords: *turismo nautico; porti turistici; sostenibilità; scoping literature review; nautical tourism; sustainability.*

Framing of the research. *Il turismo nautico rappresenta un comparto in crescita all'interno del più ampio turismo del mare che comprende anche forme quali il turismo crocieristico e sportivo. Esso rientra tra le diverse modalità di fruizione turistica del mare e degli spazi costieri e si caratterizza per l'utilizzo dell'imbarcazione da diporto come elemento centrale dell'esperienza turistica. In letteratura, il turismo nautico è definito come "a set of tourism activities performed on the sea (or other water spaces), in ports and on the coast with a pleasure boat, which is used both as a means of transport and self-accommodation, for the purpose of recreation, sports, entertainment or other needs" (Spinelli e Benevolo, 2022; p. 3). La definizione sottolinea la specificità di questa forma di turismo che si sviluppa non solo durante la navigazione ma anche nei porti turistici, che accolgono l'imbarcazione e i diportisti, e nelle destinazioni costiere raggiunte dal mare.*

*Il turismo nautico ha assunto un ruolo rilevante all'interno del settore turistico ed è oggetto di crescente attenzione da parte della letteratura scientific*a (*Martínez Vázquez et al., 2021; Spinelli e Benevolo, 2022). Dal punto di vista economico e territoriale, esso è strettamente connesso all'industria cantierista – sempre più orientata alla realizzazione di imbarcazioni performanti e sostenibili – al sistema delle infrastrutture portuali turistiche – vere e proprie strutture ricettive, alcune delle quali evolvono verso il modello "resort" (Lam-González et al., 2023) – e alle attività economiche che si sviluppano intorno a esse. In particolare, i porti turistici e le marine producono esternalità e impatti simili a quelli dei porti commerciali, seppur su scala più contenuta (Kovačić e Luković, 2007), e costituiscono nodi fondamentali per lo sviluppo del turismo nautico e delle economie costiere.*

Nel contempo, la navigazione tramite imbarcazioni da diporto può generare diverse forme di pressione sugli ecosistemi marini e costieri (Maglić et al., 2025). Le attività legate alla navigazione e alla gestione dei porti turistici possono infatti avere molteplici conseguenze sull'ambiente marino e i litorali, spesso sottovalutati anche dagli stessi gestori portuali (Petrosillo et al., 2010). Tra questi rientrano l'inquinamento delle acque dovuto a scarichi delle imbarcazioni, oli, vernici e prodotti antivegetativi, l'introduzione di specie aliene negli ecosistemi marini, le emissioni sonore e i fumi dei motori, nonché la produzione e dispersione di microplastiche e rifiuti solidi (Kasum et al., 2009; Łapko et al., 2019). Accanto agli impatti ambientali, emergono anche alcune dimensioni sociali in relazione, ad esempio, alla sicurezza, alla salute e all'interazione tra turisti nautici e comunità locali (Kovačić et al., 2011).

In questo contesto, la presenza di tali impatti rende quindi assai rilevante il tema della sostenibilità. Tuttavia, nonostante la crescente attenzione verso la sostenibilità nel turismo e nei trasporti marittimi, le questioni legate alla sostenibilità del turismo nautico e dei porti turistici risultano ancora relativamente poco esplorate nella letteratura scientifica (Spinelli e Benevolo, 2024; Spinelli et al., 2024; De-Juan-Vigaray et al., 2025). Ciò è dovuto anche alla natura interdisciplinare degli studi sul turismo nautico che si collocano all'intersezione tra turismo, economia marittima, gestione delle risorse costiere e scienze ambientali. Gli impatti ambientali e sociali associati alle attività nautiche rendono quindi necessario approfondire le modalità con le quali il settore può evolvere verso modelli di sviluppo più sostenibili; inoltre, la crescente sensibilità dei turisti rispetto alle conseguenze ambientali e sociali delle proprie scelte di viaggio rende il tema sempre più centrale anche dal punto di vista della domanda turistica.

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Purpose of the paper. *Il turismo nautico rappresenta un'importante opportunità per molte destinazioni costiere, contribuendo alla crescita economica locale e alla valorizzazione delle infrastrutture portuali e dei servizi turistici; tuttavia, come si è illustrato in precedenza, può generare anche una serie di impatti negativi di carattere economico, ambientale e sociale. Rispetto alla produzione scientifica sul tema, precedenti studi (Spinelli e Benevolo, 2022) hanno individuato un nucleo di contributi dedicati alle problematiche di sostenibilità nel turismo nautico e caratterizzati da un approccio di tipo economico-manageriale. Il presente contributo intende estendere e aggiornare tale studio, esplorando in maniera approfondita l'area di ricerca all'intersezione tra sviluppo sostenibile e turismo nautico. A tal fine, l'analisi di concentra su come i temi della sostenibilità siano stati affrontati con riferimento a questa specifica forma di turismo, identificando gli ambiti di ricerca prevalenti e individuando quali temi siano meritevoli di maggior approfondimento.*

Methodology. *Per esplorare la letteratura all'intersezione tra sostenibilità e turismo nautico, è stata realizzata una scoping literature review, un approccio metodologico finalizzato alla mappatura di un ambito di studio ampio e in evoluzione i cui confini non sono ancora chiaramente definiti (Moher et al., 2015). Mentre le systematic review sono specifiche e meno esplorative, le scoping review considerano sia la profondità sia l'ampiezza della letteratura (Grant e Booth, 2009). Costituiscono quindi uno strumento ideale per determinare la portata o la copertura di un corpus di letteratura su un dato argomento e forniscono una panoramica della sua articolazione (Munn et al., 2018). Il presente studio, in ragione anche dell'eterogeneità e frammentazione della letteratura considerata, si propone proprio obiettivi di tipo esplorativo e trova quindi nella scoping review la metodologia più appropriata (Arksey e O'Malley, 2005).*

Per garantire rigore e robustezza alla procedura, si è seguito il framework in cinque fasi proposto da Arksey e O'Malley (2005): (1) identificazione dell'ambito dello studio, (2) identificazione della portata degli studi pertinenti, (3) selezione degli studi pertinenti, (4) registrazione e organizzazione dei dati e (5) sintesi e presentazione dei risultati.

Nella fase di pianificazione, sono stati definiti l'oggetto di analisi e il perimetro della review. Successivamente, è stato selezionato Scopus (Elsevier) come database di riferimento, in quanto ampiamente riconosciuto come uno dei principali strumenti per le ricerche bibliometriche e di letteratura in ambito turistico (Otoo e Seongseop, 2020). Al fine di garantire qualità scientifica e omogeneità delle fonti analizzate, la ricerca è stata limitata ai soli articoli in lingua inglese pubblicati su riviste scientifiche entro il 2025. Si è inoltre deciso di limitare la ricerca alle aree disciplinari "Social Science", "Business and Management", "Economics", "Environmental Sciences", "Engineering", "Multidisciplinary".

Un passaggio di rilevante importanza metodologica è stato la delimitazione della strategia di ricerca, finalizzata a individuare i contributi scientifici rilevanti. A tal fine, l'interrogazione del database è stata realizzata combinando due gruppi di parole chiave, costruiti in maniera inclusiva così da inserire sinonimi e variazioni di spelling dei termini considerati. Il primo gruppo include parole chiave riferite al turismo nautico, alla navigazione da diporto e alle imprese del turismo nautico: vi rientrano quindi – con tutte le loro variazioni – "yachting tourism", "nautical tourism", "boating tourism", "charter tourism", "yachting habour", "recreational harbour", "nautical port". Il secondo gruppo comprende termini riconducibili ai temi della sostenibilità, nello specifico – nuovamente con le loro variazioni di spelling – "sustainability", "green", "sdg", "responsibility", "pollution", "environment".

L'estrazione dei contributi è stata effettuata nel gennaio 2026 e ha restituito un totale di 899 articoli. Questo insieme iniziale è stato sottoposto a un articolato processo di selezione e filtraggio. In una prima fase, mediante la lettura di titoli, abstract e parole chiave, sono stati esclusi i contributi evidentemente estranei all'obiettivo della ricerca oppure relativi a forme di turismo diverse dal turismo nautico, quali il turismo costiero e balneare, il turismo crocieristico, il whale-watching e il diving tourism.

I 259 articoli rimasti sono stati sottoposti a un'analisi più approfondita, finalizzata a individuare quelli che esplorano gli aspetti di sostenibilità del turismo nautico con una prospettiva di matrice economico-manageriale. Sono stati quindi eliminati, tra gli altri, i contributi di taglio ingegneristico dedicati alla progettazione o alla costruzione sostenibile delle imbarcazioni, le ricerche di ambito chimico relative ai residui rilasciati dalle vernici nautiche e gli studi di carattere microbiologico riguardanti, ad esempio, la diffusione di alghe o di specie invasive nei porti turistici. A valle di questa seconda scrematura si è pervenuti al dataset finale, composto da 121 articoli.

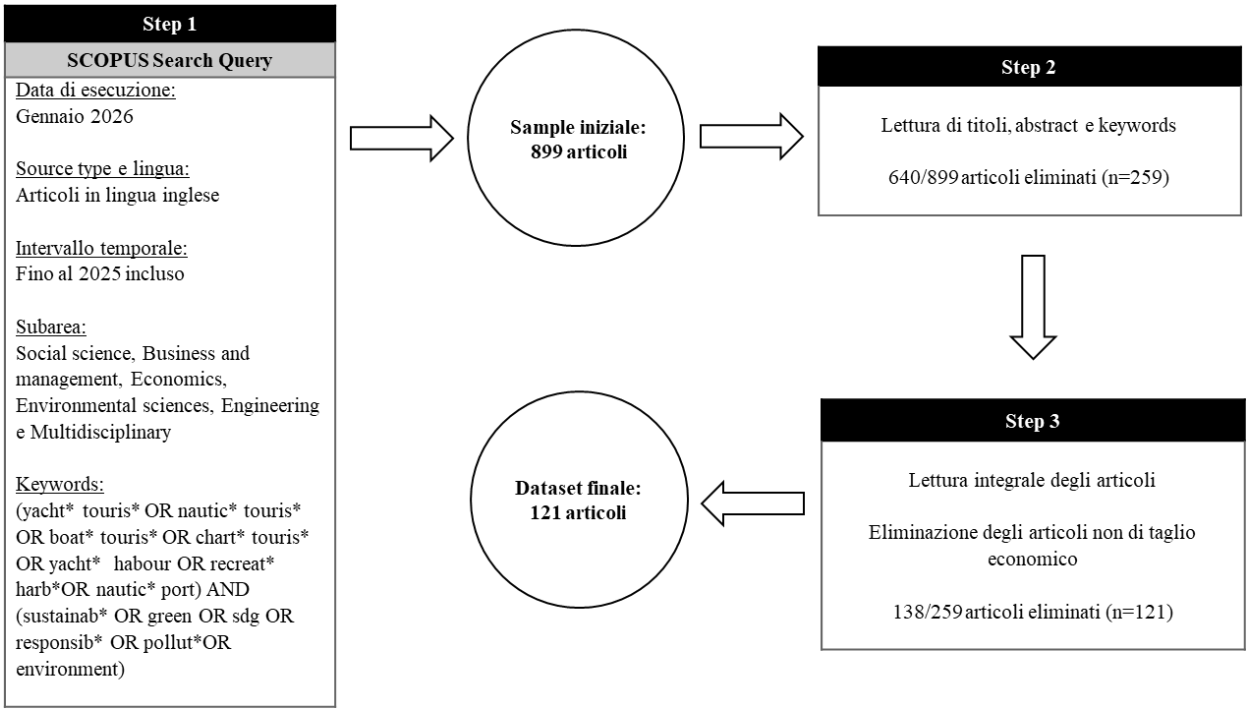
La Fig. 1 schematizza questi primi tre passaggi del processo di esecuzione della review.

Nella Fase 4, è stata eseguita un'analisi tematica sui 121 contributi, analizzandone il contenuto completo.

Per ciascun paper, sono stati rilevati, oltre ai dati bibliografici, i seguenti aspetti: tema principale, tipologia di contributo (empirico o concettuale), area geografica oggetto di studio e campione analizzato. Inoltre, si è ritenuto utile riprodurre quanto proposto da Spinelli e Benevolo (2022), suddividendo i contributi in due gruppi in base alla prospettiva di analisi; si sono quindi distinti gli studi riferiti al lato dell'offerta o della domanda nel mercato del turismo nautico.

Tutti i dati raccolti sono stati riportati in un database MS Excel che è stato quindi analizzato per pervenire ai risultati descrittivi e tematici riportati nella Fase 5 del processo.

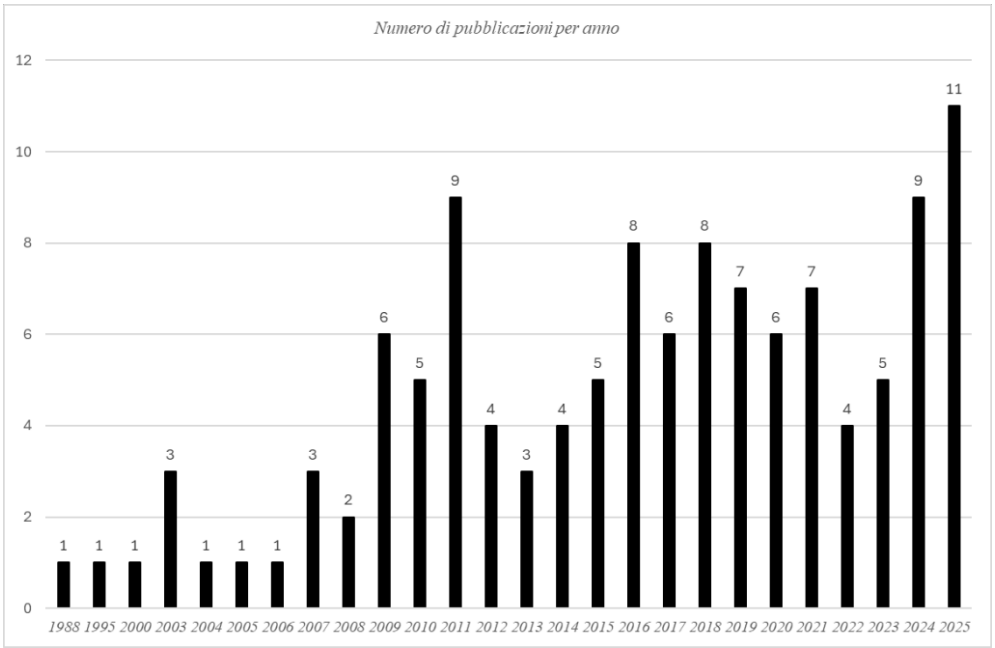
Figura 1: Fasi di esecuzione della ricerca bibliografica



Results. *I risultati della review restituiscono un quadro complessivo e articolato della letteratura esistente su sostenibilità e turismo nautico.*

La distribuzione temporale dei paper presenta un andamento altalenante con un trend crescente (Fig. 2).

Figura 2: Andamento delle pubblicazioni sulla sostenibilità nel turismo nautico



I 121 articoli sono distribuiti tra 54 riviste, riconducibili a tre principali tipologie: quelle con un focus interdisciplinare sul mare, le coste, la navigazione (con 49 articoli); quelle di matrice principalmente ambientale ed ecologica (47); quelle di taglio economico e turistico (25). Più di un terzo dei contributi è pubblicato in sole cinque riviste, peraltro di taglio non economico-manageriale e dal profilo accademico non particolarmente elevato: Sustainability (13 articoli), Marine Pollution Bulletin (9), Pomorstvo e Ocean and Coastal Management (8), WIT Transactions on Ecology and the Environment (7). La presenza nelle riviste di più alto impatto nel panorama accademico è più contenuta.

In relazione all'approccio metodologico, 107 studi sono di natura empirica mentre solo 14 sono di natura prettamente concettuale. I paper empirici sono basati prevalentemente su survey o case study, fatta eccezione per alcuni contributi con osservazione diretta sul campo (ad esempio, Gorzelany, 2004; Jett e Thapa, 2010). Nella maggior parte dei casi, i dati sono raccolti attraverso interviste o questionari e successivamente analizzati mediante strumenti statistici quali le regressioni, i modelli di equazioni strutturali e l'analisi delle componenti principali. Degno di nota è l'utilizzo dei sistemi informativi geografici (GIS) per analizzare la distribuzione spaziale delle barche (tra gli altri, Balaguer et al., 2011; Gray et al., 2011).

I campioni oggetto di studio includono solitamente diportisti e turisti nautici; meno numerosi sono gli studi che coinvolgono i soggetti dell'offerta – quali porti turistici (tra gli altri, Kasum et al., 2009; Spinelli e Benevolo, 2024), compagnie di charter (Trstenjak et al., 2020; Jiménez-Jiménez et al., 2024) o altre imprese che offrono servizi nautici (Stoll et al., 1988; Lam-González et al., 2019) – istituzioni pubbliche (tra gli altri, Grant-Smith e Mayes, 2017; Silveira et al., 2018) o residenti delle aree costiere e portuali (tra gli altri, Silveira e Santos, 2013; Ibabe et al., 2020),

Le aree geografiche oggetto di studio sono ampiamente distribuite; tuttavia, le più analizzate si trovano nel bacino del Mediterraneo (in particolare Croazia, Italia e Spagna), lungo la costa atlantica degli Stati Uniti e nella regione dei Grandi Laghi. Degno di nota è il fatto che, negli anni più recenti, siano stati effettuati studi sul campo anche in Paesi come Australia, Nuova Zelanda e Capo Verde.

Con riferimento al contenuto degli studi, abbiamo individuato 66 paper riferiti a tematiche di offerta e 55 aventi per oggetto aspetti della domanda nel mercato del turismo nautico.

I paper inerenti alle dimensioni dell'offerta possono essere ulteriormente divisi in due sottogruppi a seconda del livello macro (sistema turistico) o micro (imprese turistiche) considerato nell'analisi. Il gruppo "macro" include 41 contributi che analizzano il tema della sostenibilità nel turismo nautico con riferimento a uno specifico ambito geografico/Paese (ad esempio, Kovačić e Silveira, 2018) o nel quadro di politiche e strategie di destination management & marketing (tra gli altri, Gračan et al., 2018), attraverso l'integrazione del turismo nautico nel sistema di offerta turistica locale (tra gli altri, Ivanić et al., 2018). I 25 paper di offerta a carattere micro concentrano l'attenzione sulle imprese del turismo nautico. Prevalenti sono gli studi dedicati agli aspetti di sostenibilità nella gestione e marketing dei porti turistici (ad esempio, Donadić et al., 2025); tra i temi esplorati troviamo la comunicazione di sostenibilità tramite i siti web (Spinelli et al., 2024; De-Juan-Vigaray et al., 2025), l'adozione di certificazioni e standard ambientali (Ritchie et al., 2017; Spinelli e Benevolo, 2024) e la percezione dei rischi e della sicurezza ambientale da parte dei manager (tra gli altri, Petrosillo et al., 2009, 2010). Due articoli studiano il charter nautico, con riferimento all'allineamento tra l'offerta delle agenzie e le preferenze dei consumatori in tema di sostenibilità (Jiménez-Jiménez et al., 2024) e agli ostacoli all'adozione di soluzioni di efficientamento energico da parte delle agenzie stesse (Trstenjak et al., 2020).

I paper riferiti alla domanda si concentrano sul consumatore/turista nautico e approfondiscono aspetti quali i comportamenti dei diportisti e le loro percezioni rispetto a una fruizione sostenibile dell'esperienza turistica. In particolare, numerosi contributi analizzano le pratiche dei diportisti e il loro rispetto delle normative finalizzate alla tutela della fauna marina (tra gli altri, Flamm e Braunsberger, 2014; Jett et al., 2009; Jett e Thapa, 2010) o al contenimento della diffusione di specie invasive o non indigene (tra gli altri, Manyweathers et al., 2025; Moore et al., 2024; Martínez-Laiz et al., 2019). Un numero più limitato di contributi indaga il comportamento dei visitatori nelle aree marine protette (tra gli altri, La Manna e Sarà, 2019; Gray et al., 2010). Altro tema oggetto di studio è la distribuzione spaziale delle imbarcazioni da diporto e i relativi flussi di navigazione, con l'obiettivo di modellizzare le forme di utilizzo degli spazi marini e valutarne le implicazioni per la gestione sostenibile delle destinazioni costiere (tra gli altri, Gonson et al., 2016; Gray et al., 2011). Altri studi esplorano la "willingness to pay" dei diportisti in relazione a iniziative legate alla tutela ambientale e al ripristino degli ecosistemi marini (tra gli altri, Diedrich et al., 2013; Jiang et al., 2025). Ulteriori temi trattati sono, infine, specifici aspetti del comportamento dei turisti nautici quali le pratiche di manutenzione e gestione delle imbarcazioni (Wester e Eklund, 2011) o il rispetto delle norme di sicurezza a bordo (Bell et al., 2000; Virk e Pikora, 2011; Quistberg et al., 2014).

Nel complesso, l'analisi del campione di 121 articoli evidenzia un quadro frammentato e prevalentemente descrittivo. Numerosi studi si concentrano su aspetti specifici e spesso marcatamente operativi; sono limitate le letture d'insieme del fenomeno, capaci di coglierne le interdipendenze e la dimensione sistemica (Cardoso et al., 2023; Filimon, 2023). Ne deriva quindi una scarsa attenzione all'integrazione tra attori, pratiche e governance, che riduce la comprensione delle dinamiche complessive della transizione verso modelli e pratiche sostenibili.

L'analisi del corpus di letteratura evidenzia una significativa eterogeneità dei temi considerati; permangono, tuttavia, numerose e importanti aree di ricerca – soprattutto di matrice più strettamente economico-gestionale – non adeguatamente esplorate. Nello specifico, la dimensione ambientale della sostenibilità appare ampiamente trattata, mentre risultano ancora limitati gli studi che approfondiscono le dimensioni sociali ed economiche della sostenibilità nel turismo nautico. A livello macro, sono ancora poco esplorati l'impatto del turismo nautico sul benessere delle comunità locali, le sue ricadute economiche di lungo periodo nonché le modalità di intervento pubblico a favore di uno sviluppo più sostenibile di questa forma di turismo. Meriterebbe, inoltre, maggiore attenzione lo studio dell'overtourism nelle destinazioni nautiche e delle possibili strategie di gestione di tale fenomeno. A livello micro, la presenza di studi dedicati ai porti turistici risulta sottodimensionata rispetto al loro ruolo nel sistema turistico nautico. Oltre ad essere i principali attori dell'offerta, i porti intercettano i trend emergenti della domanda e la orientano verso approcci più sostenibili; al contempo, sono tra i principali destinatari della normativa di riferimento, dipendendo da loro una quota significativa degli impatti complessivi del fenomeno turistico nautico. Nello specifico, sono limitati gli studi sulla diffusione delle

pratiche di sostenibilità nei porti così come le analisi della loro percezione e valutazione da parte del management dei porti turistici, anche in relazione al possibile ruolo della sostenibilità quale leva di posizionamento competitivo. Con riferimento alle tematiche di domanda, il rapporto tra turisti nautici e sostenibilità è ancora poco esplorato: in particolare, appare rilevante indagare la possibile segmentazione dei turisti nautici in funzione del livello di attenzione e importanza attribuito a tali tematiche. Manca inoltre uno studio approfondito dell'impatto dei fattori legati alla sostenibilità sui processi decisionali dei turisti nautici, nonché della loro disponibilità a riconoscere un premium price per servizi e soluzioni più sostenibili.

A livello metodologico, infine, emerge l'esigenza di un più diffuso ricorso a studi comparativi, al fine di confrontare in prospettiva internazionale aspetti quali il ruolo delle normative, le politiche pubbliche e di destinazione, le strategie e politiche aziendali nonché i comportamenti del turista nautico rispetto ai temi della sostenibilità.

In questa prospettiva, future ricerche dovrebbero, da un lato, approfondire i singoli filoni ancora poco esplorati e, dall'altro, sviluppare approcci maggiormente integrati, capaci di restituire una lettura sistemica del fenomeno, attraverso l'analisi delle interazioni tra i diversi player coinvolti e la valutazione degli effetti della sostenibilità nelle sue dimensioni ambientale, economica e sociale.

Research limitations. *La ricerca presenta alcuni limiti, di natura prevalentemente metodologica. In primo luogo, la scelta delle parole chiave utilizzate per la selezione dei paper risulta determinante per la loro corretta ed esaustiva identificazione; sebbene si sia adottato un approccio fortemente inclusivo in termini di quantità e varietà dei termini, non si può escludere che alcuni contributi potenzialmente rilevanti siano rimasti esclusi. Analogamente, si è scelto di utilizzare il solo database Scopus: un'eventuale estensione ad altri, quali Google Scholar e Web of Science, potrebbe consentire di individuare ulteriori contributi significativi. Ancora, si è ristretto lo studio ai soli articoli su rivista scientifica, sebbene il tema sia affrontato anche in ulteriori tipologie di contributi quali atti di convegno, report di enti di ricerca e libri. In ultimo, va ricordato che nella rassegna sono stati selezionati solo paper in lingua inglese; il turismo nautico, tuttavia, è oggetto di studio da parte di comunità scientifiche nazionali che pubblicano anche nella loro lingua locale (soprattutto in croato, italiano e spagnolo); l'analisi di tali contributi – pur difficile per ragioni linguistiche – potrebbe portare a una visione più completa del corpus della letteratura in oggetto.*

Managerial implications. *Sebbene la natura del contributo lo collochi prevalentemente nel dibattito accademico, è possibile trarne alcune rilevanti implicazioni di carattere manageriale. In particolare, emerge la carenza di studi che integrino la prospettiva di operatori e turisti nello studio delle ricadute del turismo nautico in termini di sostenibilità; tale lacuna lascia i manager delle destinazioni e delle imprese nautiche privi di adeguati riferimenti operativi, linee guida e best practice a supporto dei processi decisionali in un ambito in rapida evoluzione. In risposta a ciò, si auspica una maggior attenzione a forme di collaborazione tra accademia e sistema produttivo, attraverso la co-progettazione di studi in grado di approfondire le diverse dimensioni del fenomeno e generare evidenze empiriche utili all'agire manageriale. Allo stesso tempo, risultano ancora limitati i contributi che affrontano il tema della sostenibilità nel turismo nautico nella prospettiva dei policy maker. In particolare, si rileva una scarsa attenzione alle dinamiche di coordinamento interistituzionale e alla declinazione delle linee di policy in strumenti operativi. In questo senso, una maggiore integrazione tra ricerca, istituzioni e decisori pubblici potrebbe favorire lo sviluppo di politiche più efficaci e coerenti con gli obiettivi di sostenibilità del settore.*

Originality of the paper. *Il presente studio rappresenta la prima review che analizza la produzione scientifica all'intersezione tra sostenibilità e turismo nautico. Il lavoro mette in relazione due ambiti di crescente rilevanza sia nel dibattito accademico sia nelle pratiche di gestione manageriale nell'industria turistica. In questo senso, il paper contribuisce a esplorare un ambito emergente nella letteratura, offrendo una prima sistematizzazione degli studi esistenti e individuando possibili direzioni di futura ricerca.*

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The dual sides of artificial intelligence in hospitality industry processes: A qualitative analysis of organizational perceptions and operational applications

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Abstract. *This study examines the dual sides of artificial intelligence (AI) in hospitality industry processes by integrating evidence from two qualitative studies conducted in the hotel context and in the hotel food supply chain. The first study is based on open-ended questionnaire responses designed to elicit in-depth perceptions of AI adoption in hotels, with particular attention to prior experiences, expectations for future applications, and perceived benefits and barriers. Forty-four complete questionnaires were analyzed through NVivo, differentiating managers from non-managers and coding perceptions as positive, neutral or negative, while also developing secondary codes for familiarity, empirical applications, and benefits and barriers. Results indicate substantial role-based differences. Managers report higher familiarity and more frequent AI use, and they tend to evaluate AI's cost–benefit profile more favorably, associating AI with efficiency, error reduction, time savings, data management, competitiveness and support in contexts characterized by labor shortages. Non-managers display lower familiarity and a more cautious stance, often neutral rather than negative, with neutrality largely explained by limited knowledge and confidence. Across both groups, current applications cluster around generative AI for writing and communication, including multilingual guest information and responses to emails and reviews, as well as marketing content, segmentation, and follow-up activities. The second study is an exploratory investigation of AI in the hotel food supply chain, centered on the empirical application of an AI-powered platform (MenuMind). Eight semi-structured interviews with hotel managers and food suppliers highlight perceived potential for demand forecasting, procurement optimization, cost control, personalization of buffet and menu planning, and strengthened ties with local suppliers, alongside concerns related to data governance, privacy, system integration, cultural resistance in kitchens, and the need for flexible solutions that respect recipe heterogeneity. Overall, the findings portray AI as simultaneously enabling and challenging: it can improve operational performance and sustainability-oriented outcomes, but its real adoption depends on organizational readiness, training and change management.*
Keywords: *artificial intelligence; hospitality management; qualitative research; organizational perceptions; food supply chain; food waste*

Framing of the research. *Artificial intelligence has become a central force in the transformation of service industries, yet its diffusion is often shaped by sector-specific constraints. In hospitality this tension is particularly pronounced because hotels operate at the intersection of process efficiency and human-centered service* (*Acharya & Mahapatra, 2024; Vorobeva, 2024). The promise of AI is frequently articulated through its capacity to automate tasks, process data at scale, and support decision-making under uncertainty (Lin et al., 2020). At the same time, hotels are social systems in which service quality is co-produced by employees and guests, and in which routines, professional identities, and established ways of working can be disrupted by technological change (Buhalis & Sinarta, 2019; Gursoy et al., 2019). The adoption of AI therefore tends to display an ambivalent profile, generating both optimism about efficiency and concern about cultural, ethical, and relational consequences (Buhalis, 2025).*

This ambivalence is visible in two interconnected domains that are especially relevant for hospitality organizations. The first domain concerns the internal organization of hotel work, including front office operations, communication, marketing activities, and managerial planning (Al-Hyari et al., 2023, Mariani & Borghi, 2024). These processes are increasingly exposed to AI tools that can assist with writing, translation, personalization, and data analysis. The adoption of such tools depends on familiarity and perceived value, which often vary across hierarchical levels. The second domain concerns the hotel food supply chain (Morosan et al., 2024). Food service in hotels is a strategic area with direct implications for customer satisfaction, costs, and sustainability. It is also an area characterized by demand volatility, heterogeneous guest preferences, seasonality, and a persistent reliance on manual processes for inventory monitoring, menu planning, supplier selection, and expiration management. As a consequence, misalignment between demand and supply may lead to overproduction and food waste, creating both economic losses and environmental impacts. Prior work has emphasized that food waste in hospitality arises not only from operational inefficiencies but also from the complexity of consumption patterns and from planning practices that rely heavily on experience-based heuristics rather than systematic analytics (Micheli & Cagno, 2021). This is particularly salient in buffet settings, where forecasting quantities is structurally difficult because the service model encourages abundance while consumption remains uncertain.

This paper contributes to the understanding of these dynamics by integrating evidence from two qualitative studies that together explore the dual sides of AI in hospitality processes. Study 1 focuses on organizational perceptions within hotels by analyzing open-ended questionnaire responses from managers and non-managers, examining familiarity,

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perceived cost–benefit balance, and concrete examples of current AI use. Study 2 examines the empirical context of AI application in the hotel food supply chain through an exploratory interview study conducted in the context of the project "REAWAPE Reducing Waste, Optimizing Purchases" (funded by the Italian Fund for Digital Republic and Google.org) which developed the MenuMind platform. The integration of these two studies offers an empirically grounded lens on how AI is perceived and enacted across hotel roles and across an operational domain that is strategically important for sustainability and efficiency.

Purpose of the paper. *The purpose of this paper is to analyze the dual sides of artificial intelligence in hospitality industry processes by using qualitative evidence from two empirical studies. The first objective is to examine how managers and non-managers perceive AI adoption in hotels, focusing on their familiarity with AI, their evaluation of the balance between benefits and barriers, and the types of AI applications currently used in practice. The second objective is to explore how AI is perceived when applied to the hotel food supply chain, with particular attention to the potential of AI-enabled platforms (i.e., MenuMind) to reduce food waste, optimize purchasing decisions, enhance personalization of food offerings, and strengthen relationships with local suppliers, while also identifying the technical and cultural barriers that may hinder adoption. By combining these objectives, the paper seeks to clarify how AI can simultaneously act as an enabler of operational improvement and a source of organizational challenges, and how adoption pathways depend on knowledge, trust and change management.*

Methodology. *Study 1 is grounded in the qualitative analysis of open-ended questionnaire responses designed to investigate perceptions of AI adoption in hospitality. The questionnaire was structured to elicit both exploratory reflections and more focused assessments. In the first section, open questions invited participants to report their prior experiences and future expectations regarding AI use in hospitality, for example by asking about the type of experience they had with AI in the hotel context, where and how they imagined future AI applications in the sector, and which empirical examples or implementations they knew. This design was intended to capture participants' familiarity with AI, as well as their anticipatory views on how AI might evolve and diffuse in hotel operations. In the second section, the questionnaire explicitly addressed perceived benefits and barriers, including questions about the main advantages and obstacles to AI adoption in hotels and whether benefits were considered to outweigh barriers or vice versa. This combination of exploratory and focused questions aimed to elicit reflective, experience-near accounts while still enabling systematic comparison across respondents. After an initial screening, the dataset included forty-four questionnaires completed in full, which constituted the empirical basis for analysis. Responses were analyzed using NVivo as a qualitative analysis tool that supports coding and visualization of recurring patterns. A key methodological decision was the distinction between two macro-groups of respondents, namely managers and non-managers. Managers were defined as respondents holding supervisory positions and being responsible for coordinating the work of others, whereas non-managers were employees without direct managerial responsibilities. This distinction was central because it enabled an examination of whether perceptions of AI adoption differ across hierarchical levels and across degrees of involvement in decision-making processes related to technological change. The analysis also coded responses according to three perception categories, positive, neutral, and negative, and developed secondary codes related to familiarity, empirical applications, and benefits and barriers. This coding scheme facilitated a structured interpretation of role-based differences and supported the identification of themes that shape acceptance, caution, or resistance toward AI. A further analytical component of Study 1 was lexical frequency analysis in response to the question about empirical examples or implementations of AI used in hotel contexts. The frequency analysis aimed to identify the most recurrent terms used by respondents to describe current AI applications, providing an additional lens on how AI is practically enacted in hotel work. The interpretation of high-frequency terms was grounded in the qualitative context of the responses, enabling the analysis to connect lexical patterns to concrete practices such as writing multilingual guest information, responding to emails and reviews, creating marketing content, segmenting guests, and supporting management activities such as energy management and revenue management.*

Study 2 is an exploratory qualitative study conducted to investigate stakeholder perceptions regarding the integration of MenuMind into the hotel food supply chain. This study was developed within the broader project "REWAPE Reduce waste, optimize purchase" and conducted after a short presentation of the project and of the MenuMind prototype. The decision to present the platform prior to interviews was intended to ensure that all participants shared a minimum and comparable understanding of the tool being discussed, thereby improving the interpretive value of their responses: Eight key stakeholders were interviewed, including hotel managers and food suppliers. Participants were selected through purposeful sampling as "information-rich" cases in the sense of Patton (2002), on the basis of their professional experience and their expected contribution to understanding the phenomenon. Interviews followed a semi-structured format, beginning with general questions about experience with digital solutions or AI systems in tourism and hospitality and then moving to specific questions about MenuMind, including perceived benefits and barriers, expected effects on kitchen efficiency, and potential implications for strengthening the relationship between hotels and the local agri-food supply chain.

Interviews lasted between twenty and thirty minutes. The coding process followed the procedure outlined by DeSantis and Ugarizza (2000), which conceptualizes themes as abstract entities that provide meaning and coherence to recurring experiences and perceptions, rather than as simple lexical clusters. The analysis applied an open coding approach following Miles and Huberman (1994), involving systematic examination of transcripts and iterative comparison between

quotes and emergent categories. Through progressive aggregation, themes were derived inductively, avoiding the imposition of pre-established interpretive schemes and strengthening internal validity. This approach allowed the analysis to capture both convergences and differences between hotel managers and suppliers, and to articulate perceived benefits and barriers across internal operational perspectives and external ecosystem perspectives.

Results. *Study 1 reveals clear differences between managers and non-managers in both familiarity with AI and evaluations of its cost–benefit balance. Seventy-one percent of managers reported being familiar with AI and actively using it, whereas twenty-nine percent indicated limited knowledge and no current applications in their hotels. Among non-managers, familiarity was evenly divided: half reported using AI in their daily work, while the other half declared no familiarity or use. These results show that AI exposure is not uniform within hotel organizations and that hierarchical position strongly influences confidence and experience with technology.*

Differences also emerge in the perceived cost–benefit ratio. Among non-managers, half believed that benefits outweigh costs, while the other half adopted a neutral stance, mainly due to limited knowledge rather than active opposition. Managers expressed a more favorable evaluation: fifty-three percent considered benefits greater than costs, thirteen percent expressed negative judgments, and thirty-four percent remained neutral. Managers tended to frame AI in terms of operational efficiency, competitiveness, and strategic advantage, whereas non-managers' evaluations were more closely tied to direct experience and familiarity.

Lexical frequency analysis further clarifies how AI is currently used. Among managers, recurring terms included creation, texts, guests, systems, management, and marketing. AI is widely employed for generating multilingual content at the front desk, responding to reviews and emails, creating personalized offers, and supporting marketing activities such as newsletters and targeted campaigns. AI is also used for guest segmentation and follow-up communication, including chatbot-based interactions that ensure continuous availability. In more infrastructural applications, AI supports security systems, predictive maintenance for laundry equipment, energy management in smart rooms, human resource screening, review management, and revenue optimization. These examples illustrate that managers perceive AI not only as a communication tool but as an operational and strategic infrastructure.

Among non-managers, the most frequent terms were writing and ChatGPT. Their AI use concentrates on drafting emails, preparing newsletters, generating social media captions, and supporting guest questionnaires. ChatGPT is perceived as a versatile tool for producing and refining text in everyday tasks. Compared to managers, non-managers report fewer system-level applications, suggesting that access and visibility of AI tools differ by role, with managers more exposed to strategic and infrastructural uses and non-managers focusing on task-level support.

Regarding perceived benefits, managers emphasized efficiency, reduction of repetitive tasks, time savings, data management, and staff shortages. AI is seen as improving routine operations, reducing errors, optimizing resources, and addressing labor scarcity by freeing employees for higher-value relational activities. Managers also stressed the necessity of AI to remain competitive and to manage the growing volume of data collected by hotels. Non-managers similarly highlighted labor shortages, cost reduction, competitiveness, and faster task execution, but identified lack of familiarity and privacy concerns as primary barriers. Overall, managers display a more proactive orientation, while non-managers tend toward cautious neutrality. Both groups, however, recognize AI's relevance for competitiveness, revealing a dual dynamic: shared acknowledgment of potential combined with role-specific concerns about knowledge, trust, and human interaction.

The analysis extends to the hotel food supply chain, identified as a strategic domain with significant economic and environmental implications. Food management in hotels is complicated by demand volatility linked to guest demographics, nationality, dietary habits, and seasonality. This variability often leads to overproduction and food waste, generating both financial and environmental costs (Micheli & Cagno, 2021). Manual processes in stock monitoring, meal planning, and supplier selection further constrain optimization, while supplier choices often prioritize convenience over local value creation (Vegan & Saghafi, 2020).

Within this context, AI is presented as a tool capable of enabling predictive demand forecasting and real-time procurement optimization to eight key informants (Table 1).

Table 1: Study participants

Interviewee	Role	Age	Sex	Professional experience
1	Hotel Manager, P.I.	35	Male	4
2	Hotel Manager, G.S.	50	Male	12
3	Hotel Manager, R.F.	58	Female	16
4	Hotel Manager, V.I.	39	Female	8
5	Hotel Manager, A.Z.	34	Male	3
6	Hotel Manager, E.G.	53	Male	18
7	Food supplier, M.N.	51	Male	20
8	Food supplier, G.P.	65	Male	25

The project "REWAPE Reducing Waste, Optimizing Purchases", supported by the Italian Fund for Digital Republic and Google.org, developed a prototype platform (MenuMind) to reduce food waste and improve purchasing efficiency. MenuMind combines data on occupancy, guest preferences, recipe grammages, and leftover feedback to generate dynamic forecasts of raw material needs. Unlike traditional systems, it learns progressively, improving predictive accuracy over time.

Eight exploratory interviews identified four macro-categories: efficiency, personalization, sustainability, and barriers. Efficiency relates to automation and predictive capacity, including automated ordering, real-time monitoring, and cost-per-meal control. These functions are perceived as reducing manual errors, optimizing margins, and enabling timely corrective interventions. Personalization refers to adapting menus and buffet planning to guest preferences, especially across different nationalities. Interviewees emphasized that AI must remain flexible to accommodate recipe heterogeneity and local culinary identity, avoiding excessive standardization.

Sustainability emerged as a central theme. AI is seen as supporting local sourcing by integrating seasonality and regional availability into purchasing decisions, thereby benefiting both the environment and local economies. Waste reduction is framed not only as an economic objective but also as corporate responsibility toward customers and the planet. Stakeholders also associate AI with supply chain resilience in contexts of climate change and market volatility.

Barriers include privacy concerns, data governance uncertainty, integration with existing management systems, and cultural resistance, particularly in kitchens. Experienced chefs may prefer intuition over algorithmic recommendations, perceiving digital tools as intrusive rather than supportive. Successful adoption therefore requires training, involvement, and cultural alignment, as well as clear governance regarding data ownership and protection. Ecosystem challenges also emerge, as integrating small local producers into digitalized supply chains may require cooperation and capacity building.

Taken together, the findings illustrate the dual sides of AI in hospitality processes. AI is widely perceived as a driver of efficiency, personalization, and sustainability, yet its adoption raises concerns about privacy, integration, and cultural acceptance. AI implementation is therefore not a purely technical matter but a socio-technical transformation shaped by organizational roles, knowledge levels, and ecosystem relationships.

Research limitations. *This study presents several limitations. First, both empirical investigations rely on qualitative methods, prioritizing depth of interpretation over statistical generalization. The findings are therefore context-bound and cannot be extended automatically to all hospitality settings. Second, the results are perception-based. Study 1 captures reported familiarity, attitudes, and examples of AI use, while Study 2 explores expectations regarding the MenuMind platform. The research does not include longitudinal data or objective performance measures such as verified cost reductions or quantified decreases in food waste. Third, although data governance and system integration emerged as central concerns, the study does not empirically analyze specific legal, technical, or organizational governance models.*

Managerial implications. *The findings suggest that AI adoption in hospitality requires role-sensitive implementation strategies. Managers tend to perceive AI more positively, while non-managers often remain neutral due to limited familiarity. Consequently, targeted training and practical demonstrations are essential to build confidence and reduce uncertainty among operational staff. AI should be framed as a support tool that enhances, rather than replaces, human interaction. By automating repetitive tasks and improving data management, AI can free employees to focus on relational and service-oriented activities. Clear data governance and transparent integration with existing systems are also critical, particularly when AI platforms connect with PMS and involve guest or supplier data. Finally, in the food supply chain context, successful implementation depends on balancing efficiency and sustainability objectives with organizational culture, flexibility and collaboration with local suppliers.*

Originality of the paper. *This study is original in its integrated examination of AI's dual sides across two interrelated hospitality process domains using qualitative evidence. It contributes by connecting role-based perceptions of AI adoption within hotel organizations to an exploratory analysis of AI application in the hotel food supply chain through the MenuMind platform. The paper's originality lies in showing how the same technology category can be framed simultaneously as a solution to labor shortages, efficiency pressures, sustainability objectives, and as a source of organizational tension involving privacy, data governance, system integration and cultural resistance. By focusing on concrete reported applications such as writing support, guest communication, segmentation, and predictive procurement, the paper provides a process-level understanding of AI adoption that bridges internal organizational dynamics and external supply chain relations. In addition, the emphasis on recipe heterogeneity and culinary identity further highlights a distinctive hospitality-specific challenge: optimization must remain compatible with differentiation, authenticity, and craftsmanship, otherwise technological benefits may be offset by erosion of unique service value.*

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The value of brand heritage in the Destination Management process: a comparative study of Italian Cultural Capitals

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Abstract. *This study investigates the role of brand heritage in destination management, focusing on Italian cities that have received institutional recognition. The research examines how heritage-based elements contribute to strengthening territorial identity and competitive positioning by analyzing the fifteen Italian cities awarded the title of Italian Capital of Culture and the four Italian cities designated European Capitals of Culture.*

The research adopts a qualitative and comparative approach to investigate how heritage-related dimensions are incorporated into strategic planning and communication processes. The study is guided by the following research questions: how institutional recognition influence heritage-based branding strategies, and what similarities and differences emerge across these culturally recognized cities strategies. Specifically, it examines the use of cultural heritage, local traditions, historical narratives and identity-based storytelling as tools to enhance destination positioning within tourism and cultural markets. Preliminary findings suggest that the effective integration of brand heritage into destination management strategies strengthens territorial identity, improves narrative coherence and enhances perceived authenticity.

This study contributes to the literature on destination branding and cultural management by highlighting the strategic importance of brand heritage in territorial development processes, offering a conceptual framework that connects cultural recognition programs with heritage-based branding strategies and destination management practices. Furthermore, it conceptualizes brand heritage as a dynamic and process-based construct, distinct from related concepts such as destination image and place branding and interprets it as a strategic resource embedded in governance and long-term territorial development processes. The study is presented as work-in-progress, with further empirical insights to be developed through ongoing qualitative data collection.

Keywords: *Brand heritage, Brand authenticity, Destination Management, Sustainable competitive advantage, Qualitative study.*

Framing of the research. The concept of destination management has evolved from a traditional focus on marketing activities aimed at attracting visitors by highlighting natural resources, cultural attractions, or infrastructure to contemporary approaches that integrate managerial and strategic perspectives designed to create long-term value for territories (Reinhold et al., 2023). This evolution reflects a broader shift in how destinations are understood and managed, with increasing attention given to the role of cultural and heritage assets in shaping territorial identity (Groote & Haartsen, 2016; Perry, 2023). Early destination management research primarily adopted a structural perspective, focusing on tourism suppliers and service chains within a defined geographical context (Presenza et al., 2006; Zhang et al., 2009). Over time, the focus has progressively moved toward leveraging heritage and cultural resources to develop distinctive territorial brands that enhance recognition and competitiveness (Fyall & Garrod, 2020; Almeida & Almeida, 2023).

Communication and branding have assumed a central role in destination management strategies. Territorial branding initiatives are now widely implemented to differentiate destinations by emphasizing their unique cultural, historical and natural characteristics (Melewar & Skinner, 2020). Yet many strategies continue to rely on relatively homogeneous narratives, often limited to the promotion of tangible and intangible assets such as monuments, landscapes and gastronomy (Kim & Youn, 2017). This standardization can undermine the uniqueness of destinations and weaken their competitive positioning in increasingly saturated tourism markets (Liu et al., 2024).

In response to these limitations, scholars and practitioners have increasingly highlighted the importance of incorporating deeper identity-based dimensions into territorial branding processes (Botschen et al., 2017). Specifically, the growing relevance of cultural and symbolic elements has led to the development of approaches such as place branding and cultural branding, which emphasize the role of identity, meaning and narrative construction in shaping the perception of places (Wong et al., 2016; Botschen et al., 2017; Maffei et al., 2026).

The concept of brand heritage has emerged as a particularly significant dimension. Originating in corporate branding literature, brand heritage refers to the temporal depth, continuity, core values and historical roots associated with a brand (Pecot et al., 2016). These elements include aspects such as longevity, track record, symbolic assets and the consistent transmission of values over time (Rindell & Santos, 2021). Several studies have highlighted that brand heritage enhances perceptions of authenticity, credibility and legitimacy, factors that have become increasingly important in contemporary markets characterized by high competition and information asymmetry (del Barrio-Garcia & Prados-Peña, 2019; Chen et al., 2021; Shi et al., 2022).

Authenticity can be understood as the perceived genuineness and credibility of a destination, often associated with its cultural traditions, historical continuity and local identity (Chen & Lee, 2021). While authenticity has been extensively studied as a determinant of tourist satisfaction and destination attractiveness, its connection with brand heritage as a strategic managerial resource remains relatively underexplored. In this respect, brand heritage differs from related

constructs such as destination image, which refers to tourists' perceptions, and place branding, which concerns the overall strategic positioning of places. Instead, brand heritage is interpreted here as a temporally embedded and strategically enacted process through which the past is selectively mobilized to shape present and future positioning.

Moving from the recognition of cultural heritage as a key territorial resource, brand heritage can be interpreted as the outcome of a strategic process through which historical and cultural assets are translated into coherent narratives and identity-based positioning strategies. More specifically, this study conceptualizes brand heritage as a process articulated in phases of activation, interpretation and strategic communication, through which heritage elements are selected, given meaning and projected externally. This perspective extends beyond the mere preservation of heritage and emphasizes its role in shaping the symbolic and competitive dimensions of destinations.

Institutional initiatives aimed at promoting cultural identity have further reinforced the strategic importance of heritage in destination management. Programs such as the European Capital of Culture and the Italian Capital of Culture provide formal recognition to cities that demonstrate strong cultural vitality and innovative approaches to heritage valorisation. These initiatives not only enhance the visibility of destinations but also stimulate the development of long-term cultural strategies, investments in cultural infrastructures and the activation of local stakeholder networks.

The recognition associated with cultural capital titles can be interpreted as a strategic platform for activating processes of identity reconstruction and heritage-based branding, as cities receiving such titles are encouraged to rediscover, reinterpret and communicate their historical and cultural narratives, thereby contributing to the construction of a coherent territorial brand grounded in authenticity.

Despite these developments, the integration of brand heritage into destination management remains a relatively underexplored area of research. Most studies on destination management have only carried out analyses of destination image and tourism experiences, without explicitly addressing how cultural identity and storytelling can be leveraged as strategic assets within territorial contexts. Therefore, the present study aims to explore how brand heritage can be integrated into destination management to strengthen territorial identity and enhance competitive positioning. In doing so, the paper also aims to contribute by bridging brand heritage literature with destination management and cultural governance perspectives, offering a process-oriented and comparative understanding of heritage-based branding strategies.

Purpose of the paper. The main objective of this study is to investigate how brand heritage can function as a strategic resource within the destination management process, particularly in cities that have received institutional recognition for their cultural strategies. More specifically, the research aims to explore how the valorization of cultural heritage, historical identity and local traditions contributes to shaping territorial branding strategies and strengthening the competitive positioning of destinations. In line with this objective, the study addresses the following research questions: how institutional recognition influence heritage-based branding strategies and what similarities and differences emerge across culturally recognized cities.

While the tourism literature has extensively analyzed destination image, tourist experiences and branding strategies (Folgado-Fernández et al., 2017; Huang et al., 2021), fewer studies have focused on the role of brand heritage as a strategic dimension in territorial communication and development. Therefore, this research aims to contribute to the existing literature by examining how cities awarded the title of Italian Capital of Culture or the Italian cities that have received the title of European Capital of Culture integrate heritage-based narratives into their destination management strategies. These cities represent particularly relevant cases for analyzing the relationship between institutional recognition, heritage valorization and territorial branding. They provide structured contexts in which cultural identity is explicitly mobilized as a lever for development and positioning.

Brand heritage, which includes tangible and intangible dimensions, contributes to shaping the symbolic and narrative dimensions of a destination's brand, allowing territories to communicate values, meanings and cultural identities that go beyond traditional promotional approaches (Rose et al., 2016; Qiu, 2023). By integrating these heritage-related dimensions into destination management processes, cities can potentially strengthen their authenticity, differentiate themselves from competing destinations and develop more sustainable forms of tourism development. In this perspective, brand heritage is not limited to the representation of the past but becomes a strategic mechanism through which destinations construct and project identity over time.

Building on these premises, this study proposes a conceptual framework that interprets brand heritage as a dynamic and processual construct within destination management, as shown in Figure 1. In doing so, the study contributes to the literature by extending the concept of brand heritage from corporate branding to territorial contexts and by framing it as a process-based and governance-related phenomenon. Specifically, brand heritage is conceptualized as the outcome of a sequence of interconnected stages through which cultural resources are activated, interpreted and strategically mobilized. In this perspective, the development of brand heritage depends on the ability of destinations to transform historical and cultural assets into coherent identity-based strategies.

The process is typically initiated by a triggering condition represented by institutional recognition, such as the designation of a city as Italian Capital of Culture or European Capital of Culture. These recognitions activate strategic processes within destinations by providing legitimacy, visibility and access to both tangible and intangible resources. They signal the cultural relevance of a city at national or international level, enhance its symbolic capital and encourage coordinated action among local stakeholders. At the same time, they often facilitate access to funding opportunities, governance structures and collaborative networks that support the implementation of cultural and development projects.

Subsequently, destinations engage in processes of heritage valorization, which represent a critical step in transforming cultural resources into strategic assets. This involves not only the identification and preservation of cultural elements but also their reinterpretation and communication. Cultural heritage shifts from a passive element to be preserved to an active resource capable of generating social and economic value. Through this transformation, destinations develop a more articulated and meaningful representation of their identity.

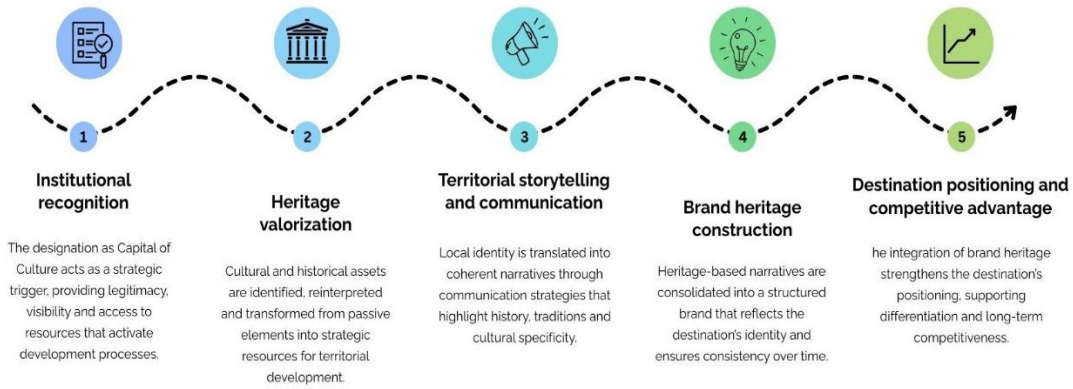
However, the existence of cultural heritage resources alone does not automatically generate competitive advantage. Their strategic value depends on the ability of destinations to communicate and narrate them effectively. For this reason, the next stage concerns the development of territorial storytelling and communication strategies. At this level, destinations select, organize and interpret elements of their past and identity in order to construct coherent narratives that can be shared with external audiences. Storytelling allows destinations to connect historical continuity with present meanings and future aspirations, translating heritage into symbolic representations capable of conveying authenticity and identity. This phase is characterized by a strong element of selectivity, as destinations strategically choose which aspects of their heritage to emphasize in line with their positioning objectives.

The interaction between heritage valorization and storytelling leads to the construction of brand heritage, which represents the core outcome of the process. At this stage, heritage becomes an integrated component of the destination's brand identity and can be understood as the synthesis of historical continuity, core values and symbolic meanings that define the essence of a place. Brand heritage strengthens perceptions of authenticity and credibility, as it reflects a coherent relationship between the identity communicated by the destination and its cultural roots. It should be emphasized that it is not a fixed condition but rather a dynamic construct that requires continuous reinforcement through consistent strategies and communication practices.

Finally, the development of brand heritage has direct implications for destination positioning and competitive advantage. By leveraging heritage-based narratives, destinations are able to differentiate themselves in increasingly competitive and standardized tourism markets. In this sense, brand heritage supports a shift from attraction-based competition to value-based positioning, where symbolic and experiential dimensions become central. At the same time, heritage-driven strategies tend to promote more sustainable forms of development, as they are rooted in local resources and encourage the involvement of communities in the preservation and enhancement of cultural assets.

Moreover, this framework highlights that the strategic value of heritage in destination management does not lie in its mere existence, but in the processes through which it is activated, interpreted and communicated. Institutional recognition, heritage valorization, storytelling and brand construction represent interdependent phases of a broader process that ultimately contribute to strengthening the identity, positioning and long-term competitiveness of destinations.

Figure 1 – Proposed conceptual framework



Methodology. This study adopts a qualitative research approach aimed at exploring the strategic role of brand heritage within destination management processes. In line with its exploratory nature, the study is guided by the following research questions:

RQ1. How do institutional recognition influence the development of heritage-based branding strategies?

RQ2. What similarities and differences emerge in the strategic use of brand heritage?

The research is based on a comparative analysis of Italian cities that have received institutional recognition for their cultural value through the titles of Italian Capital of Culture and European Capital of Culture. These recognitions provide particularly relevant contexts for analyzing how cultural heritage can be strategically integrated into territorial branding and destination management strategies.

The Italian Capital of Culture initiative was established by the Italian Ministry of Culture in 2014 with the aim of promoting cultural development, strengthening territorial identity and supporting urban regeneration through culture-led strategies. Each year, a city is selected through a national competitive process in which candidate cities present a cultural program outlining strategic projects, governance structures and long-term development objectives centered on cultural heritage and local identity. Since its introduction, fifteen cities have been awarded the title: Cagliari, Lecce, Perugia, Ravenna and Siena (2015, jointly designated); Mantua (2016); Pistoia (2017); Palermo (2018); Parma (2020–2021);

Procida (2022); Bergamo and Brescia (2023, jointly designated); Pesaro (2024); Agrigento (2025); and L'Aquila (2026). These cities represent diverse territorial, socio-economic, and cultural contexts across Italy, offering a heterogeneous set of cases through which to analyze heritage-based branding dynamics.

In addition, the study also considers the Italian cities that have received the title of European Capital of Culture: Florence (1986), Bologna (2000), Genoa (2004), and Matera (2019). The European Capital of Culture initiative, promoted by the European Union, aims to highlight the cultural richness and diversity of European cities while fostering cultural development and international visibility. For Italian cities, this designation has often acted as a catalyst for urban regeneration, cultural investment and the international repositioning of the destination brand.

The methodological approach involves an exploratory analysis of multiple secondary sources, including institutional documents, cultural programs, official communication strategies, policy frameworks and promotional materials associated with the cultural capital initiatives. The documentary corpus includes strategic plans, bid books, institutional reports, and official communication outputs produced by the selected cities. Particular attention is devoted to the ways in which these cities communicate their historical identity, cultural heritage and local traditions within territorial branding narratives. These materials allow the reconstruction of the strategic frameworks through which cultural heritage is interpreted and mobilized as a branding resource.

To strengthen the robustness of the analysis, the research adopts a data triangulation strategy that combines documentary analysis with qualitative insights gathered from primary sources. Specifically, semi-structured interviews will be conducted with key stakeholders involved in the design and implementation of the cultural capital initiatives, including mayors, project promoters, cultural program coordinators, local councillors responsible for culture and tourism, institutional representatives and other operators involved in the projects. Interviewees are selected based on their direct involvement in strategic decision-making and implementation processes related to the cultural programs. The interviews will be analyzed using NVivo software, allowing for a systematic coding process through which emerging themes and insights will be identified, categorized and grouped (Elliott-Mainwaring, 2021; Kraiwanit et al., 2023). This approach enables the organization of qualitative data into coherent analytical dimensions, facilitating the identification of recurring patterns and strategic orientations (Azeem et al., 2012; Maher et al., 2018).

The comparative analysis adopts a cross-case strategy aimed at identifying common patterns, strategic approaches, and distinctive practices across the selected cities (Palmberger & Gingrich, 2014; Roso-Llorach et al., 2018). In particular, the comparison focuses on similarities and differences in how heritage is activated, interpreted and strategically communicated within different governance and institutional contexts. By examining multiple cases within a shared institutional framework, this study aims to demonstrate how heritage-based narratives shape the identity, positioning and long-term development strategies of destinations.

Finally, it is important to note that this study is presented as work-in-progress. While the documentary analysis provides preliminary insights into the strategic use of brand heritage, the empirical investigation will be further developed through the ongoing interview phase, allowing for a deeper understanding of the underlying processes and governance mechanisms.

Results. Although the research is still ongoing, the preliminary findings highlight some emerging patterns across the analyzed cases. Destinations that integrate brand heritage into their destination management strategies tend to develop more coherent and structured territorial identities, particularly when heritage is consistently embedded within both strategic communication and policy frameworks.

The comparative analysis of the selected Italian cases shows that the valorization of cultural and historical assets is more effective when supported by strong institutional recognition and coordinated planning. In particular, cities with more structured governance mechanisms and formalized cultural strategies appear to achieve a clearer and more consistent positioning within broader cultural and development agendas, whereas less coordinated contexts display more fragmented and less strategically aligned narratives.

Within this perspective, the recognition associated with cultural capital titles emerges as a key catalyst for activating heritage-based processes. These designations encourage cities to systematize and reinterpret their historical and cultural narratives, strengthen governance structures, and implement cultural programs aligned with long-term development objectives. As a result, a more coherent strategic vision tends to emerge, grounded in local identity and supported by formal planning and institutional coordination.

Furthermore, the findings suggest that heritage-based branding strategies are inherently multi-actor processes, involving a wide range of stakeholders within the local ecosystem, including public administrations, cultural institutions, project promoters, and actors from the creative and cultural industries. The interaction among these actors appears to play a crucial role in shaping how heritage is selected, interpreted, and strategically communicated.

The analysis of institutional documents and communication materials also highlights the central role of strategic communication as a managerial lever. Cities tend to emphasize elements such as historical continuity, local traditions, and cultural production in order to construct coherent and recognizable narratives. These narratives contribute to structuring the symbolic dimension of destinations and to consolidating their positioning within national and international cultural frameworks.

Overall, the preliminary findings suggest that the integration of brand heritage into destination management goes beyond the promotion of cultural assets and involves a broader process of identity construction, strategic alignment, and governance, through which heritage becomes an active resource in shaping the development trajectories of territories.

The next phase of the research will deepen these insights through semi-structured interviews with key stakeholders, with the aim of further exploring the processes of heritage selection, interpretation, and communication, as well as the governance mechanisms underlying them.

Research limitations. Despite the research still being a work in progress, several limitations can already be identified. A primary constraint concerns the limited and fragmented body of academic literature specifically addressing brand heritage within the context of territorial and destination branding. While place branding and destination marketing have been widely explored, the role of heritage-based branding strategies remains only partially investigated, leaving important aspects of their strategic and managerial implications still underexamined.

A second limitation relates to the intrinsic heterogeneity of cultural capital initiatives and the diversity of strategies adopted by different cities. Each destination develops context-specific cultural programs and branding approaches, influenced by its historical trajectory, institutional setting and socio-economic conditions. Consequently, the identification of shared models or transferable best practices remains partial and largely interpretative.

Finally, the absence of standardized indicators or robust quantitative metrics for assessing the value and impact of brand heritage initiatives represents a significant methodological constraint. The lack of commonly accepted measurement tools makes it difficult to evaluate outcomes in a systematic and comparable way across different contexts. For this reason, the study relies predominantly on qualitative analysis and comparative interpretation of existing practices. While this approach allows for an in-depth understanding of processes and meanings, it also introduces a degree of subjectivity and limits the possibility of establishing causal relationships or measuring performance in strictly empirical terms. Future research could address this limitation by developing integrated approaches that combine qualitative insights with more structured evaluation tools.

Managerial implications. The study offers relevant implications for public institutions, destination management organizations and local stakeholders involved in cultural and tourism development. Specifically, the research highlights how brand heritage can be leveraged as a strategic resource within destination management processes, supporting the construction of coherent territorial identities and strengthening the positioning of cities in competitive contexts.

By promoting cultural traditions and local identity, heritage-based branding strategies enable destinations to develop consistent and meaningful narratives. These narratives, when supported by coherent communication and concrete territorial actions, contribute to the visibility and symbolic value of places, while also supporting the activities of local economic actors operating within the destination ecosystem.

Furthermore, the analysis suggests that institutional recognition programs, such as the Italian Capital of Culture and the European Capital of Culture, coordinate strategic actions among local stakeholders. The initiatives foster collaboration, encourage the alignment of strategic objectives and support the development of long-term cultural and territorial policies.

Overall, the study provides practical insights for policymakers and practitioners, suggesting that the effective integration of brand heritage into destination management requires communication efforts, consistent governance, stakeholder involvement and the implementation of actions aimed at the valorization of local cultural resources.

Originality of the paper. The original contribution of this ongoing research lies in its focus on the concept of brand heritage within the context of destination management and territorial branding, a perspective that remains relatively underexplored in existing literature. While prior studies have extensively addressed place branding and destination marketing, limited attention has been devoted to understanding how heritage-based narratives can be strategically integrated into destination management processes and translated into concrete positioning strategies.

In this study, brand heritage is conceptually distinguished from related constructs such as place branding, which focuses on the overall strategic positioning of places; destination image, which refers to tourists' perceptions; and authenticity, which concerns the perceived genuineness of experiences. Instead, brand heritage is interpreted as a temporally embedded and strategically enacted process through which the past is selectively mobilized to shape present and future positioning.

The paper makes three main theoretical contributions. First, it reconceptualizes brand heritage as a dynamic and process-based construct, framing it not as a static attribute linked to the past, but as a phenomenon that emerges through sequential phases of activation (selection of heritage elements), interpretation (meaning attribution), and strategic communication (external projection and positioning). Second, it extends brand heritage literature to the domain of destination management, highlighting how heritage can be intentionally leveraged in territorial branding strategies. Third, it connects brand heritage with governance and territorial development perspectives, showing how public actors, cultural institutions, and local stakeholders actively participate in the construction and management of heritage narratives.

Furthermore, the study adopts a qualitative and comparative approach that examines multiple Italian territories characterized by institutional cultural recognition, including both Italian Capitals of Culture and cities designated as European Capitals of Culture. By analyzing these cases within a shared institutional framework, the research provides a structured lens through which to observe how cultural identity, historical continuity, and local traditions are mobilized as strategic resources. This enables the identification of recurring patterns, divergences, and context-specific strategies across different territorial settings. In addition, the focus on formally recognized cultural cities introduces an institutional

dimension that is often overlooked in branding studies, highlighting the role of public policy and cultural governance in shaping branding processes.

Finally, this work in progress advances current knowledge by linking the concept of brand heritage not only to communication practices but also to broader processes of governance, identity construction, and strategic coordination. In doing so, it highlights how heritage can move beyond a symbolic or promotional function to become an active component in shaping the development trajectories and positioning strategies of destinations.

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Understanding AI adoption among hospitality microentrepreneurs: Preliminary evidence from a Delphi study in Italy

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Abstract. *Microenterprises dominate the hospitality sector yet remain underexplored in digital transformation research, particularly regarding Artificial Intelligence. In these owner-managed, resource-constrained settings, the transition from formal AI adoption to its substantive integration into operational routines constitutes a theoretically and empirically significant challenge. Drawing on an integrated framework combining UTAUT, the Technology-Organisation-Environment (TOE) framework, and Entrepreneurial Orientation (EO) theory, this paper investigates how Italian hospitality micro-entrepreneurs conceptualise AI, which adoption practices emerge in daily operations, and which factors enable or constrain substantive AI integration.*

The study adopts a Delphi-informed exploratory design. This paper reports preliminary findings from Round 1 of a multi-round Delphi study; open-ended responses from eleven experts were analysed through inductive thematic analysis guided by the UTAUT-TOE-EO architecture as sensitising categories.

Findings reveal three key patterns: widespread semantic ambiguity around AI, which distorts performance expectations; a structural bifurcation between implicit platform-mediated AI use and deliberate strategic adoption, inverting the standard UTAUT intention-to-use sequence and suggesting that environmental pressures precede individual-level acceptance mechanisms; and cognitive, identity-related, and structural barriers operating at distinct analytical levels. These preliminary findings extend UTAUT beyond its conventional individual-level application and contribute an empirically grounded, multi-level specification of AI adoption dynamics in tourism microenterprises.
Keywords: *Artificial intelligence; tourism microenterprises; UTAUT; Entrepreneurial Orientation; Delphi method; hospitality*

Framing of the research. *Tourism microenterprises represent the backbone of the global hospitality sector, accounting for the majority of accommodation providers while remaining systematically underexplored in digital transformation scholarship (Kc et al., 2021). In these organisational settings, typically family-run businesses with fewer than ten employees, the entrepreneur simultaneously embodies strategic decision-maker, operational manager, and frontline service provider, concentrating cognitive, relational and operational responsibilities within a single figure (Mohammad, 2021). This structural configuration renders digital transformation inseparable from the micro-entrepreneur's cognitive work: technology adoption influences how information is interpreted, decisions are formulated, cognitive load is managed, and the entrepreneurial role itself is constructed over time (Poulaki et al., 2024).*

Contemporary literature has progressively reconceptualised digital transformation from episodic technology adoption to cumulative organisational reconfiguration, emphasising that digitalisation outcomes depend on combinations of resources, competencies, and contextual conditions enabling persistent technology use (Grashof & Kopka, 2023; Li & Yu, 2025). Within this framework, Artificial Intelligence (AI) emerges as a potentially equalising technology, granting resource-constrained firms access to capabilities, content generation, predictive analytics, and automated customer interaction, historically reserved for larger organisations (Demir & Demir, 2025; Saydam et al., 2022). Yet empirical evidence suggests that AI's organisational value manifests not through technology per se, but through its incorporation into informational infrastructures and operational practices (Ardito et al., 2025). In microenterprises, such incorporation processes confront persistent constraints: limited financial resources, scarce digital competencies, temporal scarcity, and fragile organisational structures with minimal capacity to absorb uncertainty (Joseph et al., 2025). This disconnection between formal adoption, the mere presence of a tool and substantive use, its stable integration into consequential routines, constitutes the central empirical and theoretical problem addressed by this study.

Three interrelated theoretical frameworks are mobilised to address this problem. The primary explanatory lens is the Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et al. (2003) as an integrative synthesis of prior technology acceptance models, including the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the Technology Acceptance Model (Davis et al., 1989), the Theory of Planned Behaviour (Ajzen, 1991), and the Innovation Diffusion Theory (Rogers et al., 2014). UTAUT identifies four core constructs - Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions - as primary determinants of adoption intention and technology use behaviour. In AI-specific contexts, the model has been extended to incorporate Trust and Perceived Risk as additional constructs (Kuberkar & Singhal, 2020; Lin et al., 2022; Tran & Nguyen, 2021), whose relevance is particularly acute in micro-hospitality settings where AI outputs directly affect guest experience and reputational standing. Venkatesh (2022) has explicitly grounded a research agenda for AI adoption in UTAUT, calling for contextualised applications that attend

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to the antecedent individual, technological and environmental characteristics shaping AI use in specific organisational settings.

While UTAUT captures the mechanisms of individual technology acceptance, it does not systematically account for the organisational and environmental conditions that shape and frequently constrain the actualisation of adoption intentions. The Technology-Organisation-Environment (TOE) framework (Tornatzky & Fleischer, 1990) addresses this gap by disaggregating adoption determinants across three analytical dimensions: the technological context (relative advantage, complexity and compatibility of available technologies), the organisational context (firm size, resource endowment, managerial competencies and absorptive capacity), and the environmental context (competitive pressure, institutional support and infrastructural endowment). TOE has been extensively applied to digital technology adoption in small and medium enterprises (Ardito et al., 2025; Zuñiga-Collazos et al., 2025), and its tripartite logic maps productively onto the structural specificities of Italian tourism microenterprises, particularly in Southern regions characterised by documented North–South gaps in digital integration, limited access to advisory services, and persistent asymmetries in innovation ecosystem density (Bank of Italy, 2021). Integrated UTAUT-TOE models have demonstrated superior predictive validity compared to single-framework approaches in SME technology adoption contexts (Baker, 2012).

A third theoretical layer is introduced through the construct of Entrepreneurial Orientation (EO), understood here as a dispositional antecedent that modulates how UTAUT constructs are weighted and enacted by individual owner-managers. Drawing on Miller (1983) and Lumpkin & Dess (1996), EO captures the behavioural disposition of firms and in microenterprises, of owner-managers themselves along five dimensions: innovativeness, risk-taking, proactiveness, autonomy and competitive aggressiveness. Recent studies confirm that AI adoption in small hospitality firms is explained primarily by entrepreneurial cognitive orientations rather than structural firm characteristics (Kukanja & Planinc, 2025) and that EO significantly shapes the relationship between environmental conditions and digital technology adoption in SMEs (Williams et al., 2021). In the present framework, EO is positioned as a subordinate antecedent that modulates UTAUT construct salience: entrepreneurs characterised by higher innovativeness and proactiveness tend to form more favourable Performance Expectancy assessments and exhibit greater tolerance for the learning investment implied by Effort Expectancy; higher risk-taking propensity attenuates the inhibitory effect of Perceived Risk on adoption intentions. This positioning is consistent with Venkatesh et al.'s (2012) recognition that individual differences, including innovativeness, function as moderating antecedents within UTAUT.

This integrated theoretical architecture, UTAUT as the primary adoption mechanism, TOE as the contextualising structure, EO as the individual dispositional antecedent, responds to three gaps in existing literature. First, AI adoption research in tourism remains concentrated on sectoral-level trends or larger hospitality organisations, leaving microenterprise dynamics largely unexplored (Knani et al., 2022). Second, existing UTAUT applications in entrepreneurial contexts inadequately account for how territorial heterogeneity - digital infrastructure availability, institutional support quality, local innovation ecosystems - moderates individual adoption intentions. Third, the interplay among entrepreneurial cognitive orientation (EO), contextual embeddedness (TOE), and individual technology acceptance (UTAUT) remains empirically under-specified in resource-constrained service settings characterised by high relationship intensity and reputation sensitivity. The Italian tourism microenterprise context presents an empirically strategic case for addressing these gaps: Italy's hospitality sector is dominated by microenterprises (ISTAT, 2023), exhibits significant territorial asymmetry in digital infrastructure and institutional support, and faces intensifying competitive pressure from platform-mediated intermediaries requiring accelerated digital capability development (Esfandiar et al., 2024).

Taken together, these three strands of literature converge on a specific analytical omission: the conditions under which formal AI adoption in tourism microenterprises translates, or fails to translate, into substantive integration within operational routines remain empirically unspecified. Existing evidence documents adoption rates and sectoral diffusion patterns, yet the mechanisms linking entrepreneurial disposition, organisational constraint and territorial context to routine-embedded use are not systematically accounted for. This study addresses this omission by articulating a multi-level specification of AI adoption dynamics in Italian tourism microenterprises, thereby advancing both the theoretical integration of UTAUT, TOE and EO and the empirical mapping of adoption practices in this underserved segment.

Purpose of the paper. *This study pursues a dual aim: to explore how tourism micro-entrepreneurs in the Italian context perceive and conceptualise AI, and to identify the individual, organisational and environmental factors that enable or constrain the transition from formal AI adoption to its substantive incorporation into daily business practices. Guided by the UTAUT-TOE-EO architecture, the inquiry proceeds through three research questions, presented here jointly to make their interrelation explicit:*

RQ1: How do tourism micro-entrepreneurs perceive, conceptualise and attribute meaning to AI within their entrepreneurial activity?

RQ2: Which adoption and use practices emerge in the everyday activities of tourism micro-entrepreneurs within their operational reality?

RQ3: Which individual and organisational factors enable or inhibit AI adoption and substantive use in tourism microenterprises?

These three questions are conceived as analytically distinct yet sequentially interdependent.

RQ1 operates at the cognitive and interpretive level: it investigates how owner-managers define and make sense of AI, what functional boundaries they draw between AI tools and other digital technologies already in use, and what expectations, in terms of performance, effort, trust and risk, orient their initial attentional and evaluative dispositions toward the technology. Conceptualisation is treated not as a neutral preliminary phase but as a substantive object of inquiry, given that the cognitive frames through which micro-entrepreneurs apprehend AI constitute a foundational condition for any subsequent adoption dynamic (Giuggioli & Pellegrini, 2023). In this dimension, EO's innovativeness and proactiveness function as dispositional antecedents that shape the breadth and openness of AI sensemaking, consistently with UTAUT's Performance and Effort Expectancy constructs.

RQ2 shifts attention from intention to practice, investigating which AI applications are mobilised in the daily routines of tourism micro-entrepreneurs and across what functional domains - booking management, customer communication, content generation, dynamic pricing, operational coordination - they are deployed. Critically, this question targets the distinction between formal adoption and substantive use: the presence of a tool does not imply its integration into consequential decision-making routines, and the conditions under which this integration occurs remain poorly understood in microenterprise settings (Joseph et al., 2025). The organisational and technological dimensions of TOE are particularly operative here, directing analytical attention to the infrastructural and competence-related conditions that mediate between adoption intention and routine-embedded use (Ardito et al., 2025).

RQ3 addresses the enabling and inhibiting factors that modulate the adoption process across all three levels of the integrated framework. At the individual level, it investigates EO dimensions (innovativeness, risk-taking propensity, proactiveness), digital self-efficacy and tolerance for uncertainty as dispositional antecedents of UTAUT construct salience. At the organisational level, it examines resource endowment, absorptive capacity, data infrastructure quality and the degree of concentration of managerial functions, all structural features that distinguish tourism microenterprises from the SME populations on which UTAUT was originally validated. At the environmental level, it attends to competitive pressure, the availability and quality of institutional support, and territorial asymmetries in digital infrastructure, factors captured by TOE's environmental dimension and particularly salient in the Southern Italian context, where significant variation in innovation ecosystem density constitutes a structurally relevant moderating condition (Esfandiar et al., 2024).

Methodology. *This paper presents a preliminary stage of a broader ongoing research project and reports the design and initial findings derived from the first wave of data collection within an exploratory study informed by the Delphi tradition. The present phase of the project adopts an exploratory approach to elicit and compare a plurality of informed perspectives on the adoption of AI in Italian tourism microenterprises.*

The Delphi method is a structured, iterative group communication technique designed to elicit and refine informed judgment from a panel of experts through successive rounds of data collection, anonymous feedback and controlled convergence (Rowe & Wright, 1999; Linstone & Turoff, 2002). In its classical formulation, the technique rests on four defining properties: anonymity among panellists, iteration across rounds, controlled feedback synthesising group responses, and statistical or thematic aggregation of individual positions (Delbecq et al., 1975). While the present stage of the research does not yet employ the full iterative structure typically associated with a Delphi process, these methodological principles inform the study's broader design, particularly the elicitation of structured reflections from knowledgeable participants.

The choice of this exploratory consultation-based design is analytically motivated by the specific characteristics of the research problem. Understanding the conditions, practices, and barriers governing AI adoption in Italian tourism microenterprises involves a complex, empirically under-documented phenomenon that is not readily accessible through direct experimental or survey-based measurement. In such circumstances, collecting reflections from actors occupying different positions within the tourism ecosystem offers an empirically grounded way to map how the phenomenon is currently interpreted and experienced in practice. Approaches that gather structured reflections from informed participants have proven particularly valuable when research addresses emerging phenomena characterised by fragmented empirical evidence (Skulmoski et al., 2007). The present study, therefore, aims to assemble a heterogeneous set of perspectives able of illuminating how artificial intelligence is currently understood within the tourism sector, including the conditions perceived as enabling or constraining its diffusion and the operational practices associated with its adoption in micro-hospitality contexts.

The respondent pool is constructed according to a purposive sampling strategy combined with snowball recruitment procedures (Keeney et al., 2006). Initial participants were selected based on their professional involvement with tourism management, digital transformation, entrepreneurship, or hospitality operations. These respondents were subsequently invited to indicate additional individuals whose experience could contribute relevant insights, allowing the sample to expand through referral networks. Panel heterogeneity is a deliberate design choice: the research questions require perspectives spanning multiple registers of knowledge and practice, and panels involving actors with complementary forms of expertise are known to yield richer and more robust outputs than homogeneous configurations (Choi & Sirakaya, 2006; Foerster & von der Gracht, 2014). Accordingly, five stakeholder categories are represented: academic researchers; institutional actors; sectoral associations representing Italian hospitality operators; experienced consultants; and micro-entrepreneurs directly managing small hospitality businesses. The inclusion of micro-

entrepreneurs reflects the central role these actors play in shaping the practical conditions under which AI technologies are adopted within small hospitality firms.

The number of participants is guided by principles of purposive saturation rather than predetermined numerical targets (Giannarou & Zervas, 2014). Data collection, therefore, remains ongoing and will continue until additional responses cease to generate substantively new thematic insights. At the current stage of the research process, the material analysed in this paper corresponds to the first set of questionnaires returned by respondents recruited through the purposive and snowball procedure. These responses provide the empirical basis for the preliminary findings presented in this study.

The questionnaire was designed to elicit reflective responses through open-ended prompts aligned with the three research questions guiding the study. Participants were invited to reflect on their interpretations of the role of artificial intelligence in micro-hospitality businesses, the operational practices through which these technologies are currently adopted, and the contextual conditions that may facilitate or constrain their diffusion. All responses were collected and processed under conditions of strict anonymity to minimise reputational signalling and conformity pressures typically associated with direct expert interaction (Rowe & Wright, 1999).

Consistent with the exploratory orientation of the study, the open format of the questionnaire allows respondents to articulate their observations in their own terms while enabling the emergence of interpretive dimensions that may not yet be fully captured within the existing literature (Sekayi & Kennedy, 2017). Convergence will be assessed through the progressive stabilisation of themes across rounds; if required, a further iteration will be conducted to consolidate the emerging interpretive structure.

Data from this initial wave of responses are analysed through an iterative thematic analysis procedure. Responses are coded inductively, generating a thematic structure that maps onto the three research questions while remaining open to emergent categories not anticipated by the theoretical framework. The UTAUT-TOE-EO architecture serves as a set of sensitising categories that orient, without constraining, the interpretation of the empirical material. Findings derived from this first stage of data collection, which are presented in the following section, provide a first empirical contribution and lay the analytical foundations for the subsequent iterative rounds of the broader research programme. As additional responses are gathered, the thematic structure will be progressively refined, and the degree of convergence across perspectives will be assessed, in line with the multi-dimensional understanding of interpretive agreement recommended by Von der Gracht (2012) and Giannarou and Zervas (2014).

The validity of findings at this preliminary stage rests on the analytical function assigned to the first round within the Delphi-informed design. In its exploratory capacity, Round 1 is intended to surface the interpretive range across heterogeneous expert positions rather than to produce convergent judgment; its epistemic status is therefore diagnostic, mapping the conceptual territory within which subsequent consolidation will operate. Robustness is pursued not through the authority of a single round but through the iterative architecture of the overall study, in which successive rounds recontextualise individual positions against the aggregated pattern of prior responses, allowing dissent to be articulated, shared interpretations to stabilise, and residual divergences to be rendered analytically visible. The findings reported here should accordingly be read as foundational rather than conclusive.

Results. *The analysis of the responses allowed the identification of three main thematic areas, articulated into thirteen sub-themes corresponding to the three research questions guiding the study. The thematic structure maps onto the UTAUT–TOE–EO architecture introduced above, with findings for each research question read against the constructs they most directly engage: cognitive and acceptance-related mechanisms, organisational and technological conditions, and environmental constraints. The findings indicate that AI adoption among Italian hospitality micro-enterprises is already relatively widespread yet largely confined to specific applications. At the same time, considerable heterogeneity persists in how the technology is interpreted, used, and strategically integrated into business practices.*

Regarding the first research question, which concerns how small-scale entrepreneurs conceptualise AI, the results reveal a widespread interpretative uncertainty regarding the meaning of the term itself. Several experts noted that AI is frequently used as a generic label referring to any digital tool perceived as advanced, without a clear distinction between different technological categories. As one participant observed, "in the micro hospitality business segment, the term 'AI' is almost always misunderstood. There is a tendency to call AI anything that is perceived as a new technology". Similarly, another expert remarked that "at the moment, there is a lot of confusion, and everything tends to collapse into what an individual can directly do with ChatGPT". This semantic ambiguity affects entrepreneurs' ability to form informed expectations regarding the value of the technology and tends to limit a more systematic assessment of the opportunities offered by AI.

A second relevant finding concerns the distinction between implicit use and conscious use. According to several respondents, many micro-enterprises already interact daily with algorithm-based systems through digital platforms such as online travel agencies and booking management tools. However, this interaction often occurs without an explicit awareness of the role played by AI in operational processes. One participant summarised this dynamic effectively by noting that "in terms of unconscious use, diffusion is extremely high. Anyone working on Booking or Airbnb already uses AI every day in suggested prices, listing rankings, or automated responses". The same expert added, however, that "when it comes to conscious and autonomous use, diffusion is still very limited". This distinction suggests that exposure to the technology does not necessarily translate into deliberate integration within the firm's decision-making practices. Theoretically, this pattern inverts the canonical UTAUT sequence. In the original formulation, acceptance mechanisms

precede adoption, with Performance Expectancy, Effort Expectancy and Social Influence shaping intention before use occurs. The present evidence suggests the opposite trajectory in platform-mediated microenterprise settings: use is already in place, embedded in the infrastructural conditions of operation, and acceptance mechanisms are activated only when entrepreneurs move from ambient exposure to deliberate engagement. Adoption, on this reading, is environmentally anchored before it becomes cognitively intentional.

Alongside these interpretations, a third way of conceptualising AI also emerges, in which the technology is described as a tool able of amplifying the operational capabilities of the entrepreneur. In this perspective, AI does not replace human work but enables entrepreneurs to expand their ability to manage operational and communicative activities. One respondent described this function using a particularly illustrative metaphor: "I always think of my mountain bike with assisted speed. Without that small help, I would never have managed to climb certain mountains. I did it myself, but that assisted speed amplified my powers". Similarly, another participant defined AI as "a tireless and low-cost collaborator that democratizes tools that were once reserved for large hotel chains".

Regarding the second research question, the findings show that the use of AI in hospitality micro-enterprises is primarily concentrated in communication and content generation activities. Writing texts for OTAs, managing online reviews, translating customer messages, and producing content for websites or social media represent the most frequently mentioned application areas. As one expert explained, "the area where adoption is highest is undoubtedly written communication: responding to customers, automatic translation, descriptions for OTAs, or creating content for social media." Another participant noted that "many small entrepreneurs use AI to respond to reviews or translate messages in real time". In many cases, therefore, AI is employed to automate repetitive and linguistically structured tasks, generating immediate benefits in terms of time savings. A second application domain concerns revenue management and dynamic pricing, although its diffusion appears more limited. Some experts observed that algorithm-based tools allow even small operators to employ predictive models for price optimisation. However, these applications remain largely confined to more innovative firms or to operators already using more advanced management systems. As one participant noted, "the adoption of revenue management systems based on algorithms remains the prerogative of a more advanced minority". Another respondent pointed out that such tools enable "even small operators to work with predictive logics by adjusting prices to real market demand", although their implementation requires competencies and technological infrastructures that many micro-enterprises still lack. Results also highlight several areas in which AI adoption remains very limited. Accounting, administrative management, and strategic planning are consistently identified as domains where the technology is not yet used in a significant way. One expert observed that "accounting and administration are almost completely excluded from AI adoption, as they remain entrusted to accountants or traditional software". Similarly, another participant emphasised that AI is "still rarely used in areas such as accounting or the strategic management of the firm." In these contexts, caution is often associated with concerns regarding the reliability of the technology or the potential regulatory and reputational consequences of its improper use.

With reference to the third research question, the analysis reveals a set of factors influencing the diffusion of AI in micro-enterprises. Among the most frequently mentioned barriers are limited familiarity with digital technologies, the perceived complexity of AI tools, and the lack of time to experiment with new solutions. One participant observed that "the most widespread issue is distrust toward what is not understood," while another noted that "many micro-entrepreneurs fear that AI requires technical skills they do not possess". These constraints are distributed across the three analytical levels mobilised by the framework. At the individual level, they operate as Effort Expectancy penalties and as limits on the entrepreneurial dispositions captured by EO, particularly innovativeness and proactiveness. At the organisational level, they take the form of concentrated managerial responsibilities and restricted absorptive capacity, consistent with TOE's organisational dimension. At the environmental level, insufficient digital infrastructure in specific territorial contexts acts as a structural moderator of adoption feasibility. At the same time, experts identified several factors that may facilitate the diffusion of AI within the sector. These include the increasing accessibility of generative AI tools, their ease of use, and the possibility of obtaining immediate operational benefits. As one participant noted, "the adoption rate of generative AI has been extremely rapid, precisely because of its ease of use".

Respondents generally expect AI to progressively become part of the operational infrastructure of tourism firms over the coming years, although with differentiated outcomes. As one expert observed, "those who manage to integrate AI intentionally will gain an increasing competitive advantage, while those who remain inactive risk becoming progressively marginalised". This perspective suggests that the ability to learn and integrate new technologies will represent a crucial factor shaping the competitive trajectories of hospitality micro-enterprises.

Research limitations. *The findings should be interpreted considering several limitations. The analysis draws on an early stage of an ongoing research project. It therefore reflects an exploratory phase that will be further refined through additional rounds of data collection and analysis. The limited number of participants and the purposive sampling strategy prioritise diversity of perspectives rather than statistical representativeness. The empirical material mainly consists of expert assessments and professional reflections on sectoral dynamics, rather than direct observation of organisational practices within microenterprises. Moreover, the study is situated within the Italian tourism context, characterised by a high prevalence of microenterprises and marked territorial disparities in digital infrastructure and innovation ecosystems. These factors may affect the transferability of the findings to other settings.*

Theoretical and Managerial Implications. *On the theoretical plane, the paper contributes to the literature on AI adoption in tourism by developing a multi-level, multi-framework specification of adoption dynamics in a context that is simultaneously prevalent, where microenterprises dominate the Italian hospitality sector, and structurally underserved by existing theoretical models. The central theoretical contribution, within this specification, is the identification of a reversed acceptance–use trajectory in platform-mediated microenterprise contexts: environmental embedding precedes individual-level acceptance, rather than following from it. This finding directly addresses the omission identified in the literature, namely, the absence of an empirically grounded account of how formal exposure transitions into substantive routine integration. The value added by the integration lies not in the juxtaposition of three frameworks, but in the relationships the architecture establishes between them. TOE ceases to operate as a static inventory of contextual variables and becomes a set of conditions within which UTAUT constructs acquire differential salience; EO ceases to function as a stand-alone predictor of innovation outcomes and becomes a dispositional filter that modulates how entrepreneurs weigh Performance Expectancy, Effort Expectancy, Trust and Perceived Risk under given contextual configurations. Read together, these two reconfigurations articulate a nested architecture in which contextual, dispositional and acceptance-level mechanisms jointly shape substantive AI adoption rather than acting as parallel determinants. It extends UTAUT beyond its conventional individual-level application by embedding it within a TOE contextualisation sensitive to the territorial and institutional heterogeneity of Italian micro-hospitality, and by introducing EO as a dispositional antecedent that accounts for the heterogeneity in adoption orientations observable across owner-managers operating under analogous environmental conditions. This responds directly to Venkatesh's (2022) call for contextualised applications of UTAUT that attend to the antecedent individual, technological and environmental characteristics shaping AI use in specific organisational settings. On the practical plane, the study aims to produce evidence-based guidance for policy makers, training providers and sectoral associations whose interventions are most effective when calibrated not only to technological affordances but to the socio-cognitive and organisational conditions that determine whether AI tools become stably embedded in the daily practices of tourism micro-entrepreneurs or remain peripheral to their operational reality. Three operational priorities emerge from the evidence. First, the semantic ambiguity surrounding AI, widespread even among operators already exposed to algorithmic tools, suggests that capability-building initiatives cannot proceed from generic awareness campaigns but should begin with disambiguation work that separates genuinely AI-based functionalities from other forms of digital automation, enabling entrepreneurs to form accurate performance expectations. Second, because many microenterprises already interact with AI implicitly through platform infrastructures, the more consequential intervention is not first exposure but guided transition toward conscious use, through sectoral associations offering low-intensity advisory formats calibrated to the cognitive and temporal constraints of owner-managers. Third, the territorial asymmetries documented in the findings argue against uniform policy instruments: regions with thinner innovation ecosystems require stronger infrastructural investment and institutional support, whereas in denser ecosystems the binding constraint lies in organisational absorptive capacity, which is more effectively addressed through training and peer-learning mechanisms than through infrastructure provision.*

Originality of the paper. *This study offers a preliminary exploration of AI adoption in hospitality microenterprises, a segment central to the tourism sector yet still underexamined in digital transformation research. As a work in progress, it provides an initial empirical mapping of how AI is interpreted and operationalised within owner-managed hospitality businesses. By integrating UTAUT, TOE, and Entrepreneurial Orientation, the paper advances a multi-level perspective linking individual cognition, organisational constraints, and environmental conditions shaping AI use. The findings highlight the gap between implicit technological exposure through digital platforms and deliberate strategic adoption.*

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Società Italiana di MANAGEMENT

Short papers

Track:
Transforming Management in the Era of Post-Globalization and Agentic Economy



Discovery to Attribution: Reputation in the AI era

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Abstract. *This study adopts a prompt-based Comparative Experimental design to audit how leading generative AI systems reconstruct reputational crises and attribute responsibility. By replicating a standardized prompting protocol across multiple AI models, the research examines differences in crisis discoverability, responsibility attribution, and narrative framing. Results pointed out the Generative AI systems tend to converge in the reconstruction of crisis events but diverge significantly in the attribution and intensity of responsibility: they are emerging as secondary crisis interpreters, shaping how non-expert audiences understand responsibility in reputational crises.*
Keywords: *Artificial Intelligence; Algorithmic Reputation; Crisis Management; discoverability; responsibility attribution; AI-mediated experiment; AI audit study; Attribution Theory*

Framing of the research. In digital environments, reputation is no longer shaped exclusively by direct communication between organizations and stakeholders, nor solely by human-generated content such as reviews, media coverage, or word-of-mouth. Instead, it is progressively influenced by algorithmic infrastructures - including search engines, recommendation systems, social media ranking algorithms, and generative AI interfaces - that select, prioritize, summarize, and frame information. The amount of touchpoints continues to grow steadily, also reshaping the balance of credibility and trust attributed by individuals, thereby defining new equilibria within the information and communication ecosystem.

Within the stream of research on the evolution of the customer journey and customer experience management, among the many touchpoints that shape contemporary consumer-brand interactions, one in particular is emerging as pivotal: Artificial Intelligence. AI is increasingly and disruptively becoming embedded in individuals' customer journeys across all stages - before, during, and after the purchase process (McKinsey, 2025). According to the framework proposed by Lemon and Verhoef (2016), AI can be positioned within the category of social/external touchpoints.

In this scenario, by relying on the analysis of large volumes of data and the application of probabilistic learning models, AI systems are able to generate insights and predictions that support more informed and adaptive decision-making processes. AI intervenes along three key dimensions of the customer journey: 1. Reduction of decision-making effort 2. Perceived enhancement of informational quality/quantity 3. Personalization of the interaction/empathy.

AI enables dynamic and contextual personalization, grounded in the real-time analysis of behavioral, historical, and situational data. This allows the experience to be shaped not only according to who the consumer is, but also according to the specific moment, channel, and objective of each interaction. In this sense, the experience is not merely "adapted," but continuously recalibrated along the customer journey.

Given the pervasiveness and rapid diffusion of these technologies, awareness of algorithmic bias and of the hallucinations that may result from them remains relatively limited among customers. In this regard, literature suggests that the use of AI-based personalization systems "significantly enhances consumer purchase decision-making primarily through its positive influence on consumer trust," recognizing that trust in the system represents a crucial mediating factor between algorithmic recommendations and actual purchasing behavior (Singhal et al., 2025). When consumers perceive an AI system as competent, reliable, friendly, fast, well-informed, and respectful of privacy, their propensity to follow personalized inputs and recommendations increases. In doing so, AI can simplify the complexity of the customer journey and rationalize the decision-making process, in some cases even reducing or eliminating the use of other touchpoints perceived as less convenient or efficient.

This growing reliance on digital touchpoints (from online reviews to AI) can be interpreted as a form of cognitive delegation on the part of consumers, who increasingly entrust a significant portion of their evaluative and decision-making processes to external sources perceived as competent and trustworthy. The theoretical foundation of this study is grounded in the "theory of bounded rationality" (Simon, 1955), which provides a robust conceptual framework for interpreting decision-making processes in environments characterized by informational complexity, time constraints, and finite cognitive capacities. From this perspective, decisions do not rely on a form of "full" rationality; rather, individuals adopt adaptive strategies of simplification, such as heuristics, routines, and other cognitive shortcuts. Importantly - and this is particularly relevant for the present study - these strategies may also include forms of externalization of parts of the evaluative process.

A key methodological implication emerging from Simon's work is that cognitive delegation represents a functional response to environmental constraints: individuals delegate because a fully autonomous processing of information would be inefficient or impractical given the limitations of the decision-making context (the "Messy Middle" described by Google, 2023). Delegation therefore allows individuals to make choices in a sustainable way by transferring portions of the evaluative process to external actors that operate as intermediaries or mediators in the decision-making process. Within this stream of research, the concept of Automation bias in AI is introduced, as the human tendency to over-rely on

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automated systems, accepting AI-generated suggestions as correct even when they contradict common sense or contradictory information (Romeo & Conti, 2026). Trust in automation does not necessarily depend on an understanding of how the system operates; rather, it depends on its perceived reliability, the consistency of its outputs, and the ability of the automated system to integrate smoothly into the user's decision-making process (Parasuraman & Riley, 1997).

According to a recent report by McKinsey (2025), AI-powered search is rapidly becoming the "new front door to the Internet", fundamentally transforming how consumers discover information, evaluate brands, and make purchasing decisions. Around half of consumers already use AI-powered search tools, and by 2028 more than 75% of searches may include AI-generated summaries, shifting the decision-making process upstream within AI platforms rather than traditional websites. This transformation implies that 20-50% of traditional web traffic may be at risk, as users increasingly rely on AI-generated answers instead of navigating multiple sources directly. This shift also affects Search Engines, whose role as a key gateway to corporate touchpoints is gradually weakening. An increasing number of users now reach websites or content through AI systems in their various forms rather than through traditional search engines - most notably Google. Consequently, firms must move beyond traditional SEO toward Generative AI Engine Optimization (GEO), focusing on influencing the broader ecosystem of sources - such as publishers, user-generated content, and third-party platforms-from which AI systems synthesize their responses. According to WeAreSocial (2026) data, as of October 2025 in Italy 87.7% of Internet users use Search Engines each month, while 25.2% already use ChatGPT. The report also highlights the distribution of AI-generated web traffic referrals in Italy (October 2025) across a selection of leading large language model platforms. The data show a highly concentrated ecosystem, with ChatGPT accounting for the vast majority of referrals (84.05%), followed at a considerable distance by Microsoft Copilot (8.55%) and Perplexity AI (4.23%). Other systems, such as Gemini (2.08%), Claude (0.81%), and DeepSeek (0.28%), currently play a comparatively marginal role in directing traffic toward external websites. From a strategic perspective, these data suggest that AI platforms are emerging as new intermediaries in the information discovery process, with ChatGPT functioning as a dominant gateway through which users access online content. This concentration implies that a substantial portion of AI-mediated web traffic may increasingly depend on the visibility and representation of brands within the informational ecosystems accessed by these systems. In this context, GenAI systems are becoming "crisis interpreters", pointing out the construct of Algorithmic Reputation, conceptualized along three main dimensions (Visibility, Interpretation, and Attribution), also offering a novel theoretical lens for rethinking reputation management in AI-mediated environments. Consequently, organizations may need to reconsider traditional search and visibility strategies, extending beyond conventional SEO toward approaches that take into account the growing role of AI-driven discovery and referral mechanisms.

Purpose of the paper. The purpose of this paper is to examine how generative AI systems mediate the discovery and interpretation of reputational crises. Specifically, the research investigates differences in crisis discoverability, responsibility attribution, and narrative framing across leading generative AI platforms. As individuals increasingly rely on AI systems to access information about events, controversies, and organizational behavior, these technologies are becoming influential intermediaries in shaping public understanding of reputational incidents. In a context characterized by growing informational delegation, the way in which crises are discovered, reconstructed, and explained by AI systems may significantly influence stakeholders' perceptions of responsibility and, ultimately, the reputation of brands and organizations. By systematically comparing the outputs generated by different AI models, this study aims to provide insights into how AI-mediated narratives may affect the informational environment within which reputational judgments are formed.

Methodology. To pursue the research objective, an AI-mediated experiment (Matthes and Vranken, 2025) was employed. The first stage consisted of developing a coding scheme that integrated key contributions from the literature on crisis management and AI audit studies. In the second stage, the experimental protocol focused on designing a standardized prompting protocol (stimulus), which was subsequently administered to four leading generative AI models (GPT, Claude, Gemini, and Perplexity: treatment).

The coding scheme (Table 1) was developed to systematically assess how generative AI systems identify, reconstruct, and interpret reputational crises. The variables capture three main analytical dimensions: crisis recognition and factual reconstruction, attribution processes (the theory selection has been based on previous comparative theories discussion (Gistri 2018; Negri and Ieva, 2022)), and discursive framing of the crisis.

Table 1: The Coding Scheme

Variable	Operational definition	Coding scale/Categories
Crisis discoverability	Ability of the AI system to recognize the described event as a reputational or communication crisis	0 = not recognized; 1 = partially recognized; 2 = clearly recognized
Identification type of crisis ***(Crisis Communication literature) &*** **Crisis Framing** ***(Framing Theory, Borah 2011)***	Crisis category assigned by the AI Dominant interpretative frame used to describe the crisis	Reputational/Ethical failure /DEI/Product-harm/ Communication failure/Managerial failure/External attack/Systemic issue/Other

Accuracy of Crisis reconstruction (information reliability) and Completeness of reconstruction	Degree to which the AI correctly reconstructs the facts of the crisis	1 = very low *to* 5 = very high & number of words
Presence of hallucinations	Presence of false information	0 = none; 1 = minor; 2 = moderate; 3 = high
Responsibility attribution *(Attribution Theory (Coombs and Holladay, 1996; Zhang et al., 2026)*	Whether the AI attributes responsibility for the crisis	0 = none; 1 = implicit; 2 = explicit
Tone toward the organization (Discourse analysis)	Overall evaluative tone used toward the organization involved in the crisis	1 = defensive/favourable *to* 5 = strongly critical
Suggested crisis response *(Situational Crisis Communication Theory- Coombs, 2004)*	Presence and specificity of recommendations for crisis management and Alignment between attributed responsibility and recommended response strategies	0 = none; 1 = generic; 2 = wrong; 3 = specific/consistent
Overall self-reliability of output *(AI Audit Studies)*	Overall evaluation of the reliability of the AI-generated narrative	1 = very low *to* 5 = very high

This structure enables a comparative evaluation of both the informational reliability and interpretive patterns emerging from AI-generated outputs. Both the coding scheme and the prompt structure are the result of a triangulation process conducted by three independent coders (30% of the dataset has been analyzed: inter-coder reliability was assessed using Krippendorff's Alpha, yielding an average coefficient of $\alpha = .84$, indicating strong agreement. Krippendorff's Alpha has been selected for its robustness with nominal variables and multiple coders). In particular, the prompt was designed to incorporate the elements to be evaluated while also approximating as closely as possible the natural style with which users typically interact with generative AI systems: it was intentionally designed to mirror the natural conversational style typically used by non-expert users when interacting with generative AI systems. This choice was intended to enhance ecological validity, as the objective of the study is to assess crisis discoverability from the perspective of a non-expert audience.

The selection of crises (Table 2) was designed to cover a broad range both in terms of temporal span and geographical scope. Moreover, different types of crises were included, involving varying degrees and configurations of responsibility.

Table 2 – Crises selection

Crisis (Brand/Case)	Year	Type of crisis	Geographical scope
1. Barilla (Guido Barilla statements on same-sex families)	2013	Corporate values/DEI communication crisis	International (originating in Italy)
2. Tesco (horse meat scandal)	2013	Food fraud/supply chain integrity crisis	Europe (primarily UK and Ireland)
3. Volkswagen (Dieselgate emissions scandal)	2015	Corporate misconduct/regulatory compliance crisis	Global
4. Mutti (alleged arsenic contamination in tomato sauce)	2017	Food safety rumor/misinformation crisis	Italy
5. Lidl (Workplace misconduct by employees)	2017	Employee misconduct	Italy
6. Dolce & Gabbana (China advertising backlash)	2018	Cultural sensitivity/communication crisis	China/International
7. Meta (Cambridge Analytica data scandal)	2018	Data privacy/platform governance crisis	International
8. Veralab (loyalty points controversy)	2022	Loyalty program promotional crisis	Italy
9. Elisabetta Franchi (statements on hiring women)	2022	Gender equality/corporate culture crisis	Italy/International media coverage
10. Balenciaga (controversial advertising campaign)	2022	Ethical advertising/brand reputation crisis	International
11. "Open to Meraviglia" (Italian tourism campaign backlash)	2023	Nation branding/communication strategy crisis	Italy/International media coverage
12. Chiara Ferragni (Pandoro Balocco charity controversy)	2023	Influencer marketing/consumer trust crisis	Italy/International media coverage

In addition to the use of natural language - without any academic or technical terminology and resembling the style an average user would employ - the prompt was designed around three stages of progressive questioning, similar to what would occur in a real conversation:

Step 1: Crisis narration (ITA: Ho sentito qualcosa riguardo a una crisi che riguarda [brand/evento/persona]. Potresti spiegarmi cosa è successo? ENG: I heard something about a controversy involving [brand/event/person]. Could you explain what happened?)

Step 2: Responsibility attribution (ITA: Chi è il responsabile di quanto accaduto?; ENG: Who was mainly responsible for what happened?)

Step 3: Confidence/epistemic check (ITA: Quanto sei certo di questa spiegazione?; ENG: How certain are you about this explanation?)

The decision to consider multiple research scopes is connected to evidences, which show that different systems vary significantly from one another.

Table 3 - The research perimeter

AI	Description	Risk
ChatGPT (Auto)	Conversational assistant	possible mitigation of liability
Gemini (Gemini3)	Search-integrated AI	dependence on web source bias
Perplexity	AI search engine	risk of replicating dominant media framings
Claude (Sonnet 4.6)	Reason-focused AI	risk of over-neutralization

Practitioners pointed out distinct patterns in the attribution of responsibility across the generative AI systems analyzed, reflecting differences in their underlying design philosophies, safety policies, and information retrieval mechanisms. Some models tend to adopt a cautious and balanced framing, emphasizing the existence of multiple interpretations and avoiding direct blame attribution, likely as a result of stronger safety-oriented training. Others provide more contextualized responsibility attribution, embedding judgments within broader narrative explanations that reference public criticism or stakeholder reactions. Models more tightly connected to web-based information ecosystems often reproduce the dominant framing present in online sources, thereby reflecting the informational consensus emerging from digital media coverage. Finally, AI systems that explicitly cite external sources tend to produce more direct and evidence-based responsibility attributions, although this may also amplify prevailing media narratives. These differences suggest that generative AI systems do not merely reconstruct crisis events but also mediate the interpretation of responsibility, potentially shaping how non-expert audiences understand reputational controversies.

The study was conducted in February 2026 over several days in order to comply with the usage limits imposed by some of the models in their non-paid versions.

Results. The findings of this study highlight several relevant patterns in the way generative AI systems reconstruct and interpret reputational crises. Below (Tables 4, 5, and 6) are three illustrative cases selected from those analyzed, as they are representative of both national and international experiences, involving events that are more or less recent, and characterized by differing levels of responsibility and crisis management appropriateness.

Table 4 – Case 2, Tesco

2, TESCO	ChatGPT	Gemini	Perplexity	Claude	Coding scale/Categories
Crisis discoverability	**2**	**2**	**2**	**2**	0 = not recognized; 1 = partially recognized; 2 = clearly recognized
Identification type of crisis *(Crisis Communication literature)* & Crisis Framing *(Framing Theory, Borah 2011)*	**intentional food fraud**	**food safety and commercial fraud, Horsegate**	**scandal**	**horsegate scandal**	Reputational/Ethical failure /DEI/Product-harm/ Communication failure/Managerial failure/External attack/Systemic issue/Other
Accuracy of Crisis reconstruction (information reliability) and Completeness of reconstruction	**4, 789 words (+23 emoji)**	**5, 1.254 words**	**4, 808 words**	**4, 904 words**	1 = very low *to* 5 = very high & number of words
Presence of hallucinations	**0**	**0**	**0**	**0**	0 = none; 1 = minor; 2 = moderate; 3 = high
Responsibility attribution *(Attribution Theory (Coombs and Holladay, 1996; Zhang et al., 2026)*	**2**	**2**	**2**	**2**	0 = none; 1 = implicit; 2 = explicit

Tone toward the organization (Discourse analysis)	**2 *(indirect responsibility)***	**3 (ethical + systemic control failure)**	**4**	**3**	1 = defensive/favourable *to* 5 = strongly critical
Suggested crisis response *(Situational Crisis Communication Theory-Coombs, 2004)*	**2**	**2**	**2**	**0**	0 = none; 1 = generic; 2 = wrong; 3 = specific/consistent
Overall self-reliability of output *(AI Audit Studies)*	**5**	**5**	**5**	**5**	1 = very low *to* 5 = very high *(over 90%)*

Table 5 – Case 4, Mutti

4, MUTTI	**ChatGPT**	**Gemini**	**Perplexity**	**Claude**	**Coding scale/Categories**
Crisis discoverability	**2**	**2**	**2**	**2**	0 = not recognized; 1 = partially recognized; 2 = clearly recognized
Identification type of crisis *(Crisis Communication literature)* & Crisis Framing *(Framing Theory, Borah 2011)*	**Fake news**	**Fake news**	**Fake news**	**Fake news**	Reputational/Ethical failure /DEI/Product-harm/ Communication failure/Managerial failure/External attack/Systemic issue/Other
Accuracy of Crisis reconstruction (information reliability) and Completeness of reconstruction	**4, 798 words (+22 emoji)**	**4, 793 words**	**4, 797**	**3, 645 words**	1 = very low *to* 5 = very high & number of words
Presence of hallucinations	**0**	**0**	**0**	**0**	0 = none; 1 = minor; 2 = moderate; 3 = high
Responsibility attribution *(Attribution Theory (Coombs and Holladay, 1996; Zhang et al., 2026)*	**2**	**2**	**2**	**2**	0 = none; 1 = implicit; 2 = explicit
Tone toward the organization (Discourse analysis)	**1**	**1**	**1**	**1**	1 = defensive/favourable *to* 5 = strongly critical
Suggested crisis response *(Situational Crisis Communication Theory-Coombs, 2004)*	**1**	**3**	**3**	**1**	0 = none; 1 = generic; 2 = wrong; 3 = specific/consistent
Overall self-reliability of output *(AI Audit Studies)*	**5**	**5**	**5**	**4**	1 = very low *to* 5 = very high *(over 90%)*

Table 6 – Case 12, Chiara Ferragni - Balocco

12, CHIARA FERRAGNI - BALOCCO	**ChatGPT**	**Gemini**	**Perplexity**	**Claude**	**Coding scale/Categories**
Crisis discoverability	**2**	**2**	**2**	**2**	0 = not recognized; 1 = partially recognized; 2 = clearly recognized
Identification type of crisis *(Crisis Communication literature)* & Crisis Framing *(Framing Theory, Borah 2011)*	**Pandoro-gate charitable initiative**	**Pandoro-gate, misleading communication**	**Pandorogate, unfair commercial practice**	**Pandoro-gate, misleading communication**	Reputational/Ethical failure /DEI/Product-harm/ Communication failure/Managerial failure/External attack/Systemic issue/Other
Accuracy of Crisis reconstruction (information reliability) and Completeness of reconstruction	**4, 1.111 words *(+25 emoji)***	**5, 1.110 words**	**5, 907 words**	**5, 913 words**	1 = very low *to* 5 = very high & number of words
Presence of hallucinations	**0**	**0**	**0**	**0**	0 = none; 1 = minor; 2 = moderate; 3 = high
Responsibility attribution *(Attribution Theory (Coombs and Holladay, 1996; Zhang et al., 2026)*	**2 Legal responsibility, attributed to all**	**2 focus on legally recognized responsibilities**	**2, shared responsibility between the parties,**	**2, shared responsibility between the parties**	0 = none; 1 = implicit; 2 = explicit

	companies involved Public/reputational responsibility, Chiara Ferragni		**prominent role Ferragni and Damato**		
Tone toward the organization (Discourse analysis)	**5**	**5**	**5**	**3**	1 = defensive/favourable *to* 5 = strongly critical
Suggested crisis response *(Situational Crisis Communication Theory- Coombs, 2004)*	**0**	**3**	**1**	**1**	0 = none; 1 = generic; 2 = wrong; 3 = specific/consistent
Overall self-reliability of output *(AI Audit Studies)*	**5**	**5**	**5**	**3**	1 = very low *to* 5 = very high *(over 90%)*

First, the results indicate a substantial convergence in factual reconstruction of crisis events across the models analyzed. In most cases, the AI systems were able to identify the existence of a controversy and provide a broadly coherent description of the underlying events. However, important differences emerged in the depth and extent of the narrative reconstruction. Some systems tended to produce more detailed and contextualized explanations, including background information and stakeholder reactions, while others generated significantly shorter summaries that focused primarily on the most salient/legal aspects of the crisis. Furthermore, while ChatGPT also incorporates emojis and structures the text into clearly identifiable paragraphs (aesthetic mediation effect), the way in which the facts are presented is similar for Claude and Perplexity, both of which adopt a more plain, unembellished style. These formal and aesthetic differences in descriptive richness may influence how users understand the magnitude and complexity of reputational incidents. More pronounced divergences were observed in the attribution of responsibility, which represents one of the central dimensions of crisis interpretation. Certain models (Claude) displayed a tendency toward cautious or neutral framing, often presenting responsibility as debated or distributed among multiple actors. This pattern may reflect safety-oriented design choices aimed at avoiding potentially harmful or defamatory claims. Conversely, other systems were more inclined to formulate explicit attributions of responsibility (ChatGPT and Gemini), particularly when the crisis had been widely documented in public sources. In such cases, the AI output often reflected the dominant narrative emerging from media coverage. It is also noteworthy that only limited emphasis is placed on the recovery strategies and, more broadly, on the crisis management efforts of the companies or actors involved. The analysis also revealed the presence of informational and interpretative biases linked to the architecture and training strategies of the different models. Systems that rely more heavily on web-based information retrieval tended to reproduce the prevailing framing found in online sources, potentially amplifying dominant media narratives. At the same time, models optimized for safety and reasoning frequently exhibited a tendency toward over-neutralization, which may reduce the clarity of responsibility attribution even in cases where accountability is well established. Almost all models, in a more or less explicit manner, suggest the user's subsequent steps in the search process (suggestion-drivem navigation bias), thereby effectively shaping the perception and interpretation of what has occurred and guiding the decision-making path (guided sensemaking). In the specific case of Mutti, it is noteworthy that Gemini repeatedly suggested additional pathways - framed in an educational manner - to help users recognize and manage fake news. These findings suggest that generative AI systems not only act as information summarizers but also function as interpretative filters, shaping how crises are presented to users.

Overall, the results support the view that generative AI systems are emerging as secondary crisis interpreters, mediating the discovery and interpretation of reputational events for non-expert audiences. As individuals increasingly rely on AI systems to access information about controversies involving brands or organizations, variations in narrative framing, descriptive depth, and responsibility attribution may play a significant role in shaping public perceptions of corporate reputation.

Research limitations. This study presents several limitations that also point to directions for Future Research. First, the analysis focuses on a limited set of crisis cases (12), selected to ensure diversity in terms of temporal span, geographical scope, and crisis typology; however, a broader sample of events could further strengthen the generalizability of the findings. Second, the study examines the behavior of a restricted number of leading generative AI systems at a specific point in time. Given the rapid evolution and continuous updating of these models (and the opacity about the training data), future studies could replicate the audit longitudinally or include additional systems to assess potential changes in outputs over time. Third, the experimental design relies on a standardized prompting protocol intended to approximate the natural interaction style of non-expert users. While this approach enhances ecological validity, different prompting strategies might lead to different outputs, suggesting that future research could compare alternative prompting designs. Moreover, this process may underestimate the calibration of responses at the individual user level (user dependency), which could otherwise be adapted based on prior interactions and interaction history. Indeed, for the purposes of this project, a "clean" testing environment was created by accessing the main AI systems through a newly established email account, specifically set up to ensure that the responses would not be influenced by previous interactions. Finally, the evaluation of AI responses is based on a coding scheme derived from crisis communication and AI audit literature; although efforts were

made to ensure reliability through independent coding and triangulation, further research could refine these measures or complement them with computational text analysis techniques.

Managerial implications. The findings of this study carry several Managerial Implications for organizations operating in increasingly AI-mediated information environments. First, companies should recognize that generative AI systems are becoming important intermediaries in the discovery and interpretation of reputational crises. As users increasingly rely on these systems to obtain explanations about (controversial) events involving brands or organizations, firms must consider the AI-mediated discoverability of crises as part of their broader reputation management strategy. This implies the need to monitor how crises are reconstructed by generative AI platforms, to ensure that accurate and up-to-date information is available across digital ecosystems, and to integrate AI monitoring into existing digital listening and crisis communication practices. In addition, organizations should anticipate that AI-generated narratives may influence stakeholder perceptions, amplifying or reframing reputational risks even after the initial crisis has occurred. In this context, it becomes crucial to understand whether and how AI-generated responses can be influenced across different environments (e.g., snippets, SERPs, etc.), also with a view to potential paid investments. At the same time, organizations should seek to prevent data poisoning activities that could alter the informational ecosystem and negatively affect a company's reputation. The growing investments in Generative Engine Optimization (GEO), combined with the increasing opacity of algorithmic systems, raise significant ethical concerns related to manipulation, transparency, and responsible AI governance. As organizations attempt to influence AI-mediated visibility, discoverability, and reputational narratives, the boundary between legitimate optimization practices and manipulative interventions becomes progressively blurred. In this context, firms are required to carefully balance reputation management and crisis communication strategies with broader ethical responsibilities toward stakeholders and the information ecosystem. The limited transparency surrounding the functioning of generative algorithms further exacerbates concerns regarding accountability, bias amplification, and the potential distortion of public perception. Consequently, companies should adopt governance approaches that integrate reputational objectives with principles of transparency, fairness, and responsible AI use.

Second, the results also highlight important responsibilities for the developers and providers of generative AI systems. Given the growing informational authority attributed to these systems, it becomes crucial to refine training processes and governance mechanisms in order to minimize hallucinations, factual inaccuracies, and misleading attributions of responsibility. Particular attention should be devoted to the handling of sensitive reputational events, where algorithmic outputs may inadvertently assign blame or provide incomplete contextualization. From this perspective, improving epistemic transparency, uncertainty communication, and attribution handling represents a key challenge for AI developers seeking to enhance the reliability and societal trustworthiness of their systems.

Finally, the study also raises broader societal implications related to the increasing delegation of informational and evaluative processes to generative AI. As individuals rely more heavily on AI systems to interpret complex events and assign responsibility, there is a risk that informational and decision-making delegation may shape public understanding in ways that are not always transparent or critically examined. This dynamic may influence how reputational crises are perceived, discussed, and remembered within the public sphere. Consequently, the growing role of generative AI in mediating access to information reinforces the need for regulatory attention and policy frameworks aimed at ensuring transparency, accountability, and responsible deployment of AI systems in contexts that affect public discourse and reputational dynamics.

Originality of the paper. This paper shifts the focus to how crises are algorithmically interpreted: AI is not only a touchpoint, but an interpretative infrastructure, contributing to the emerging literature at the intersection of crisis communication and generative artificial intelligence and introducing a novel methodological approach to the study of reputational crises in AI-mediated environments. Specifically, it applies a Comparative Experimental design to examine how leading generative AI systems identify, reconstruct, and attribute responsibility in real-world crises. While prior research has largely focused either on organizational crisis management strategies or on the technical performance of AI systems, this study bridges these domains by investigating how AI systems act as secondary narrators and interpreters of crises for non-expert audiences that delegate to AI the discovery of facts/responsibilities. By combining insights from Attribution Theory, crisis communication scholarship, and algorithmic audit studies, the paper offers one of the first systematic attempts to evaluate the discoverability of crises and the attribution of responsibility within AI-generated narratives, thereby opening new avenues for research on the role of generative AI in shaping public understanding of reputational events. In light of the growing role of generative AI in the discovery of facts, events, and information, this phenomenon warrants careful investigation, as its reputational implications can be significant.

The paper also lays the academic foundations for the concept of "algorithmic reputation", referring to the process through which the reputation of organizations, brands, or individuals is increasingly constructed, mediated, and interpreted through algorithmic systems. Algorithmic reputation can be conceptualized along three dimensions: Visibility (what is shown), Interpretation (how it is framed), and Attribution (who is responsible). These systems determine which information becomes visible, which sources are considered authoritative, and how narratives about a brand are structured and surfaced to users. Consequently, algorithmic processes influence not only information discoverability, but also responsibility attribution, framing of crises, and the perceived credibility of sources.

This shift implies that reputation is increasingly shaped in contexts where stakeholders delegate part of their cognitive and evaluative processes to digital intermediaries. As users rely on algorithmically curated outputs - such as search results, AI-generated summaries, or conversational answers - the reputational landscape becomes partially governed by the logic, biases, and training data of algorithmic systems. Therefore, algorithmic reputation highlights the need to reconsider traditional reputation management frameworks, as organizations must now account not only for human audiences and media ecosystems, but also for the algorithmic agents that mediate visibility, interpretation, and narrative construction in digital environments, avoiding the loss of narrative control.

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From automotive legacy to smart mobility: Agentic AI as a trigger of technological exaptation in the Turin ecosystem

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Abstract. *While ecosystems often rely on existing knowledge distributed across multiple actors and socio-technical arrangements, they must continuously renew that knowledge to allow the ecosystem to evolve and remain future oriented. In contexts where technology plays a central role, the risk for the ecosystem obsolescence is even higher. The present paper investigates how Agentic AI can act as a trigger for technological exaptation in an innovation ecosystem, enabling knowledge transformation and supporting the transition from manufacturing centric legacies to emerging urban smart mobility trajectories. We adopt an exaptation lens to explain this process as the re-functionalisation of technologies and competencies toward novel purposes and service configurations.*

Empirically, the paper is grounded in the Turin context, where Turin City Lab is interpreted as an exaptive space that concentrates heterogeneous actors and testing opportunities, while ToMove is conceptualized as an exaptive event that builds platform capacities through three demonstrators and an experimentation pipeline that also leverages Agentic AI. We focus on how Agentic AI-enabled trial triggers exaptive search and repurposing within demonstrators (e.g., decision environments, autonomous services, and adaptive operational behaviours), and how these exaptive moves contribute to the transformation of ecosystem knowledge into novel streams of business knowledge relevant for smart mobility.

As a work-in-progress contribution, the paper develops an initial mechanism model and a set of propositions that theorize Agentic AI as a trigger of ecosystem-level exaptation and explain knowledge transformation as the evolution of legacy automotive and manufacturing knowledge into service-oriented, data-intensive, and AI-enabled smart mobility capabilities. It also outlines a follow up research design (partner interviews and process tracing) to examine ecosystem level outcomes of knowledge transformation, including emerging complementarities, experimentation routines, and subsequent project pipelines (e.g., mobility data space trajectories).

Keywords: *Agentic AI; exaptation; innovation ecosystem; knowledge transformation; MaaS*

Framing of the research. *Research on innovation ecosystems has expanded significantly, and the domain is increasingly attracting interest as it promises important benefits to all the different actors in the system. The term "innovation ecosystem" refers to "a network of interconnected organizations, connected to a focal firm or a platform, that incorporates both production and use side participants and creates and appropriates new value through innovation" (Autio & Thomas, 2014). Therefore, the innovation ecosystem includes a set of individuals, communities, organizations, material resources, rules, and policies across different institutions in constant evolution that engage collectively to enable the knowledge flows (Bramwell, Hepburn, & Wolfe, 2012). From this perspective, ecosystem evolution is a matter of governance and coordination, but also a process of knowledge transformation through which existing ecosystem knowledge is reinterpreted, recombined, and stabilized into emerging technological, service, and governance configurations. In this study, such transformation is understood as the re-functionalization of legacy knowledge toward different purposes, leading to the emergence of innovative routines, complementarities, and trajectories.*

Although ecosystem interactions may spontaneously generate innovation, exaptation highlights the value of intentionally stimulating the application of novel functionalities to existing artefacts, organizations, scientific results, or cultural models (Bonifati, 2013). In the domain of biology, the term 'exaptation' has been employed to denote the process by which characteristics evolve to fulfil different functions, as the evolution of dinosaur feathers from their original function of thermal insulation to their subsequent co-option and adaptation for flight (Gould and Vrba, 1982). Exaptation explores the evolution mechanisms and dynamics that enable organisms to survive in response to environmental change (Beltagui, 2020). In management studies, exaptation extends known solutions to emerging problems by enabling ideas and artefacts developed in one field to be redeployed in another. In this sense, innovation shows two main traits, as it emerges when existing knowledge and artefacts are redirected toward unexpected applications (Andriani & Kaminska, 2021), and is driven by latent elements embedded in existing technologies (Mastrogiorgio & Gilsing, 2016; Andriani et al., 2017).

Exaptive innovations can be also encouraged by humans (Garud et al., 2016), starting a process whereby products and services are reused or recombined to create innovative solutions, with a re-functionalisation, changing the value and meaning of an artefact within a different application domain (Liu et al., 2021; Gould & Vrba, 1982). This exaptation occurs within exaptive spaces (Garud et al., 2018, 2016), characterised by specific exaptive relations (James et al., 2022). Exaptive spaces are exaptive pools, that collect codified knowledge; exaptive forums, where innovators meet physically

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or virtually to exchange knowledge; and exaptive events, as planned meetings for innovators. Exaptive relations consider strong and weak relations among innovators and facilitators of innovation, intentionally or incidentally multiplied with the aim of solving critical difficulties. Exaptive relations have a positive impact on exaptive forums and events, which strengthen and craft them back.

In the context of innovation ecosystems, exaptation emerges from interactions with dynamic environments characterised by rapid technological and competitive evolution, producing knowledge transformation and ecosystem evolution (Schiavone et al., 2022; Ardito et al., 2021). Its relevance highlights how renewal may arise when legacy technological elements, routines, or competencies are redeployed into novel purposes and stabilized by experimentation.

This is exemplified by the field of emerging technologies, where AI models are in a constant state of evolution. They are moving away from conventional models, which are often used to solve specific tasks, towards Agentic AI models that are capable of "exhibiting autonomous decision-making, goal-oriented behaviour, and continuous learning while interacting with dynamic environments" (Hosseini & Seilani, 2025). Agentic AI signifies the latest phase in the evolution of artificial intelligence systems. These architectures are characterised by their multi-agent design, which enables them to achieve objectives with a high degree of autonomy (Acharya et al., 2025; Sapkota et al., 2025; Hughes et al., 2025; Lee & Su, 2025). This autonomy encompasses the execution of complex tasks in dynamic and uncertain environments with minimal oversight, the adaptation of these systems over time via continuous learning and self-improvement, context-sensitive reasoning that enables flexible, situation-appropriate decisions, persistent memory to store and leverage information over the long term, dynamic orchestration of tools and subtasks to accomplish higher-level objectives, and multi-agent coordination to scale problem-solving based on distributed roles and interactions.

Despite growing research on innovation ecosystems, technological exaptation, and AI-enabled transformation, we still lack a clear explanation of how Agentic AI may support exaptive search and knowledge transformation across ecosystems. Existing studies have mainly examined exaptation as technological repurposing within specific organizational or technological domains, while research on Agentic AI has emphasized technical features, organizational applications, and decision-making potential. This paper addresses this gap by conceptualizing Agentic AI as a frontier technology that can activate exaptive search across ecosystem participants. We argue that these capabilities can make exaptive search faster and more visible by supporting testing, adaptive decision environments, and iterative learning across different ecosystem participants. Through this mechanism, legacy knowledge embedded in automotive and manufacturing ecosystems can be transformed toward smart mobility knowledge streams.

The empirical setting is the city of Turin, where mobility-related innovation initiatives have progressively built testing infrastructures and routines based on open innovation. Turin City Lab is a living lab that can be recognised as an exaptive space, a socio-technical environment that increases the likelihood of exaptive matches by bringing together varied actors, infrastructures, and demonstrators. Building on this substrate, ToMove project, an exaptive event that builds platform capacities via three demonstrators and an experimentation pipeline that also leverages Agentic AI. In this framing, demonstrators are not treated as isolated pilots; they function as exaptive vehicles through which knowledge and technologies are co-option and adapted into future-oriented urban mobility services and decision environments.

The study examines how Agentic AI-triggered exaptation contributes to knowledge transformation and to the transition from manufacturing-centric legacies toward smart mobility configurations. The expected outcomes include business knowledge streams such as service operations know-how, data-driven governance routines, validation practices in urban contexts, and mobility data space trajectories. These outcomes will be examined in subsequent stages based on partner interviews and process tracing, with the goal of specifying when and how ToMove contributes to longer-term ecosystem evolution.

Overall, the paper contributes to three connected debates. It advances technological exaptation theory by theorizing Agentic AI as a catalyst of exaptive search and re-functionalization, rather than merely as an automation tool. It also contributes to innovation ecosystem research by explaining knowledge transformation as a mechanism through which legacy capabilities are recombined into service-oriented and data-intensive configurations. Finally, it develops an event-based perspective on ecosystem evolution by interpreting Turin City Lab as an exaptive space and ToMove as an exaptive event.

Purpose of the paper. *The innovation process is driven by technological changes, both in terms of their intensity and direction (Dosi and Nelson, 2010). Technological change has given rise to new forms of ecosystems, characterised by reconfigured relationships between agents and artefacts that may support emerging scenarios and challenges (De Sordi et al., 2019). In such contexts, firms and ecosystem participants are compelled to renew, transfer, and recombine knowledge to sustain value creation. The transition of the automotive industry toward smart mobility is an emblematic case of this broader phenomenon. It requires the recombination of heterogeneous assets, such as digital and physical infrastructures, data governance arrangements, and service operations, across multiple actors. This view is consistent with the structural perspective on ecosystems, which emphasizes the alignment of actors, activities, and complementarities around a value proposition (Adner, 2017).*

Technological exaptation is the theoretical lens adopted to explain how ecosystems can transform their inherited knowledge base by recombining existing technologies, competencies, and routines into new functions and applications. Exaptation theory suggests that, within innovation ecosystems, the interplay of cooperative and competitive dynamics can generate "exaptive leaps," particularly in industries characterized by strong couplings between physical and digital components (Beltagui et al., 2020).

Building on this view, we argue that Agentic AI may act as a frontier technological catalyst that supports exaptive search and the transformation of legacy capabilities toward smart mobility configurations.

This empirical setting is used to examine how structured experimentation contexts can make ecosystem-level knowledge transformation observable. Turin City Lab provides the broader infrastructure, while ToMove offers a focused context in which demonstrators and experimentation pipelines may reveal how existing technologies and competencies are re-functionalized toward smart mobility applications. The main aim is to understand how Agentic AI-enabled technological exaptation supports knowledge transformation in the automotive innovation ecosystem and fosters smart mobility trajectories that may be transferable to other data-intensive, service-oriented settings.

Accordingly, the paper addresses the following research question: How does Agentic AI-enabled exaptation generate ecosystem-level outcomes, such as distinctive complementarities, shared routines, and innovation pipelines, and how can these outcomes be traced in the transition from automotive legacy to smart mobility?

As a work-in-progress nature, this paper develops an initial conceptual mechanism and expected propositions, and it outlines a follow-up qualitative research design (partner interviews and process tracing) to examine how exaptive moves translate into ecosystem evolution through novel business knowledge streams, experimentation routines, and follow-on project pipelines.

Methodology. *This paper is designed as a conceptual and exploratory mechanism-building study. It develops an initial explanation of how Agentic AI-enabled exaptation may support knowledge transformation in innovation ecosystems. Turin City Lab and ToMove provide an illustrative and theoretically relevant setting for grounding the conceptual argument and guiding subsequent empirical validation. Consistent with this aim, we adopt a narrative research approach. As argued by Garud, Gehman, and Giuliani (2016, p. 156), "narratives afford the capacity to act by imagining the future, remembering the past, and seizing the moment," thereby stimulating the emergence of innovation opportunities. In the context of exaptation, narratives are performative, as they help actors interpret technological possibilities, mobilize attention, and reconfigure meaning and value. These performative aspects are grounded in both the relational and temporal properties of narratives. The relational dimension concerns how exaptation creates new connections among actors and artefacts. Exaptive dynamics often unfold by an abductive process (Peirce, 1974) that enables participants (e.g., scientists, entrepreneurs, innovators, investors, public agencies) to converge on shared interpretations, "speak the same language," and collectively attribute original significance, value, and functionalities to technological elements (Bartel & Garud, 2009). The temporal dimension concerns how narratives link legacy knowledge to future-oriented trajectories.*

Literature selection and analytical logic. The literature was selected with a theory-driven approach aimed at building the proposed mechanism rather than conducting a systematic review. The review focused on innovation ecosystems, technological exaptation, Agentic AI, and knowledge transformation because these streams jointly support the conceptual architecture of the study: the ecosystem as the level of analysis, exaptation as the explanatory mechanism, Agentic AI as the enabling technology, and knowledge transformation as the expected outcome.

Empirical setting and conceptual positioning. Following Garud et al. (2016, 2018), exaptive leaps may occur wherever agency is disseminated across networks of connections, particularly within exaptive spaces where "problems meet solutions." In this study, Turin City Lab is conceptualised as an exaptive space, an environment that concentrates trial opportunities and heterogeneous actors, increasing the likelihood of exaptive matches. Building on this substrate, we assert that ToMove plays the role of an exaptive event, a concentrated initiative that produces an enabling platform and stimulates technological exaptation (Garud et al., 2016) to generate innovative solutions (Gould & Vrba, 1982; Liu et al., 2021). In our framing, ToMove operationalizes exaptation through three demonstrators and a structured trialling pipeline, within which Agentic AI can be observed as an enabling technological component in the production of unexpected functionalities and solutions.

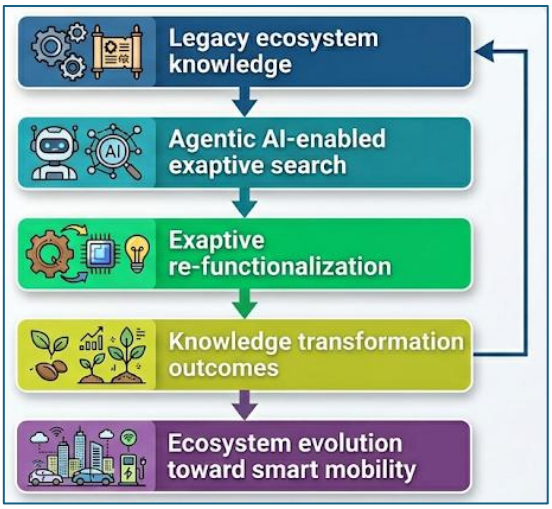
The analysis focuses on the exaptive event trajectory associated with ToMove by tracing demonstrator-level episodes in which inherited capabilities are redirected toward different application domains, as well as the ecosystem-level consequences rising from these episodes. Consistent with the research question, the study focuses on three classes of ecosystem outcomes:

1. *Emerging complementarities, captured as newly formed or intensified interdependencies among actors, infrastructures, and artefacts (e.g., couplings between data resources, infrastructure operators, service providers, and research partners).*
2. *Shared routines, captured as recurrent practices that stabilize testing and learning (e.g., shared protocols for trials, recurring evaluation and validation practices, shared vocabularies and templates that reduce coordination friction).*
3. *Innovation pipelines, captured as follow-on trajectories that extend beyond the initial event (e.g., subsequent project portfolios, scaling initiatives, and data-governance trajectories such as mobility data spaces).*

Building on the theoretical discussion, we propose an initial mechanism model that links Agentic AI-enabled exaptation to ecosystem knowledge transformation. The model builds on the idea that legacy ecosystems, such as automotive and manufacturing-based ones, accumulate knowledge in technologies, routines, infrastructures, and relationships among actors. Agentic AI may trigger exaptive search by enabling actors to explore alternative uses of these existing assets via experimentation, simulation, adaptive decision environments, and autonomous service

configurations. Through these search processes, existing knowledge elements may acquire new functions in smart mobility contexts. Over time, these exaptive moves help redirect ecosystem knowledge toward business capabilities relevant for smart mobility.

Figure 1. Agentic AI-enabled exaptation and ecosystem knowledge transformation: an initial mechanism model



Source: Authors' elaboration

The model does not assume that Agentic AI automatically produces ecosystem evolution. It suggests that Agentic AI can support ecosystem evolution when its use is embedded in exaptive spaces and events that connect participants, provide innovative opportunities, and stabilize learning into reusable knowledge.

Data collection and analysis. Data collection is organised to support narrative reconstruction and outcome tracing.

The first stage regards the narrative reconstruction on project documents and artefacts associated with the ecosystem and the ToMove event (e.g., official decks and descriptions of demonstrators, calls and selection materials available, public and partner communications, and archival records documenting the evolution of experimentation activities). These sources are used to build an initial narrative of how ToMove mobilises legacy knowledge, how Agentic AI is embedded in demonstrators and trials (where documented), and how exaptive re-functionalization is articulated. In the next stage, we will validate the narrative and trace ecosystem-level outcomes through semi-structured interviews with key partners, including public orchestrators, infrastructure and system integrators, mobility operators, firms/startups/SMEs, and research institutions. The interview protocol will examine how existing technologies, competencies, routines, or infrastructures were reused or reinterpreted within ToMove-related demonstrators; how Agentic AI or AI-enabled experimentation supported adaptive decision-making, simulation, service configuration, or operational learning; how actors recognized and stabilized new functionalities for existing assets; and how complementarities, routines, and follow-on pipelines emerged over time.

Data analysis will proceed through iterative narrative coding aligned with exaptation theory. First, we will identify narrative elements that signal exaptation. We will then examine the relational mechanisms through which actors reinterpret existing technologies and competencies. Finally, we will map narrative evidence onto the three outcome categories: complementarities, routines, and innovation pipelines. Throughout the analysis, we will use abductive logic to refine the emerging explanation (Bartel & Garud, 2009; Garud et al., 2016).

The research setting. The investigation is based on Turin, an Italian city in the northwest of Italy. Turin has a dense entrepreneurial fabric, with more than 221,000 companies (CamCom Torino, 2026) and 672 start-ups (LaStampa, 2026). ts research system is organised around two main institutions able to involve more than 120,000 students: the University of Turin, with strong expertise in the humanities, social sciences and economics, and the Polytechnic University of Turin, mainly focused on technology and engineering (Comune di Torino, 2026). In 2024 Turin has been awarded the title of European Capital of innovation and European Capital of Smart Tourism for the 2024-2025 biennium (Torino City Lab, 2026). Turin is considered one of the most innovative Italian cities (EY, 2020), even in the European region, already investigated in scientific articles for the relevance of the approach of its open innovation ecosystem (Cillo et al., 2020; Grimaldi, 2022).

The Turin setting provides an analytically coherent context because it combines an established open innovation and participatory ecosystem approach, called Turin City Lab (TCL). TCL supports companies and other ecosystem actors in testing innovative solutions under real-life urban conditions by facilitating access to experimentation opportunities, infrastructures, and institutional support. In this perspective, TCL is an exaptive space where the likelihood to link features to context and producing an exaptive leap is maximized. Among those, the "ToMove" project could be identified as the exaptive event able to induce the technological exaptation, leading to the emergence of an innovation ecosystem, called "Smart Road Mobility".

Figure 2. ToMove's demonstrators



Source: https://torinocitylab.it/en/to-move/

The ToMove project

ToMove is a large-scale open laboratory with the objective of advancing the digital and sustainable transition towards more efficient, secure, and adaptable urban mobility solutions. It is a technological and service innovation programme, integrating investigation on Mobility as a Service (MaaS) with the evaluation of cooperative, connected, and autonomous mobility solutions (CCAM). Along with this, ToMove is guiding the urban mobility transformation orchestrating diverse stakeholders and facilitating the user adoption.

The ToMove initiative is situated within the national MaaS4Italy programme, promoted by the Department for Digital Transformation with support from the Ministry of Transport. It received a grant exceeding €10 million in funding. It is scheduled until June 2026, and it is closely associated with overarching sustainability objectives, including the alignment with the European Mission "100 Climate Neutral Cities," to which Turin is committed. The programme includes funding for living labs demonstrating autonomous driving in urban transport and other actions related to data governance.

The project promotion and governance are overseen by the City of Turin, in collaboration with a Promoting Committee that includes mobility operators, research institutions, and business actors, with a formalised structure of the ecosystem orientation and initiative organization, such as co-experimentation, a coordinated portfolio of trials and applied research activities.

ToMove is articulated into two complementary components. The ToMove Living Lab functions as the primary open testing environment for developing original smart and sustainable mobility scenarios, explicitly integrating CCAM solutions into MaaS-oriented service models and supporting applied, multidisciplinary research programs aimed at assessing impacts and effectiveness. MaaS ToMove conducts a trial to assess whether integrated mobility services can offer citizens and user communities viable alternatives to private car use. These two are the focus of the initiatives and so they are involved in analysis, co-design, and testing, which positions the programme to evaluate feasibility beyond technical performance, including acceptability, usability, and perceived value of emerging service configurations. Furthermore, it explores how CCAM technologies can be embedded within service models rather than remaining as stand-alone pilots.

All the above-mentioned reasons demonstrated that ToMove provides an appropriate context for examining how a city orchestrates a multi-actor mobility innovation ecosystem based on formal governance and staged experimentation.

Results. *As this is a work-in-progress conceptual and exploratory study, the results are presented as expected conceptual insights and propositions. These propositions will be refined through partner interviews and process tracing of ToMove-related exaptation episodes.*

The first expected insight concerns the role of Agentic AI in supporting exaptive search. By combining autonomous task orchestration, adaptive decision-making, simulation, and continuous learning, Agentic AI may help ecosystem actors explore alternative uses for existing technologies, data resources, infrastructures, and competencies, making exaptive opportunities more visible and actionable (Gould & Vrba, 1982; Bartel & Garud, 2009).

Proposition 1. Agentic AI-enabled experimentation makes exaptive search more likely by helping actors explore alternative uses for existing technologies, data resources, and ecosystem capabilities.

ToMove may be interpreted as an exaptive event because it concentrates different participants, demonstrators, demonstrator-based learning opportunities, and governance arrangements around emerging smart mobility challenges (Peirce, 1974; Bartel & Garud, 2009; Garud et al., 2016). In this context, exaptation is not limited to technological repurposing; it also involves the creation of emerging complementarities among public orchestrators, mobility operators, infrastructure providers, technology firms, research institutions, and users.

Proposition 2. Exaptive events foster new complementarities when they connect actors and artefacts around shared experimentation problems and support the re-functionalization of existing knowledge toward different application domains.

Repeated exaptive episodes are expected to contribute to knowledge transformation when the learning generated through demonstrators becomes stabilized into shared routines, validation practices, data governance arrangements, and

follow-on innovation pipelines (Garud et al., 2016, 2018; Liu et al., 2021). In this sense, the outcome of exaptation is the emergence of technological applications and the transformation of the ecosystem knowledge base.

Proposition 3. Agentic AI-triggered exaptation supports knowledge transformation when repeated experimentation becomes embedded in shared routines, complementarities, and follow-on innovation pipelines.

The last expected result relates the knowledge transformation and its support to the ecosystem evolution by allowing automotive and manufacturing-rooted capabilities to be recombined into data-intensive, service-oriented, and AI-enabled streams (Garud et al., 2016, 2018; Liu et al., 2021) for the smart mobility.

Proposition 4. Ecosystem evolution toward smart mobility depends on whether knowledge transformation extends beyond individual demonstrators and produces reusable service, data, and governance capabilities.

Research implications. *The study has implications for three connected debates. For innovation ecosystem research, it suggests that ecosystem evolution can be interpreted in terms of governance, orchestration, or complementarity formation, and as a process of knowledge transformation. For technological exaptation theory, it moves the analysis from specific artefacts, technologies, or firms to distributed processes involving actors, infrastructures, routines, data resources, and governance arrangements. For the emerging debate on Agentic AI in management, it shifts attention from automation and decision support to exaptive search and the renewal of ecosystem knowledge.*

Research limitations. *The study is work in progress and currently relies primarily on documentary and publicly available project materials; therefore, ecosystem-level outcomes are framed as expected and will require validation through the planned interview phase. Besides, a key limitation concerns the current granularity of evidence on the specific role of Agentic AI within ToMove demonstrators. For this reason, the paper does not claim that Agentic AI has already produced measurable ecosystem-level effects. It develops a mechanism that will be empirically examined by tracing how AI-enabled experimentation supports exaptive search, re-functionalization, and knowledge transformation. As a single-case, mechanism-building study, generalization is analytical, not statistical. The contribution is to specify a narrative mechanism and outcome categories that can be examined in other ecosystem settings through replication and comparative work.*

Managerial implications. *From a managerial perspective, the study suggests that frontier AI technologies can be mobilized beyond efficiency gains, as catalysts for exaptive search and knowledge transformation. Ecosystem orchestrators, such as cities, living labs, and intermediaries, can use demonstrator portfolios and pipelines to help actors re-functionalize legacy technologies and capabilities. Firms embedded in automotive and manufacturing ecosystems may benefit from these settings when experimentation generates reusable service and system capabilities for smart mobility. For policymakers and ecosystem designers, the key implication is that living labs and demonstrators should be assessed not only as isolated pilots, but as mechanisms for producing durable ecosystem outcomes.*

Originality of the paper. *This paper contributes by integrating technological exaptation and Agentic AI to explain knowledge transformation in innovation ecosystems, theorizing Agentic AI as a frontier technology that can accelerate exaptive search and re-functionalization. It advances an event-based ecosystem view by conceptualizing Turin City Lab as an exaptive space and ToMove as an exaptive event that builds enabling platform capacities through demonstrators and a portfolio pipeline. Methodologically, it applies a narrative and abductive approach to trace how exaptive meanings, connections, and temporal linkages translate into ecosystem-level outcomes, such as complementarities, routines, and innovation pipelines, providing a transferable mechanism for future comparative research.*

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Territorial purpose and emotional place branding in rural development: Storytelling, identity and place value creation

ROSAMARIA REIG-RAMELLAT

Abstract. *Rural territories across the world are experiencing profound socio-economic transformations driven by globalization, demographic change, and economic restructuring. These dynamics have weakened traditional development models while simultaneously opening new opportunities for place-based strategies rooted in territorial identity, cultural heritage, and community participation. This conceptual paper examines how rural actors are reframing development narratives through emotional place branding strategies that emphasize identity, authenticity, and sense of place. Building on literature from place branding, territorial development, and place identity studies, the paper introduces the concept of territorial purpose; the collective articulation of a territory's mission integrating economic development, cultural preservation, environmental supervision, and community well-being. The paper argues that emotional attachment and place identity play a central role in mobilizing stakeholders and shaping territorial narratives, and proposes a framework linking identity, emotional place branding, stakeholder collaboration, and place-based value creation. The paper contributes to emerging debates on purpose-driven development by extending the notion of corporate purpose to the territorial scale.*
Keywords: *Territorial purpose; place branding; emotional place branding; rural development; place identity; rural storytelling.*

Framing of the research. *Rural territories have historically played a fundamental role in economic production, social organization, and cultural heritage. Traditionally associated with agriculture and natural resource exploitation, rural areas have been central to sustaining regional economies and preserving cultural landscapes. However, globalization, technological change, and urbanization have significantly transformed rural territories, altering traditional socio-economic structures and challenging conventional development models.*

These transformations have generated multiple structural challenges for rural regions. Many rural areas experience demographic decline, aging populations, limited economic diversification, and reduced access to services and infrastructure. Rauhut and Halme (2025) highlight that rural development has progressively shifted away from purely agricultural models toward multi-sectoral approaches that better reflect the complexity of contemporary rural economies. Furthermore, rural territories often face negative stereotypes portraying them as economically stagnant or socially marginal; perceptions that may hinder investment, discourage migration, and reinforce territorial inequalities.

Despite these challenges, rural territories also possess significant opportunities for innovation and renewal. Contemporary development paradigms increasingly emphasize the importance of place-based development strategies that leverage local resources, cultural identity, and territorial narratives. Rather than relying exclusively on external investment or large-scale industrial development, place-based strategies focus on mobilizing endogenous assets such as landscapes, cultural heritage, local knowledge, and social capital. Baccarani, Cassia, Rossato and Cavallo (2019) underscore how territory, firms, and communities operate in synergy through processes of value co-creation, in which place-specific assets serve as a shared foundation for competitive advantage and identity-building.

Within this context, place branding has emerged as an important tool for territorial development. Anholt (2010) argues that the reputation of places is shaped not only by communication campaigns but by the cumulative effect of policies, behaviors, and lived experiences associated with a territory. Place branding therefore should be understood as a multidimensional process that integrates communication strategies, governance practices, and stakeholder interactions. Kavaratzis (2004) conceptualized this transition as a move from traditional place marketing toward a more holistic approach centered on identity construction and strategic communication. More recently, Kavaratzis and Hatch (2013) have further developed this identity-based perspective, arguing that place brands emerge from ongoing interactions among multiple stakeholders rather than being controlled by a single organization.

In rural contexts, the relevance of place branding has grown substantially. Jafarli and Canavari (2025) provide a comprehensive review of the rural place branding literature, identifying how rural regions increasingly deploy branding strategies to differentiate their territories within globalized markets. Gulisova (2021) further synthesizes this literature through a meta-analysis of rural place branding processes, demonstrating that successful initiatives tend to involve participatory governance, authentic narratives, and long-term commitment from diverse stakeholder groups. Logar (2025) reinforces this perspective from a geographical standpoint, analyzing how place branding approaches have been adopted in rural development scholarship across multiple disciplinary traditions.

Alongside place branding scholarship, rural development research has also engaged with questions of identity and narrative. San Eugenio-Vela and Barniol-Carcasona (2012) investigate how territorial brands function as instruments of local development in inland Catalonia, demonstrating how place-based narratives can mobilize community engagement and reshape external perceptions of marginalized rural areas. Moroz, Karachyna, Vakar and Vitiuk (2020) similarly analyze territorial branding as an instrument for enhancing rural competitiveness in Eastern European contexts,

highlighting the role of institutional support and stakeholder coordination. These contributions collectively suggest that place branding, when rooted in authentic identity and participatory governance, can constitute a powerful mechanism for territorial development.

At the same time, contemporary management literature has increasingly emphasized the importance of purpose-driven strategies. The concept of corporate purpose refers to the broader societal mission of organizations beyond profit generation, integrating economic performance with social and environmental responsibility. Bonetti and Simoni (2011) examine the integration between tourism marketing and territorial marketing as a lever for economic development, arguing that place-based development systems require coherent strategic frameworks that align the objectives of multiple actors. This paper argues that similar dynamics are emerging at the territorial level, giving rise to the concept of territorial purpose.

Purpose of the paper. *This paper presents a **work-in-progress research** project aimed at developing and validating the concept of territorial purpose as a framework for understanding rural development through emotional place branding. The first objective of the project is to conceptually define territorial purpose by synthesizing insights from place branding, territorial development, and place identity literatures. The second objective is to validate this concept through qualitative fieldwork in selected European rural territories.*

Territorial purpose is defined as the shared strategic narrative through which a territory expresses its identity, values, and development aspirations, mobilizing stakeholders to create economic, cultural, and social value rooted in place. Territorial purpose extends the concept of corporate purpose to the territorial scale by emphasizing collective identity, stakeholder collaboration, and place-based value creation. While corporate purpose focuses on the mission and societal contribution of individual organizations, territorial purpose reflects the broader mission of a territory and its communities, integrating economic development with cultural preservation, environmental stewardship, and social well-being.

Three key dimensions characterize territorial purpose. The first is collective identity formation, which refers to the processes through which communities construct shared meanings and narratives about their territory. Giovanardi, Lucarelli and Pasquinelli (2013) contribute to this dimension through their brand ecology framework, which conceptualizes place brands as dynamic ecosystems of meaning shaped by the interactions among multiple stakeholders, institutions, and symbolic resources. The second dimension is place-based value creation, which refers to the capacity of territories to generate economic value by linking products, services, and experiences to local identity and heritage. The third dimension is emotional attachment and sense of place, which refers to the affective bonds that individuals and communities develop with their territory. Campelo, Aitken, Thyne and Gnoth (2014) demonstrate that sense of place is a critical determinant of destination branding effectiveness, arguing that places derive their competitive advantage not merely from physical attributes but from the emotional meanings that communities attach to them.

Identity formation often finds concrete expression through community narratives, or what can be described as rural storytelling. Govers (2018) explores how communities construct imaginative narratives around place identity, showing that the most admired cities, regions, and countries are those capable of articulating compelling collective stories that resonate both internally and externally. In rural contexts, such narratives frequently emphasize authenticity, heritage, tradition, and connection to nature; themes that resonate with contemporary societal trends including sustainable tourism, local food systems, and experiential consumption. Rural narratives play an important role in strengthening community resilience: by reinforcing shared identity and collective purpose, they foster cooperation among stakeholders and support collaborative forms of governance. They also provide symbolic resources that communities can mobilize to navigate economic and social transformations, legitimizing hybrid economic models that combine commercial activities with social and cultural objectives.

Hankinson (2004) contributes to this understanding by conceptualizing place brands as relational networks, in which different actors collectively contribute to constructing and communicating the brand meaning of the territory. This network perspective underlines the importance of cooperation and coordination among stakeholders in order to develop coherent and credible place branding strategies; a principle that is central to the concept of territorial purpose proposed here.

The conceptual framework proposed links territorial identity and emotional attachment to place branding, stakeholder collaboration, and ultimately sustainable rural development. In this framework, sustainability becomes a core guiding principle of territorial purpose, integrating environmental protection, cultural preservation, and economic development within coherent territorial narratives. Zenker and Braun (2017) argue that place branding strategies can contribute to sustainable territorial development when they successfully align economic goals with social and environmental values. Kavaratzis (2012) reinforces this by framing sustainable place branding as a collaborative governance process that requires the active participation of local stakeholders in defining the identity and future vision of the territory.

Conceptual framework: territorial purpose model

Territorial identity (culture, heritage, landscape)
↓
Emotional attachment (sense of place)
↓
Emotional place branding (narratives, storytelling)
↓
Stakeholder collaboration (institutions – businesses – community)
↓
Territorial purpose (shared mission and development vision)
↓
Place-based value creation (economic + cultural + social value)
↓
Sustainable rural development

Source: Author's own work

Methodology. *This study adopts a conceptual and qualitative research design. The first phase, which informs the present paper, involves a systematic review and conceptual synthesis of the literature on place branding, territorial development, rural identity, and corporate purpose. Drawing on this synthesis, the paper proposes the concept of territorial purpose and the associated conceptual framework. The literature review follows an integrative approach, combining contributions from management, marketing, economic geography, and territorial planning in order to capture the multidisciplinary nature of the phenomenon under study.*

The second phase of the research project, currently being designed, will incorporate an empirical component based on qualitative fieldwork in two European rural territories. This phase adopts a cross-border comparative design, deliberately selecting cases from different national contexts in order to test the transferability of the proposed framework across diverse institutional and territorial settings. The two cases presented below are not meant to be exhaustive but serve as illustrative pilot studies that will initiate a broader comparative research programme. They have been selected because they represent contrasting yet complementary expressions of territorial purpose: one rooted in agri-food heritage and landscape identity, the other in community-driven sustainable tourism. The first case study will focus on the wine-producing region of Piedmont in northern Italy, where gastronomy, landscape, and cultural heritage play a central role in territorial identity and place branding strategies. The second case study will examine rural tourism initiatives in the Catalan Pyrenees in Spain, a region characterized by strong community traditions, natural landscapes, and emerging sustainable tourism models.

Data collection in both case studies will involve semi-structured interviews with key stakeholders including local governments, producers, community-based organizations, rural tourism businesses, and territorial development actors. The qualitative analysis will seek to explore how different rural actors articulate territorial narratives, how these narratives contribute to strengthening emotional attachment to place, and how territorial purpose manifests in governance and development practices. The findings from these two pilot cases will subsequently inform the design of additional case studies in other European rural contexts, progressively strengthening the generalizability of the territorial purpose framework. The comparative cross-border design reflects the conviction, grounded in the work of Rauhut and Halme (2025), that internationally comparative approaches are essential for advancing generalizable theoretical frameworks in rural place branding research.

Results. *The conceptual contribution of this paper is the territorial purpose framework, which integrates insights from place branding, territorial identity, and purpose-driven development. The framework proposes the following logic chain: territorial identity (culture, heritage, landscape) generates emotional attachment (sense of place), which activates emotional place branding (narratives, storytelling), fostering stakeholder collaboration (institutions, businesses, community), which gives rise to territorial purpose (shared mission and development vision), enabling place-based value creation (economic, cultural, and social value), and ultimately supporting sustainable rural development.*

This framework integrates and extends several key contributions from the literature. The emphasis on identity as the foundation of territorial purpose builds on Kavaratzis and Hatch (2013), who argue that place brands are fundamentally identity-based phenomena. The role of emotional attachment in activating branding narratives reflects the insights of Campelo, Aitken, Thyne and Gnoth (2014), who demonstrate that sense of place is a critical driver of place branding effectiveness. The relational network dimension of stakeholder collaboration draws on Hankinson (2004), while the sustainability orientation of the framework reflects Zenker and Braun (2017) and Kavaratzis (2012). The role of storytelling as the communicative vehicle of territorial purpose is informed by Govers (2018) and by the rural branding literature reviewed by Gulisova (2021), Logar (2025), and Jafarli and Canavari (2025).

This framework suggests that rural place branding functions not only as a marketing strategy but also as a governance mechanism that aligns stakeholders around shared values and long-term development goals. Concrete examples of territorial purpose in practice include community-based tourism initiatives, cooperative agricultural networks, territorial

product labels, and local food systems rooted in regional identity. Such models demonstrate how emotional place branding can generate not only symbolic value but also tangible economic and social benefits, consistent with the value co-creation perspective advanced by Baccarani, Cassia, Rossato and Cavallo (2019) and the territorial branding competitiveness literature developed by Moroz, Karachyna, Vakar and Vitiuk (2020).

As this is a work-in-progress project, empirical results are not yet available. The expected results of the forthcoming fieldwork phase will provide evidence on how territorial purpose is interpreted and enacted by rural stakeholders in different contexts, and how emotional place branding shapes governance arrangements and development trajectories. The cross-border comparative design will allow testing whether the framework holds across different national institutional contexts, contributing to its potential generalizability and international applicability.

Research limitations. *As a conceptual paper based on literature synthesis, this study has several limitations. First, the proposed framework has not yet been empirically tested, and the fieldwork validation phase remains forthcoming. The propositions advanced are therefore theoretical in nature and require empirical scrutiny across diverse rural contexts. This is a deliberate feature of the work-in-progress design: the conceptual phase provides the foundation upon which the empirical phase will build, following a two-stage research logic.*

Second, the paper draws primarily on European rural territories as its empirical referents. The framework may require adaptation when applied to rural contexts in the global south or other institutional settings characterized by different patterns of land governance, community organization, or cultural heritage management. Third, the concept of territorial purpose, while drawing on well-established literatures, involves integrating perspectives from different disciplines (management, geography, marketing, and planning) which introduces inherent complexity and some definitional challenges. The multidisciplinary synthesis pursued in this paper reflects the perspective of Giovanardi, Lucarelli and Pasquinelli (2013), who argue that place branding scholarship benefits from embracing theoretical diversity rather than converging on a single disciplinary perspective.

Future research should therefore explore how territorial purpose influences governance structures, stakeholder participation, and sustainable development outcomes across different rural contexts. Comparative studies across regions and countries could help identify the institutional arrangements and policy frameworks that best support purpose-driven territorial development, building on the cross-national tradition in rural development scholarship exemplified by Rauhut and Halme (2025).

Managerial implications. *The territorial purpose framework offers important insights for practitioners and policymakers involved in rural development. For territorial managers and local governments, the framework highlights the importance of fostering participatory processes in which residents, businesses, and civil society organizations collaboratively define and communicate territorial identity. This approach aligns with Kavaratzis (2012), who emphasizes that stakeholder involvement is not merely a procedural requirement but a substantive contributor to the credibility and legitimacy of place branding strategies.*

For rural entrepreneurs and producers, the framework suggests that anchoring economic activities to place identity and cultural meaning can strengthen competitiveness and open new markets, particularly in sectors such as agri-food, rural tourism, and creative industries. By linking products and services to authentic territorial narratives, rural actors can differentiate their offerings within increasingly competitive markets; a strategy validated empirically by San Eugenio-Vela and Barniol-Carcasona (2012) in the context of inland Catalonia and theoretically supported by the value co-creation framework of Baccarani, Cassia, Rossato and Cavallo (2019).

For policymakers at regional and national levels, the concept of territorial purpose provides a lens through which rural development policy can be reoriented toward place-based, identity-driven approaches that integrate economic, cultural, and environmental objectives. This implies supporting not only infrastructure and economic incentives, but also the intangible dimensions of rural development such as community engagement, cultural heritage preservation, and narrative-building capacity. The integration of tourism and territorial marketing strategies proposed by Bonetti and Simoni (2011) offers a practical reference for designing coherent policy frameworks that harness the potential of territorial purpose in public administration.

More broadly, the territorial purpose framework suggests that rural development policy should move beyond sectoral approaches, focused narrowly on agriculture, tourism, or infrastructure, toward integrated territorial strategies that recognize the interdependence of economic, cultural, and environmental dimensions. Moroz, Karachyna, Vakar and Vitiuk (2020) provide empirical support for this orientation, demonstrating that territorial branding initiatives are more effective when embedded within comprehensive rural development strategies rather than implemented as isolated communication campaigns.

Originality of the paper. *The primary contribution of this paper is the introduction of the concept of territorial purpose, which extends the notion of corporate purpose to the territorial scale. While the relationship between place branding and rural development has received growing attention in the literature (Gulisova, 2021; Logar, 2025; Jafarli & Canavari, 2025; Rauhut & Halme, 2025), no previous study has systematically linked corporate purpose theory with territorial identity and emotional place branding in a rural development context.*

The paper also contributes to the emerging literature on purpose-driven development by highlighting the role of emotional attachment, rural storytelling, and stakeholder collaboration in shaping territorial narratives. By proposing a coherent conceptual framework that integrates identity, emotion, governance, and value creation, this work provides a foundation for future empirical research on rural place branding and territorial governance. The framework synthesizes and extends contributions from Anholt (2010), Kavaratzis (2004; 2012), Kavaratzis and Hatch (2013), Campelo, Aitken, Thyne and Gnoth (2014), Hankinson (2004), Govers (2018), and Giovanardi, Lucarelli and Pasquinelli (2013), integrating them within a single conceptual architecture oriented toward rural territorial development.

Furthermore, by explicitly positioning this study as a work-in-progress with a forthcoming qualitative fieldwork phase, the paper contributes to ongoing methodological debates on how to investigate complex territorial phenomena through place-based, participatory research approaches.

An additional dimension of originality lies in the cross-border design of the empirical phase. Rather than focusing on a single national context, the research deliberately seeks comparative evidence across different European countries, with the explicit aim of testing the transferability of the proposed framework beyond specific territorial or institutional settings. This cross-border approach responds to the growing need for internationally comparative research in rural place branding (Rauhut & Halme, 2025) and reflects the conviction that territorial purpose, as a conceptual framework, is exportable and applicable across diverse rural contexts within , and potentially beyond, Europe. The comparative design is also consistent with the territorial competitiveness perspective of Moroz, Karachyna, Vakar and Vitiuk (2020), who emphasize the value of cross-national evidence in assessing the effectiveness of territorial branding strategies.

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Società Italiana di MANAGEMENT

Short papers

Track: International Business



AI involvement in international business decisions: How decision type and agency level shape managers' adoption intentions

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Abstract

This paper presents a work-in-progress research involving two experimental studies, examining how International Business (IB) decision type (strategic vs. operational) and artificial intelligence (AI) involvement influence managers' intention to adopt AI-supported decision-making processes. Study 1 investigates how the type of decision shapes adoption intentions, while Study 2 introduces the degree of AI agency (information provider, advisor, decision-maker) as an additional dimension. Drawing on IB decision-making theory, algorithm aversion and appreciation research, the study hypothesizes that AI adoption intentions vary systematically across human-AI paradigms depending on decision type. The research also explores the mediating role of perceived control over AI, risk, trust, and effectiveness, as well as the moderating effect of AI self-efficacy, in shaping these managerial responses.

Keywords: *Artificial intelligence; International business; Decision-making; AI adoption, AI self-efficacy*

Conceptual development.

Study 1: How decision type shapes managers' intention to adopt AI in international business. *The International Business (IB) literature distinguishes between two primary types of managerial decisions: strategic and operational.*

Strategic decisions in IB have broad implications for the firm, shaping its relationships with the external environment and influencing resource allocation over time. They involve competitive, activity, and temporal interdependence, meaning that present choices constrain future options and require resource commitments under substantial uncertainty (Leiblein et al., 2022). Csaszar et al. (2024) describe strategic decisions as inherently high-stakes, ambiguous, and subject to delayed and noisy feedback. When making strategic decisions, managers are confronted with incomplete information about foreign environments, uncertainty about the behavior of international partners and competitors, and the need to integrate tacit, experiential knowledge that is difficult to quantify or systematize (Johanson & Vahlne, 1977; Aharoni et al., 2011). These are typical scenarios for decisions such as foreign market entry mode selection or international ownership restructuring (Johanson & Vahlne, 1977; Leiblein et al., 2022; Buckley & Casson, 2019).

Operational decisions in IB, by contrast, are more structured, repetitive, and data-intensive, with more clearly defined inputs and outputs (Egelhoff, 1991; Buckley & Casson, 2019). They include international transfer pricing adjustments (Egelhoff, 1991; Buckley & Casson, 2019), routine cross-border supply chain and logistics coordination (Bartlett & Ghoshal, 1989; Menzies et al., 2024), and cross-market optimization of digital advertising budget allocation (Davenport et al., 2020). Unlike strategic decisions, operational decisions usually involve a shorter time horizon, are more easily reversible, and can be assessed more readily through objective performance criteria (Leiblein et al., 2022; Egelhoff, 1991).

A growing body of literature has begun to examine how organizations leverage artificial intelligence (AI) to facilitate these types of decisions, distinguishing between "automation", where AI substitutes for human tasks, and "augmentation", where AI enhances human capabilities while leaving ultimate judgment in human hands (Raisch and Krakowski, 2021), arguing that operational decisions are inherently more suitable for automation, while complex managerial tasks requiring human intuition and accountability resist full algorithmic substitution. According to Hasan and Ojala (2024), AI is particularly well-suited to automating IB operational processes such as market data aggregation, supply chain optimization, and routine internationalization performance monitoring because these tasks generate well-defined, quantifiable data flows that current AI systems are designed to process efficiently. Menzies et al. (2024) similarly show that AI primarily contributes to operational activities, including international market trend forecasting, demand prediction, and routine resource allocation, rather than to strategic choices such as entry mode selection or ownership configuration, which depend more heavily on judgment and contextual sensitivity. Following Rana et al. (2023), AI's computational rationality should complement the bounded-rationality that constrains human managers in international contexts, particularly for tasks where large volumes of structured data can be processed to optimize decisions within clearly defined parameters. However, their analysis also reveals a critical asymmetry: while AI helps reduce bounded-rationality constraints in operational IB activities, it faces fundamental limitations in strategic domains, where dynamic institutional environments, cultural specificities, and managerial accountability make it difficult to fully formalize or delegate decision-making authority.

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A behavioral perspective on AI in IB decision-making calls for a distinction between augmentation and automation, suggesting that the appropriate mode depends on the task's cognitive demands (Ratten et al., 2024). Lindner et al. (2025) demonstrate that AI-augmented decision-making in multinational enterprises differentially affects the biases underlying strategic versus operational IB choices, with AI showing greater promise in reducing bounded-rationality constraints for the latter, while the former continues to require experience-based human judgment that current AI systems cannot replicate.

These arguments are reinforced by evidence from the research literature on algorithm aversion and appreciation. According to algorithm aversion literature (Dietvorst et al., 2018), people's willingness to rely on algorithmic support is systematically moderated by the nature of the task. Castelo et al. (2019) demonstrated that trust in algorithms is higher for tasks perceived as objective, which are quantifiable and rule-based, compared to subjective tasks based on intuition. Strategic IB decisions align closely with this definition of subjectivity, as they involve judgment calls and managerial accountability that resist full quantification (Dane & Pratt, 2007; Highhouse, 2008). In contrast, operational IB decisions mirror the characteristics of objective tasks, being more process-oriented and thus naturally compatible with algorithmic support (Egelhoff, 1991).

The preference for algorithmic over human judgment, a phenomenon known as algorithm appreciation, is particularly evident in tasks with quantifiable and objectively assessable outcomes (Logg et al., 2019). In the domain of marketing, Davenport et al. (2020) argue that AI adoption is shaped by task characteristics, with standardized and rule-based tasks being more amenable to automation, while holistic and contextually complex decisions that characterize much of international marketing strategy tend to resist full algorithmic processing. While AI systems excel at the analytical processing of complex data, human judgment retains a comparative advantage in conditions of uncertainty and equivocality (Jarrahi, 2018), precisely the conditions that define strategic decision-making in IB (Aharoni et al., 2011; Sniazhko, 2019).

Taken together, these findings suggest that decision type should significantly influence managers' intention to adopt AI-supported processes, with greater acceptance expected for operational than for strategic decisions.

Study 2: How human-AI decision-making paradigms and decision type shape managerial acceptance of AI in international business

Beyond the influence of task characteristics, the degree of agency granted to the AI system constitutes a fundamental dimension of the decision-making process. In Study 2, this agency is introduced as an independent variable with three distinct levels, designed to capture the transition from high human oversight to full AI autonomy.

The conceptual foundation for this manipulation draws on two converging streams of literature.

First, Kern et al. (2022) established that perceptions of fairness and acceptability of automated decision-making systems vary systematically depending on "who makes the final decision", distinguishing between solely human decision-making assisted by a computer program, human decision-making based on an automated recommendation, and fully automated decision-making by an algorithm.

Second, Li et al. (2025) operationalized three human-AI collaboration paradigms, namely "AI as advisor", "AI as peer collaborator", and "AI as decision maker under human supervision", demonstrating that these paradigms produce measurable differences in human cognitive responses during joint decision making tasks and that these roles carry distinct implications for human agency, reliance, and confidence calibration.

Building on these foundations and extending them to the use of AI in the IB decision-making context, this study operationalizes the human-AI decision-making paradigm as a three-level manipulation:

The first level is "AI as information provider": the AI system processes and organizes decision-relevant data, presenting structured information to the manager without offering any interpretive output or directional suggestion. The manager retains full analytical and decisional agency. This condition reflects the concept of basic computational support described by Kern et al. (2022), who observe that computer programs can offer data processing and outputs without proposing a specific recommendation.

The second level is related to "AI as advisor": the AI system provides an explicit recommendation, while the manager retains authority over the final decision. This corresponds to the automated recommendation condition of Kern et al. (2022) and the AI-as-advisor paradigm of Li et al. (2025). The authors describe this approach as the most widely used framework in Human-Computer Interaction (HCI) and AI research. In this setup, the AI augments managerial judgment without replacing it, consistent with the concept of decision augmentation (Leyer & Schneider, 2021).

The last level is about "AI as decision-maker": the AI system autonomously produces the final decision, with no residual decisional role for the manager. This corresponds to the fully automated condition of Kern et al. (2022), in which the program determines the final outcome without any human involvement in the decision process.

As shown in Table 1, the three levels of human-AI decision-making paradigm operationalized in the present study reflect a continuum of increasing AI autonomy and decreasing human control over the outcome.

Table 1. Operationalization of the Human-AI Decision-Making Paradigm in Study 2

	AI as Information Provider	***AI as Advisor***	***AI as Decision-Maker***
AI role	*Processes and organizes data; presents structured information; no recommendation*	*Provides an explicit recommendation*	*Autonomously produces the final decision*
Human role	*Full analytical and decisional agency*	*Retains final decision authority*	*No residual decisional role*
AI autonomy	*Low*	*Medium*	*High*
Human control	*High*	*Medium*	*None*
Theoretical grounding	*Kern et al. (2022)*	*Kern et al. (2022); Li et al. (2025); Leyer & Schneider (2021)*	*Kern et al. (2022); Leyer & Schneider (2021)*

Source: Authors' own elaboration

This distribution of agency and decision authority is expected to shape managerial reactions to the use of AI. Managerial responses to AI are not neutral; they vary systematically with the distribution of decision-making authority. Hybrid arrangements, where AI provides recommendations while humans retain final authority, are perceived as more acceptable than fully automated processes (Kern et al., 2022). This preference is driven by a documented hesitation among managers to delegate decisions entirely, as the desire for control remains a primary barrier to full automation (Leyer & Schneider, 2021). Consequently, reactions to AI differ profoundly depending on whether the system is designed for augmentation or automation. These responses are moderated by task characteristics, such as the degree to which a task is perceived to require uniquely human abilities (Langer & Landers, 2021).

Because managerial responses to AI depend on task characteristics, reactions may differ depending on whether managers face operational decisions or strategic choices.

Strategic decisions are characterized by high levels of ambiguity, contextual complexity, and managerial accountability (Eisenhardt & Zbaracki, 1992). These choices are difficult to evaluate against objective criteria and require experience-based judgment as well as sensitivity to cultural and institutional factors (Hitt & Tyler, 1991; Johanson & Vahlne, 2009). Consequently, trust in algorithms is lower for tasks that require personal intuition, as managers perceive automated systems as lacking the contextual and affective abilities needed for such work. In high-stakes environments, the complete removal of human judgment, as seen in the "AI as decision maker" condition, generates resistance because it eliminates accountability and conflicts with the need for human oversight (Castelo et al., 2019). This perspective is further supported by the argument that AI is most effective when applied to standardized, rule-based tasks, whereas it tends to struggle with the holistic, contextually complex decisions of international strategy (Davenport et al., 2020). In this context, the AI as information provider condition may be perceived as failing to leverage the full benefits of algorithmic processing. Conversely, the "AI as advisor" paradigm offers a middle ground, augmenting judgment while preserving final authority. This arrangement aligns with evidence that granting individuals control over algorithmic outputs increases engagement, satisfaction, and conviction in the technology's utility (Dietvorst et al., 2018). By allowing managers to accept or reject suggestions, the advisor role maximizes the autonomy and responsibility required in consequential decision-making contexts (Leyer & Schneider, 2021).

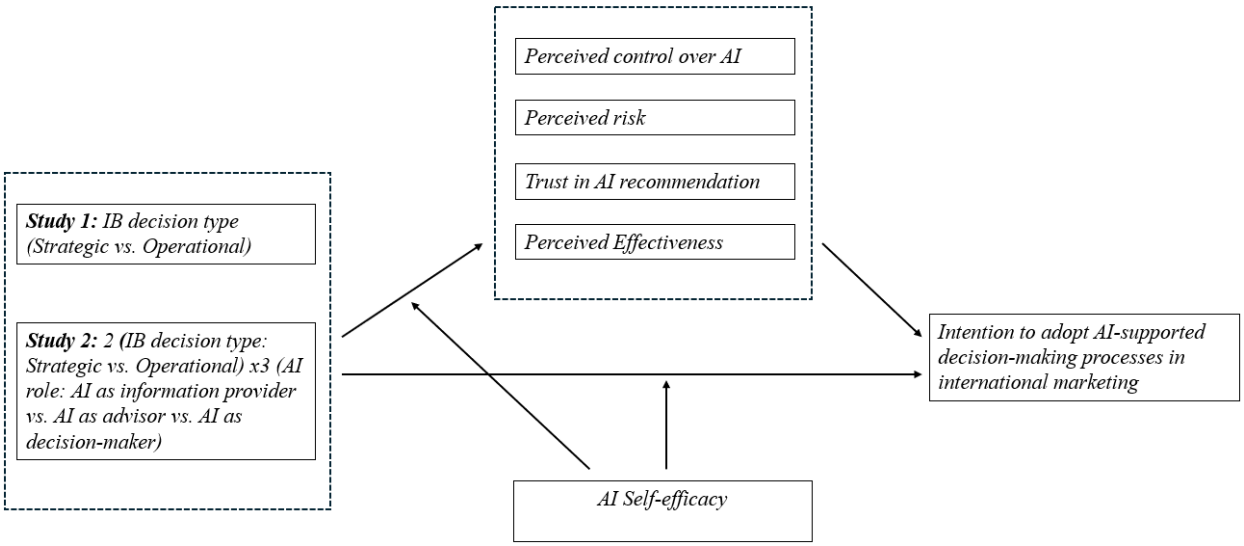
Operational decisions are more structured, repetitive, and data-intensive, with more clearly defined inputs and outputs, and for which algorithmic processing is more straightforwardly applicable (Simon, 1960). In such contexts, the perceived subjectivity of the task is substantially lower, which, as demonstrated by Castelo et al. (2019), directly increases trust in and reliance on algorithms. Algorithm appreciation rather than aversion emerges for tasks characterized by an objectively assessable outcome, a condition more representative of operational than strategic decisions (Logg et al., 2019). Under these conditions, full delegation to AI becomes more acceptable, as the costs of relinquishing control are perceived as lower and the efficiency gains of automation more salient. Leyer and Schneider (2021) corroborate this reasoning, arguing that decision automation is most valuable for routine operational tasks because it frees managerial capacity for more complex and demanding activities. Conversely, a condition in which AI merely organizes and presents data without recommending a course of action, as in the AI as information provider condition, is likely to be perceived as underutilizing the technology's potential, particularly when the task structure would support a more directive algorithmic output. The "AI as advisor condition" occupies an intermediate position, offering directional guidance while preserving human authority, but for operational decisions, this residual human involvement may be perceived as unnecessary friction rather than a valued safeguard.

In both studies, individual differences in managers' perceived self-efficacy regarding the use of AI technologies are expected to constitute a boundary condition for AI acceptance. AI self-efficacy (AISE) can be defined as an individual's general belief in their ability to use and interact with AI technologies and products, encompassing not only technical competence but also comfort during interaction and perceived usefulness of AI assistance (Wang & Chuang, 2024). Rooted in Bandura's (1977) social cognitive theory, self-efficacy is a domain-specific construct that shapes individuals' expectations about their capacity to perform a given task and, consequently, their willingness to engage with the tools involved in that task. AISE comprises four main components: assistance, anthropomorphic interaction, comfort with AI, and technological skills (Wang and Chuang, 2024). Together, these dimensions reflect the multifaceted nature of individuals' self-perceived competence in AI interactions.

In "AI-supported decision making", AISE serves as a key moderator between the human AI paradigm and managerial acceptance. This influence is predicted to be most significant at the extremes of the agency continuum. For strategic decisions, high AISE likely amplifies the preference for the advisor condition by increasing confidence in evaluating recommendations while retaining authority, consistent with the motivational benefits of perceived control (Dietvorst et al., 2016). For operational decisions, high AISE may facilitate the acceptance of full AI autonomy by reducing the anxiety associated with delegation, aligning with the positive relationship between confidence and willingness to delegate to algorithmic systems (Leyer & Schneider, 2021).

Figure 1 displays the hypothesized model of this research.

Figure 1. Research model



Source: Authors' own elaboration

Objectives. *The present research pursues two interconnected research objectives, each addressed through a dedicated experimental study.*

Study 1 aims to investigate whether and how the type of IB decision influences managers' intention to adopt AI-supported decision-making processes. Specifically, it examines whether managers' adoption intentions differ systematically when AI is introduced in the context of strategic decisions, characterized by high ambiguity, contextual complexity, and managerial accountability, compared to operational decisions, which are more structured, repetitive, and amenable to algorithmic processing. This first study will provide a foundational understanding of how the nature of the task shapes managerial openness to AI involvement.

Study 2 builds on these foundations and introduces an additional layer of complexity by examining how different configurations of human-AI collaboration interact with decision type to shape managerial responses. It investigates how three distinct human-AI decision-making paradigms, reflecting increasing levels of AI autonomy and decreasing degrees of human control, influence managers' perceptions and acceptance of AI-supported decision processes in strategic and operational IB decisions. The second study will address the more specific question of which form of AI involvement is most acceptable and under what conditions of international business decision-making.

Both experimental studies will investigate the role of potential mediators in the relationship between decision type and intention to use AI systems. These variables, namely perceived control over AI, perceived risk, trust in AI recommendations, and perceived effectiveness, are included in the model because they are considered important factors influencing the intentions to use AI systems (Ismatullaev et al., 2024).

This research includes an exploratory comparison of data from international business managers in the U.S. and Italy to identify differences in their perceptions of AI's role in decision-making. Given that national contexts influence how

managers view digitalization and AI, this cross-country analysis provides fresh insights into the intersection of technology and international business (Cannavale et al., 2025).

Together, the two studies provide a progressive and theoretically grounded examination of the factors shaping managerial acceptance of AI in international business.

Methodological framework. *The proposed research adopts a quantitative experimental approach to examine how AI agency and decision type shape managerial acceptance of AI-supported decision-making in IB contexts.*

The research will consist of two studies, both grounded in the Experimental Vignette Methodology (EVM; Aguinis & Bradley, 2014), a well-established approach that combines the internal validity of experimental designs with the contextual richness of scenario-based stimuli. EVM is particularly well-suited to the present research questions because it allows for the clean manipulation of relevant independent variables, namely the type of decision and the level of AI agency, while keeping all other contextual features constant through random assignment to conditions (Eckerd et al., 2021). The studies will employ a between-subjects design, in which each participant is exposed to only a single experimental condition. Prior to the main data collection phases, all vignettes will be subjected to a structured pretest sample of professionals in order to verify scenario realism, clarity, and the correct perception of the intended manipulations; stimuli that fall below acceptable realism thresholds or that fail to produce clear differentiation between conditions will be revised iteratively until validity criteria are met.

For the manipulation of IB decision type, three decision types were identified in the literature for each category. The strategic category included foreign market entry mode selection, international location choice for FDI, and international ownership restructuring (Johanson & Vahlne, 1977; Leiblein et al., 2022; Buckley & Casson, 2019). The operational category included international transfer pricing adjustments, routine cross-border supply chain and logistics coordination, and cross-market optimization of digital advertising budgets across subsidiaries (Davenport et al., 2020; Menzies et al., 2024; Hasan & Ojala, 2024; Egelhoff, 1991).

*Manipulation checks will be administered after vignette exposure to confirm that participants perceived the experimental conditions as intended (Oppenheimer et al., 2009), and attention checks will be embedded throughout the survey to identify and exclude inattentive respondents (Hulland et al., 2018). Sample size will be determined through an a priori power analysis for between-subjects comparison, conducted using G*Power 3.1 (Faul et al., 2007), considering a 20% recruitment buffer to account for anticipated attrition and exclusions.*

Study 1 employs a single-factor between-subjects design in which the independent variable is IB decision type, manipulated at two levels. The strategic condition presents participants with an AI-supported scenario centered on a high-stakes decision. Such decisions involve long-term consequences for the firm's international competitiveness and significant resource commitments, consistent with the IB grounded definition of strategic decisions provided by Leiblein et al. (2022). Candidate scenarios include foreign market entry mode selection (e.g., greenfield investment versus joint venture) and international ownership restructuring, decisions characterized by competitive, activity, and temporal interdependence and by the irreversibility of resource commitments under deep uncertainty (Buckley & Casson, 2019; Johanson & Vahlne, 1977). In the operational condition, a structurally equivalent scenario describes an AI-supported, routine, and more reversible decision with shorter-term consequences and clearly defined performance criteria. Candidate scenarios include international transfer pricing adjustments and the cross-market optimization of digital advertising budgets across subsidiaries (Hasan & Ojala, 2024; Menzies et al., 2024). The two vignettes will be matched in length, linguistic complexity, and framing of AI involvement to ensure that any observed differences in the dependent variable(s) are attributable to the manipulation of decision type rather than to incidental stimulus features.

Study 2 will extend the design by introducing a second independent variable – the human-AI decision-making paradigm – and will employ a 2 × 3 between-subjects factorial design crossing decision type (strategic vs. operational) with three levels of AI agency: AI as information provider, AI as advisor, AI as decision-maker.

Data will be collected through an online survey using specialized market research companies that maintain proprietary panels of employed professionals, ensuring that all respondents are currently active in business roles relevant to the research context. Participants will be selected based on screening criteria related to their professional experience in international business. They will receive an incentive from the panel supplier, in accordance with standard market research practice. This approach is increasingly adopted in experimental marketing and management research because it combines sample quality with scale (Hulland et al., 2018). It offers a methodological advantage over convenience samples by guaranteeing verified professional backgrounds and reducing the ecological validity concerns often raised against vignette studies conducted with student panels.

Hypothesis testing will rely on independent-samples comparisons and factorial ANOVA as appropriate, supplemented by mediation and moderation analyses using Hayes's (2013) PROCESS macro.

The study will employ validated scales to measure the constructs of interest, with all items rated on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived control over AI will be measured using a three-item scale adapted from Belanche et al. (2022). The scale captures the extent to which managers perceive that they retain control over the use of the AI system during the decision process (e.g., "When I use the AI system in international marketing decision making, I feel that I have control over the actions I take"). Perceived risk will be measured using a four-item scale adapted from Höddinghaus et al. (2021). The items assess managers' perception of the potential uncertainty and negative consequences associated with the AI-supported international marketing decision-making process described in the scenario. Trust in AI recommendations will

be measured using a three-item scale adapted from Shin (2021). The items capture the extent to which managers perceive the AI system as trustworthy and reliable in providing recommendations for international marketing decision-making. Perceived effectiveness will be measured using a three-item scale adapted from Castelo et al. (2019). The scale assesses managers' evaluation of the usefulness and expected performance of the AI supported decision-making process described in the scenario.

AI self-efficacy will be measured using the AI Self-Efficacy Scale developed and validated by Wang and Chuang (2024). The scale was selected because it demonstrated strong psychometric properties in the original validation and because it was purposely designed to capture individuals' perceived self-efficacy in the use and interaction with AI technologies and products, going beyond general technology self-efficacy by incorporating dimensions that are unique to the AI context, such as anthropomorphic interaction and comfort with AI. The scale comprises 22 items distributed across four sub-dimensions: assistance, anthropomorphic, comfort with AI, and technological skills. The sub-dimension scores will be considered for supplementary exploratory analyses.

Managerial acceptance will be operationalized as managers' behavioral intention to adopt AI-supported decision-making processes. This will be measured using a three-item scale adapted from Venkatesh et al. (2003), which is the most widely validated measure of technology acceptance intention in the information systems literature, as the scale demonstrated excellent psychometric properties in the original validation study.

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Beyond Borders: A Systematic Review of Internationalization Pathways for Performing Arts Organizations

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Abstract. *This paper provides a systematic review of the literature on the internationalization pathways of performing arts organizations (PAOs), a distinctive and still underexplored segment within the cultural and creative industries. Drawing on a structured analysis of 66 peer-reviewed articles published between 1994 and 2026, the study examines how PAOs approach internationalization strategies while facing structural constraints such as high production costs, limited scalability, and strong cultural embeddedness.*

The findings highlight the growing academic interest in this field, particularly after 2010, and reveal a fragmented yet multidisciplinary body of research spanning cultural economics, international business, and tourism studies. However, the wide dispersion of publications across journals suggests a limited ability to address the topic cohesively and integrate it within a more unified scholarly domain.

Overall, this study advances research on cultural organizations by offering a comprehensive overview of internationalization strategies in the performing arts and outlining directions for future interdisciplinary research.
Keywords: *Internationalization; Cultural industries; Performing arts*; *Cultural organizations; International business*

Framing of the research. *The internationalization of performing arts organizations (PAOs) represents a critical frontier in contemporary cultural economics, emerging as a strategic response to the "earnings gap" - the structural disparity between rising costs and stagnant revenues in live performance (Baumol & Bowen, 1966). While industrial cultural sectors - such as film, recorded music, and publishing - have traditionally leveraged economies of scale derived from the commercialization of intellectual property rights, near-zero marginal costs, standardized formats, and access to private capital to facilitate global expansion, PAOs remain constrained by the inherent nature of live shows. These constraints impose high variable costs and a structural productivity lag, alongside significant cultural and logistical barriers.*

The drivers of international expansion for PAOs, particularly non-profits, can be categorized as either internal or external.

***Internal Determinants and Managerial Resilience**. From an internal perspective, internationalization offers an opportunity for risk sharing, achievable by distributing substantial fixed production costs across a larger number of performances through international co-productions (Mariani, 2007; Mariani, 2009). These collaborations function not only as financial levers but also activate collaborative learning processes that accelerate the acquisition of cross-border competitive advantages. Furthermore, internationalization enables PAOs to increase revenues through the development of new business models (Schiuma, 2017) and the adoption of new technologies for cultural distribution, such as digital live-streaming (Ouazzani et al., 2022). These technologies allow PAOs to partially decouple economic performance from the physical limitations and logistical costs of touring, while simultaneously fostering "phygital engagement" capable of attracting younger generations (Pesce & Franzè, 2025). From a competitive standpoint, international projection strengthens organizational prestige and, crucially, helps overcome the "liability of outsidership" (Johanson & Vahlne, 2009). By participating in international networks - often through network intermediaries (e.g., international agents, festival artistic directors) who act as gatekeepers to elite circuits - organizations can reduce not only the physical and cultural distance from foreign markets but also the disadvantage of lacking local relational embeddedness. This, in turn, enhances the capacity to attract top international talent and incremental financial resources from private supporters (Shekhtman & Barabási, 2023).*

***External Determinants and Cultural Diplomacy**. From an external perspective, a strong push toward internationalization stems from the political will of national governments or supranational institutions (e.g., the EU) seeking to capitalize on cultural soft power (Nye, 2004). PAOs are viewed as vital instruments for "nation branding" (Anholt, 2007), contributing to a country's international reputation and generating positive externalities in other sectors, such as cultural tourism (Abromaite et al., 2025) and foreign trade, while opening privileged diplomatic channels. Within the European context, programs such as Creative Europe and Perform Europe (European Commission, 2016, 2018, 2021) promote the safeguarding and development of European cultural and linguistic diversity. These initiatives aim to strengthen the competitiveness and economic potential of cultural and creative sectors, pursuing not only economic objectives but also social cohesion and intercultural dialogue. At the national level, governments support internationalization to bolster the competitiveness of domestic firms and contribute to the renewal of the national cultural capital and artistic languages within increasingly saturated domestic markets.*

Given the highly differentiated nature of the performing arts and the local specificity of their offerings compared to industrial cultural products, internationalization cannot be reduced to mere export. Instead, it requires strategies aimed at building long-term cultural relationships, preserving the symbolic components of the artistic product without

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compromising cultural authenticity, and projecting offerings toward foreign markets that are as sensitive to aesthetic-historical-cultural value as they are to economic considerations (Rastrollo-Horrillo & Casillas, 2020).

Pursuing these internationalization strategies compels PAOs—particularly non-profits—to undertake a profound organizational reconfiguration. From a Resource-Based View (RBV) perspective (Barney, 1991), these organizations often lack human resources with the managerial capabilities necessary to develop international networks and successfully navigate global markets (Symbola & Unioncamere, 2024). They also frequently face the "dual leadership" paradox (Cray, Inglis, & Freeman, 2007), which can generate internal tensions between artistic direction (artistic mission) and business management (financial sustainability), leading to slower decision-making on complex strategic choices. One area where dual leadership manifests is in market selection: artistic directors may prioritize high-prestige markets to maximize reputational returns, while business directors may favor "profitable" markets or those with greater access to transnational subsidies (e.g., EU grants). This lack of specialized competencies is further exacerbated by the scarcity of financial resources for internal development - a consequence of both the 'cost disease' (Baumol & Bowen, 1966) and a structural dependency on public subsidies, which are still largely allocated based on historical parameters or domestic impact (e.g., number of local performances or tickets sold).

Purpose of the paper. *This paper aims to provide a systematic synthesis of current research on the internationalization pathways of PAOs, summarizing distinctive characteristics of the internationalization of such organizations and highlighting research gaps.The paper also aims to develop future research trajectories characterized by cross-cutting and interdisciplinary approaches.*

Methodology. *This study adopts a systematic literature review (SLR) methodology in order to rigorously and transparently identify, analyze, and synthesize existing research related to the internationalization of PAOs. The review process was conducted following established guidelines and structured into several stages: definition of the research questions, identification of relevant data sources, selection of pertinent studies, and data analysis. Specifically, the literature search was carried out across SCOPUS, a recognized academic database, using a combination of keywords and Boolean operators to ensure comprehensive coverage. The search string was "performing art*" OR "cultural industr*" OR "CCIs" in the title, abstract or keywords sections. In this phase, an effort was made to include as many journals as possible, starting from the ABS ranking within the categories of International Business, Marketing, and sector-specific journals (e.g., culture and tourism). The use of the ABS ranking serves as a guarantee of the quality of the publications considered. By combining a keyword-based search with the list of ABS-ranked journals in the aforementioned fields, an initial database of 530 articles was obtained. At this stage, a highly inclusive approach was preferred, given the specific nature of the topic and the possibility that it may be addressed across a wide range of heterogeneous journals. Inclusion and exclusion criteria were defined a priori to guarantee consistency and replicability, taking into account factors such as thematic relevance and methodological quality. During the eligibility phase, we selected articles that were specifically focused on issues related to the internationalization of PAOs. The screening process led to the exclusion of numerous studies that were not thematically or methodologically relevant, resulting in a final sample of 66 articles. Finally, the extracted data were synthesized using a content analysis, with the aim of identifying recurring patterns, gaps in the literature, and directions for future research.*

Results. *The analysis of the identified articles offers an interesting overview of the evolution of the current research on the internationalization pathways of PAOs. Analyzing the distribution of the articles over the time span considered (1994-2026), the results reveal a growth in the number of contributions over time, with an acceleration after 2010 and a further increase in recent years, with 9 articles published in 2023 and 13 articles in 2025. This finding suggests a rising academic interest in the global dynamics of PAOs.*

In terms of sources, the articles are published across 30 journals, suggesting a relatively broad but fragmented publication landscape. This aspect sheds light on the multidisciplinary nature of the phenomenon and shows a research strand dispersed across multiple outlets rather than concentrated in a few core journals.

The articles counted a total of 1,579 citations, with an average of 23.8 citations per article and of 47.8 citations per year. This indicates a moderate level of scholarly impact, with few highly cited contributions driving the overall citations. This pattern suggests that the field is undergoing continuous development, as demonstrated by the concentration of publications in recent years, even if the first contributions date back to several decades.

Table 1 offers some descriptive statistics that synthesize the main characteristics of the internationalization pathways of PAOs' intellectual structure.

Tables 2 and 3 namely show the journals which publish more on the topic and the list of the most cited articles. In the first case, we considered those journals that published more than 2 articles among the identified contributions. In this case, the analysis suggests a concentration of articles in a limited number of sources, where the "International Journal of Arts Management" (14 articles) and the "Journal of Cultural Economics" (11 articles) represent the dominant publication venues. This result reflects the roots of the topic that remain anchored in the field of economic and management of cultural and creative organizations, which represent the core disciplinary foundations of the research strand. However, across the most publishing journals emerge at the third position"Journal of International Business Studies" (5 articles), followed by "Asia Pacific Business Review", highlighting an increasing integration with international business literature. Finally, it is interesting to note the presence of journals concerning the domain of

tourism research, that offer a perspective on the opportunity offered by PAOs' activities to increase the attractiveness of tourism destinations. This result, moreover, again confirms the multidisciplinary nature of the topic.

Table 1. Descriptive Statistics

Variable	*Value*
Total number of articles	*66*
Time span	*1994–2026*
Number of journals	*30*
Total citations	*1579*
Average citations per article	*23.8*
Average citations per year	*47.8*

Source: Authors' elaboration

Table 2. Most publishing journals (more than 2 citations)

Journal Title	*N articles*
International Journal of Arts Management	*14*
Journal of Cultural Economics	*11*
Journal of International Business Studies	*5*
Asia Pacific Business Review	*3*
Journal of Marketing Management	*2*
Leisure Studies	*2*
Journal of Travel and Tourism Marketing	*2*
Journal of Vacation Marketing	*2*
International Marketing Review	*2*
Tourism Recreation Research	*2*
Journal of Macromarketing	*2*

Source: Authors' elaboration

Concerning the analysis of the most cited articles, we considered the articles with more than 50 citations. Among the top three cited contributions, Prentice and Andersen (2003) and Frey (1994) demonstrate the long-standing importance of festivals and cultural events as key contexts for studying performing arts and cultural consumption. Moreover, more recent works point out some emerging topics that characterize most in general the field of cultural and creative industries, such as the need to find alternative funding sources (Bœuf et al., 2014) or risk and opportunities related to the digital transformation (see for example Mueser and Vlachos, 2018).

Finally, the analysis focused on word frequencies in abstracts and keywords to identify the core topics of the articles.

Table 3. Most cited articles (more than 50 citations)

Authors	*Year*	*Title*	*Source title*	*Cited by*
Prentice R., Andersen V.	*2003*	*Festival as creative destination*	*Annals of Tourism Research*	*335*
Bœuf B., Darveau J., Legoux R.	*2014*	*Financing creativity: Crowdfunding as a new approach for theatre projects*	*International Journal of Arts Management*	*125*
Frey B.S.	*1994*	*The economics of music festivals*	*Journal of Cultural Economics*	*93*
Mueser D., Vlachos P.	*2018*	*Almost like being there? A conceptualization of live-streaming theatre*	*International Journal of Event and Festival Management*	*77*
Hofmann J., Clement M., Völckner F., Hennig-Thurau T.	*2017*	*Empirical generalizations on the impact of stars on the economic success of movies*	*International Journal of Research in Marketing*	*59*
Flinn J., Frew M.	*2014*	*Glastonbury: Managing the mystification of festivity*	*Leisure Studies*	*55*
Vendrell-Herrero F., Gomes E., Collinson S., Parry G., Bustinza O.F.	*2018*	*Selling digital services abroad: How do extrinsic attributes influence foreign consumers' purchase intentions?*	*International Business Review*	*54*
Bakhshi H., Throsby D.	*2014*	*Digital complements or substitutes? A quasi-field experiment from the Royal National Theatre*	*Journal of Cultural Economics*	*52*
Wang S.L., Gu Q., Von Glinow M.A., Hirsch P.	*2020*	*Cultural industries in international business research: Progress and prospect*	*Journal of International Business Studies*	*50*
Chen S.	*2016*	*Cultural technology: A framework for marketing cultural exports – analysis of Hallyu (the Korean wave)*	*International Marketing Review*	*50*

Source: Authors' elaboration

Table 4 shows the results for word frequencies in the abstracts, distinguishing between one-word analysis and two-word analysis (bigram), and identifying the top 20 frequencies. Findings show that the most frequent words and bigrams pertain to the sectors where the organisations operate, as the case of "perform" (100 occurrences) or "performing arts" (63 occurrences). These results suggest a clear focus of the literature, confirming that the dataset is strongly centred on the performing arts domain. A second major thematic area emerges around cultural and creative industries, frequently

cited as "cultur" (121 occurrences), "cultur industri" (23 occurrences) and "creativ industri" (9 occurrences). This pattern indicates that research on performing arts is often embedded within the broader framework of cultural and creative industries, highlighting an interdisciplinary perspective.

Furthermore, a part of highly cited words and bigrams suggest a focus on topics related to managerial, market and strategic dimensions. This element is revealed by words such as "market" (64 occurrences) or "business model" (10 occurrences), suggesting research focuses on organisational structures and management practices. The presence of words and bigrams related to the international market and international tourists highlights the field's global dimension.

This is also confirmed by the international dimension of the geographical settings, which range across several experiences in different countries, as in the case of Cantonese opera (9 occurrences). These terms indicate that empirical research is often grounded in specific cultural settings and case studies, reinforcing the contextual nature of performing arts research.

Table 4. Most frequent words and bigrams in abstracts

Word	*Frequency*	*Bigram*	*Frequency*
cultur	*121*	*perform art*	*63*
perform	*100*	*cultur industri*	*23*
art	*97*	*art organ*	*11*
industri	*67*	*busi model*	*10*
market	*64*	*case studi*	*9*
studi	*63*	*creativ industri*	*9*
product	*60*	*cantones opera*	*9*
intern	*40*	*star power*	*8*
research	*38*	*opera hous*	*8*
creativ	*34*	*cultur product*	*7*
effect	*34*	*intern tourist*	*7*
find	*34*	*neg effect*	*7*
opera	*34*	*shed light*	*6*
music	*32*	*art festiv*	*5*
technolog	*32*	*find reveal*	*5*
tourist	*31*	*practic implic*	*5*
artist	*31*	*offic revenu*	*5*
success	*30*	*music industri*	*5*
develop	*29*	*intern market*	*5*
organ	*29*	*studi investig*	*5*

Source: Authors' elaboration

Table 5 shows the results for word frequencies in the keywords, even in this case, distinguishing between one-word analysis and two-word analysis (bigram), and identifying the top 20 frequencies. The results of the keywords' analysis corroborate the previous findings. In particular, the focus on data from the performing arts sector is confirmed, both in words (cultur=30 occurrences; art=22 occurrences) and in bigrams (perform art=16 occurrences). Moreover, even keywords analysis reveals that the collected literature also focuses on the economic, managerial, and international dimensions (market=18 occurrences; busi model=4 occurrences). Finally, the presence of terms such as "innov" (6 occurrences), "technolog" (6 occurrences) and "digit" (5 occurrences) points to a growing interest in aspects related to technological innovation and digital transformation.

Table 5. Most frequent words and bigrams in abstracts

Keyword	*Frequency*	*Bigram*	*Frequency*
cultur	*30*	*('perform', 'art')*	*16*
art	*22*	*('cultur', 'industri')*	*9*
perform	*19*	*('busi', 'model')*	*4*
market	*18*	*('market', 'perform')*	*3*
industri	*17*	*('art', 'product')*	*3*
tourism	*10*	*('creativ', 'industri')*	*3*
innov	*6*	*('cultur', 'tourism')*	*2*
valu	*6*	*('creativ', 'cultur')*	*2*
music	*6*	*('innov', 'intermediari')*	*2*
technolog	*6*	*('valu', 'chain')*	*2*
intern	*6*	*('artist', 'organ')*	*2*
product	*6*	*('korean', 'wave')*	*2*
analysi	*6*	*('south', 'korea')*	*2*
creativ	*5*	*('opera', 'perceiv')*	*2*
organ	*5*	*('perceiv', 'valu')*	*2*
busi	*5*	*('manag', 'art')*	*2*
theori	*5*	*('organ', 'perform')*	*2*

digit	*5*	*('digit', 'technolog')*	*2*
movi	*5*	*('art', 'technolog')*	*2*
china	*5*	*('cultur', 'heritag')*	*2*

Source: Authors' elaboration

Research limitations. *Despite its rigor and transparency, this systematic literature review has several limitations. First, the scope of the review is inherently constrained by the selection of databases, journals, and keywords, which may have led to the omission of relevant studies published in less accessible or non-English-language sources. Second, the heterogeneity of methodologies and conceptual frameworks across the included studies poses challenges for synthesis and comparability. Third, given the relatively limited number of studies specifically addressing the internationalization of PAOs, the findings may not fully capture the diversity of practices across different cultural and national contexts. Future research might overcome these limits and seek to develop a taxonomy of the typical internationalization pathways of PAOs.*

Managerial implications. *The preliminary results of the study drive some managerial implications of internationalization in the PAOs.*

First, there is a need to develop new business models that place internationalization at the core of organizational strategies. Cultural institutions and live performance organizations are increasingly required to reduce their dependence on public funding by diversifying their revenue streams. In this regard, international tournée, co-productions with foreign partners, and participation in global festivals represent key mechanisms for expanding target markets, enhancing visibility, and mitigating financial risks. Second, the adoption of new technologies constitutes a strategic lever to support internationalization processes. The integration of digital tools—such as live streaming, on-demand platforms, and interactive digital services—enables organizations to diversify their publics. This approach not only broadens access to cultural content but also fosters the development of new revenues opportunities and forms of audience engagement. Third, it is essential to incentivize the sector to develop strategies capable of attracting inbound international flows. Performing arts can play a crucial role as a driver of tourism attractiveness, contributing to the enhancement of culture through internationally relevant live events. From this perspective, it is crucial to promote support policies and partnerships among cultural institutions, public authorities, and tourism operators in order to create integrated ecosystems that strengthen destination positioning and generate positive spillovers. Finally, it is fundamental to overcoming outsidership through network intermediaries: success in foreign markets depends less on physical distance and more on relational embeddedness. PAOs managers must build strong ties with network intermediaries—such as international agents and festival directors—who act as gatekeepers to elite global circuits.

Originality of the paper. *The paper represents an initial attempt to systematize the literature on the internationalization pathways of PAOs, a highly specific category of organizations characterized by distinctive and unique features. It provides insightful reflections while identifying gaps and outlining avenues for future research. From an international business perspective, contemporary research in international business on cultural industries, and specifically on PAOs, would benefit from stronger cross-disciplinary integration. Over the past decades, studies on cultural industries conducted across various disciplines have largely evolved in parallel, with growing yet still limited interaction. Enhancing these cross-disciplinary linkages would enable IB scholars to draw on a wider range of scientific approaches—including concepts, theoretical perspectives, and methodologies—thereby fostering a more comprehensive understanding of cultural industries and related research domains.*

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Beyond Intermediaries. A Theoretical Framework for Technology-Oriented Negotiation (TON) in SME Internationalization

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1. Introduction. Internationalisation refers to the outward movement of a company's operations from its home market into a foreign market (Karlsen et al., 2003). For the majority of small and medium-sized enterprise (SME) companies internationalisation is important to improve performance, ensure long term viability and to provide access to new knowledge and technology (Pangarkar, 2008). However, internationalisation is complex as SMEs have to navigate different legal systems, cultures and political climates, and therefore, internationalisation can be especially difficult for SMEs due to the *liability of smallness* due to a lack of financial resources, limited specialised managerial skills, and limited ability to take on the high levels of risk associated with cross border trade. The primary difficulty faced by SMEs when attempting to internationalise is managing three key flows; product flow, finance flow and information flow (Korneliussen & Grønhaug, 2003). These flows rely heavily on the success of negotiations between parties who are geographically separated and who do not necessarily have an existing relationship or level of trust (Lancaster & Reynolds, 1998). Traditional international business transactions are characterised by high transaction costs, significant risks of information leakages, and reliance on third party intermediaries (such as financial institutions), to protect against the risks of fraud and counter default. As a result, many SMEs may find themselves unable to expand beyond their domestic markets, due to the barriers created by the need for successful negotiation within an increasingly globalised environment.

The majority of research on SME internationalization has viewed digitalization broadly as an enabler of internationalization (Bargoni et al., 2024; Gaweł et al., 2023; Luu et al., 2026); much of the focus has been placed on the corporate website, digital platform and e-commerce as methods to reduce the costs associated with geographic distances (Jean & Kim, 2020). Scholars have applied the resource-based view (RBV) and network theories to illustrate how digital capabilities enable SME to identify international opportunities and acquire foreign market intelligence at a reduced cost (Kaur & Kumar, 2024). Additionally, recent research has highlighted the use of Industry 4.0 technologies (i.e., blockchain, smart contracts) to revolutionize trade finance through decentralized, tamper-proof ledgers that provide enhanced transparency and eliminate the need for trusted intermediaries to conduct business internationally (Toorajipour et al., 2022). Nonetheless, there exists a significant gap in understanding the technological solutions that can assist in supporting the negotiation phase of the internationalization process of SME. In particular, current research is generally categorized into either a communication-focused approach or a document-focused approach (Ribau et al., 2018); i.e., communication-focused approaches model the message exchanges occurring during the negotiation phases of internationalization (Treviño & Doh, 2020), however, do not capture the document management aspects of internationalization negotiations. Conversely, document-focused approaches capture the final negotiated contract agreements among parties (Woldegiyorgis et al., 2018), however, lose the rich history and rationale behind each step taken by parties negotiating the agreement. Finally, there exists limited research that examines the *third party less* approach (Brousseau & Chaves, 2005), i.e., when the technology itself (i.e., through the self-executing logic of smart contracts) is used as the main facilitator of peer to peer (P2P) business transactions in international trade. While blockchain is commonly referred to as a *machine for creating trust*, existing conceptual models fail to illustrate how the automated contractual obligations of the negotiation process affect the behaviour and strategic decision-making of entrepreneurs in industries that rely heavily on technology. Therefore, we consequently wish to answer the following research question:

RQ. How does technology-oriented negotiation (TON), facilitated by the self-executing mechanisms of smart contracts and blockchain, transform the traditional trust-commitment sequence to enable disintermediated internationalization for resource-constrained SMEs?

This study will address this important theoretical and empirical gap by examining the ways in which technology-oriented negotiation (TON) supports the internationalization process for SMEs. The study will focus specifically on the use of smart contracts and blockchain technology as the underlying mechanisms for SMEs to navigate the complexity of international trade, and therefore reduce their dependency on traditional third-party intermediaries. The contribution of this research study is three-fold. Firstly, using a socio-technical perspective (STP), this research will move beyond the functional analysis of digital tools to analyse the *joint optimization* of both technical subsystems-the algorithmic rules of the ledger-and social subsystems-human negotiators, organizational dynamics and the strategic goals of the firm. A STP is particularly relevant here, since it challenges technological determinism (Amanollahnejad et al., 2026), arguing that the success of TON depends on the alignment of the automated *if-then* logic of smart contracts with the complex communicative acts necessary for negotiating complex P2P transactions. Secondly, this study will re-imagine the traditional trust-commitment theory (TCT) within the context of the industry 4.0. In traditional TCT models, interpersonal trust is seen as the necessary precursors to relationship commitment (Ling-Yee Li et al., 2017). However, in the context of a blockchain enabled environment, the need for interpersonal benevolence is replaced by industrialized trust based on the immutability and transparency provided by the shared ledger, providing a means by which commitment may be manifested through the reliability of the technology itself, thus potentially allowing for a *loose-coupling view* of digital

globalization whereby SMEs may participate in secure transactions without the resource intensive processes associated with developing long-term social bonds.

Our research is focused on an Italian-based consulting technology company located in Tuscany which has historically relied heavily on local networking, but currently finds itself facing increasing challenges due to the demands of global competition (Ottati, 2024). Utilizing a single-case methodology, we utilize in-depth interviews with top management team to create a detailed mapping of the firm's negotiation behaviour and develop a comprehensive theoretical framework that combines technological affordance with international strategic considerations. The developed theoretical framework will examine how digital tools, specifically *if-then* algorithmic commands may be utilized to enable the automation of the implementation of agreements, thus reducing the risk of opportunistic behaviour, while also providing a *single-source-of-truth* among all parties involved in negotiations. Following the development of this theoretical framework, we will conduct a small-scale survey of entrepreneurs to verify our findings and confirm the broader applicability of our model throughout the SME. This methodological approach allowed us to move beyond simplistic automation frameworks and towards a more detailed understanding of *negotiation support*, where technology enables human negotiators to undertake more complex, semi-structured communication about bundles of products and/or services.

2. Literature Review

2.1 The Entrepreneurial Trajectory of SME Internationalization. Internationalisation of SMEs have traditionally been understood through an Uppsala theory, based on the idea that the firm's foreign market expansion occurs sequentially, incrementally, and through a process of experiential learning (Figueira-de-Lemos et al., 2011; Forsgren, 2002). Based on this, SMEs will generally begin by developing activities in markets that are both geographically and culturally close in order to reduce the *liability of smallness.* As the SME develops its experiential knowledge of the new market(s), it increases its level of commitment to those markets. This traditional view of SMEs assumes that the *liability of smallness*, which is the resource constraint caused by limited financial resources, limited administrative capacity, and limited management expertise, is a major disadvantage for SMEs when attempting to pursue global opportunities (Acs et al., 2020). However, the rapidly changing nature of the global business environment has challenged these incremental assumptions about SMEs and has given rise to two new concepts; the *international new venture (INV)* and the *born global firm (BGF)* (Fan & Phan, 2007; Rumyantseva & Welch, 2023). Both of these concepts describe businesses that skip the traditional stages of development and enter multiple remote or distant markets at inception using unique capabilities and global networks.

Further understanding the internationalization journey of SMEs, larger volume of literature has explained it through the resource-based view (RBV) for examining its accelerated development (Anwar et al., 2024). RBV views valuable, rare, inimitable and non-substitutable resources as the basis for competitive advantage (Parker & Lawrence, 2021). The Penrosian Logic, however, views the degree of flexibility that exists within a firm's resources as the primary means by which a firm can create, capture, and deliver value (Prashantham, 2008). The degree of flexibility allows SMEs to *do more with less* than larger enterprises and therefore overcome size-related barriers via resourcefulness. Additionally, due to digitalization, the digital technology is now an important resource that enables SMEs to transform their firm capabilities and reduce costs related to both physical distance and information processing (Bargoni et al., 2024). Therefore, digital technology functions as an export enabler that allows SMEs to access a global customer base without having to develop the bureaucracy typically found in large multinational corporations.

Moreover, network theory emphasizes on the idea that relationships are key in the internationalization process (Anwar et al., 2024). Business networks for SMEs are important for bridging foreign markets, and in doing so, provide SMEs with access to strategic information and resources that they do not have within their organization. The international entrepreneurship literature has built upon this, viewing internationalization as the behavioural process of identifying and leveraging opportunities across national borders (Reuber et al., 2018). The emergence of digital platforms has significantly altered this field as well. Digital platforms can be viewed as *matchmakers*, eliminating transaction costs and enabling SMEs to expand internationally quickly and sequentially through digital interaction. As such, SMEs' internationalization is no longer simply a series of commitments, but rather an emergent, socially embedded change process that is influenced by the continuous digital interactions between firms.

2.2 Negotiation in the Internationalization Process. Internationalization requires communication among many people around the world; therefore, communication is an important component of an organization's internationalization strategy as it is a large number of interactions and transactions with different types of international customers, partners, and other stakeholders (Szkudlarek et al., 2020). The high-stakes process of communicating in international trade is called negotiation and it is the means through which the exchange of goods, services, money, and ideas take place internationally (Jeong et al., 2008). Communication between two individuals or organizations that are located in different countries and cultures can be a challenge since they have no prior relationship, geography and culture can serve as barriers to successful negotiation. International negotiations involve increased uncertainty, ambiguity, and risk than domestic negotiations because the parties negotiating are subject to different laws, economic conditions, and customs of doing business. Internationalization literature has traditionally focused on intercultural negotiation, recognizing that cultural norms and individual differences affect negotiation style (Hurn, 2007). Therefore, negotiators must recognize and accommodate the

negotiation style of their counterpart in another country, and this becomes increasingly difficult as the cultural distance increases.

Grounded in transaction cost economics, the purpose of international negotiation is primarily to reduce search costs, contracting costs, and agreement enforcement/monitoring costs (Hennart, 2010). Resource constrained SME's have significant difficulties in reducing their transaction costs due to the barriers they create when trying to enter into foreign markets. A major problem identified by literature in P2P business transactions are information asymmetries that exist among the parties involved because there is no pre-established trust between the parties (Musti & Baporikar, 2023). This lack of pre-established trust creates a need for the use of costly third-party intermediaries such as; Banks issuing *Letters of Credit* (LC). While these intermediaries create an environment of trust, they also introduce other problems to be solved, including; lengthy processes, high costs, and the potential loss of confidential information.

Negotiation literature differs between the deal making and relationship building (Usunier, 2018). A *deal* refers to the specific attributes of the transaction that are negotiated, while the *relationship* refers to the social/emotional bonds developed during the negotiation process. In high-trust cultures, the relationship typically precedes the deal. In low-trust or transactional environments, the deal must be secured by formal contracts first. Building the necessary relational capital for internationalization is time consuming and resource intensive for SMEs building (Usunier, 2018). While information and communication technology (ICT) has been used to support the preparation phase of negotiations (Meyer et al., 2025), however, there is limited research on how decentralized technologies reconfigure the execution and strategic behavioural aspects of these interactions.

The introduction of human machine interaction has enabled the concept of technology-based negotiations and taken the concept of automation to the next level in creating a structure to enable human negotiators to negotiate and complete complex P2P transactions. Therefore, we recognized the necessity of developing the TON model which is based on a paradigm shift that enables technology, specifically through use of blockchain and smart contract, moving from the status of a *neutral tool* to an active *governance mechanism* that will enable P2P trading, which is accomplished without *third-party intermediaries*. The STP provides the strong theoretical basis for the TON model by enabling the *co-optimization* of social and technological systems/subsystems. the social subsystem comprised of all of the human involved in negotiating with each other in order to achieve their own goals within their organizations that are influenced by their cultural values. The technical subsystem is comprised of the *if-then* rules of an algorithm, the immutability of a shared ledger, and the transparency of the technical subsystem; this in turn provides the ability for businesses to automate their existing business logic into self-executing code through the technology.

STP argues that technological excellence is insufficient if it is not tailored to the needs of the organizational members (Sarkar, 2026). In the context of TON, this translates into aligning the *blind execution* of smart contract with the complex and semi-structured communicative actions required to negotiate the details of B2B packages. This perspective contests the concept of *technological determinism.* Blockchain technology is viewed as a site where authority, legitimacy, and participation are continually being negotiated. Thus, STP views organizations as dynamic combinations of social and technical sub-systems that interact with one another and the innovation outcomes are dependent on the recurrent alignment of organizational routines and technical affordances. The negotiation during the internationalization process is an ongoing adjustment of worker autonomy and algorithmic control to achieve a joint optimum. Therefore, TON serves as a method to reduce information asymmetry and transaction risk by providing a "single source of truth" for all parties involved.

2.3 Digital technologies as the Underlying Mechanisms of Digital Internationalization. With the rise of Industry 4.0, digital transformation has transitioned from an enabling role to a central element in the internationalization strategy of SMEs (Bargoni et al., 2024). Cloud computing, big data and artificial intelligence represent the "backbone" that enables SMEs to overcome geographical and cultural distance when entering foreign markets with limited resources (Mallela et al., 2024). While there exists a *U-shaped* relationship between digital innovation and international performance (Wan et al., 2025) such that firms must exceed a certain level of digital technology innovation to generate sustainable competitive advantages, a significant knowledge gap exists; current research tends to treat digitalization as a general enabler of foreign market entry and neglects the detailed pre-contractual mechanisms, specifically the negotiation process, through which trust is formed.

Blockchain technology can be seen as a radical change in the way that information in global value chains is being authenticated and exchanged (Chang et al., 2020). Blockchain is a decentralized/distributed ledger that has the potential to provide security, transparency, and immutability which could act as a machine for creating trust (Wittine et al., 2022). The core design of Blockchain makes it impossible to alter financial records, thus decreasing the cost of distrust and therefore the need for centralization of monitoring(Chen et al., 2022). For SMEs, Blockchain provides a third party less environment to conduct international trades by allowing P2P business transactions that do not require traditional institutions such as banks to facilitate these trades (Egwuonwu et al., 2022). Blockchain based documents provides an environment that will increase efficiency, reduce costs, and enhance information security in the trade finance process.

A key part of this blockchain technology is the smart contract which refers to an executable program that is composed of a set of rules or promises, defined by a developer, that will be automatically invoked on a blockchain based system, when certain pre-defined conditions have been satisfied (Sinha & Roy Chowdhury, 2021). Smart contracts utilize the *trustless* property of blockchain to enable parties to negotiate mutually beneficial agreements without the need for a basis of trust between them (Khan et al., 2021). The use of *if-then* commands through smart contracts, ensures that all obligations contained within contractual arrangements are fulfilled autonomously and therefore eliminate many of the

risks associated with opportunistic behaviour and counter-default (Toorajipour et al., 2022). As such, smart contracts provide for credible exchange in no-trust contracting environments, a function that can be especially valuable to SME's that enter into new markets in which their reputation has yet to be established.

The introduction of this new technology changes the way we look at TCT, as well as how we have looked at STP. STP states that trust has to be built before commitments occur (De Ruyter et al., 2001). Once the commitment occurs, it will reduce opportunism on the part of either party. However, once blockchain is integrated into an organization's business model, the commitment is established by the reliability and immutability of the code itself. This means the organization does not have to go through the traditional process of building a relationship prior to establishing a commitment. The shift from building trust in an individual, to building trust in technology affords SMEs the ability to create a *Loose Coupling view* of globalization (Nambisan & Luo, 2021). *Loose Coupling Theory* states that organizations can remain responsive to the changing needs of local markets, while maintaining the distinctiveness of their global platforms (Luo, 2022). Affordances and Generativity allow SMEs to create flexible, dynamic systems of value creation, with their foreign partners. Therefore, by combining algorithmic protocols with strategic flexibility, SMEs can better navigate the complexities of digital globalization and ensure that all transactions are verifiable and irrevocable, regardless of the level of external uncertainty.

The synthesized literature shows us that we have a good understanding of how digital transformation can support SME's; however, we have little to no understanding of how this will shape their strategic behaviour in the pre-contractual negotiation phase. Most studies on digital transformation are focused on the broad use of e-commerce platforms or post-contractual supply chain transparency; therefore, the pre-contractual negotiation phase is currently an *under-theorized black box.* Furthermore, there is also an obvious, theoretical contradiction between the 'human-trust' paradigm of traditional STP, and the 'no-trust' paradigms of decentralization technology. This study addresses this void with a new theoretical model called TON, which will be used to integrate both the technical and social subsystems.

3. Methodology: This study is using a sequential exploratory mixed-methods design adhering to the steps adapted by Asante et al. (2025), well-suited for the development of new theories around emerging technologies as they allow researchers to conduct qualitative investigations into emergent technologies (e.g., blockchain and smart contracts), and quantitative investigations into whether or not these emerging technologies can support business strategy development. The exploratory sequential method describes the process of developing a new theory through multiple phases where each subsequent phase builds upon the previous phase (Mihas, 2019).

The first phase of this study will initially conceptualize the TON framework based on the results from a series of in-depth semi-structured interviews with 10 senior technology consultants working in Tuscany, Italy. Tuscany was selected as a theoretical exemplar due to the high density of SMEs currently attempting to digitally transform their relationship-based trade practices to more decentralized forms of trade. The technology consultants were selected via purposeful sampling as having a minimum of five years of experience with the implementation of blockchain and international trade financing for their client base. Secondary triangulation will occur through review of company whitepapers and technical documentation associated with the smart contracts being utilized to provide evidence supporting the validity of the developed theory. In conjunction with the use of primary sources of data, abductive reasoning will also be used to further refine the TON constructs by identifying how industrialized trust modifies the typical order of trust-commitment in relationships among SMEs.

The second phase of the research will involve collecting additional data through a survey of 40-60 SMEs in the high tech and consulting sectors to empirically validate the TON framework. As the proposed sample size is relatively small, fuzzy-set qualitative comparative analysis (fsQCA) will be employed instead of traditional regression techniques. FsQCA provides researchers with the ability to determine causal recipes or combinations of social and technical factors that would be sufficient for an SME's successful internationalization (e.g., high levels of digital orientation + adoption of smart contract). Insights collected during the qualitative exploratory phase of the research will be used to provide anchor points for the fuzzy-set calibration process thereby allowing for a seamless integration of the two separate research strands.

4. Expected Findings. We anticipate identifying certain social/technological mechanisms which allow SMEs to attain *industrialized trust*, circumventing long term interpersonal bonding. Our findings will most likely show that when managerial vision aligns recursively with *if-then* logic, *algorithmic commitment* (a new mediator) is created; where transaction reliability is anchored in self-executing code. We also anticipate that our mixed method analysis using fsQCA will demonstrate that technological enabled pathway, will provide disintermediated internationalization opportunities for resource constrained firms to overcome their *liability of smallness*; through the use of blockchain based governance as an intermediary replacement, providing a better solution for rapid and secure foreign market entry.

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Country Risk Premium in Non-Financial Firms. A Systematic Literature Review

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Abstract. *In recent decades, the increasing internationalization of firms and the growing heterogeneity of institutional environments have renewed attention to country risk within corporate finance. More recently, heightened geopolitical tensions and global market disruptions have further emphasized the relevance of country-level risk in investment decision-making. In this context, the country risk premium ("CRP") has gradually emerged as a relevant factor in estimating the cost of capital and in asset valuation, particularly for firms operating in international and emerging markets.*

This paper reviews how the academic literature has addressed the estimation and incorporation of CRP into the cost of equity for non-financial firms, to identify the main perspectives and methodological approaches developed by scholars. To this end, the study adopts a systematic literature review approach and examines a set of peer-reviewed contributions published over the past two decades.

The analysis identifies three broad streams of research: studies treating CRP as an input in valuation processes, contributions focusing on the methodologies used to estimate CRP, and research emphasizing the geographical dimension of country risk. Overall, the literature generally associates CRP with asset valuation outcomes, although considerable diversity remains in the empirical proxies and estimation approaches employed.

The analysis focuses on journal articles and non-financial firms, which may limit the inclusion of related strands of research. Nevertheless, the review provides an overview of how CRP has been addressed in the literature and seeks to organize the existing contributions while highlighting possible directions for future research on the role of country risk in corporate valuation. In doing so, it may also offer useful insights for practitioners involved in estimating the cost of capital and incorporating country risk into valuation decisions in international contexts.

Keywords: *Country risk premium; Cost of capital; Asset valuation; Corporate finance; Systematic literature review*

Framing of the research. *Over the past decades, particularly amid increasing globalization and financial integration, the assessment of country risk has attracted growing attention from policymakers, investors, academics, and corporate practitioners (Damodaran, 2025). This trend has recently intensified amid emerging geopolitical tensions, including trade fragmentation, regional conflicts, and the reconfiguration of global supply chains, contributing to heightened uncertainty and disruptions in international business activities.*

In this context, recent practitioner-oriented analyses (McKinsey & Company, 2026) highlight how geopolitical risk is increasingly becoming a structural component of firms' strategic decision-making, influencing investment allocation, supply chain resilience, and access to critical resources. At the same time, cross-border activity remains a key driver of value creation, having surged in 2025 and continuing to play a central role in securing strategic assets (JP Morgan, 2026). Overall, these dynamics underscore the growing relevance of geopolitical risk in shaping the global economic landscape, with significant implications for financial markets, asset pricing, and investor behavior (Bain, 2026; Rafi & Ali, 2026).

Firms are required to internalize such dynamics when evaluating investment decisions; in this regard, the estimation of the CRP provides a framework for reflecting geopolitical risk exposures in valuation and investment decisions.

In this context, the concept of the country risk premium ("CRP") has become an important component in estimating the cost of capital for firms operating in international markets. As companies expand their activities across diverse institutional and macroeconomic environments, incorporating country-specific risk factors into valuation models has become increasingly relevant in corporate finance and investment analysis.

In the corporate finance literature, estimating the cost of equity is a fundamental element of investment appraisal, capital budgeting, and firm valuation. Traditional asset pricing models, such as the Capital Asset Pricing Model ("CAPM"), were originally developed in the context of integrated and mature financial markets. However, their application to firms operating in emerging or institutionally heterogeneous economies has raised several methodological and theoretical challenges (Estrada, 2001; Pereiro, 2006). In particular, scholars and practitioners have questioned whether and how additional country-level risk components should be incorporated into the discount rate used in corporate valuation frameworks. Furthermore, the selection of the risk-free rate also affects the choice of the equity risk premium, since it is necessary to assess which component of the CRP is already embedded in the risk-free rate (Bini, 2018).

To address these issues, the literature has proposed various approaches to estimate and incorporate the country risk premium (Roggi et al., 2017). These approaches include sovereign spread-based methods, volatility-adjusted models, estimates of the implied equity premium, and modified versions of the CAPM designed to account for partial market

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segmentation and institutional differences across countries. Despite the increasing relevance of these models in both academic research and valuation practice, significant heterogeneity remains in the methodologies adopted and in the assumptions regarding the nature and transmission of country risk. Sun et al. (2021) identify one possible way to classify CRP estimation methodologies, distinguishing between two different frameworks: a multi-criteria framework (based on macroeconomic fundamentals) and an asset-pricing-based framework (based on market information).

At the same time, the growing body of literature addressing the role of country risk in corporate valuation has developed across different strands of research, including international finance, asset pricing, and emerging markets valuation. However, a comprehensive and systematic synthesis of these contributions remains relatively limited, particularly regarding the implications of country risk premium estimation for non-financial firms operating across different economic and institutional contexts.

More broadly, the lack of consensus on the appropriate estimation and application of the country risk premium appears to stem from three main sources. First, different studies rely on alternative theoretical assumptions regarding the degree of integration or segmentation of international financial markets. Second, scholars adopt different empirical proxies to measure country risk, including sovereign bond spreads, credit ratings, volatility measures, and implied market premiums. Third, the literature diverges on the extent to which country-level risk should be incorporated into firm-level discount rates, raising concerns about the potential overestimation or double-counting of risk in corporate valuation models. Consequently, different implementation choices may lead to substantial differences in the estimated cost of capital, even within the same country (Aguilar et al., 2024).

In light of these considerations, this study addresses the following research question: How has the academic literature conceptualized, estimated, and applied the country risk premium in estimating the cost of equity for non-financial firms? Addressing this question is essential to clarify how country-level risk is incorporated into corporate valuation frameworks and to provide a structured understanding of the methodological and theoretical heterogeneity that characterizes the existing literature.

Purpose of the paper. *Building on this research question, this paper aims to analyze and categorize the main contributions to the literature on the country risk premium in the estimation of the cost of equity for non-financial firms. Specifically, the study seeks to organize the existing research by identifying the principal methodological approaches adopted to estimate country risk, clarifying the underlying theoretical assumptions, and discussing the implications for corporate valuation across different economic contexts.*

More precisely, the paper aims to provide a structured overview of the existing body of knowledge, identify the main research streams, highlight areas of convergence and divergence among scholars, and outline potential avenues for future research on the topic. To achieve these objectives, the study adopts a systematic literature review (SLR) methodology, which provides a structured process for identifying, screening, and classifying relevant academic contributions that address the role of the country risk premium in corporate valuation frameworks.

Methodology. *The study adopts an SLR methodology, commonly structured into three phases: planning, execution, and reporting (Tranfield et al., 2003). The review was conducted between February 20th, 2026, and March 2026. The analysis was carried out in a series of steps that enabled the construction of a database comprising the main characteristics of the selected papers. In particular, the database collects information on publication details, the methodological approaches used to estimate the country risk premium, and the theoretical assumptions underlying each contribution.*

The resulting dataset enabled analysis of the literature from different perspectives. It provided a structured overview of international academic contributions addressing the role of the country risk premium in estimating the cost of equity for non-financial firms.

In the planning stage, the specific aims of the research and the key data sources have been defined. On this point, we chose peer-reviewed journals (articles) as the primary source, since they can be considered validated knowledge and are likely to have the highest impact in this field.

Figure 1 shows the entire review process.

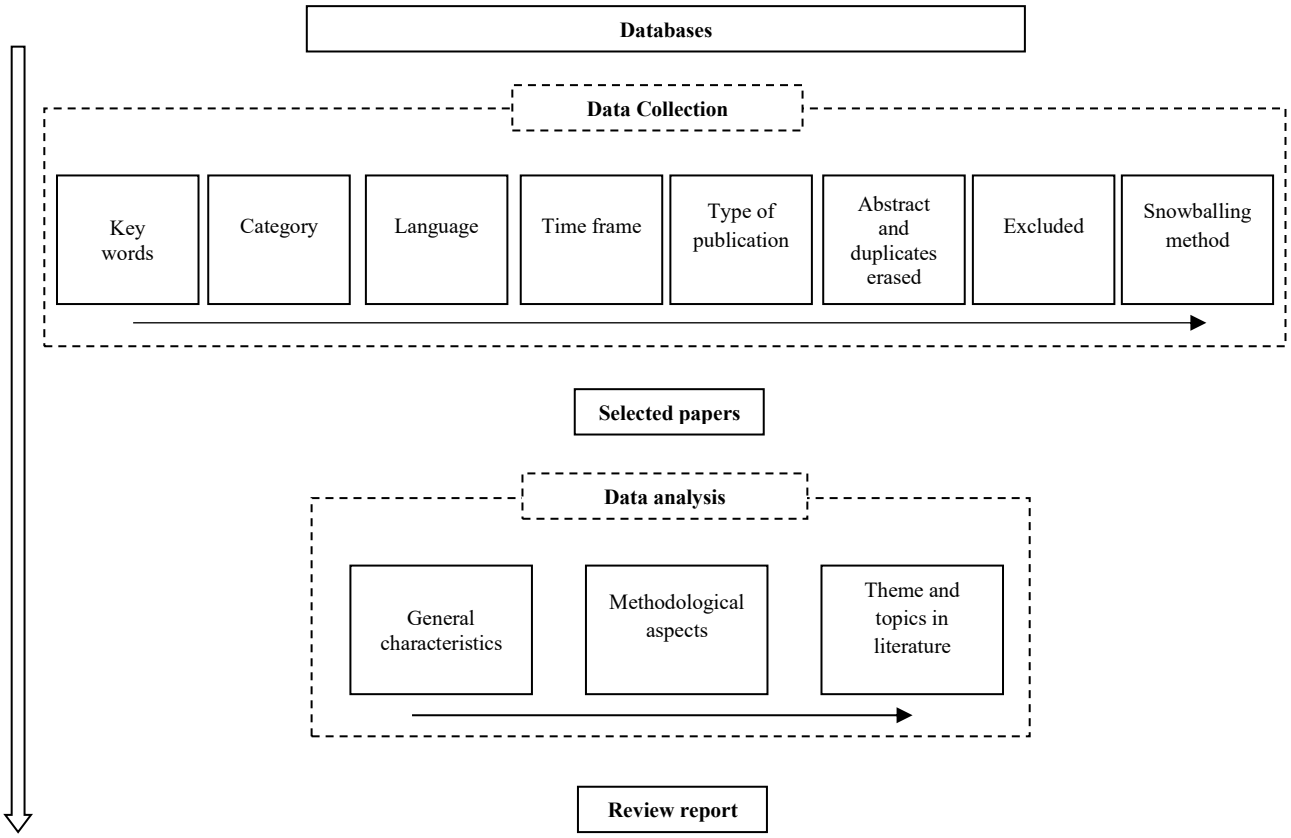
The research started by identifying Scopus and EBSCO as databases from which the papers were extracted. The databases were selected for their primary international use in management studies and for recommendations from the online libraries of major universities. These databases proved to be among the most comprehensive in terms of the collection of scientific publications and provided a great combination of variables, useful for performing the SLR. Moreover, filters were used to limit the research to the topic under analysis.

The execution phase of the SLR process consisted of two steps, i.e., (i) data collection and (ii) data analysis.

The data collection step included extracting all materials from the electronic resources. The academic journals were screened, looking at articles matching the following keywords in the box "title, keywords, or abstract", i.e. ("country risk premium" OR "country risk" OR "sovereign spread" OR "default spread" OR "country spread" OR "emerging market premium") AND ("cost of equity" OR "cost of capital" OR "CAPM" OR "valuation" OR "DCF" OR "discount rate") AND ("firm" OR "firms" OR "company" OR "companies" OR "corporate" OR "corporation") AND NOT ("bank" OR "banking" OR "insurance" OR "financial institution")([a]).

([a]) The selection of the keywords was based on previous review of the literature and brainstorming.

Fig. 1: Review process



Source: our elaboration

Moreover, the bibliographic research was conducted considering the following set of criteria:

- *articles in the category "Management", "Business", and "Business Finance";*
- *articles written in English;*
- *a publication time frame that covers the period 2001-2026. The search was limited to the period 2001-2026, as the explicit use of the country risk premium within corporate valuation frameworks became widespread in the early 2000s;*
- *papers and reviews published in academic journals.*

The article search query was defined using highly restrictive criteria and returned n. 43 studies are consistent with the established selected parameters.

The data analysis phase included different activities. First of all, materials were labeled and stored. Only papers that were relevant and available for our research were considered, excluding those with scarce or no reference to the managerial and business domains; case studies and books were also excluded. Furthermore, using the snowballing method (reference list of the papers and where they were referenced and cited), n. 5 papers have been added to our sample (Wohlin, 2014).

One Damodaran paper (2003) retrieved through has been substituted with the updated version of the same study (2022).

At the end of this screening procedure, n. 30 papers were selected.

Tab. 2: Step II – Data analysis

Total papers	**43**
Excluded	18
Refined papers	**25**
Snowballing method	5
Selected papers	**30**

Source: our elaboration

The data analysis step dealt with the analysis of each article, through a content analysis technique (Hsieh & Shannon, 2005) that considered the following categories:

- *reference data: year, journal, country (first author's university affiliation);*
- *content issues: aim, main topic, process (if applicable), eco-system (if applicable), results and implications;*
- *context issues: geography;*
- *methodology issues: types (theoretical, empirical), sampling procedures, case study selection criteria, and data analysis techniques.*

Results. *The findings suggest that, about CRP and the methodologies used to assess it, scholarly interest is particularly strong across the body of literature examined. In their contributions, scholars have sought to develop a deeper understanding of the mechanisms underlying both the valuation and incorporation of the CRP, given that, at present, no dominant theoretical framework appears to exist regarding its quantification.*

Within the broader discussion surrounding CRP estimation methodologies, it is equally important, in the context of this SLR, to consider how CRP may influence asset valuation. From this perspective, two distinct mechanisms emerge: a direct effect, in which empirical evidence explicitly identifies CRP as a determinant of asset valuation, and an indirect effect, in which CRP enters the valuation process through its incorporation into the cost of capital, thereby affecting valuation outcomes indirectly. About the latter mechanism, it appears reasonable to argue that whenever CRP is incorporated into the computation of the cost of capital, it is likely to affect asset valuation to the extent that the cost of capital is used as an input in the valuation process.

Having clarified these two distinct mechanisms through which CRP may affect asset valuation, a first relevant finding is that most authors (n. 27 of the analyzed papers) found, either directly or indirectly, an impact of CRP on asset valuation. No significant CRP effect was reported in only n. 3 cases (Janakiramanan et al., 2005; Schnusenberg et al., 2007; Sanvincente et al., 2017). These three cases are particularly worth examining, as they offer a perspective that differs from the prevailing view in the academic literature.

About Janakiraman et al. (2005), they examine the impact of international joint venture announcements (by Australian firms) on shareholder returns and do not identify any significant CRP effect, instead attributing the observed outcomes to other factors that may better explain them.

Schnusemberg et al. (2007) found that changes in Coface country ratings do not affect valuations in the corresponding stock markets, suggesting that such revisions do not appear to influence investors' decisions in equity markets.

Regarding Sanvincente et al. (2017), they found that, in the Brazilian stock market, CRP has no particular relevance. Considering that Brazil, for instance, is classified as an emerging market in Damodaran's geographical classification, a significant CRP effect would have been expected. However, the authors' findings may instead suggest that Brazil should not be interpreted strictly through the conventional emerging-market lens; rather, the country's risk premium may exhibit characteristics more commonly observed in mature markets, indicating the need to identify alternative risk factors.

After examining the three contributions that diverge from the general research trend, the analysis turns to the three main analytical frameworks identified in this SLR on CRP and its estimation, namely CRP as input, CRP as output, and CRP associated with a specific geography. To provide a structured overview of the studies discussed in the results section, Table 3 classifies the contributions by both their analytical perspective and the significance of the CRP effect on asset valuation, distinguishing among CRP as input, CRP as output, CRP associated with specific geographical contexts, and studies that do not identify a significant CRP effect.

Tab. 3: CRP literature classification

CRP effect on asset valuation	Analytical perspective	Articles	N.
Significant	CRP as input	Click & Weiner (2010); Jerry Ho *et al.* (2011); Wu (2012); Haque *et al.* (2016); Lepore *et al.* (2018); Vengesai & Muzindutsi (2020); Renaud & Kumral (2021); Aguilar *et al.* (2024); Ekawati *et al.* (2025).	9
	CRP as output	Erb *et al.* (1996); Doukas & Padmanabhan (2002); Wu (2012); Lepore *et al.* (2018); Zhang & Zhao (2004); Damodaran (2022); Damodaran (2025); Renaud & Kumral (2021); Muzindutsi (2025).	9
	CRP associated with a specific geography	Estrada (2000); Perotti & Oijen (2001); Pereiro (2005); Girard & Omran (2007); Roggi *et al.* (2017); Petrović *et al.* (2021); Acuña & Acuña (2026); Zhang & Zhao (2004); Wang & Huang (2015); Saculasan & Kanamura (2020); Dato *et al.* (2025); Momcilovic *et al.* (2015); Popovic & Paunovic (2018).	13
Not significant		Janakiramanan *et al.* (2005); Schnusenberg *et al.* (2007); Sanvincente *et al.* (2017).	3

Source: our elaboration

CRP as input. Scholars may address CRP from two distinct perspectives: either by treating it as an input in their analyses to assess the relevance and magnitude of its effect on asset valuation, or by considering it as an output, namely by investigating which estimation methodologies are most appropriate in a given context.

As far as the input perspective concerns, authors have found that CRP has an impact on their asset valuation (Haque et al., 2016), firm financial decisions (Vengesai & Muzindutsi, 2020) and can destroy asset value (Click & Weiner, 2010), even though in a portfolio selection study, CRP was identified as the factor exerting the smallest influence on expected market returns, nevertheless it retains a measurable effect (Jerry Ho et al., 2011). In the context of mining companies, Renaud & Kumral (2021) suggest that accounting for CRP will become increasingly important due to globalization and the growing relevance of operations in foreign countries; accordingly, identifying an appropriate estimation methodology becomes essential.

As previously noted, there is no universally accepted method for incorporating CRP into a firm's cost of capital. Consequently, different implementation choices may lead to substantial differences in the estimated cost of capital, even within the same country, because the inputs used to estimate it may vary (Aguilar et al., 2024).

It is also noteworthy that ESG criteria and CRP can be analyzed jointly. In particular, the evidence suggests that CRP acts as a moderating lever in the relationship between ESG implementation and the cost of capital: firms adopting ESG criteria experience an increase in the cost of capital when operating in countries characterized by high CRP, whereas a reduction in the cost of capital is observed when ESG adoption takes place in lower-CRP environments (Ekawati et al., 2025).

CRP as output. As previously anticipated, there is no universally accepted methodology for CRP estimation. The literature proposes a variety of approaches, often substantially different from one another; the following discussion summarizes the main evidence emerging from this SLR. The relevance of CRP also lies in its ability to provide additional information that, for instance, is not fully reflected in beta (Damodaran, 2022), a measure included in the CAPM methodology.

Damodaran (2025) identifies the different sources of CRP, in particular, the stage of the cycle, company, political risk, legal risk, and economic structure. Moreover, he proposes three options for CRP estimation: using historical data, using a build-up method with additional risk premiums, or using the market's implied equity risk premium.

Another approach may include a modular and risk-weighting techniques (Renaud & Kumral, 2021), and it is also worth noting a study showing that (in the context of Johannesburg Stock Exchange) Credit Default Swap spreads explain CRP more effectively than Bond Default Spread (Muzindutsi, 2025).

Regarding CRP estimation methodologies, the Chinese equity market is particularly interesting, as it exhibits a marked separation between domestic and foreign investors. Listed firms issue Class A shares for domestic investors and Class B shares for foreign investors. Although the underlying assets are identical, these share classes display different valuation levels; such differences can be attributed to CRP, insofar as foreign investors require higher compensation for exposure to CRP (Zhang & Zhao, 2004). This circumstance allows estimation of CRP for China using market data directly linked to listed equities, rather than relying, for example, on CDS.

CRP can also be estimated through index-based or rating-based approaches (Erb et al., 1996), which allow the inclusion of dimensions that are otherwise difficult to capture. Corporate performance has been analyzed in relation to ownership structure and the contestability of the largest shareholder's power (Lepore et al., 2018), while IPO valuation has been examined using indices of economic freedom and transparency (Wu, 2012).

Another approach examines firms' ability to assess CRP by considering their intangible asset base (Doukas & Padmanabhan, 2002). This perspective is noteworthy insofar as it emphasizes risk-management capability rather than direct CRP measurement.

CRP associated with a specific geography. As expected, given the nature of the topic, the literature analyzed in this SLR highlights the strong relevance of the geographical dimension, with several authors examining CRP in relation to specific geographical contexts, particularly emerging economies ("EM"). Perotti & Oijen (2001) found that political risk (a source of CRP) has a strong effect on local stock market development and excess return in EM. Regarding EM, it is noteworthy that, in emerging economies, the traditional CAPM could not fully capture the range of risks affecting stocks (Petrović et. al., 2021), which suggests the need for alternative CAPM specifications (Estrada, 2000; Pereiro, 2005; Girard & Omran, 2007; Roggi et al., 2017; Acuña & Acuña, 2026).

The following section presents considerations emerging from this SLR with reference to specific geographical areas.

Regarding Arab capital markets, risk factors, particularly political risk, appear significant. At the same time, a constant beta does not seem to provide an adequate measure of risk for these thinly traded emerging markets (Girard & Omran, 2007).

About China, the valuation differential between Class A and Class B shares has already been discussed as a possible basis for estimating CRP. More specifically, Zhang & Zhao (2004) observe that political risk may account for an important share of this CRP. China's CRP is significant, and policymakers and international investors should take it into account (Wang & Huang, 2015).

Regarding the Philippines and firms operating in the renewable energy sector ("RE"), the impact of CRP was observed in the short term across all companies. In contrast, in the medium to long term, it remained significant only for

the firm exclusively engaged in RE (Saculasan & Kanamura, 2020). This finding is particularly relevant, as it links CRP sensitivity to a specific type of business activity.

About Africa, one study focusing on the electricity sector estimates the Weighted Average Cost of Capital ("WACC") across several African countries. The results show WACC levels above global benchmarks, with the cost of equity in Africa almost twice that of debt (Dato et al., 2025). Such differences may be attributed, at least in part, to CRP.

About Serbia, it is noteworthy that n. 2 articles, conducted in different sectors, reach the same conclusion that CRP emerges as the main component in the determination of the cost of capital, and in both cases, it seems assessed as high (Momcilovic et al., 2015; Popovic & Paunovic, 2018).

In conclusion, the present SLR shows that although the academic literature on the CRP has grown substantially over recent decades, it remains marked by notable heterogeneity in both theoretical frameworks and empirical methodologies. The evidence from this systematic review indicates that CRP is a significant component in estimating the cost of capital and, by extension, in asset valuation processes, especially in international and emerging markets, where country-specific risks profoundly influence investment decisions and corporate financial outcomes. Concurrently, the literature displays a persistent lack of consensus regarding the optimal methods for estimating and integrating CRP into corporate valuation models, reflecting divergences in methodological choices, empirical proxies, and assumptions about the transmission of country-level risk to firm-specific discount rates. As global economic integration continues to advance alongside institutional heterogeneity and heightened geopolitical uncertainty, and as evolving macroeconomic conditions emerge, the relevance of country risk in corporate finance is expected to increase. Future research should aim to further elucidate the determinants and transmission mechanisms of CRP, with particular emphasis on the interaction between country-level risk and firm-specific characteristics, the impact of institutional and macroeconomic environments, and the development of more robust, context-sensitive methodologies for incorporating country risk into valuation and financial decision-making frameworks.

Research limitations. *As with any SLR, this study is subject to certain limitations. First, the scope of the analysis is intentionally limited to contributions addressing the role of the country risk premium in estimating the cost of equity for non-financial firms, which may exclude related strands of research in international finance or sovereign risk. Second, although a structured review methodology has been adopted, the processes of article selection, evaluation, and categorization inevitably involve a degree of interpretive judgment.*

Furthermore, the literature search relied on a specific set of keywords and a limited number of databases, which may have excluded potentially relevant contributions. For this reason, the present analysis should be considered illustrative rather than exhaustive, providing an overview of the existing literature rather than a definitive classification of all contributions on the topic.

Future research could further refine the framework proposed in this study by incorporating additional contributions, extending the search to other databases, and exploring complementary strands of literature in international asset pricing, emerging market finance, and corporate valuation.

Managerial implications. *The findings of this study may offer useful insights for corporate finance practitioners, investors, valuation professionals, and policymakers involved in investment decisions in international contexts. By reviewing the main approaches proposed in the literature for estimating the country risk premium, the study highlights the underlying assumptions and methodological differences that characterize existing valuation practices.*

In particular, the classification of methodological approaches may help practitioners better understand how to incorporate country risk adjustments into the estimation of the cost of equity, especially for firms operating in emerging or institutionally heterogeneous markets.

Originality of the paper. *This study provides a systematic overview of the academic literature on estimating the CRP in corporate valuation. While the topic has been widely discussed across different research areas – such as international finance, asset pricing, and emerging market valuation – the existing contributions remain relatively fragmented and often rely on heterogeneous methodological approaches.*

By organizing these contributions into a common analytical framework, the paper aims to clarify how the literature has approached the estimation and use of the country risk premium in corporate valuation. In doing so, the study also points to several areas that may benefit from further research, particularly regarding the translation of country-level risk into firm-level discount rates for internationally operating firms.

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Governare la sostenibilità: un framework per analisi delle relazioni inter-organizzative che coinvolgono le imprese multinazionali

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Abstract. *Nel corso dell'ultimo decennio si è registrato un crescente ricorso a forme d'interazione tra imprese multinazionali (MNE) e organizzazioni della società civile, per affrontare congiuntamente le sfide della sostenibilità. Tali sfide rappresentano obiettivi globali condivisi e, al contempo, ambiti di ridefinizione delle logiche competitive e dei modelli di creazione del valore nel lungo periodo. Parallelamente, si è osservata una notevole proliferazione di studi dedicati a partenariati e alleanze orientate alla sostenibilità. Tuttavia, la letteratura esistente rimane caratterizzata da una marcata frammentazione concettuale, soprattutto per quanto concerne l'uso spesso indistinto di termini quali coordinazione, cooperazione e collaborazione. La presente ricerca, ancora* in fieri*, adotta il framework di Castañer e Oliveira (2020) al fine di operare una distinzione sistematica tra i concetti di coordinazione, cooperazione e collaborazione nel contesto delle relazioni (IOR) tra MNE e società civile orientate alla sostenibilità. Tale distinzione si fonda su due dimensioni analitiche: la fase temporale dell'interazione (definizione degli obiettivi* versus *implementazione) e la natura degli obiettivi perseguiti (obiettivi comuni dell'IOR* versus *obiettivi privati). In questa prospettiva, la coordinazione si riferisce alla definizione congiunta degli obiettivi di sostenibilità; la cooperazione concerne le azioni intraprese per l'implementazione di obiettivi condivisi; la collaborazione attiene al supporto volontario fornito ai partner dell'IOR per l'attuazione di obiettivi comuni e/o privati. La ricerca, inoltre, si avvale del framework di Castañer e Oliveira (2020) per esaminare le relazioni tra MNE e fornitori, perché pur non essendo questi ultimi, sovente, partner "formali" nelle relazioni tra MNE e società civile, essi rappresentano il principale* locus *di implementazione delle pratiche di sostenibilità e sono sempre più al centro delle pressioni esercitate dalla società civile sulle MNE. Ne consegue che le IOR tra MNE e società civile non possono essere interpretate senza una considerazione inclusiva delle relazioni più ampie che coinvolgono MNE, attori della società civile, fornitori e, frequentemente, attori pubblici. Nel complesso, il paper contribuisce a una maggiore precisione concettuale, favorendo lo sviluppo cumulativo della conoscenza sulle IOR per la sostenibilità, e offre implicazioni pratiche.*
Parole chiave: *imprese multinazionali; società civile; sostenibilità; relazioni inter-organizzative; coordinazione; cooperazione; collaborazione; catene globali del valore*

Inquadramento della ricerca. *Nell'attuale contesto competitivo, la ricerca della sostenibilità costituisce una condizione strategica inevitabile che coinvolge imprese di ogni dimensione, operanti in pressoché tutti i settori dell'attività economica. Le imprese del XXI secolo non possono più prescindere da una sistematica considerazione dell'impatto ambientale e sociale generato dalle proprie attività produttive e dai modelli di gestione adottati (Marti et al., 2024; Whelan e Fink, 2016; Zaheer, 2025). Tale imperativo trova un solido fondamento anche negli obiettivi dell'Agenda 2030 per lo Sviluppo Sostenibile. Come noto, le Nazioni Unite hanno evidenziato l'urgenza di promuovere un'azione condivisa orientata al conseguimento di obiettivi globali di sostenibilità. Nel 2015, i 193 Stati membri hanno adottato un programma organico volto a integrare crescita economica, tutela ambientale e protezione sociale, delineando, per tale via, un percorso di sviluppo sostenibile su scala globale.*

È opportuno osservare come l'Agenda 2030 rappresenti l'esito di un processo regolativo caratterizzato da un grado di inclusività senza precedenti: le MNE, gli attori della società civile e i governi sono stati coinvolti nella co-creazione di regole e di incentivi finalizzati alla promozione della sostenibilità (Leone, 2025; Montiel et al., 2021). Si è, inoltre, progressivamente consolidato un percorso volto alla promozione di partnership per la sostenibilità, formalmente riconosciute nell'Obiettivo 17 delle Nazioni Unite, dedicato al rafforzamento delle collaborazioni multi-livello e multi-attore. Tali considerazioni inducono a riconoscere il ruolo sempre più centrale assunto dalle relazioni inter-organizzative (IOR) nel management internazionale e nella governance per la sostenibilità, come pure nella letteratura che si occupa di tali tematiche.

Tale evoluzione ha contribuito a una riconfigurazione dell'autorità nella governance globale della sostenibilità, all'interno della quale imprese e attori della società civile svolgono ruoli sempre più rilevanti nel colmare i vuoti regolativi lasciati dagli Stati (Rana e Sørensen, 2021; Teegen et al., 2004). In questo scenario sono emerse molteplici forme di partenariato per la sostenibilità, che si estendono da alleanze tra imprese e organizzazioni non governative a iniziative multi-stakeholder, fino a schemi di certificazione e standard privati transnazionali, quali la Global Reporting Initiative, l'UN Global Compact, il Fairtrade e il Forest Stewardship Council.

Tuttavia, la frammentazione concettuale che permea tanto la letteratura sulle relazioni IOR quanto quella sui partenariati per la sostenibilità rischia di indebolire la validità discriminante dei concetti, compromettere la parsimonia teorica e ostacolare il progresso cumulativo della conoscenza. In particolare, termini quali coordinazione, cooperazione

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e collaborazione sono stati frequentemente impiegati come sinonimi o con sfumature differenti, senza che ne siano stati esplicitati i tratti distintivi, sebbene rinviino a forme distinte d'interazione, caratterizzate da differenti atteggiamenti, comportamenti ed esiti (Castañer e Oliveira, 2020; Glasman e Albarracín, 2006). Parallelamente, una specifica tipologia di IOR – quella che coinvolge MNE e organizzazioni della società civile – ha acquisito crescente centralità tanto nel dibattito accademico quanto in quello politico (Bruijn et al., 2024; Liu e Heugens, 2024). Ciò è riconducibile principalmente alla sempre maggiore rilevanza assunta dalla sostenibilità quale obiettivo globale condiviso, formalmente sancito dall'Agenda 2030 delle Nazioni Unite. In questo contesto, le MNE sono progressivamente chiamate a interagire con attori della società civile per affrontare questioni eterogenee, quali il cambiamento climatico, la tutela dei diritti umani, le condizioni di lavoro e la protezione ambientale, sfide che non possono essere gestite in modo efficace né attraverso meccanismi puramente di mercato né mediante interventi statali tradizionali (Burritt et al., 2020).

Obiettivo del paper. *L'obiettivo principale di questo paper è fornire maggiore chiarezza concettuale nello studio delle relazioni tra MNE e società civile per la sostenibilità, distinguendo in modo sistematico tra le nozioni di coordinazione, cooperazione e collaborazione. Adottando il quadro teorico di Castañer e Oliveira (2020), il lavoro intende chiarire il significato di coordinazione, cooperazione e collaborazione nel contesto delle relazioni tra MNE e società civile, mettendo in luce come tali modalità d'interazione si articolino in funzione della fase temporale e della natura degli obiettivi perseguiti. In particolare, il paper riconosce che le relazioni tra MNE e società civile non si esauriscono in interazioni di natura meramente bilaterale, ma includono frequentemente anche attori pubblici e, soprattutto, fornitori lungo le catene globali del valore. Questi ultimi, pur non essendo sempre parte formale dei partenariati tra MNE e società civile, costituiscono un ambito cruciale in cui gli obiettivi di sostenibilità vengono tradotti in pratiche concrete*.

Metodologia. *Il paper è di natura teorico-concettuale, fondato sull'analisi e sull'estensione del framework di Castañer e Oliveira (2020), che distingue i concetti di coordinazione, cooperazione e collaborazione sulla base di differenti atteggiamenti, comportamenti ed esiti, nonché della fase temporale e della natura degli obiettivi perseguiti. Castañer e Oliveira (2020) identificano tre dimensioni interazionali– atteggiamento, comportamento ed esito – che caratterizzano coordinazione, cooperazione e collaborazione nelle IOR. In particolare, l'atteggiamento si riferisce agli orientamenti cognitivo-valutativi che influenzano il modo in cui organizzazioni e individui percepiscono e valutano oggetti, idee, attori o situazioni; il comportamento comprende le azioni concrete attraverso cui tali orientamenti vengono messi in atto; e l'esito indica gli effetti o i risultati generati da tali azioni (Castañer e Oliveira, 2020; Glasman e Albarracín, 2006).*

Castañer e Oliveira (2020) sostengono che le interazioni IOR differiscono lungo due dimensioni discriminanti: (a) la fase temporale dell'interazione, che distingue tra le fasi di decisione e deliberazione e la successiva fase di implementazione degli obiettivi, e (b) il tipo di obiettivo (Khanna et al., 1998), che indica se gli obiettivi perseguiti sono obiettivi privati oppure collettivamente condivisi. Sulla base di queste due dimensioni, Castañer e Oliveira (2020) concettualizzano in senso ampio la coordinazione come l'insieme di atteggiamenti, comportamenti ed esiti che comportano la definizione di obiettivi comuni all'interno di una IOR. La cooperazione si riferisce agli atteggiamenti, ai comportamenti e agli esiti associati all'implementazione di obiettivi concordati tra i partner dell'IOR. Infine, la collaborazione emerge quando atteggiamenti, comportamenti ed esiti sono collegati al supporto di un partner nel perseguimento di un obiettivo condiviso della IOR oppure di un obiettivo privato del partner.

Si sostiene che il quadro teorico sviluppato da Castañer e Oliveira (2020) sia particolarmente adatto all'analisi delle IOR orientate alla sostenibilità poiché esse si sviluppano tipicamente nel tempo – passando dall'articolazione e deliberazione degli obiettivi, all'implementazione e al monitoraggio – e, sovente, coinvolgono una combinazione di obiettivi privati e collettivi. Piuttosto che un semplice trasferimento tra ambiti di ricerca, l'adozione del framework di Castañer e Oliveira per le relazioni tra MNE e società civile orientate alla sostenibilità comporta un'estensione teorica che rafforza la chiarezza concettuale all'intersezione tra gli studi di management internazionale e sostenibilità.

In maggior dettaglio, il metodo seguito può essere descritto come un processo di estensione teorica: il framework originariamente sviluppato per analizzare le IOR in generale viene applicato e rielaborato alla luce del contesto specifico delle relazioni tra MNE e società civile orientate alla sostenibilità. Questa operazione non consiste in un semplice adattamento, ma in una rielaborazione concettuale che tiene conto delle peculiarità di tali relazioni, in particolare del ruolo degli attori civili, delle dinamiche di legittimità e della rilevanza delle catene globali del valore.

Inoltre, il paper intende integrare evidenze empiriche tratte dalla letteratura esistente, utilizzate in modo illustrativo per supportare e arricchire l'argomentazione teorica.

Risultati. *I risultati della ricerca ancora in una fase embrionale si articolano in tre parti principali, corrispondenti alle tre forme d'interazione analizzate: coordinazione, cooperazione e collaborazione.*

La coordinazione *si riferisce agli atteggiamenti, ai comportamenti e agli esiti coinvolti nella deliberazione, negoziazione e costruzione del consenso attorno a un obiettivo condiviso, ossia alla definizione congiunta di obiettivi comuni all'interno di una IOR. Un atteggiamento di coordinazione riflette l'inclinazione degli attori a riconoscere bisogni condivisi e ad allinearsi attorno a un obiettivo collettivo. I comportamenti di coordinazione includono le attività intraprese dai (potenziali) partner per prepararsi, negoziare e formalizzare accordi su obiettivi comuni nelle fasi iniziali della IOR (Doz, 1996; Ring e Van de Ven, 1994). Gli esiti della coordinazione si riflettono sia nell'identificazione di un obiettivo condiviso sia nell'incapacità di raggiungere un accordo.*

Nel dominio della sostenibilità nel management internazionale, la coordinazione implica processi che si sviluppano attraverso contesti nazionali e istituzionali eterogenei, mediante i quali vengono stabiliti collettivamente l'ambito di azione, il contesto operativo, le risorse necessarie e le priorità per definire obiettivi di sostenibilità. Tre questioni interrelate caratterizzano tali processi.

Primo, la coordinazione riguarda la delimitazione dell'ambito degli obiettivi di sostenibilità, che raramente è semplice data la natura composita di tali questioni (Montiel et al., 2021). Recenti ricerche mostrano che la coordinazione è iterativa e segnata da tensioni tra logiche di governance differenti (Williams et al., 2024). In questa prospettiva, la letteratura di management internazionale riconosce le organizzazioni non governative come attori chiave accanto a MNE e governi (Lambell et al., 2008; Liu e Heugens, 2024; Schepers, 2006). Di conseguenza, la coordinazione nelle relazioni MNE–società civile implica deliberazione multi-attore su priorità, standard e rappresentazioni degli interessi sociali e ambientali (Teegen et al., 2004).

Secondo, la coordinazione è influenzata dal contesto istituzionale e dalle risorse disponibili. Molte sfide di sostenibilità costituiscono beni collettivi globali, per i quali né i mercati né la governance stato-centrica forniscono incentivi adeguati (Teegen, 2003). In presenza di vuoti istituzionali, le organizzazioni non governative internazionali emergono spesso come attori chiave di coordinazione, fungendo da "istituzioni globali informali" (Teegen, 2003, ns. traduzione). Le MNE possono colmare tali vuoti collaborando con organizzazioni non governative localmente radicate, che offrono conoscenza contestuale e legittimità informale, mentre le imprese forniscono capitale e capacità manageriali (Webb et al., 2010; Leone, 2025). Un esempio è la Business Leaders' Initiative on Human Rights*, in cui grandi MNE hanno collaborato con organizzazioni non governative per affrontare questioni attinenti ai diritti umani nei paesi* BRIC *(Lehrer e Delaunay, 2009).*

Terzo, la coordinazione è un processo di prioritizzazione, attraverso cui obiettivi globali astratti (come gli SDG dell'Agenda 2030) vengono negoziati in obiettivi condivisi considerati legittimi e fattibili in specifici contesti (Van Zanten e van Tulder, 2018). Tale processo è dinamico e può riflettere interpretazioni divergenti di responsabilità, fattibilità e impatto (Webb et al., 2010; Williams et al., 2024). Inoltre, la coordinazione è contingente alle strutture di opportunità politiche: in contesti autocratici, gli attori della società civile spesso si affidano alle MNE straniere per accedere ad "arene deliberative" (Liu e Heugens, 2024, ns. traduzione).

Infine, la fase di coordinazione è complicata dall'eterogeneità interna della società civile e dalle asimmetrie di potere tra organizzazioni non governative del Nord e del Sud globale (Schepers, 2006). Di conseguenza, gli obiettivi di sostenibilità che emergono possono riflettere le priorità di organizzazioni non governative più potenti, piuttosto che i bisogni delle comunità locali. Nel complesso, la coordinazione è un processo centrale nelle relazioni MNE–società civile, i cui esiti condizionano la possibilità di una successiva cooperazione per l'implementazione degli obiettivi di sostenibilità.

Nell'estendere il framework di Castañer e Oliveira (2020), il paper attribuisce un ruolo centrale alla coordinazione nella fase di definizione degli obiettivi di sostenibilità. La coordinazione è concettualizzata come un processo deliberativo e politico in cui gli obiettivi non sono predefiniti, ma emergono attraverso l'interazione tra attori con interessi divergenti. In questa fase, gli attori della società civile operano prevalentemente in qualità di definitori dell'agenda di sostenibilità e portavoce di interessi collettivi, mentre le MNE assumono il ruolo di promotori e di coordinatori del processo, favorendo l'allineamento tra le istanze sociali e le capacità organizzative.

La cooperazione *riguarda gli atteggiamenti, i comportamenti e gli esiti associati all'implementazione di obiettivi comuni concordati. Essa implica la disponibilità dei partner a contribuire al raggiungimento di tali obiettivi e si manifesta attraverso azioni che possono essere sia congiunte sia svolte internamente alle singole organizzazioni in modo coerente con gli obiettivi della IOR (Brattström e Faems, 2020; Das e Teng, 2002; Koza e Lewin, 1998; Gulati e Singh, 1998). La cooperazione segue la fase di coordinazione e riguarda principalmente l'attuazione degli obiettivi definiti collettivamente. La cooperazione emerge quando gli attori pubblici stabiliscono aspettative che incentivano la partecipazione di MNE e attori della società civile, senza ricorrere alla coercizione diretta (Schneider e Scherer, 2019).*

Nel dominio della sostenibilità, la cooperazione tra MNE e società civile si realizza attraverso molteplici modalità, tra cui programmi di volontariato aziendale, donazioni, iniziative multi-stakeholder e processi di co-creazione regolatoria con attori pubblici (Bruijn et al., 2024; Caligiuri et al., 2013; Jamali et al., 2011; Jamali e Keshishian, 2009; Reinecke e Donaghey, 2021; Scherer e Palazzo, 2011). Un ruolo distintivo è svolto dalle organizzazioni non governative, quali consulenti esperti, che supportano le MNE nell'interpretazione e nell'operazionalizzazione degli obiettivi di sostenibilità e, così facendo, influenzano il modo in cui tali obiettivi vengono inquadrati e implementati (Kourula, 2010; Reinecke e Ansari, 2016; Teegen et al., 2004; Webb et al., 2010).

Due fattori chiave distinguono i pattern di cooperazione: (1) il tipo di obiettivo (sociale versus ambientale) e (2) il coinvolgimento di attori pubblici. Quando l'obiettivo è la sostenibilità sociale (es. standard lavorativi, sviluppo comunitario, inclusione), la cooperazione tende a essere bottom-up *e basata su relazioni con comunità locali, organizzazioni non governative e sindacati, soprattutto in contesti istituzionalmente deboli (Lévesque et al., 2018; Rondinelli e London, 2003; Webb et al., 2010). In tali contesti, le MNE cercano legittimità e competenze locali, mentre la società civile ottiene accesso a risorse e capacità organizzative (Bruijn et al., 2024; Mena e Palazzo, 2012; Sharma e Bansal, 2017). La* Joint Ethical Trading Initiative *rappresenta un esempio di cooperazione istituzionalizzata tra MNE, organizzazioni non governative e sindacati (Reinecke e Donaghey, 2021).*

Al contrario, la cooperazione su obiettivi ambientali tende a essere top-down *e inserita in quadri di governance pubblica, spesso sotto forma di partenariati pubblico-privati e iniziative regolatorie internazionali (Eberlein, 2019;*

Kaplan, 2024). Esempi includono la Roundtable on Sustainable Palm Oil*, la collaborazione di* IBM *per la protezione del Mar Baltico e* l'Extractive Industries Transparency Initiative *(Aaronson, 2011; Ritvala et al., 2014). In questi casi, gli attori pubblici agiscono quali catalizzatori, creando un contesto di cooperazione (Adam e Rachman-Moore, 2004; Scherer et al., 2016; Shin e Gond, 2024; Schneider e Scherer, 2019).*

Tuttavia, la distinzione tra dinamiche bottom-up *e* top-down *non va intesa in termini rigidi: anche obiettivi di natura sociale possono essere perseguiti attraverso forme di cooperazione* top-down*, ad esempio mediante le convenzioni dell'*International Labour Organization*, le normative sulla* due diligence *in materia di diritti umani e le politiche di promozione dell'uguaglianza di genere (Boersma, 2018; Leone et al., 2025; Zeitler e Schwarzkopf, 2025).*

Nel complesso, la cooperazione tra MNE e società civile è un processo contingente, modellato dal tipo di obiettivo e dal ruolo degli attori pubblici, oscillando tra approcci bottom-up *e* top-down*. Con la diffusione degli obiettivi di sostenibilità lungo le catene globali del valore, l'attenzione si sposta verso modalità di collaborazione per supportare i fornitori delle MNE nell'adozione di pratiche più sostenibili (Montiel et al., 2021; Surroca et al., 2013).*

La collaborazione *si riferisce agli atteggiamenti, ai comportamenti e agli esiti connessi al sostegno volontario offerto a un partner nel perseguimento di un obiettivo condiviso della IOR o di un obiettivo privato del partner stesso (Castañer e Oliveira, 2020). Tale sostegno può essere motivato da considerazioni morali, strumentali o reputazionali (Das e Teng, 2002; Williamson, 1993). L'atteggiamento collaborativo riflette la disponibilità ad assistere volontariamente; i comportamenti si manifestano nelle azioni concrete di supporto; gli esiti comprendono il progresso verso obiettivi comuni, il sostegno ad obiettivi privati e le più ampie conseguenze reputazionali o morali che ne derivano (Bruyaka et al., 2018).*

Nel contesto delle relazioni MNE–società civile per la sostenibilità, la collaborazione diventa particolarmente rilevante quando l'attenzione si sposta sui fornitori appartenenti alle catene globali del valore. La collaborazione è identificata come particolarmente rilevante per catturare il ruolo dei fornitori delle MNE all'interno delle catene globali del valore. Anche quando i fornitori non sono partner formali nelle IOR tra MNE e società civile, essi rappresentano gli attori principali attraverso cui le richieste di sostenibilità vengono implementate in pratica. La letteratura mostra che la società civile estende sempre più la responsabilità delle MNE alle pratiche dei fornitori, ad esempio in caso di inquinamento, abusi lavorativi o asimmetrie di potere tra MNE acquirenti del Nord e fornitori del Sud globale (Grabs e Ponte, 2019; Moosmayer et al., 2019; Reinecke e Ansari, 2016; Yu, 2008).

Due aspetti chiave caratterizzano la collaborazione. Il primo aspetto riguarda la modalità di supporto: poiché i fornitori spesso affrontano vincoli strutturali, la collaborazione assume frequentemente la forma di capacity-building *e attività abilitanti (Locke et al., 2013). Esempi includono la formazione su pratiche lavorative, l'assistenza tecnica per certificazioni ambientali e le iniziative di rafforzamento delle capacità (Bartley, 2010; Benstead et al., 2018; Leone, 2025; Liu et al., 2018). Il caso di* Nestlé–Proshika *in* Bangladesh *illustra come la collaborazione possa tradurre obiettivi di sostenibilità in pratiche concrete a livello di fornitore (Rana e Sørensen, 2021). Logiche simili caratterizzano iniziative rivolte a fornitori alla base della piramide, come* l'e-Choupal*, che facilitano l'integrazione di piccoli produttori nelle catene globali (Lehrer e Delaunay, 2009; Parmigiani e Rivera-Santos, 2015; Prahalad, 2005).*

Il secondo aspetto fa riferimento all'orientamento motivazionale: la collaborazione può essere guidata da motivazioni morali, strumentali o reputazionali, che spesso coesistono e influenzano l'intensità del supporto (Mueller et al., 2009; Pies et al., 2010; Rasche, 2010). Liu e Heugens (2024) mostrano che la collaborazione tra MNE e organizzazioni non governative crea strutture di opportunità che consentono alle organizzazioni non governative di esercitare una leva indiretta sui fornitori, soprattutto in contesti autocratici. Iniziative come il Bangladesh Accord *e* l'Alliance *dopo la tragedia di* Rana Plaza *illustrano come la collaborazione motivata da preoccupazioni reputazionali possa migliorare le condizioni sociali e di sicurezza lungo le catene del valore (Donaghey e Reinecke, 2018), favorendo la diffusione della sostenibilità oltre i confini dell'impresa (Haufler, 2018).*

Nel complesso, focalizzarsi sui fornitori consente di evidenziare che le relazioni MNE–società civile non possono essere ridotte a interazioni diadiche: la collaborazione implica una governance più estesa della sostenibilità in cui MNE, società civile, fornitori e governi interagiscono per generare esiti sostenibili (Leone, 2025). Di conseguenza, il paper estende il framework di Castañer e Oliveira (2020) includendo esplicitamente i fornitori, poiché le pressioni esercitate dalla società civile sulle MNE danno origine sovente ad interventi lungo la catena di fornitura. In molti casi, danni ambientali o sfruttamento del lavoro causati dai fornitori vengono attribuiti alle MNE, spingendo le imprese a intervenire nella selezione e nel monitoraggio dei fornitori. Di conseguenza, sebbene i fornitori non siano partner formali nelle IOR MNE–società civile, essi diventano parte integrante delle dinamiche attraverso cui tali relazioni generano esiti di sostenibilità.

Limiti della ricerca. *Una prima limitazione del paper concerne la sua natura prevalentemente teorico-concettuale. Pertanto, le argomentazioni teoriche sviluppate necessitano di future corroborazioni e validazioni empiriche, basate sulla raccolta e sull'analisi di dati empirici originali.*

In secondo luogo, il quadro teorico adottato, pur risultando utile per chiarire e sistematizzare i concetti, potrebbe non cogliere pienamente la complessità e la varietà delle relazioni tra MNE e società civile nei diversi contesti istituzionali, dove, accanto a forme di collaborazione positiva, possono emergere anche dinamiche di confronto e conflitto.

Implicazioni pratiche. *Il paper offre un quadro analitico utile ai manager per valutare in modo più consapevole le modalità d'interazione - coordinazione, cooperazione o collaborazione - in funzione degli obiettivi di sostenibilità perseguiti. Più in generale, il framework consente ai decisori aziendali di selezionare con maggiore chiarezza conoscitiva e consapevolezza la forma di relazione più coerente con gli obiettivi strategici dell'impresa, come pure di valutare la necessità di adeguamenti nel tempo sulla base delle evoluzioni intervenute nella IOR e negli obiettivi condivisi e privati.*

In particolare, i manager dovrebbero riconoscere che la coordinazione richiede tempo, dialogo e capacità di gestione dei conflitti, mentre la cooperazione presuppone la capacità di progettare e implementare congiuntamente soluzioni operative. Per quanto concerne la collaborazione, il paper suggerisce che i manager dovrebbero investire maggiormente in attività di supporto e di rafforzamento delle capacità dei fornitori, anziché limitarsi a pratiche di monitoraggio e controllo.

Originalità del paper. *L'obiettivo principale di questo paper è fornire maggiore chiarezza concettuale nello studio delle relazioni tra MNE e società civile a supporto della sostenibilità, superando l'uso disinvolto di termini quali coordinazione, cooperazione e collaborazione. Il principale contributo teorico del paper consiste nello sviluppo di una classificazione per analizzare le IOR nel campo della sostenibilità, favorendo lo sviluppo cumulativo della conoscenza e aumentando la parsimonia concettuale.*

Sebbene la frammentazione – più che la convergenza – nell'uso dei concetti possa essere interpretata come un indicatore della vitalità del campo (Durand et al., 2017), il paper sostiene che, in una fase evolutiva della letteratura, l'adozione di concetti distinti e chiaramente definiti rappresenti una condizione indispensabile per un progresso teorico robusto.

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Innovative Pedagogies in Enhancing Cultural Variety in the International Business Classroom

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Abstract. *The diversification of international business education increasingly depends on pedagogical approaches capable of fostering cross-cultural competence in classrooms that are often less internationally diverse than policy narratives assume. This paper explores how culturally responsive avatars can be used to expand opportunities for intercultural learning within an Internationalization at Home (IaH) perspective.*

Drawing on the intersection of constructivism, Culturally Responsive Teaching (CRT), and Self-Regulated Learning (SRL), the study proposes a CR-SRL framework for the design of scenario-based learning activities centred on culturally nuanced managerial dilemmas. The paper reports preliminary findings from a pilot implementation in a Cross-Cultural Management course involving 80 undergraduate students from more than ten national backgrounds. In this initial phase, the intervention relied on static avatar prototypes informed by the GLOBE dimensions and collaboratively developed through a co-creation process involving instructors and students.

Qualitative evidence from interviews, reflective narratives, and classroom observations suggests that the avatars supported perspective-taking, encouraged reflection on cultural assumptions, and reduced communication anxiety by creating a structured 'safe space' for experimentation. At the same time, the pilot highlighted the pedagogical limits of pre-scripted interactions and the need for more dynamic AI-enabled dialogue.

The paper argues that the value of avatar-mediated pedagogy lies not only in simulation, but in its capacity to make intercultural learning more inclusive, reflexive, and accessible to students who may not benefit from physical mobility. The discussion concludes by outlining design implications, ethical considerations, and the transition from static prototypes to future LLM-enabled interactions.

Keywords: *International Business Education; Cross-Cultural Management; Internationalization at Home; AI-Enhanced Avatars; Culturally Responsive Teaching; Self-Regulated Learning.*

Framing of the research. *The analytical framing of this research is situated at the intersection of a persistent pedagogical gap in international business education and the growing relevance of digitally mediated learning environments. International business programmes frequently present the classroom as a space in which students naturally encounter different cultural perspectives and develop the intercultural sensibilities required to operate in global organisational environments. Yet this expectation is often only partially fulfilled. In many higher education contexts, limited mobility opportunities, financial barriers, visa restrictions, and the cultural homogeneity of local cohorts reduce the frequency and quality of meaningful intercultural encounters. As a result, the development of cross-cultural competence cannot be left to the incidental composition of the classroom, but increasingly requires intentional pedagogical design.*

To address this gap, the paper adopts the Internationalization at Home (IaH) perspective, which emphasises the deliberate integration of international and intercultural dimensions into the home curriculum rather than relying exclusively on outbound mobility or exchange opportunities (Beelen & Jones, 2015). Within this perspective, intercultural learning becomes an inclusive educational objective for all students, including those who are unable or unlikely to participate in international experiences abroad. For international business education, this is particularly important because the field requires students not only to understand diversity in abstract terms, but also to engage with conflicting expectations, unfamiliar communication styles, and culturally situated managerial choices.

The theoretical core of the paper is the CR-SRL framework, which combines insights from Culturally Responsive Teaching and Self-Regulated Learning. CRT foregrounds the importance of recognising learners' cultural identities, prior experiences, and interpretive frames as legitimate resources for learning, while SRL highlights the learner's active role in planning, monitoring, and reflecting on complex tasks (Zimmerman, 2000). Taken together, these perspectives reposition intercultural learning as an active, situated, and reflexive process. In this sense, students are not passive recipients of knowledge about 'other cultures', but active interpreters of culturally complex situations. This perspective is also consistent with recent work showing that culturally responsive and self-regulation-oriented learning environments can strengthen motivation and engagement when students are invited to navigate meaningful tasks that connect cognition, context, and reflection (Anyichie & Butler, 2023).

Within this pedagogical architecture, digital avatars are conceptualised as mediating devices rather than merely technical novelties. They can represent differentiated managerial standpoints, allow students to rehearse interaction in a low-risk environment, and support forms of perspective-taking that are difficult to activate through lecture-based teaching alone. Earlier literature on immersive and avatar-based learning has already shown that virtual environments can increase engagement, presence, and collaborative meaning-making when they are aligned with clear educational goals

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(de Freitas, 2006; Falloon, 2010). This broader pedagogical promise is also reflected in Della Piana et al. (2024), who show how avatars can be used to enhance cultural diversity and classroom dynamics when they are intentionally aligned with inclusive learning objective.

More recent scholarship on avatar-mediated instruction also suggests that these tools are becoming increasingly relevant to higher education, especially as institutions look for ways to combine learner support, digital presence, and pedagogical innovation (Hanson et al., 2025).

The relevance of avatars becomes even more pronounced when considered in relation to recent developments in generative artificial intelligence. Large Language Models make it increasingly possible to move from rigid, scripted exchanges to responsive, context-sensitive dialogue. In theory, this expands the pedagogical affordances of avatar-mediated learning: students can ask follow-up questions, negotiate meanings, test assumptions, and receive adaptive feedback within culturally situated scenarios. Work in AI and education has already stressed that the real value of intelligent systems does not lie in automation alone, but in their capacity to support richer forms of feedback, exploration, and personalised guidance (Holmes et al., 2019; Luckin, 2018). At the same time, the literature also suggests caution. The educational integration of AI requires careful design choices, strong pedagogical governance, and a clear awareness of bias, representation, and trust.

A further conceptual element concerns the social perception of digital agents. Recent work on warm and competent avatars shows that students do not engage with educational agents only because of their functionality, but also because of the relational signals such systems project (Richter et al., 2025). For intercultural education, this matters significantly. An avatar designed to support managerial learning across cultures must not only appear informative, but also credible, approachable, and respectful. In other words, the effectiveness of avatar-mediated pedagogy is linked to both cognitive and relational design.

For these reasons, the paper does not treat avatars as neutral containers of content. Rather, it considers them as pedagogical artefacts whose educational value depends on how they are designed, contextualised, and enacted. This is particularly important in international business education, where the risk of reducing culture to static categories or stereotypes is ever-present. The challenge, therefore, is to develop learning scenarios that expose students to cultural variety while avoiding essentialist representations. This concern informs the emphasis on co-creation, reflexivity, and iterative design that runs throughout the study.

Purpose of the paper. *The purpose of this paper is to explore how culturally responsive avatars can be designed and implemented to increase cultural variety and support the development of intercultural and managerial competences in international business education. The focus is not simply on adopting an emerging technology, but on understanding how such tools can function as pedagogical mediators within the IaH agenda. In this sense, the paper addresses a practical and conceptual question: how can institutions create meaningful intercultural learning opportunities for students who remain in domestic classrooms, often characterised by uneven or limited exposure to diversity?*

The study approaches this issue through the development of a pedagogical framework that links intercultural learning objectives to scenario-based interaction. More specifically, the paper examines how culturally differentiated avatars can be constructed around managerial personas inspired by the GLOBE dimensions (House et al., 2002), and how those personas can be embedded in business situations involving communication styles, negotiation practices, and decision-making norms. Rather than using culture as a fixed explanatory label, the project treats these personas as prompts for reflection, comparison, and discussion.

A second objective of the paper is to foreground participatory co-creation as a design strategy. The avatars are not conceived in a top-down manner by faculty alone, but are developed through a collaborative process involving both instructors and students. This choice is pedagogically relevant because co-creation helps reduce the risk of stereotypical cultural representations and encourages students to reflect on how cultural assumptions are built into managerial discourse. It is also methodologically relevant, as student–staff co-creation has been shown to strengthen ownership, engagement, and the educational relevance of curriculum innovation in higher education (Dollinger & Lodge, 2020).

At the same time, the paper has an explicitly developmental character. It reports an initial pilot phase based on static avatar prototypes and uses that phase to identify both pedagogical affordances and design limitations. The ambition is therefore twofold: first, to understand what static avatars can already achieve in terms of perspective-taking and reflective engagement; second, to clarify why a future transition to more dynamic, LLM-enabled interaction may be pedagogically valuable. In this way, the paper contributes to current debates on innovative pedagogy in international business education by proposing a staged pathway from symbolic representation to adaptive intercultural dialogue.

More specifically, the paper addresses the following guiding question: "How can culturally responsive digital avatars be designed and implemented to foster intercultural and managerial competence, expand cultural variety, and support inclusive learning experiences in international business education?"

Methodology. *To address the core research question, this study adopts a design-based, exploratory methodology aimed at iteratively developing and evaluating the pedagogical value of culturally responsive avatars in an authentic higher education setting. Consistent with design-based research in technology-enhanced learning, the study combines intervention design, pilot implementation, and reflective evaluation in order to examine how the proposed CR-SRL framework can support intercultural learning processes (Wang & Hannafin, 2005). The approach is grounded in constructivist learning theory, which conceives learning as an active and socially situated process in which meaning is*

co-constructed through interaction, reflection, and contextualised problem-solving. Participatory co-creation is therefore treated as a core methodological principle, positioning students and instructors as contributors to the design of the learning environment. This choice is also coherent with student–staff co-creation research in higher education, which has highlighted the value of qualitative inquiry for understanding how collaboratively designed learning activities generate engagement and ownership (Dollinger & Lodge, 2020).

The research unfolded through four iterative stages. The first stage focused on the conceptual design of the pedagogical framework and on the development of culturally responsive avatars intended to represent different managerial perspectives in international business contexts. Drawing on literature in intercultural communication, cultural intelligence, and international business education, the intervention was structured around learning objectives related to intercultural awareness, reflective engagement, and perspective-taking. Particular attention was devoted to the design of culturally nuanced scenarios involving negotiation styles, communication practices, and decision-making norms across different business environments.

The second stage consisted of the co-creation and scripting of the avatars. Instructors and students collaborated in defining character profiles, cultural traits, narrative settings, and interaction scripts, with the aim of ensuring cultural plausibility while avoiding reductive or stereotypical representations. The use of scenario-based intercultural tasks is consistent with prior educational interventions that employed digitally mediated collaboration to foster intercultural competence in higher education and business-related learning contexts (Swartz et al., 2020). The scripting process also encouraged students to surface implicit cultural expectations embedded in managerial language, thereby making the design activity itself part of the learning process.

The third stage involved a pilot implementation in a Cross-Cultural Management course attended by 80 undergraduate students from more than ten national backgrounds. At this stage, the intervention relied on static avatar prototypes designed around managerial personas informed by the GLOBE dimensions (House et al., 2002). The avatars functioned primarily as visual and symbolic anchors within fixed scenario-based modules rather than as fully interactive agents. The purpose of the pilot was therefore not to test the effectiveness of an LLM-enabled system, but to assess the pedagogical feasibility of the CR-SRL framework, students' initial engagement with the cultural scenarios, and the extent to which the avatars could support early forms of perspective-taking and reflective discussion. This staged logic is also in line with recent digitally mediated intercultural learning studies, where pilot interventions have been used to explore how virtual environments shape interaction and perceived engagement before moving toward more advanced technological implementations (Gruber et al., 2023).

Finally, data collection combined multiple sources in order to capture the experiential and interpretive dimensions of the learning process. Qualitative data were gathered through semi-structured interviews with the 80 participating students and through written reflective narratives describing their engagement with the avatars and the scenarios. Classroom observations were also used to capture how students responded to the scenarios during the pilot activities. These materials were analysed through thematic analysis using an open coding process that allowed themes to emerge inductively from the data, and were progressively grouped into broader categories related to intercultural awareness, communication confidence, perspective-taking, and perceived cultural complexity. At the current stage, the research remains predominantly qualitative and exploratory. A subsequent phase will complement these findings with self-assessment survey instruments aimed at examining changes in communication confidence, cultural empathy, perspective-taking, and perceived competence in navigating culturally diverse business situations.

Results. *Preliminary findings from the pilot suggest that avatar-mediated scenarios can support intercultural learning in ways that are both pedagogically meaningful and accessible within the home curriculum. A first recurrent theme concerns the reduction of communicative inhibition. Many students described the avatars as creating a protected space in which they could test interpretations, ask culturally sensitive questions, and rehearse responses without the immediate social pressure often associated with direct peer interaction. In this sense, the avatars appeared to lower the threshold for participation and to encourage experimentation in culturally unfamiliar situations.*

A second theme concerns perspective-taking. Students frequently reported that the scenarios helped them move beyond abstract descriptions of cultural difference and engage more concretely with how managerial expectations may vary across contexts. The use of distinct personas made it easier for participants to compare communication styles, assumptions about hierarchy, and negotiation behaviours. This did not eliminate complexity; rather, it made complexity more discussable. Reflective narratives showed that students were often less interested in 'getting the culture right' than in recognising how quickly their own assumptions surfaced when interpreting the scenario.

A third finding relates to the pedagogical value of symbolic anchoring. Even in their static form, the avatars helped transform theoretical constructs such as the GLOBE dimensions into tangible managerial situations. Students were able to connect conceptual material from the course with recognisable interactional dilemmas, thereby making the learning experience more applied and memorable. In this respect, the pilot indicates that avatars can enrich the IaH agenda not only by simulating difference, but by giving students a structured way to analyse and discuss it.

At the same time, the pilot made the limits of the current design highly visible. Because interactions remained pre-scripted, the scenarios could not sustain prolonged dialogue, unexpected questions, or adaptive feedback. Students could interpret the avatars and reflect on them, but they could not genuinely negotiate with them. This limitation is analytically important because it clarifies that the most promising contribution of future AI-enabled avatars lies in responsiveness

rather than visual representation alone. The pilot therefore generated two complementary outcomes: encouraging evidence of pedagogical usefulness in the static phase, and a clearer rationale for the next design iteration based on dynamic interaction.

Research limitations. *Despite these promising early findings, several limitations define the current boundaries of the study. First, the pilot was conducted within a single Cross-Cultural Management course and should therefore be read as a context-specific exploration rather than as a generalisable evaluation of effectiveness. The sample was pedagogically rich, given its range of national backgrounds, but the intervention remains tied to one institutional setting and one curricular context.*

Second, the present phase relied on static avatar prototypes. This was a deliberate design choice for feasibility and pedagogical testing, but it necessarily constrained the scope of interaction. Students could engage in reflection and scenario interpretation, yet the absence of responsive dialogue limited the extent to which they could practice negotiation, improvisation, and real-time adjustment in culturally complex conversations. In this respect, the study identifies a clear boundary between symbolic representation and genuine conversational scaffolding.

Third, the current evidence base is predominantly qualitative and centred on participants' reported experiences. This is appropriate for an exploratory phase, but it means that claims about impact must remain cautious. The paper therefore avoids treating the pilot as proof of learning gains in a strict causal sense. Instead, it presents the results as preliminary indications of pedagogical value that require further triangulation through structured self-assessment measures and, ideally, longitudinal follow-up.

A final limitation concerns the wider challenge of design governance. Developing culturally responsive digital agents requires sustained collaboration among disciplinary experts, instructional designers, and technical specialists. It also requires explicit attention to the risks of cultural simplification, representational bias, and misplaced trust in AI-mediated interaction. For this reason, the future evolution of the project depends not only on technological enhancement, but also on robust pedagogical and ethical oversight.

Managerial implications. *The findings of this study offer several implications for managers of higher education programmes, curriculum designers, and faculty members engaged in the renewal of international business education. First, the paper reinforces the strategic relevance of Internationalization at Home as more than a compensatory approach for students who do not go abroad. Properly designed avatar-mediated activities can make intercultural learning a regular component of the curriculum, rather than an opportunity reserved for the mobile minority.*

Second, the study suggests that innovative digital pedagogies should be integrated at the level of curriculum design rather than treated as isolated classroom experiments. In practical terms, this means embedding scenario-based intercultural tasks into course objectives, assessment logics, and reflective activities. In international business education, avatars can help operationalise abstract goals such as cultural awareness, communication adaptability, and ethical sensitivity by translating them into concrete managerial situations. To facilitate this, instructors should adopt a phased implementation: starting with low-risk scenarios to build confidence, followed by structured debriefing sessions where student-led reflective narratives are used to bridge the gap between avatar interaction and theoretical constructs.

Third, the project highlights the organisational implications of AI adoption in education. Institutions interested in scaling similar initiatives need faculty development, instructional design support, and explicit governance structures for the ethical use of AI. The issue is not only technical feasibility, but educational legitimacy: who designs the personas, how cultural assumptions are reviewed, how bias is mitigated, and how students are guided to interpret avatar interactions critically rather than passively.

Finally, the findings indicate that avatar-mediated pedagogy may be especially useful in monocultural or low-exposure contexts, where students have limited opportunities to test intercultural judgement in practice. In such settings, avatars do not replace authentic human diversity, but they can function as transitional pedagogical devices that make intercultural complexity more discussable, more inclusive, and more systematically teachable. For management education, this is a relevant contribution because it links curriculum innovation, inclusion, and digital transformation within a single pedagogical agenda.

Originality of the paper. *The originality of the paper lies in the way it connects three conversations that are often treated separately: Internationalization at Home, culturally responsive and self-regulated learning, and avatar-mediated pedagogical design. Rather than discussing AI avatars as generic educational tools, the paper situates them within the specific challenge of increasing cultural variety in international business classrooms where intercultural exposure cannot be assumed.*

A second element of originality is the emphasis on participatory co-creation. The study does not simply apply pre-existing avatars to a teaching context; it frames their development as a collaborative pedagogical process through which students and instructors jointly negotiate representation, plausibility, and meaning. This helps counter the risk of essentialising culture and makes the design process itself educationally productive (Minkov & Hofstede, 2011).

Finally, the paper contributes by documenting a staged transition from static prototypes to the prospect of future LLM-enabled interaction. In doing so, it avoids overstating the current level of technological sophistication while still clarifying why responsive AI may matter pedagogically. The theoretical advancement of this work lies in redefining the role of digital agents from mere simulation tools to active cognitive mediators within the CR-SRL framework. By shifting

the focus from 'knowing about' a culture to 'navigating' its complexities through self-regulated interaction, the paper provides a conceptual bridge between culturally responsive pedagogy and AI-enabled reflexivity. This advances current theory by demonstrating how structured digital environments can systematically trigger the 'disorienting dilemmas' necessary for transformative intercultural learning, even in the absence of physical mobility.

The contribution of the paper is therefore not the claim that AI has already solved intercultural learning, but the proposal of a theoretically grounded and empirically informed pathway for developing more inclusive, reflexive, and scalable forms of intercultural pedagogy in international business education.

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MNEs Resilience Amid Dual Complexities: Insights from Peripheral Areas in Turbulent Times

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Abstract. *Global value chains' (GVCs) resilience has become a central concern in both International Business (IB) and Industrial Marketing and Purchasing (IMP) research, yet existing studies largely treat firms as operating in contextually neutral environments, overlooking how sub-national territorial characteristics shape the strategies through which disruptions are absorbed and managed. This paper addresses this gap by focusing on MNEs embedded in peripheral areas (PAs), which face both the global disruptive pressures and the structural place-related constraints.*

Drawing on a qualitative methodology based, the paper examines two place-based MNEs located in Italian inner areas with IMP lens, tracing how peripheral resources interact with international dynamics to produce distinctive resilience configurations.

The findings suggest that peripheral location, rather than being merely a constraint to compensate for, functions as a generative context, contributing as a place-based resilience infrastructure that underpins international competitiveness.
Keywords: *Resilience; MNEs; Peripheral Areas; Context; Business Network; Resources.*

Framing of the research. *In recent years, the resilience of global value chains (GVCs) has emerged as a central concern in both International Business (IB) (Malik & Terzidis, 2025; Gereffi et al., 2025) and Industrial Marketing and Purchasing (IMP) research (Guercini et al., 2024, 2025; Cinti et al., 2025). Particularly in IB literature, GVC reconfiguration has been widely discussed as a primary mechanism through which firms respond to environmental turbulence (Contractor et al., 2026). Existing studies have largely focused on how multinational enterprises (MNEs) adjust the geographical dispersion of activities, redesign governance structures, diversify suppliers, and rebalance control and coordination mechanisms across their international networks (Sacco et al., 2025). From this perspective, resilience, i.e. the ability to adapt, resist and "bounce back" after disruptions (Conz & Magnani, 2020; Hillmann & Guenther, 2021), is primarily interpreted as the outcome of strategic choices made by focal firms (Buckley, 2020; Strange, 2020) operating within complex, globally dispersed, and tightly interconnected networks (Kano, 2018; Statsenko et al., 2025).*

However, in the extant literature, the complexity that firms are assumed to manage is mainly conceived as global in nature, stemming from cross-border interdependencies, institutional heterogeneity, and exposure to exogenous shocks (Bennett & Lemoine, 2014; Petricevic & Teece, 2019), thus adopting a relatively decontextualised view (Welch et al., 2022). Much less attention has been devoted to how this complexity is shaped by the specific sub-national territorial contexts in which firms are embedded (Boschma, 2024). This perspective becomes problematic when the analysis delves into the specifics of location choices, shifting from the macro, national level to the micro, sub-regional level – that is, the precise location where the business operates. IB analyses often implicitly assume that resilience strategies unfold in environments characterised by adequate infrastructure, institutional support, access to specialised resources, and proximity to dynamic industrial ecosystems (Prashantham & Bhattacharyya, 2020). By focusing on peripheral areas (PAs) (Pugh & Dubois, 2021; Pike et al., 2023), this article demonstrates that this assumption is not always valid, highlighting how even the national context, within itself, is a varied and heterogeneous collection of places with specific characteristics that influence the active and adaptive response of firms to the changes and disruptions occurring at a global level.

With the umbrella term of PAs we refer to places characterised by sparse population, political subordination, social and economic marginality, and remoteness from hotspots of economic development (Kühn, 2015; Pugh & Dubois, 2021; Nilsen et al., 2023), outcome of the interplay of macro-context dynamics, such as technological advancement and globalisation, with place-specific weaknesses related to people, firms, and institutions (Iammarino et al., 2019). Recent events, including the financial crisis, the COVID-19 pandemic, trade wars, and geopolitical instability, have further affected these places (Woods, 2025), intensifying an already ongoing trend of peripheralisation with respect to metropolitan areas (Kühn, 2015).

Firms operating in PAs face a form of complexity that is not episodic but structurally embedded in the territory itself (Copus & Skuras, 2006; Korsgaard et al., 2015). Even during relatively stable periods, they must cope with resource constraints, thin networks, and limited opportunities for diversification (Gherhes et al., 2021; Khan et al., 2024). When GVC disruptions occur, these firms are therefore exposed to dual complexity: on the one hand, they experience the same disruptive pressures affecting global networks, including supply interruptions, demand volatility, and governance instability (Petricevic & Teece, 2019). On the other hand, these shocks interact with pre-existing territorial vulnerabilities, exacerbating constraints related to distance, dependence on external actors, and limited strategic

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alternatives (Brown & Cowling, 2021; Almeida & Daniel, 2023). In such contexts, resilience cannot be understood merely as a firm-level response to temporary disruptions; rather, it has to be analysed as an ongoing process shaped by both global dynamics and local structural conditions (Crespo et al., 2017; McIntyre & Roy, 2023).

For this reason, it is necessary to adopt context-based analytical approaches that are capable of capturing the distinctive features and complexities of PAs. To this extent, an Industrial Marketing and Purchasing (IMP) perspective (Håkansson & Snehota, 1995; Håkansson et al., 2009) on resources (Baraldi et al., 2012; Bocconcelli et al., 2020) offers a valuable theoretical framework for examining firms' resilience strategies (Bygballe et al., 2023; Guercini et al., 2025) in relation to the context. Drawing its origins from the Uppsala Model of firms' internationalisation (Johanson & Vahlne, 1977), IMP provides excellent analytical-interpretative tools to unfold typical IB issues with a business network perspective (Guercini et al., 2025), stressing the idea that every business establishes relationships and becomes part of a network, engaging in continuous exchanges of resources and activities (Håkansson & Snehota, 1989). Where IB scholarship has concentrated on the strategic responses of focal firms and the governance of GVC configurations (Gereffi et al., 2022; Statsenko et al., 2025), IMP emphasise that resilience is an interaction outcome, treating it not as a property that firms individually possess but as a condition that emerges and underpinned through the relationships connecting actors within and across networks (Bondeli & Havenvid, 2022; O'Toole & McGrath, 2023). Resources occupy a central position in defining resilience (Bygballe et al., 2023) since disruptions are fundamentally resource deficiencies (Tunisini et al., 2023) which force the reconfiguration of resource constellation built up through the adaptation and mutual fitting of counterparts over time (Håkansson & Snehota, 1995; Baraldi et al., 2007). It is through the recombination and reactivation of resources across network relationships that firms absorb shocks and restore operational continuity, not through unilateral firm-level decisions (Bygballe et al., 2023). By analysing places as sets of resources (Håkansson et al., 2006), it is possible to highlight the elements determining the resilience of territories, such as industrial composition, the structure of knowledge exchange networks, and the institutional framework, factors that are not evenly distributed across space and that result in systematic differences in the resilience potential of firms located in different places (Crespo et al., 2017).

Purpose of the paper. *Against this background, this study addresses the following research question: How do MNEs operating in PAs configure and leverage resource interactions to build resilience in the face of GVC disruptions?*

With this in mind, the study aims to foster cross-fertilisation between the IB and IMP literatures, highlighting for both the need for a greater understanding of context and emphasising the components and characteristics of the specific locations in which firms operate, with particular regard for PAs that have been neglected in these two research areas. Specifically, by investigating how MNEs operate in resource-constrained places as PAs in times of global disruption, we will provide a context-specific analysis of resilience strategies, emphasising the necessity to adapt to both local and global dynamics. In this sense, the study advances research in the field of IB through a greater understanding of the micro-processes operating at the sub-regional level that underpin the macro-dynamics generally analysed, whilst simultaneously contributing to the development of IMP-based research on business resilience through the lens of resource interaction approach.

Methodology. *To this aim, the research adopts a qualitative explorative methodology (Halinen & Törnroos, 2005; Eisenhardt & Graebner, 2007) based on a small number of case studies with retrospective in-depth interviews, covering a period from 2015 to the present, thus including the major global challenges companies faced up to now. The analysis focuses on place-based MNEs, that is those multinational companies that are deeply embedded in their place and "cannot relocate without losing part of their value proposition, and have already committed to using local resources" (Korsgaard et al., 2026, p. 10). Purposeful sampling (Patton, 1990) was used to select the case studies according to specific criteria: a recognised international activity, a period of activity of at least 10 years and, above all, the geographical location of the headquarters in a recognised PA included in National Strategy for Inner Areas (SNAI) adopted by the Italian government (Dipartimento per le Politiche di Coesione e per il Sud, 2025). Currently, two companies have been selected, but it is our purpose to extend the analysis up to four companies (Table 1).*

Table 1: Case studies' details

Company	*Foundation Year*	*Sector*	*Region*	*Peripheral Area*
Alpha	*2007*	*Water Treatment*	*Marche*	*Montefeltro e Alta Valle del Metauro*
Beta	*1973*	*Plastic Recycling*	*Lombardy*	*Valle Seriana e Val di Scalve*

Source: Our elaboration

Primary data have been collected with face-to-face interviews with key informants withing both organisations (Table 2), while secondary sources, such as company websites and company reports, have been consulted to triangulate information. For confidentiality reasons agreed upon with the participating organisations at the time of interview, the companies are referred to with pseudonyms. However, given the specificity of the cases in terms of sector, location, and founding year, the empirical grounding of the study remains fully transparent and verifiable.

Table 2: Case study informants

Company	***Informant position***	***Interview date***	***Length***
Alpha	*Ceo*	*10.03.2026*	*30 min*
Beta	*Purchasing & Environmental manager*	*10.03.2026*	*60 mins*

Source: Our elaboration

Company Alpha is an Italian company active since 2007 and specialized in innovative solutions for the treatment and recovery of civil and industrial water. Although Company Alpha has a physical presence in more than 10 countries across Europe and a global customer base, its production remains firmly rooted in the "Montefeltro and Alta Valle del Metauro" inner area, which comprises 17 municipalities in the province of Pesaro Urbino. The territory, which is predominantly hilly and mountainous, exhibits a robust manufacturing and agricultural sector, yet is also marked by demographic ageing and depopulation.

Company Beta is an Italian company specialising in the recovery and regeneration of polyethylene. Active since 1973 and with roots in a previous entrepreneurial venture, it is one of Europe's leading companies in the sector. The company mainly produces bags and sacks for waste collection (for use in apartment buildings, homes, industry and commerce) using regenerated raw materials. Company Beta is situated in the "Valle Seriana e Val di Scalve" Inner Area, which encompasses 42 municipalities in the province of Bergamo. The territory, which is predominantly mountainous, is experiencing a decline in population and economic activity, with a concentration of resources and services in the valley floor. The local economy has traditionally been characterised by a manufacturing-based structure, with a particular focus on the textile and mechanical engineering sectors.

Results are analysed with systematic combining abductive method (Dubois & Gadde, 2002), moving iteratively between empirical data and the literature. In the light of the GVCs' networked structure (Buckley, 2011; Buckley & Strange, 2015; Kano, 2018) and the importance of business relationships and business networks for companies operating in PAs (Copus & Skuras, 2006), data analysis adopts the IMP perspective (Håkansson & Snehota, 1995; Håkansson et al., 2009), which allows us to understand resilience emerging process within and across business networks (Cinti et al., 2025; Bondeli & Havenvid, 2022), thus beyond firm-centric and purely strategic explanations. Drawing from Håkansson et al. (2006), who conceptualise places as sets of resources, to understand the relationship between companies and their embedding location, we need to investigate how they interact with it (Gaddefors & Anderson, 2019). To this aim, this study adopts the Resource Interaction Approach (RIA) lens (Baraldi et al., 2012; Bocconcelli et al., 2020; Prenkert et al., 2022), investigating how resources interact within and across organisations with a networked and shared perspective. According to the RIA, resources are heterogeneous (Penrose, 1959), with their value arising from interaction with other resources. This implies that resources are open and variable objects over which companies have only limited control (Baraldi et al., 2012; Bocconcelli et al., 2020; Prenkert et al., 2022). RIA classifies resources are into four categories, which define the 4R Model (Håkansson and Waluszewski, 2002; Baraldi et al., 2012): products (Ps), production facilities (PFs), organisational units (OUs), and business relationships (BRs). This framework allows precise analyses of interaction processes, making it possible to represent business networks at both a particular point in time and of complex processes, identifying involved resources and interfaces (Baraldi et al., 2012).

Results. *The initial findings highlight the characteristics of the public administrations in which the multinationals under analysis are based, emphasising the key elements of their resilience strategies. Notably, from the perspective of those who work there on a daily basis, these areas do not merely suffer from the well-known limitations in terms of infrastructure and innovative resources. On the contrary, they offer access to other - hidden - key resources that are capable of compensating for these shortcomings. The decision to establish and maintain headquarters there is neither accidental nor purely biographical, but fundamental to the company's identity. Both companies are deeply imprinted by their peripheral location, which determines their internal culture, cohesion and staff motivation, resources that are difficult to replicate in urban contexts. This place embeddedness derives from the Italian entrepreneurial tradition to build the production facility close to the house, addresses as "home and workshop model" (Beta - Purchasing & Environmental manager), and that still governs the boundary between private and working life, producing an organisational cohesion with the local context. This place-based work ethic extends beyond the founder to permeate the entire workforce: the high dedication of Alpha's employees is explicitly attributes by the CEO to the industrious character of the local community and functions as an organisational resource in its own right, enhancing productivity, reducing coordination costs, and sustaining performance levels that would be difficult to achieve through formal incentive mechanisms alone. Moreover, even if they do not operate within a classic industrial district, both companies draw on what may be called a residual relational substrate, that is the surviving local micro-activities and service provider who maintain operational proximity and informal trust. The practical value of this local network materialises in moments of operational urgency, as in the case of Beta which relies on local metalwork firm whose owner already knows the plant's structural layout and can intervene within hours, or in joint and territorial development projects, as expressed by Alpha's CEO concerning the social relationships across entrepreneurial and institutional settings, through which information, contacts, and collaborative dispositions circulate.*

Undoubtedly, the network of international relationships forms the basis of both companies' operations, as they both operate within GVCs where suppliers and customers are globally dispersed; hence, maintaining access to these channels and their resources is essential. Early evidence points to two distinct resilience strategies, shaped by their GVC architectures. Alpha's upstream linkages are purely transactional it source raw materials from petrochemical MNEs suppliers which offer no relational buffer against input price shocks, making upstream exposure its primary vulnerability. Downstream, however, Alpha targets distributors serving public sector clients and infrastructure operators, where procurement is governed by technical specifications and regulatory compliance rather than unit price, enabling the consolidation of long-term buyer-supplier ties that partially offset this fragility. Alpha's products' category, an integrated water treatment system, is engineered to be irreplaceable within the client's operational infrastructure. By positioning its offer as "not a product but a plant" (Alpha – CEO), the company embeds technical complexity, regulatory compliance, and long-term serviceability into the product itself, creating a configuration that is inherently resistant to price-based substitution. Furthermore, the growing structural relevance of water scarcity as a global challenge functions as a demand-side stabiliser. Beta presents an inverse profile, with upstream supply chain ties built with long-term interaction. Beta actively advises suppliers on material quality and monitoring second-tier flows, thus acting as a distributed quality assurance node and gaining preferential access in return. Downstream, Beta's products are recycled polyethylene bags for waste disposal achieves a comparable resilience effect through their recognised quality. In a commodity-adjacent market where Eastern European and Asian competitors can match or undercut Beta's price, the firm has built its international position on a quality standard so reliably maintained that it becomes the primary selection criterion for sophisticated B2B clients. Beta targets buyers, primarily institutional clients, who prioritise consistent quality and reliable delivery over price, and for whom it can therefore leverage its manufacturing expertise. When managing supplies and sales, particularly at an international level, both companies recognise that logistics in PAs involve higher costs. The current energy crisis caused by the war in the Persian Gulf has further increased transport costs. Yet both Alpha and Beta consider their location to be non-negotiable, preferring to absorb the costs by increasing the efficiency of their production processes, as in the case of the former, or by implementing logistics and warehouse management systems that minimise costs as much as possible, as in the case of the latter.

Through the RIA, it is possible to analyse the resilience strategies of these enterprises in terms of their micro-components – namely, their resources – whilst also understanding the processes by which they interact. The "Home & Workshop" model perfectly describes the nature and organisational approach that characterises OUs, determining their strong roots in the local area and in the network of BRs – both formal and informal – with the local actors who support the enterprise. This approach is also reflected in the BRs with the international partners of the GVCs, with whom the enterprises tend to establish long-term BRs, based on the quality and reliability of the Ps exchanged. The logistical complexity due to their peripheral location impacts the functionality of the PFs, becoming a disciplining factor in the management of internal processes within the OUs as well as external ones relating to the BRs.

In summary, the firms analysed so far offer a perspective on how PAs are not a sterile environment for MNEs but, on the contrary, demonstrate how they are able to adapt and respond to periods of increasing turbulence and complexity at a global level.

Research limitations. *The research is still a work in progress and only a limited number of interviews have been conducted so far. The use of PAs officially recognised by the Italian Ministry of Territorial Cohesion and the South allows, on the one hand, to investigate homogeneous contexts in terms of territorial marginality criteria but, on the other hand, limits the possibility of generalising the results at European level, which will nevertheless be possible in future research once common criteria, beyond geography, for identifying such territories have been defined.*

Managerial implications. *Operating in peripheral areas is inherently challenging due to their remoteness from major centres, as well as the need to rely on external channels for procurement and sales. Yet the data emerging from these cases highlight how the strong local roots of businesses in these areas have shaped their organisational structure, disciplining it and preparing it for conditions of natural resource scarcity. The two cases particularly highlight how businesses in peripheral areas, vulnerable to fluctuations in logistics costs, can nevertheless remain competitive thanks to the lasting relationships they establish with suppliers and customers, based on the high quality of their production, which has been developed over the course of their operations.*

Originality of the paper. *This study advances a cross-fertilisation agenda that enriches both IB and IMP fields through three interrelated theoretical contributions. First, it extends the IB contextualisation agenda (Welch et al., 2022) by demonstrating that sub-national territorial conditions are not background variables but constitutive elements of MNE resilience. Specifically, PAs are indeed complex contexts but still they can produce distinctive resource configurations available for embedded organisations (Granovetter, 1985). Second, by integrating IMP's RIA into an IB framework, the study advances a relational account of GVC resilience that moves beyond firm-centric and purely strategic explanations (Hillmann & Guenther, 2021; Sacco et al., 2025) to a condition that emerges through the interaction of place-based and internationally dispersed resources, that is culturally imprinted OUs, constraint-disciplined PFs, and trust-anchored BRs whose are consolidated through PS quality and technical irreplaceability. At last, we show how peripheral MNEs may be structurally accustomed to managing resource deficiencies (Tunisini et al., 2023), which paradoxically constitutes an experiential resilience advantage under conditions of global turbulence.*

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Network centrality and establishment mode choice: An empirical analysis on European firms

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Abstract. *Foreign establishment mode choice represents one of the most consequential strategic decisions firms face when expanding internationally. When entering foreign markets, firms typically choose between building new operations through greenfield investments or acquiring existing firms through cross-border mergers and acquisitions (M&As). This decision determines the level of resource commitment, organizational integration, and strategic control associated with international expansion. The Resource-Based View (RBV) predicts that firms endowed with strong technological resources possess the capabilities required to replicate organizational routines and production systems abroad and are therefore more likely to pursue greenfield investments. Conversely, firms lacking strong technological capabilities are expected to rely on acquisitions in order to access external resources.*

However, empirical evidence suggests that this prediction does not always hold. Several studies have documented cases in which firms with relatively weak technological resources nevertheless undertake greenfield investments even in resource-intensive contexts. This pattern presents a theoretical puzzle that cannot be fully explained by internal resources alone.

This study develops a relational extension of the RBV to explain this phenomenon. Specifically, we argue that board network centrality constitutes a network-enabled strategic resource that can compensate for technological capability gaps. Firms embedded in central positions within board interlock networks gain privileged access to strategic information, reputational legitimacy, and connections to specialized intermediaries. These relational advantages reduce uncertainty and coordination costs associated with establishing new operations abroad.

Using a dataset of 414 European publicly listed firms observed between 2017 and 2023 and 10,663 cross-border investment events, we examine how technological capabilities and board network centrality jointly influence establishment mode choices. Our findings show that firms with stronger technological capabilities are significantly more likely to enter foreign markets via greenfield investments rather than acquisitions, consistent with RBV expectations. More importantly, firms occupying more central positions in board interlock networks also display a higher propensity to choose greenfield investments.

The analysis further reveals a compensatory mechanism: network centrality exerts its strongest pro-greenfield effect among firms with weaker technological capabilities. In other words, central firms lacking technological depth can leverage network-derived resources to undertake greenfield investments that would otherwise be difficult to implement. These findings contribute to the literature on international business and strategic management by integrating network-enabled resources into RBV explanations of establishment mode choice and by demonstrating how relational resources reshape firms' international expansion strategies.

Keywords: *establishment mode; board interlocks; network centrality; resource-based view.*

Framing the research. *Foreign establishment mode choice represents one of the most consequential strategic decisions in the internationalization process of multinational enterprises (Slangen and Hennart, 2007; Brouthers and Hennart, 2007). Firms seeking to expand into foreign markets must decide whether to build new operations from scratch through greenfield investments or to acquire existing firms through cross-border M&As (Agarwal and Ramaswami, 1992; Meyer et al., 2009). This decision has far-reaching implications for the allocation of resources, the degree of control over foreign subsidiaries, and the risks associated with operating in unfamiliar institutional environments (Brouthers, 2002; Buckley and Casson, 1998).*

Greenfield investments allow firms to design new operations according to their own organizational structures, managerial practices, and technological systems (Kogut and Zander, 1992). This approach provides firms with a high level of control and facilitates the transfer of proprietary knowledge and capabilities from the parent company to the foreign subsidiary (Kogut and Zander, 1992; Capron and Mitchell, 2012). However, greenfield investments require substantial resource commitments and involve significant uncertainty, particularly in unfamiliar markets where firms lack local knowledge and experience (Slangen and Hennart, 2007).

Acquisitions represent an alternative entry strategy that allows firms to obtain immediate access to local resources, including technological capabilities, distribution networks, and managerial expertise embedded in existing organizations (Anand and Delios, 2002; Capron and Mitchell, 2012). Although acquisitions may reduce the time required to enter foreign markets, they often involve complex post-acquisition integration challenges and may require significant managerial attention in order to align organizational structures and corporate cultures (Capron and Mitchell, 2012).

Because of these trade-offs, a substantial body of research has sought to explain the factors influencing firms' establishment mode choices. Early studies emphasized transaction cost explanations, arguing that firms choose governance structures that minimize coordination costs and uncertainty associated with cross-border operations (Buckley and Casson, 1998). Institutional perspectives later emphasized the role of differences in regulatory frameworks, cultural norms, and political institutions in shaping foreign entry strategies (Brouthers, 2002; Meyer et al., 2009).

Alongside these perspectives, the RBV has emerged as one of the most influential frameworks for explaining firms' international expansion strategies (Barney, 1991; Peteraf, 1993). According to this perspective, firms possess heterogeneous bundles of resources and capabilities that shape their competitive advantages and strategic decisions. Firms expand internationally by deploying and leveraging these resources across different markets (Kogut and Zander, 1992).

Within the RBV, technological capabilities represent a particularly important resource (Barney, 1991; Peteraf, 1993). Firms possessing strong technological resources are better equipped to replicate production processes and organizational routines across geographical locations (Kogut and Zander, 1992). These firms are therefore more likely to pursue greenfield investments, which allow them to transfer proprietary knowledge and maintain control over technological processes abroad (Slangen and Hennart, 2007).

Conversely, firms lacking strong technological capabilities may face substantial challenges when attempting to establish new operations in foreign markets (Anand and Delios, 2002). Without sufficient technological expertise, firms may struggle to design efficient production systems, coordinate complex operations, or adapt technologies to local conditions (Kogut and Zander, 1992). For such firms, acquisitions may represent a more attractive strategy because they allow firms to internalize technological resources embedded within target firms (Anand and Delios, 2002; Capron and Mitchell, 2012).

Although this logic provides a powerful explanation for many establishment mode decisions, empirical observations suggest that the relationship between technological capabilities and entry strategies is not always straightforward (Benito, 2005). In several cases, firms with relatively weak technological resources nevertheless undertake greenfield investments in foreign markets. These observations raise an important theoretical puzzle: how can firms lacking strong technological capabilities successfully undertake resource-intensive greenfield investments?

One possible explanation lies in the relational context in which firms operate. Firms rarely operate in isolation. Instead, they are embedded within networks of interorganizational relationships that shape access to information, legitimacy, and strategic opportunities (Gulati, 1999; Lavie, 2006). These networks may allow firms to access external resources that complement or substitute for internal capabilities (Lavie, 2006).

Among the various forms of corporate networks, board interlock networks represent a particularly important governance structure linking firms together (Mizruchi, 1996; Connelly et al., 2011). Board interlocks arise when directors serve simultaneously on the boards of multiple companies, thereby connecting firms through shared governance ties (Mizruchi, 1996). Through these connections, firms gain access to information about strategic decisions, managerial practices, and organizational experiences observed in other firms (Haunschild, 1993).

Firms occupying central positions within board interlock networks may benefit from enhanced access to information and resources circulating within the corporate network (Freeman, 1978; Gulati, 1999). Central firms often enjoy greater visibility and reputational standing within the corporate community (Shipilov et al., 2014). These advantages can facilitate interactions with investors, regulators, and potential business partners (Shipilov et al., 2014).

From an international business perspective, network centrality may provide firms with access to valuable information about foreign markets, institutional environments, and competitors' strategies (Gulati, 1999; Cuypers et al., 2020). Such information advantages can significantly reduce the uncertainty associated with greenfield investments, which require substantial resource commitments and organizational coordination (Slangen and Hennart, 2007).

Furthermore, board networks may facilitate access to professional intermediaries such as financial institutions, legal advisors, and consulting firms that play crucial roles in structuring international investments (Connelly et al., 2011). These intermediaries provide expertise regarding regulatory frameworks, financing arrangements, and strategic opportunities in foreign markets.

Taken together, these arguments suggest that relational resources embedded within corporate networks may influence firms' establishment mode choices (Lavie, 2006). By reducing uncertainty and improving access to external expertise, network centrality may enable firms with limited technological capabilities to undertake greenfield investments that would otherwise be difficult to implement (Gulati, 1999; Cuypers et al., 2020).

Purpose of the paper. *The purpose of this study is to examine how internal technological capabilities and external relational resources jointly influence firms' foreign establishment mode choices (Barney, 1991; Lavie, 2006). In particular, the paper investigates whether board network centrality can compensate for limitations in firms' technological capabilities when firms expand internationally (Gulati, 1999; Cuypers et al., 2020).*

The international business literature has long emphasized the role of firm-specific resources in shaping entry strategies (Meyer et al., 2009; Brouthers and Hennart, 2007). According to the RBV, firms possessing strong technological capabilities are better equipped to replicate production processes and organizational routines across borders (Barney, 1991; Kogut and Zander, 1992). These firms are therefore more likely to favor greenfield investments, which allow them to transfer proprietary knowledge and maintain control over their operations abroad (Slangen and Hennart, 2007).

In contrast, firms with weaker technological capabilities may face substantial challenges when establishing new operations in foreign markets (Anand and Delios, 2002). These firms may lack the technical expertise required to design production systems, coordinate complex international operations, or adapt technologies to local environments (Kogut and Zander, 1992). As a result, acquisitions may represent a more attractive entry strategy, as they allow firms to obtain technological resources embedded within existing organizations (Anand and Delios, 2002; Capron and Mitchell, 2012).

However, empirical evidence suggests that firms with relatively limited technological capabilities sometimes undertake greenfield investments in foreign markets (Benito, 2005). This observation raises an important theoretical question regarding how firms lacking strong internal resources are able to pursue resource-intensive international expansion strategies.

This study argues that relational resources embedded within corporate networks may provide an explanation for this phenomenon (Lavie, 2006). Firms are embedded in networks of interorganizational relationships that shape access to information, legitimacy, and strategic opportunities (Gulati, 1999). Board interlock networks, in particular, connect firms through shared directors and create channels through which strategic knowledge can flow across organizations (Mizruchi, 1996; Connelly et al., 2011).

Firms occupying central positions within board interlock networks may benefit from greater access to information about foreign markets, institutional environments, and competitors' strategies (Freeman, 1978; Cuypers et al., 2020). In addition, network connections may enhance firms' reputational standing and facilitate access to professional intermediaries involved in international investments (Shipilov et al., 2014).

Building on these arguments, this study investigates whether board network centrality enables firms with limited technological capabilities to undertake greenfield investments that would otherwise be difficult to implement (Gulati, 1999; Cuypers et al., 2020). By examining the joint effects of technological capabilities and network centrality, the paper contributes to a more comprehensive understanding of how internal resources and external relationships shape firms' international expansion strategies (Barney, 1991; Lavie, 2006).

Methodology. *This study investigates how technological capabilities and board network centrality influence firms' foreign establishment mode choices (Slangen and Hennart, 2007; Brouthers, 2002). To address this research question, a longitudinal dataset combining firm-level financial information, corporate governance data, and international investment records was constructed. The analysis focuses on cross-border investment events undertaken by European publicly listed firms, allowing us to observe how internal resources and network positions shape strategic decisions regarding foreign market entry (Meyer et al., 2009).*

The dataset was assembled using multiple modules of the Bureau van Dijk ORBIS database, which provides harmonized information on firms' financial performance, ownership structures, corporate governance characteristics, and international investment activities. ORBIS is widely used in international business research due to its standardized firm identifiers and broad coverage of publicly listed firms across multiple countries. The observation period spans from 2017 to 2023, allowing the construction of a panel dataset capturing firms' international expansion activities over time.

The initial sample included publicly listed firms headquartered in European countries for which reliable financial and governance information was available. Firms operating in financial industries were excluded from the analysis because their regulatory environments and investment patterns differ substantially from those of non-financial corporations. Firms lacking reliable information on board composition or international investment activities were also excluded, as these data are necessary to construct the network variables and identify foreign establishment events. The final sample consists of 414 firms headquartered in fourteen European countries. These firms operate across a wide range of industries, including manufacturing, technology, consumer goods, and business services.

The dataset contains 10,663 cross-border investment events observed during the study period. These events include both greenfield investments and cross-border acquisitions undertaken by the sampled firms. Information on greenfield projects was obtained from the ORBIS Cross-Border Investments module, which records the characteristics of new foreign investment projects. Data on cross-border acquisitions were obtained from the ORBIS M&A database, which provides detailed information on acquisition transactions, including the identity of acquiring firms and target firms. Using Bureau van Dijk's standardized firm identifiers, these investment events were matched with firm-level financial and governance data.

The dependent variable in the analysis is foreign establishment mode. This variable captures whether a firm enters a foreign market through a greenfield investment or through a cross-border acquisition (Agarwal and Ramaswami, 1992; Slangen and Hennart, 2007). Following common practice in the international business literature, establishment mode was coded as a binary variable. The variable takes the value of one when a firm enters a foreign market through an acquisition and zero when the entry occurs through a greenfield investment.

The main independent variable capturing firms' internal resources is technological capability (Barney, 1991). Technological capabilities were operationalized using indicators reflecting firms' innovation activities and technological knowledge base. In particular, measures related to research and development investments and patent activity were used to capture firms' technological resources. These indicators reflect both firms' ongoing innovation efforts and the accumulation of technological knowledge over time (Kogut and Zander, 1992).

The second key explanatory variable is board network centrality. To construct this variable, board interlock networks were created using information on corporate board memberships (Mizruchi, 1996; Connelly et al., 2011). Board interlocks arise when directors serve simultaneously on the boards of multiple companies, thereby connecting firms through shared governance ties (Mizruchi, 1996). Using board membership data from ORBIS, instances in which two firms shared at least one board member in a given year were identified. These shared directorships were used to construct firm-to-firm network connections. Based on these connections, yearly networks were constructed in which nodes represent firms and ties represent board interlocks.

Within these networks, degree centrality was calculated as the primary measure of firms' network positions (Freeman, 1978). Degree centrality captures the number of direct connections maintained by a firm within the board interlock network. Firms with higher degree centrality occupy more central positions within the corporate network and therefore have greater access to information and resources circulating among connected firms (Gulati, 1999).

Several control variables were included in the empirical models to account for alternative explanations of establishment mode choice. Firm size was measured as the natural logarithm of the number of employees. Larger firms often possess greater financial and organizational resources that may influence their preferred mode of foreign market entry (Anand and Delios, 2002). Leverage was measured as the ratio of total debt to total assets, capturing differences in firms' financial structures that may affect their ability to finance international investments. Firm age was also included as a control variable, as more mature firms may possess greater organizational experience and international exposure. The models also include measures capturing firms' international experience. International experience was operationalized as the cumulative number of foreign investments undertaken by the firm prior to the focal year. Firms with greater international experience may possess more knowledge about foreign markets and therefore face lower uncertainty when establishing new operations abroad (Meyer et al., 2009). Host-country experience was also included to capture whether firms had previously invested in the same host country.

In addition, geographic distance between home and host countries and cultural distance were included as country-level controls (Brouthers, 2002). Greater distance between countries may increase uncertainty and coordination costs associated with international expansion. Year fixed effects were included to control for global economic shocks and temporal trends affecting cross-border investment activities during the observation period.

By combining firm-level measures of technological capabilities with network measures capturing firms' positions within board interlock networks, the empirical framework allows us to examine how internal resources and relational resources jointly influence foreign establishment mode decisions (Barney, 1991; Lavie, 2006).

Results. *The empirical analysis examines how technological capabilities and board network centrality influence firms' foreign establishment mode choices (Slangen and Hennart, 2007). The objective is to determine whether relational resources embedded within corporate networks can compensate for limitations in firms' internal technological capabilities when firms expand internationally (Lavie, 2006). To address this question, a series of regression models were estimated in which the dependent variable captures whether firms enter foreign markets through greenfield investments or cross-border acquisitions (Agarwal and Ramaswami, 1992).*

The analysis first examines the direct relationship between technological capabilities and establishment mode choice. Consistent with expectations derived from the RBV, the results indicate that firms with stronger technological capabilities are significantly more likely to undertake greenfield investments when entering foreign markets (Barney, 1991; Peteraf, 1993). Firms with greater innovation-related resources appear better equipped to replicate production processes and organizational routines abroad (Kogut and Zander, 1992). As a result, these firms may prefer greenfield investments because this entry mode allows them to maintain full control over technological processes and operational structures in foreign subsidiaries (Slangen and Hennart, 2007).

This finding aligns with existing research emphasizing the role of firm-specific capabilities in shaping international expansion strategies (Meyer et al., 2009). Firms possessing strong technological resources often rely on internal development strategies when entering foreign markets because these strategies allow them to leverage proprietary knowledge while avoiding the integration challenges typically associated with acquisitions (Capron and Mitchell, 2012). Greenfield investments enable such firms to transfer organizational routines directly from headquarters to newly established foreign operations (Kogut and Zander, 1992).

The analysis then examines the role of board network centrality in shaping establishment mode decisions. The results show that firms occupying more central positions within board interlock networks display a higher propensity to choose greenfield investments rather than acquisitions. Firms with greater network centrality appear more likely to establish new operations abroad rather than relying on acquisitions to enter foreign markets (Gulati, 1999; Cuypers et al., 2020).

This result suggests that relational resources embedded within corporate networks may play an important role in shaping firms' international expansion strategies (Lavie, 2006). Firms occupying central positions within board interlock networks may benefit from improved access to strategic information regarding foreign market opportunities, regulatory environments, and competitors' international expansion experiences (Gulati, 1999). Access to such information may reduce uncertainty associated with foreign investments and facilitate the identification of attractive opportunities for greenfield expansion (Slangen and Hennart, 2007).

In addition to information advantages, network centrality may enhance firms' reputational standing within the broader corporate community (Shipilov et al., 2014). Firms connected to prominent organizations through board interlocks may enjoy higher levels of legitimacy among investors, regulators, and business partners (Connelly et al., 2011). Such legitimacy may facilitate negotiations with local stakeholders and improve firms' ability to secure financing or regulatory approvals when establishing new operations in foreign markets.

The analysis also examines whether board network centrality moderates the relationship between technological capabilities and establishment mode choice. In particular, the models test whether firms with weaker technological capabilities rely more heavily on relational resources derived from corporate networks when undertaking foreign expansion.

The results provide evidence supporting this compensatory mechanism. The interaction between technological capabilities and network centrality indicates that the influence of network centrality on greenfield entry is stronger for firms with relatively limited technological capabilities. In other words, firms lacking strong technological resources appear more likely to undertake greenfield investments when they occupy central positions within board interlock networks.

This finding suggests that relational resources embedded within corporate networks may partially compensate for deficiencies in firms' internal resource base (Lavie, 2006). Firms with limited technological capabilities may leverage their network positions to access external information, legitimacy, and expertise that facilitate the establishment of new operations abroad (Gulati, 1999). Network centrality therefore appears to function as a strategic resource that allows firms to overcome internal capability constraints.

The control variables included in the models behave largely as expected. Larger firms show a higher propensity to engage in acquisition-based entry strategies, likely reflecting their greater financial resources and capacity to finance large acquisition transactions (Anand and Delios, 2002). Firms with greater international experience display a higher likelihood of pursuing greenfield investments, suggesting that accumulated international knowledge reduces uncertainty associated with establishing new operations abroad (Meyer et al., 2009).

Geographic and cultural distance between home and host countries are associated with a higher likelihood of acquisition-based entry strategies. These findings are consistent with prior research suggesting that firms may prefer acquisitions when entering more distant or uncertain markets in order to access local knowledge embedded within target firms (Brouthers, 2002; Meyer et al., 2009).

Overall, the results support the central argument of this study: both technological capabilities and board network centrality influence firms' foreign establishment mode choices, and network centrality appears to play a particularly important role for firms with weaker technological capabilities. These findings highlight the importance of considering both internal resources and external relational resources when examining firms' international expansion strategies (Barney, 1991; Lavie, 2006).

Research limitations. *Despite its contributions, this study presents several limitations that open avenues for future research. First, the empirical analysis focuses on publicly listed firms headquartered in European countries. Although this context provides a suitable setting to examine board interlock networks and international investment activities (Mizruchi, 1996; Connelly et al., 2011), the results may not fully generalize to privately held firms or firms operating in other regions of the world. Smaller firms or firms located in emerging economies may face different constraints when expanding internationally, and the role of corporate networks in shaping their strategic decisions may differ (Meyer et al., 2009).*

Second, the study focuses specifically on board interlock networks as a source of relational resources. While board networks represent an important governance mechanism connecting firms (Mizruchi, 1996), organizations may also benefit from other types of interorganizational relationships, including strategic alliances, joint ventures, ownership ties, and supply chain partnerships (Gulati, 1999; Lavie, 2006). These alternative network structures may provide firms with additional sources of information and resources that influence international expansion strategies. Future research could examine how different types of networks interact in shaping firms' foreign establishment mode decisions.

Third, although the empirical models include several firm-level and country-level control variables, potential endogeneity concerns cannot be completely ruled out. For example, firms that are more internationally oriented may simultaneously seek more central positions within corporate networks and pursue more ambitious international expansion strategies (Cuypers et al., 2020). Future studies could employ alternative empirical approaches, such as instrumental variable techniques or natural experiments, to further examine the causal relationship between network centrality and establishment mode choice.

Finally, the present study focuses on the choice between greenfield investments and acquisitions, but does not examine the subsequent performance of these investments. Future research could investigate whether the compensatory role of network centrality also influences the long-term performance of international investments undertaken by technologically weaker firms (Anand and Delios, 2002).

Managerial implications. *The findings of this study offer several important implications for managers involved in international expansion strategies.*

First, the results highlight the strategic value of corporate networks. Firms embedded in central positions within board interlock networks appear better positioned to access strategic information, reputational benefits, and professional expertise that facilitate foreign expansion (Gulati, 1999; Shipilov et al., 2014). Managers should therefore recognize that corporate networks represent not only governance structures but also valuable channels through which firms can access external resources relevant to international strategy (Lavie, 2006).

Second, the study suggests that relational resources may partially compensate for limitations in firms' internal capabilities. Firms with relatively weak technological resources may still pursue ambitious international expansion strategies if they are embedded in well-connected corporate networks (Barney, 1991; Lavie, 2006). Access to information and expertise through board networks may reduce uncertainty associated with establishing new operations abroad and help firms overcome internal capability constraints (Gulati, 1999).

Third, the findings indicate that board composition and governance structures may have strategic implications beyond traditional monitoring functions. Directors who serve on multiple boards may bring valuable knowledge about foreign markets, investment opportunities, and institutional environments (Haunschild, 1993; Connelly et al., 2011). Firms may therefore benefit from considering directors' network connections when designing board structures. Overall, the results suggest that managers should view corporate networks as an important component of the firm's strategic resource base (Barney, 1991). By leveraging relationships embedded within board networks, firms may enhance their ability to identify and pursue international growth opportunities.

Originality of the paper. *This study contributes to the international business and strategic management literature by integrating internal technological capabilities and external relational resources into a unified explanation of firms' foreign establishment mode choices (Barney, 1991; Lavie, 2006). While prior research has extensively examined how firm-specific resources influence entry strategies, relatively little attention has been devoted to understanding how firms' positions within interorganizational networks shape these decisions (Gulati, 1999).*

First, the paper extends resource-based explanations of foreign establishment mode choice by incorporating relational resources derived from corporate networks. The RBV traditionally emphasizes internal resources and capabilities as the primary determinants of firms' strategic behavior (Barney, 1991; Peteraf, 1993). By highlighting the role of board network centrality, this study demonstrates that external relational structures can also provide firms with valuable strategic resources that influence international expansion decisions (Lavie, 2006).

Second, the study identifies a compensatory mechanism through which network centrality enables firms with limited technological capabilities to undertake greenfield investments. Existing research typically assumes that firms lacking strong technological resources are more likely to rely on acquisitions when entering foreign markets (Anand and Delios, 2002; Slangen and Hennart, 2007). The findings of this study suggest that firms embedded in central network positions may overcome such resource constraints by leveraging relational advantages embedded within corporate networks (Gulati, 1999).

Third, the study contributes to the growing literature on corporate networks by demonstrating that board interlock networks influence firms' strategic decisions beyond traditional governance outcomes (Mizruchi, 1996; Connelly et al., 2011). While prior research has primarily examined how board networks affect corporate governance practices and firm performance, this study shows that network positions also shape firms' international expansion strategies (Cuypers et al., 2020).

Taken together, these contributions provide a more comprehensive understanding of how internal capabilities and external relational resources jointly influence firms' establishment mode choices in international markets (Barney, 1991; Lavie, 2006).

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Organisational Resilience in Extreme Environments: Key Success Factors

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Abstract. *This proposed qualitative exploratory study examines organisational resilience in Gaza's small and medium-sized manufacturing firms during wartime extremes. Using a QCA-informed multiple-case design, it focuses on the testing of potential success factors—operational slack, supply chain collaboration, flexible operations, and networking capabilities—and how disruption severity shapes their relevance. Through semi-structured interviews and cross-case comparison, the study will identify patterns of adaptation and the changing role of internal and relational capabilities under different disruption levels. It aims to generate configurational insights into resilience in resource-scarce conflict settings.*

Keywords: *Firm Resilience, Supply Chain Collaboration, Networking Capabilities, Operational Slack, Operational Flexibility, Disruption Severity, Wartime Context.*

1. An introduction. Firms in extreme environments face challenges that go beyond the assumptions of most resilience research. War zones, blockades, collapsed infrastructure, and ongoing institutional disruptions create repeated, overlapping shocks that threaten not just recovery, but basic continuity, resource access, and survival. Unlike isolated events studied in much of the literature, these conditions demand constant adaptation, improvisation, and coordination with others, revealing resilience as a dynamic process rather than a fixed trait. The Gaza Strip stands out as a critical case for understanding these processes. Since the prolonged blockade and recurring conflicts, including the 2023-2025 war, firms in Gaza's food and manufacturing sectors have navigated border closures, acute shortages of fuel and raw materials, widespread infrastructure damage, chronic power outages, and direct wartime threats. These pressures have collapsed markets, disrupted supply chains, and forced reliance on informal networks and smuggling, exposing the shortcomings of traditional contingency planning. Yet, Gaza's firms, making up the bulk of the private sector, have shown remarkable endurance by blending internal capabilities with external ties, such as solidarity networks and adaptive informal economies. While resilience studies increasingly highlight both internal strengths (like flexible operations) and external links (like supply chain collaboration), few explore their interplay under prolonged, severe conflict. This gap is especially relevant in Gaza, where SMEs represent 85% of economic activity and are vital for local livelihoods amid humanitarian crises. This study addresses this by asking: How do Gaza-based SMEs build organizational resilience under severe wartime disruption, and how does disruption severity shape the relative importance and enactment of different resilience mechanisms? Drawing from established literature, the analysis centers on four key mechanisms refined through the Gaza context: (1) operational slack, which provides buffers like excess inventory or capacity to handle shortages; (2) supply chain collaboration, enabling shared risks and alternative sourcing despite blockades; (3) flexible operations, allowing quick shifts in production amid power cuts and material gaps; and (4) networking capabilities, leveraging community ties, informal markets, and partnerships for survival. The study argues that its novelty lies not in new concepts, but in demonstrating how these mechanisms are reprioritized, recombined, and improvised when disruptions intensify, for instance, favouring networks over slack when resources vanish entirely. Methodologically, this is an exploratory qualitative study using a QCA-informed multiple-case design and interviews with Gaza SMEs to generate configurational insights rather than broad generalizations. It aims to explain how resilience is enacted in extreme wartime settings and offer practical and analytical value for crises such as conflict and climate shocks.

2. Theoretical Foundation. Organisational resilience has been conceptualised as the capacity to absorb shocks, adapt operations, recover performance, and learn from disruption (Pradana & Ekowati, 2024; Galy et al., 2023; Hall & Koupaei, 2024). In manufacturing and supply settings, this often includes the ability to sustain operational continuity despite supply interruptions, uncertainty, and sudden environmental change (Ambulkar et al., 2015; Rahimazar et al., 2024). However, much of this literature is developed from contexts where institutions remain broadly functional and disruptions, though serious, are bounded in duration or scope. In extreme wartime environments, resilience takes on a more complex character. The challenge is not only to recover after disruption, but to continue functioning during repeated breakdowns in logistics, infrastructure, markets, and governance. This shifts attention from resilience as an outcome to resilience as an evolving organisational accomplishment shaped by resource constraints, social relations, and adaptive routines (Karunaratne, 2022; Davey et al., 2024). The Gaza setting therefore allows resilience to be examined in its most exposed form, where survival depends on both organisational ingenuity and embeddedness in broader support networks. The resource-based view (RBV) helps explain why some firms are better positioned than others to withstand disruption because they possess valuable and hard-to-replicate resource bundles (Barney, 1991). In this study, operational slack, flexible operations, collaborative relationships, and networking capabilities can all be understood as resources or resource configurations that support resilience under pressure (Conz et al., 2023; Wang et

al., 2022; Barney, 1991). RBV is useful here because it highlights that resilience depends in part on the resources and capabilities firms possess before and during a crisis. Dynamic capabilities theory (DCT) complements this perspective by focusing on how firms sense threats, seize response options, and reconfigure resources as conditions change (Eisenhardt & Martin, 2000; Teece et al., 1997). In wartime settings, resilience depends not only on possessing buffers or relationships, but on mobilising them quickly and creatively as disruption unfolds. Flexible operations, rapid decision-making, and relational coordination are therefore not simply static assets; they are enacted capabilities that allow firms to improvise and recombine resources under pressure (You et al., 2023; Essuman et al., 2023).
Integrating RBV, which highlights enduring resilience resources such as operational slack and networks, with DCT's emphasis on dynamic reconfiguration through flexibility and collaboration, reframes organisational resilience in Gaza's food and manufacturing sectors. Here, communal lifelines (e.g., NGO and family networks) surpass solo efficiency, as firms rely on relational ties to absorb shocks and adapt amid blockades and outages Barney, 1991; Eisenhardt & Martin, 2000). Studies converge on absorption, adaptation, and learning: Pradana & Ekowati (2024) on sustaining performance amid interruptions (e.g., dairy spoilage delays); Rahimazar et al. (2024) on flexibility (textiles-to-aid); Galy et al. (2023) on shock resistance (recipe tweaks); Davey et al. (2024), Bawati et al. (2025), Hall & Koupaei (2024), Thannhauser et al. (2024) on foresight, recovery, and agility. Table 1 defines these resilience dimensions in the manufacturing context.

Table 1: Definitions of Firm Resilience

Definition	Sources
The capacity of a manufacturing firm to absorb and recover from various disruptions, including supply chain interruptions, while maintaining operational performance.	Pradana & Ekowati (2024)
The ability of organizations in the manufacturing sector to be flexible in their operations, allowing for quick adaptations during crises while also ensuring long-term sustainability.	Rahimazar et al. (2024)
A measure of a manufacturing firm's capability to withstand shocks, adapt to changes in the environment, and leverage disruptions to improve strategic positioning.	Galy et al. (2023)
The process through which manufacturing firms build capabilities to anticipate risks, manage disruptions, and achieve recovery through strategic foresight and resource reevaluation.	Davey et al. (2024)
The degree to which a manufacturing firm can foresee and effectively cope with challenges while optimizing performance and innovation during adverse conditions.	Bawati et al. (2025)
The inherent ability of a manufacturing organization to recover quickly from operational challenges and apply learned lessons to enhance future performance and survival capacity.	Hall & Koupaei (2024)
A manufacturing firm's systematic ability to employ agile manufacturing techniques that facilitate rapid response to market changes and emerging threats.	Thannhauser et al. (2024)

3. Critical Success Factors CSFs. This study examines four critical success factors (CSFs) for organisational resilience in Gaza's food and manufacturing firms: operational slack, supply chain collaboration, flexible operations, and networking capabilities, which literature affirms as core for firms facing acute disruptions (Ali et al., 2017; Scholten & Schilder, 2015; Essuman et al., 2023; Badwan, 2025). RBV frames these as valuable, inimitable resource bundles: slack offers redundancy buffers, collaboration and networking build social capital, flexibility embeds agility (Barney, 1991; Conz et al., 2023). Disruption severity anchors analysis via scale (e.g., revenue losses), breadth (production to supplies), and duration (outages to sieges), revealing why mild shocks lean on internal slack/flexibility, but Gaza's protracted war demands relational CSFs for survival (Statsenko et al., 2023; Li et al., 2022; Found et al., 2024). DCT complements RBV by explaining dynamic enactment: firms sense threats to seize collaborative reroutes, reconfiguring slack into flexible responses amid airstrikes (Teece et al., 1997; Eisenhardt & Martin, 2000). This RBV-DCT lens addresses a gap in resilience theory because uniform models often overlook extreme contexts where interdependence intensifies, as in Gaza, where self-reliance alone is often insufficient. The study highlights tailored pathways such as building networks in advance and combining slack with collaboration to support firms facing prolonged crises.
3.1. Operational Slack. Operational slack refers to surplus resources, including financial, human, capacity, and inventory, that can be mobilised when shocks occur (Badwan, 2025; Conz et al., 2023). This includes financial slack (cash reserves, accessible credit), human slack (extra or multi-skilled staff), capacity slack (unused but available production capability), and inventory slack (strategic buffer stocks). These reserves give firms room to absorb disruptions and maintain basic operations without immediately resorting to drastic cuts (Alessandro, 2024; Guo et al., 2025). Existing evidence suggests that slack does not automatically translate into resilience; what matters is how it is directed and used (Essuman et al., 2023). Studies that integrate resource-based and attention-based views show that slack supports operational resilience when managers facing critical threats deliberately allocate it to cushioning disruptions and enabling recovery.
3.2. Supply Chain Collaboration. Supply chain collaboration refers to establishing trust-based relationships among suppliers, manufacturers, distributors, and customers so that they plan and act together instead of in isolation (Badwan, 2025). It typically involves joint planning, open information sharing, frequent communication, and coordinated problem solving, which enhance visibility, speed, and flexibility across the chain (Ali et al., 2017; Scholten & Schilder, 2015). During disruptions, such collaboration supports early detection of issues, sharing of scarce resources, and rapid adjustment of production and deliveries (Ali et al., 2017). Research finds that collaboration serves as an antecedent to

key resilience mechanisms such as visibility, velocity, and flexibility, helping firms absorb shocks and recover, even if it does not always lower costs in stable times (Scholten & Schilder, 2015; Badwan, 2025).

3.3. Flexible Operations. Flexible operations capture a firm's ability to reconfigure production processes, adjust schedules, shift capacity, and change product mixes quickly in response to shifting conditions, while still maintaining acceptable quality and cost levels (Statsenko et al., 2023; Essuman et al., 2023; Badwan, 2025). This includes process adaptations, cross-task mobility of workers, rapid volume or product changes, and the use of technologies such as automation and analytics to support real-time reconfiguration (Badwan, 2025). Across crisis and disruption studies, operational flexibility consistently appears as a central enabler of resilience because it expands the range of feasible responses when inputs are unstable, transport is constrained, or demand becomes highly volatile (Essuman et al., 2023).

3.4. Networking Capabilities. Networking capabilities describe a firm's skill in building, sustaining, and leveraging external relationships with a broad set of stakeholders, including suppliers, customers, peer firms, institutions, and community actors, to access resources, information, and support during disruption (Essuman et al., 2022; Scholten & Schilder, 2015; Kabbara et al., 2013). Strong networks can provide early-warning information, alternative sourcing routes, and shared problem-solving capacity, which become crucial when internal resources alone are insufficient (Badwan, 2025). Empirical findings link networking to adaptive responses, innovation, and faster recovery in disrupted environments, suggesting that networking enhances the ability to improvise and coordinate recovery across organisational boundaries (Guo et al.,2025).

3.5. Disruption Severity. Disruption severity lies at the heart of this study. In tough settings like Gaza, it captures how badly a shock hits: its scale (say, lost revenue or damaged gear), reach (hitting production lines, warehouses, or whole supply chains), and length (quick blackouts versus months of rebuilding), a key idea in resilience research (Statsenko et al., 2023; Guo et al., 2025). It shows up directly in how well firms keep performing, measuring drops in output and the hard slog back to normal (Li et al., 2022). For Gaza's food and manufacturing SMEs amid airstrikes and blockades, high severity forces heavy use of slack (to handle rotting goods or cash shortages), networks (for community help), collaboration (quick info shares and fixes), and learning—unlike minor hiccups that barely need them (Found et al., 2024). Things like buffering cover urgent gaps, while collaboration thrives in the mess with fast teamwork (Essuman et al., 2023; Crespo et al., 2025; Scholten & Schilder, 2015; Found et al., 2024). By digging into severity, we uncover how these tools shift roles, helping build smarter strategies for endless crises.

4. Research Design. This study adopts a Qualitative Comparative Analysis (QCA) perspective within an exploratory qualitative multiple-case design. QCA is suitable because it allows the study to work with a relatively small number of cases while identifying equifinal pathways to resilience and success across firms facing the same extreme environment. The design is especially appropriate for Gaza, where resilience processes are still not fully understood and cannot be captured well through standard measures, making a configurational and context-sensitive approach more suitable. The study is interpretive and theory-building in orientation. It addresses the "how" question by examining how resilience is enacted in practice across firms exposed to prolonged and severe disruption, rather than testing predetermined causal relationships. Semi-structured interviews are used to capture mechanisms, sequences, and meaning-making, which is essential in an extreme context such as Gaza's war zone. A multiple-case design strengthens the analysis by enabling comparison within and across firms, helping to identify both shared patterns and context-specific responses. The analysis uses the four critical success factors and disruption severity as sensitising concepts, while remaining open to new themes and patterns that emerge from the interview data. This approach provides a structured yet flexible way to explain not only what resilience looks like in Gaza SMEs, but how it develops under severe disruption.

4.1. Sampling and case selection. The study is based on twelve semi-structured interviews from six Gaza firms in food processing and plastic manufacturing. These sectors face high wartime risks but differ in product needs, operations, and supply chains. This variation is useful because it allows cross-case comparison while maintaining contextual comparability. We will use purposive sampling, not random, to pick firms and people. Firms were chosen for their track record of enduring long disruptions, checked with experts, for the richest stories. Respondents handle production, supply chains, or key decisions first-hand (Memon et al., 2025). To address the referee's concern about clarity, the study now treats the sample as two sectoral clusters rather than three sectors, consistent with Table 2. The sample size is appropriate for an exploratory short study because the objective is depth of insight into process and mechanism, not representativeness.

4.2. Data collection. Data are generated through semi-structured interviews lasting approximately 45 to 60 minutes, conducted either online or over WhatsApp calls, depending on access. The interview protocol is organized around the four CSFs, disruption severity, and observed resilience outcomes, while leaving sufficient room for respondents to narrate concrete incidents, adaptations, and decision processes. This structure supports comparability across cases without losing contextual richness. The design also makes explicit how the interview questions map onto the research question. Questions on slack examine how firms buffer shocks and preserve continuity; questions on flexibility probe rapid operational adjustments; questions on collaboration and networking explore inter-firm and extra-firm coordination under constraint; and questions on disruption severity examine how respondents interpret and respond to different levels of threat. This alignment strengthens methodological fit and helps show how the data can answer the core research question. Table 3 summarizes domains with illustrative questions from resilience literature.

Table 2: Respondents' Profile (Gaza Wartime Interviews)

ID	Industries	Position	Firm Size (Employees)	Work Experience (Years)
1	Food Processing	Direct Manager	22	25
2	Food Processing	Production Manager	22	25
3	Plastic Manufacturing	CEO	55	30
4	Plastic Manufacturing	Supply Chain Manager	55	30
5	Food Processing	Direct Manager	15	14
6	Plastic Manufacturing	Operations Supervisor	40	35
7	Food Processing	Production Manager	33	20
8	Food Processing	Direct Manager	33	20
9	Plastic Manufacturing	Supply Chain Analyst	20	25
10	Plastic Manufacturing	Plant Manager	45	18
11	Plastic Manufacturing	Plant Manager	45	18
12	Plastic Manufacturing	Plant Manager	45	18

Table 3: The interview main questions

CSF Domain	Illustrative Questions	Informed By
Operational Slack	- How do you maintain financial, inventory, or capacity buffers during wartime disruptions? - Can you describe a time when unused resources helped absorb a shock?	Essuman et al. (2023); Badwan (2025)
Supply Chain Collaboration	- How do you coordinate with suppliers/customers during supply shortages or border closures? - What joint planning or information-sharing practices have aided recovery?	Scholten & Schilder (2015); Ali et al. (2017)
Flexible Operations	- How quickly can you adjust production processes, staffing, or product mixes under constraints? - What technologies or worker skills enable rapid reconfiguration?	Statsenko et al. (2023)
Networking Capabilities	- Which external partners (NGOs, peers, institutions) provide critical support or information? - How have relationships helped access alternatives during isolation?	Essuman et al. (2022); Martin & Grodach (2023)
Disruption Severity	- How would you rate the intensity, scope, and duration of wartime shocks on your operations? - How does shock severity change your reliance on the above CSFs?	Statsenko et al. (2023); Found et al. (2024)

4.3. Data Analysis. The analysis proceeds in three stages. First, interview transcripts are read closely and coded to identify incidents, practices, and interpretations related to resilience, disruption, and the four CSFs. Second, codes are grouped into higher-order themes capturing how resilience mechanisms are enacted at different levels of disruption severity. Third, a cross-case comparison is conducted to identify recurring patterns, contrasts between sectors, and possible configurations of resilience mechanisms. To improve transparency, the study specifies that the analysis seeks to capture micro-manifestations such as ad hoc production shifts, informal sourcing arrangements, relational work, trust mobilisation, inventory rationing, and improvised logistics. These are the kinds of fine-grained practices through which resilience becomes observable in extreme environments. Analytical robustness is strengthened through comparison across firms, iterative coding, and the use of respondent accounts tied to concrete episodes rather than abstract general statements. Ethical safeguards include informed consent, anonymisation, and secure data storage.

5. Expected Findings. We expect all four CSFs to matter, but their roles change with the timing and strength of disruptions. Supply chain elements play a big part, bringing out less obvious factors like trust and flexible arrangements. Short-Term Shocks (Lower Severity): Operational slack (extra stock or capacity) and flexible operations (quick changes to recipes or lines) should help most at first. They let firms keep going during fuel shortages or small attacks. Hidden supply chain details show up here, such as backup deals with local suppliers. Long or Harsh Disruptions: When problems drag on (like long blockades), collaboration and networking become key. Firms turn to partners for info, shared resources, and fixes. This reveals supply chain "secrets" like favor-trading, verbal agreements, and aid links—vital when normal paths fail.

6. Theoretical and Managerial Implications. Theoretically, the study contributes by refining RBV and DCT for an extreme setting where institutional support is weak and resilience depends heavily on relational embeddedness. It suggests that resilience in wartime SMEs is not only a function of valuable resources or dynamic reconfiguration, but also of socially mediated access, trust, and cross-boundary coordination. This gives the case theoretical relevance even without formal generalisation.
Managerially, the study suggests that resilience planning in extreme environments should not focus exclusively on internal efficiency or stockpiling. Managers may need to invest simultaneously in slack, flexible operating routines, trusted supply relationships, and broader support networks. For policymakers and NGOs, the findings point to the importance of enabling shared logistics, communication channels, and collaborative infrastructures that help firms survive severe and prolonged disruption.

7. Limitations of the Study. This study has clear limits. Its small, purposive sample targets two sectors (food and manufacturing) in Gaza's unique extreme context, supporting analytical transfer to similar settings rather than statistical generalization. As a concise study on ongoing research, empirical claims align with the current analysis phase, avoiding premature overstatements.

8. Originality of the Study. These limitations focus rather than weaken the study's contributions as a theory-informed exploratory study. Its strengths lie in rare access to Gaza firms amid active conflict, where primary data collection is challenging. The process focus reveals managers' real-time adaptations, details often absent from surveys or retrospective accounts. It also advances targeted propositions on CSF shifts with disruption severity, enabling future comparative studies across conflicts (e.g., Ukraine, Yemen) or mixed-methods designs integrating qualitative depth with quantitative validation.

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Partnering with International Clients through Ingredient Branding: Leveraging Sustainability and Digital Communication

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Abstract. *This paper explores ingredient branding, a pivotal business-to-business strategy, as a means for suppliers to attract international customers and partner with them, with a focus on the intersection of sustainability and digital communication. While this strategy has traditionally been associated with the technological superiority of the ingredient brand, our study posits a strategic shift, particularly within the international context. Utilizing a qualitative multiple-case study methodology to analyze six small and medium-sized enterprises (SMEs) operating as ingredient brands, our research reveals that sustainability and digital communication competencies are becoming as vital as technological ones. The findings suggest that an ingredient brand can differentiate itself and become an attractive partner for international clients by excelling in sustainability and digital outreach. To expand beyond national borders and achieve international recognition, ingredient brands must strategically blend technological, sustainable, and digital communicative competencies to legitimize themselves and be chosen by international customers. This paper contributes to the literature by highlighting the evolving nature of ingredient branding and emphasizing the growing importance of digitalization and sustainability factors in the global arena. Precisely, we discuss managerial implications for SMEs seeking to leverage this strategy for international expansion, suggesting that a mixed offering of "ingredients" can enhance the supplier's strategic attractiveness within the international client's selection process.*
Keywords: *international clients; partner selection; ingredient branding*; *sustainability*; *digitalization*; *business-to-business setting*

Framing of the research. *How to attract international customers and establish strategic partnerships with them? Extant literature underscores the pivotal role of partner selection in ensuring the viability of new partnerships (Geringer, 1991; Cavusgil and Evirgen, 1997). Previous scholarship has scrutinized this phenomenon through various lenses, ranging from technological development to the complexities of international joint ventures, cross-border marketing initiatives, and dynamic markets (Varis et al., 2005; Ishii and Kikumori, 2024). Companies choose partners to compete in the global marketplace. For supplier firms, attracting international customers and fostering strategic partnerships are essential objectives; however, the complexity of today's market environment complicates organizations' ability to clearly distinguish themselves from competitors. In this study, we focus on a key branding strategy, i.e., the ingredient branding strategy, and advance it as a means for supplier companies to partner with international clients.*

In the last decade, scholars have increasingly focused on the significance of branding strategies within business-to-business (B2B) markets, even in an international perspective (Kaufmann et al., 2015; Pyper et al., 2020). The global corporate landscape has witnessed a profound expansion in the strategic application of B2B branding, which now serves as a critical mechanism for cultivating and sustaining long-term industrial partnerships. Robust B2B branding enhances a firm's international prestige and institutional credibility, providing a competitive edge in the global context (Marvi et al., 2024). Recent scholarly contributions underscore that a sophisticated global brand presence is instrumental in mitigating perceived risk and bolstering the decision-making confidence of industrial buyers (Anaza et al., 2023). Such high-equity brands do more than signal technical or functional superiority; they leverage powerful associative cues that stimulate heightened procurement interest among organizational buyers (Brown et al., 2011). In this vein, effective B2B brands must offer decision-makers a streamlined, cognitively and emotionally resonant pathway that facilitates more efficient, decisive purchasing outcomes (Blankson and Kalafatis, 2019; Mogaji et al., 2023). B2B branding policies can foster relationships with clients, many of whom operate internationally due to the inherent nature of these markets.

Effective B2B branding extends beyond mere aesthetic elements, such as logos or slogans. It involves strategically positioning companies to resonate with business customers, thereby influencing their decision-making. This is achieved by establishing trust, demonstrating clear value propositions, and distinctly highlighting a company's unique offerings in the marketplace (Leek and Christodoulides, 2011; Marvi et al., 2024). Indeed, after years of research, B2B branding has evolved from irrelevance and consideration of branding as a pure business-to-consumer (B2C) phenomenon towards being important for business marketing practice (Österle et al., 2018). Hence, building and maintaining strong, recognized B2B brands is a major objective and an integral part of the marketing strategy in industrial markets. The B2B branding literature has explored the unique aspects of branding in the industrial realm, highlighting, for example, the role of digital strategies and tools (Lipiäinen and Karjaluoto, 2015; Pardo et al., 2022), even for the definition of an international marketing strategy in a B2B domain (Katsikeas et al., 2020). Moreover, the sustainability theme in B2B

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markets has steadily attracted attention and academic investigation in recent times (Voola et al., 2022; Runfola et al., 2025), including the specific issue of sustainability communication in digital environments (Guercini et al., 2025).

However, surprisingly, despite its relevance and historical prominence, the ingredient branding strategy—a key B2B branding technique—has not received substantial scholarly attention, especially in the international realm, which this paper focuses on.

The ingredient branding strategy is realized when "key attributes of one brand are incorporated into another brand as ingredients" (Desai and Keller, 2002, p. 73), thereby leveraging the established reputation and perceived quality of a component brand (the ingredient brand) to bolster the overall appeal of the host brand's final product. In particular, when an ingredient is branded with a distinct name or other brand elements associated with a separate firm, it can be classified as a cobranded ingredient (Desai and Keller, 2002). In the B2B relationship between the manufacturer and the supplier, the supplier's end product becomes one of the components of the manufacturer's offering (Erevelles et al., 2008). The "Intel Inside" effect is a well-known strategy that is valuable to both brands in terms of relationship benefits and the association between the host and the ingredient (Norris, 1993).

From a historical perspective, ingredient branding strategy has been primarily associated with firms that can distinguish themselves within host brands through technological competencies (e.g., patents and R&D investments) and the technical superiority of their products (Moon and Sprott, 2016). This paper aims to investigate ingredient branding strategy in light of recent empirical shifts, particularly the growing role of digital communication and sustainability as drivers of ingredient branding. Moreover, the study considers these empirical shifts pivotal for the ingredient brand to expand internationally and attract international clients.

The strategic prioritization of sustainability has fundamentally altered the selection criteria firms use to identify potential international suppliers, thereby significantly influencing relational outcomes (Galkina, 2021). Specifically, within the buyer-supplier relationship, a supplier's sustainable brand image provides customers with positive emotional benefits. Consequently, suppliers are increasingly repositioning themselves as sustainable entities to cultivate organizational trust—a critical factor that, in turn, enhances buyer performance (Casidy and Lie, 2023). Ultimately, sustainability serves as a transformative force, reshaping the nature of customer-supplier relationships and redefining the strategic role of B2B brands (Maleki et al., 2023). At the same time, given ongoing technological advancements, B2B relationships have become increasingly dependent on digital communication platforms. In this context, social media platforms have assumed a strategic role in cultivating and maintaining these industrial partnerships. To optimize both customer acquisition and retention, an increasing number of B2B organizations—specifically supply-side firms—are integrating digital communication tools into their operations, recognizing them as essential vehicles for capturing business opportunities (Fraccastoro et al., 2021; Pardo et al., 2022).

Sustainability and digitalization are increasingly emerging as decisive competitive drivers, particularly for small and medium-sized enterprises (SMEs) with a strategic international orientation. This shift occurs within a landscape where digital transformation and sustainable development have become inextricably linked challenges, reshaping the modern market environment (Lee et al., 2019; Denicolai et al., 2021). The integration of digitalization not only introduces new complexities but also presents significant opportunities, acting as a powerful catalyst for the international expansion of smaller firms (Jean et al., 2010; Sinkovics et al., 2013). By leveraging these digital advancements, SMEs can access novel tools and methodologies to engage global customer bases more effectively, while simultaneously optimizing their organizational structures and business operations to better align with a more interconnected global economy (Falahat et al., 2020). At the same time, sustainability is currently an international growth path for firms, even as countries increasingly issue regulations, protocols, and guidelines (Gadenne et al., 2009; Denicolai et al., 2021).

Purpose of the paper. *This paper focuses on the strategic positioning of B2B brands that, as SMEs, seek to transcend national boundaries by leveraging ingredient branding. This strategy provides them with an opportunity to overcome inherent liabilities and challenges. Specifically, the research investigates how integrating other "ingredients"—namely, sustainability and digital communication competencies—alongside more traditional technological competencies enables B2B brands to scale in the international landscape. In other words, the study emphasizes the importance of sustainable and digital communicative competencies to legitimize both the ingredient brand and the host brand. In doing this, we advance the idea that B2B brands can enhance their global legitimacy and significantly increase their attractiveness as preferred partners for international clients.*

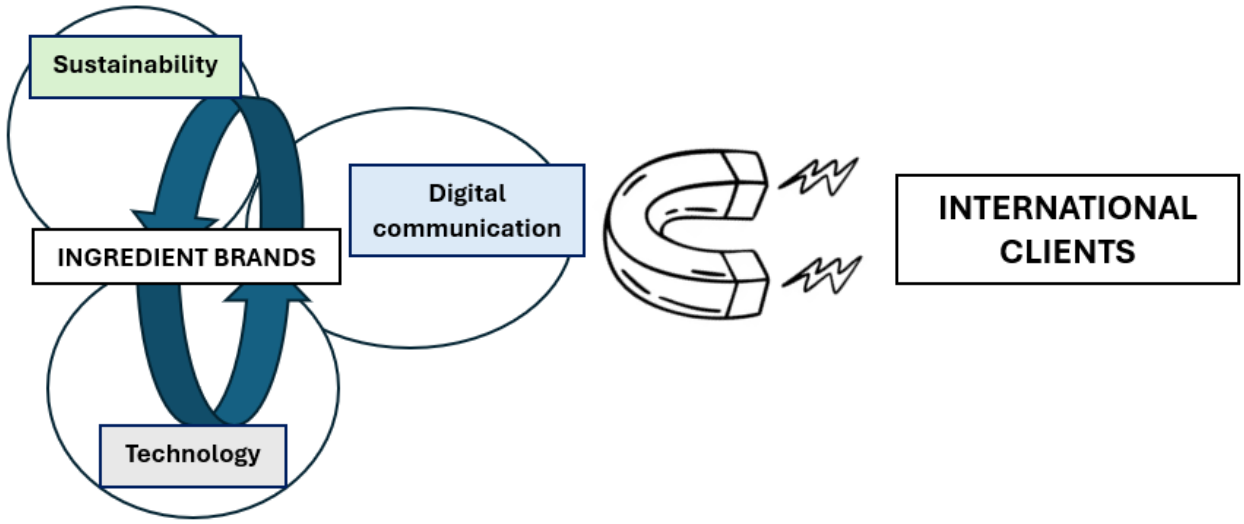
Within our conceptualization, we posit that ingredient branding enables suppliers to leverage core competencies—technology, sustainability, and the digital communication of sustainability—to facilitate their selection as strategic partners by customers in the international context.

Methodology. *This study employs a qualitative research methodology grounded in multiple case studies (Eisenhardt, 1989). Specifically, the paper analyzes six case studies of Italian ingredient brands, developed through interviews with company representatives and the collection of secondary materials. We also conducted non-participant observation on digital channels, taking notes of the content posted by the ingredient brands. They are all SMEs that operate across different industries, including textile, fashion, furniture, and manufacturing. We adhered to specific criteria for the identification of these ingredient brands: they have a marked orientation towards the sustainability requirements and, at the same time, communication, especially through digital channels; also, they boast established relationships with their customers (i.e., the host brands), which are both national and international. For the semi-structured, in-depth interviews,*

an interview protocol was used. The face-to-face interviews, conducted both online and in person, were subsequently recorded and transcribed verbatim.

Results. *Based on the study's results, we argue that the ingredient brand (the supplier) can leverage sustainability to become a valuable component for the host brand (the customer), especially on an international level. In this context, sustainability emerges as a key competency. Additionally, the ingredient brand's ability to effectively communicate its sustainability efforts—particularly through modern digital channels such as social media platforms, corporate websites, mobile apps, newsletters, and virtual communities—greatly enhances the overall ingredient branding strategy for both parties involved. This is because the host brand benefits from the ingredient brand's communication efforts. Essentially, our research reveals that the traditionally studied ingredient branding strategy is evolving, and we present a nuanced, mixed perspective, emphasizing that alongside technological expertise, competencies in sustainability and digital communication are becoming increasingly important. In fact, the ingredient brand chosen by the host brand might not be the most technologically advanced, but rather the most sustainable or the most skilled at communicating its sustainability digitally. By adopting this strategy, the ingredient brand can differentiate itself and become a more appealing partner for international clients. This multifaceted value proposition is especially vital for ingredient brands, especially SMEs aiming to grow internationally, as it allows them to go beyond national boundaries by offering a hybrid value that aligns with global trends. By integrating sustainability and digital outreach, these firms create international resonance that boosts their visibility and customer appeal, ultimately gaining a significant competitive edge in the interconnected global economy. Figure 1 visually illustrates our reasoning.*

Figure 1. The effectiveness of a mixed ingredient branding strategy in attracting international customers.



Source: Own elaboration

Moreover, through the ingredient branding strategy, the supplier brand can also strengthen its own corporate identity. This approach helps the supplier validate its brand and increase international recognition. Host brands also gain advantages: by incorporating a specific sustainable ingredient, they can confirm their commitment to sustainability. This is especially important since host brands are often B2C companies that need to show their sustainability efforts to the mass market. Therefore, while sustainability sets the ingredient brand's products apart, host brands benefit by showcasing their dedication to sustainability globally through their final-market offerings. Digital communication from the ingredient brand can also enhance these benefits for host brands.

In summary, the concept of the ingredient branding strategy proposed relies on a triad of core competencies: technological, sustainable, and digital communication. The integration of these diverse skills suggests that B2B brands offering such a multifaceted value proposition can gain a significant competitive advantage over traditional suppliers. This strategic positioning not only enables crossing national borders but also increases the likelihood of being chosen as a preferred partner by international clients, thereby attracting them.

Therefore, this paper advances the B2B branding literature by exploring the intersection of sustainability and digitalization (Lipiäinen and Karjaluoto, 2015; Pardo et al., 2022; Voola et al., 2022; Marvi et al., 2024), with a new focus on ingredient branding strategies. From this perspective, sustainability and communication are major global trends in international marketing (Pyper et al., 2020; Denicolai et al., 2021; Runfola et al., 2022), helping suppliers become integrated into—and prioritized by—international customers for strategic partnerships (Varis et al., 2005).

Research limitations. *Despite the significant insights provided, this study has limitations that should be acknowledged. First, given the qualitative nature of the research, the paper focused on a multiple case study approach involving six Italian SMEs; while these cases, as ingredient brands, offer depth, they may reflect specific characteristics related to the country or sector. Second, concentrating on SMEs might overlook dynamics unique to large multinational corporations, where resource abundance could lead to different strategic priorities regarding competencies. Additionally, future research could use longitudinal designs to observe how the ingredient branding strategy develops over time; in other words, future studies should examine potential trade-offs or hierarchical dominance between sustainability and digital communication competencies in attracting international customers during the supplier selection process.*

Managerial implications. *From a managerial perspective, this paper shows how the ingredient branding strategy can be used by all firms, especially SMEs. Combining sustainable and technological skills broadens access to this strategy, allowing more companies to utilize it effectively. At the same time, digital communication greatly extends the reach of the ingredient branding strategy, creating international impact and helping to reach a growing global audience. Therefore, our view differs from the traditional view of ingredient branding, which is usually applied to large companies (e.g., Intel or Google Android) with strong technological and R&D capabilities. Sustainability and digital communication become key growth drivers for companies adopting the ingredient branding strategy. In this context, international clients' choice of suppliers as partners may hinge on the opportunity to incorporate supplier components that excel not only in technology but also in sustainability and digital communication into their value propositions and offerings.*

Originality of the paper. *The originality of this paper lies in its exploration of the ingredient branding strategy, which plays a key role in the B2B branding literature, through the dual lenses of sustainability and digital communication, as well as the technological lens, from an international perspective. While the existing literature has traditionally anchored ingredient branding in technological superiority, this study posits a paradigm shift in which non-technological factors become the primary drivers of competitive advantage in the international setting. By proposing a triad of core competencies (technological, sustainable, and digital communicative) within a mixed-ingredient branding strategy, the research offers a more nuanced, multifaceted value proposition for ingredient brands as suppliers. Furthermore, the paper provides evidence that SMEs, often perceived as resource-constrained, can leverage these competencies to attract international clients and, at the same time, gain international recognition and expand. Indeed, the ingredient brand's technological, sustainable, and digital communicative competencies can attract international host brands, adding a novel dimension to the understanding of B2B relationship dynamics. This study highlights the necessity of integrating novel "ingredients" that align with contemporary empirical shifts—specifically, the urgency of sustainability and the outreach facilitated by digital communication. Such a multifaceted approach enhances the brand's prospects of being selected as a preferred supplier partner by international customers.*

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Psychological Contract and Job Performance among Chinese Expatriates in Thailand: The Moderating Role of Trustworthiness

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Abstract. *This study examines the impact of psychological contract on job performance through the mediating roles of job satisfaction, organisational citizenship behavior, organisational commitment, and intention to quit among Chinese expatriates working in Thailand. In addition, the study investigates the moderating role of trustworthiness in the relationships between psychological contract and the four mediating variables. A quantitative survey approach was employed, and data were collected through structured questionnaires. A total of 144 valid responses from Chinese expatriates working in Thailand were obtained and used for the final analysis. The findings reveal that psychological contract fulfillment has significant positive effects on job satisfaction, organisational citizenship behavior, and organisational commitment. Job satisfaction also positively influences job performance, while job performance significantly enhances employee sustainable performance. Moreover, trustworthiness negatively moderates the relationship between psychological contract and intention to quit. The results provide important managerial implications for Chinese multinational enterprises (MNEs) operating in Thailand, highlighting the need to effectively manage psychological contract in order to foster supportive work environments that promote Chinese expatriates' satisfaction, well-being, and long-term work engagement.*
Keywords: *Psychological Contract; Trustworthiness; Job Satisfaction; Job Performance; Organisational Citizenship Behavior; Sustainable Performance*

Framing of the research. The rapid globalisation of Chinese multinational enterprises (MNEs) has significantly increased the number of Chinese employees assigned overseas as a result of China's outward foreign direct investment (Wang et al., 2022). Thailand has emerged as an important destination for this expansion, hosting a growing number of Chinese subsidiaries (Sorndee et al., 2017). To maintain coordination between headquarters and overseas operations, Chinese firms frequently deploy expatriates to managerial positions abroad. Despite their strategic importance, expatriates often face substantial adjustment challenges in host countries, including cultural differences, uncertainty, and limited social support (Caligiuri and Bonache, 2016). These difficulties may result in psychological strain, reduced work engagement, or premature assignment termination, which can generate significant organisational costs. Psychological contract research has traditionally focused on Western organisational contexts, even though Asia has become a major centre of global economic activity (Budhwar et al., 2017). Because psychological contracts are subjective and shaped by cultural norms, Western-based assumptions may not fully explain employment relationships in Asian contexts (Cooke, 2018). Greater attention to Asia-based empirical studies is therefore needed. Similarly, expatriate management research has largely examined Western expatriates, while Chinese expatriates remain relatively underexplored despite China's rapidly expanding global investment (He, An, and Berry, 2018). Chinese expatriates are often associated with strong performance orientation and cost efficiency; however, adjustment challenges and workplace tensions have also been reported. Thailand provides a particularly relevant context for studying Chinese expatriates. As a key ASEAN hub and major destination for Chinese investment (Athukorala, 2017; Luo and Tung, 2018), Thailand hosts an increasing number of Chinese professionals working in multinational subsidiaries. Understanding how psychological contracts influence expatriate attitudes and performance in this context can therefore contribute to both international HRM research and expatriate management practice.

Purpose of the paper. This study focuses on the effect of psychological contract on job performance via job satisfaction, organisational citizenship behavior (OCB), organisational commitment, and intention to quit of Chinese expatriates working in Thailand. As well, the moderation role of trustworthiness in moderating the associations between psychological contract and four mediators has also been investigated. The sets of hypotheses of the study which heavily grounded on the extensive literature review were established in the following.

Psychological Contract and Psychological Contract Fulfilment: The psychological contract refers to employees' beliefs about mutual obligations between themselves and their employer that are not formally specified in legal agreements (Denise Rousseau, 1995). Psychological contract fulfilment reflects employees' perceptions that these obligations have been delivered. Grounded in Social Exchange Theory (George Homans, 1961), which emphasises reciprocity and mutual obligations, psychological contracts influence employee attitudes and behaviours (Cropanzano and Mitchell, 2005). Empirical studies show that contract fulfilment is associated with lower turnover intention and improved employee wellbeing (Lu et al., 2023).

Intention to Quit: Intention to quit refers to employees' conscious willingness to leave the organisation and is widely recognised as a strong predictor of actual turnover (Tett and Meyer, 1993). Research indicates that higher quitting

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intentions are associated with poorer job performance and reduced organisational citizenship behaviour (Wang, 2025b). Meta-analytic evidence also suggests that psychological contract fulfilment significantly reduces turnover intention (Chiang and Hsieh, 2012).

H1: Psychological contract fulfilment negatively associates with employees' intention to quit.

Job Satisfaction: Job satisfaction refers to a positive emotional evaluation of one's job (Herzberg et al., 1959). Prior studies consistently show that psychological contract fulfilment enhances job satisfaction by reinforcing perceptions of fairness and organisational support (Zhang et al., 2025).

H2: Psychological contract fulfilment positively affects job satisfaction.

Organisational Commitment: Organisational commitment reflects employees' psychological attachment and willingness to contribute to organisational goals (Mathis and Jackson, 2003). Both job satisfaction and psychological contract fulfilment are important antecedents of organisational commitment (Jehanzeb and Bashir, 2025).

H3: Psychological contract fulfilment positively associates with organisational commitment.

Organisational Citizenship Behaviour (OCB): Organisational citizenship behaviour refers to discretionary behaviours beyond formal job duties that support organisational effectiveness (Organ, 1997). Research shows that OCB enhances organisational performance and is encouraged by supportive organisational climates and relational employment relationships (Podsakoff et al., 2000).

H4: Psychological contract fulfilment positively affects organisational citizenship behaviour (OCB).

Association between Intention to Quit and Job Satisfaction: Intention to quit is often viewed as part of a cognitive withdrawal process resulting from dissatisfaction. Empirical evidence consistently demonstrates a significant negative relationship between job satisfaction and turnover intention across organisational contexts (Ersoy, 2024).

H5: Job satisfaction negatively influences intention to quit.

Job Performance: Job performance reflects employees' effectiveness in fulfilling work duties and contributing to organisational goals (Eshete et al., 2025). It is influenced by motivation, psychological resources, and supportive work environments (Pomaranik and Kludacz-Alessandri, 2024).

Job Satisfaction and Job Performance: Research consistently shows that job satisfaction is positively associated with job performance because satisfied employees demonstrate higher motivation and engagement (Ersoy, 2024).

H6: Job satisfaction positively affects job performance.

Intention to Quit and Job Performance: Employees who intend to leave the organisation often reduce effort and disengage from work responsibilities, which may weaken performance outcomes (Bui et al., 2024).

H7: Intention to quit negatively affects job performance.

Organisational Commitment and Job Performance: Organisational commitment reflects employees' psychological attachment and loyalty to their organisation. Highly committed employees demonstrate stronger role investment and willingness to support organisational goals, thereby enhancing job performance (Zhao et al., 2025).

H8: Organisational commitment positively affects job performance.

OCB and Job Performance: OCB involves discretionary behaviours that support colleagues and organisational functioning (Cao et al., 2022). Such behaviours improve workplace collaboration and contribute to job performance through improved teamwork and organisational efficiency (Saad et al., 2024).

H9: OCB positively affects job performance

Employee Sustainable Performance: Sustainable work performance emphasises maintaining productivity through the continuous renewal of human and social resources (Docherty et al., 2009). Building on this perspective, employee sustainable performance involves achieving high performance while maintaining well-being and resource vitality (De Jonge and Peeters, 2019).

Association between Job Performance and Employee Sustainable Performance: Job performance reflects short-term task outcomes, whereas employee sustainable performance emphasises long-term productivity while maintaining employee wellbeing and energy resources (Ji et al., 2021).

H10: Job performance positively affects employee sustainable performance.

Trust and Trustworthiness: Trust refers to the willingness to accept vulnerability based on positive expectations that others will not exploit that vulnerability (Roger Mayer et al., 1995). Trustworthiness represents the attributes that make an exchange partner worthy of trust and can provide competitive advantage (Barney and Hansen, 1994).

Trustworthiness consists of three dimensions—ability, benevolence, and integrity—which reflect competence, concern for others, and adherence to ethical principles (Mayer et al., 1995). These attributes foster employees' trust in leaders and are associated with positive organisational outcomes such as organisational citizenship behaviour and team performance (Simon et al., 2025). Accordingly, the following hypotheses are proposed:

H11: Trustworthiness negatively moderates the association between psychological contract and intention to quit.

H12: Trustworthiness positively moderates the association between psychological contract and job satisfaction.

H13: Trustworthiness positively moderates the association between psychological contract and organisational commitment.

H14: Trustworthiness positively moderates the association between psychological contract and OCB.

Methodology. In this study, questionnaires of survey based on the proposed research model were distributed to Chinese expatriates working in Thailand whose companies are members of the Thai-Chinese Chamber of Commerce. According

to Thai-Chinese Chamber of Commerce (2026), currently has 389 member companies. However, the actual number of Chinese expatriates working in these companies is unknown. The researcher contacted the Chamber and requested its assistance in distributing the questionnaires to Chinese expatriates employed in member companies through the human resources departments of each firm. The questionnaires using the five-point Likert scale were formulated in English and Chinese and then were sent to the Chamber. The appropriate sample size for structural equation modeling (SEM) can be determined from the number of observed variables, using the recommended ratio of 5:1 (five respondents per observed variable) proposed by Bentler and Chou (1987). In this study, there are 46 observed variables; therefore, a minimum sample size of approximately 230 respondents (46 × 5) is required to adequately perform SEM. Convenience sampling method has been applied to this study. Finally, a total of 144 valid responses were obtained from Chinese expatriates working in Thailand and were included in the final analysis. This compares favourably to similar studies in the extant literature (e.g., Dam et al., 2023). To test nonresponse bias, a comparison was made between early and late respondents, as suggested by Armstrong and Overton (1977). The results show no significant differences between early and late responses. Partial least squares structural equation modeling (PLS-SEM) has been used to test the proposed hypotheses. This is because PLS-SEM does not require the normality assumption and can efficiently handle non-normal data distributions (Hair et al., 2024). In addition, PLS-SEM is particularly appropriate for theory development and model exploration, as it is designed for predictive purposes rather than strict model confirmation. Importantly, PLS-SEM is also suitable for studies with relatively small sample sizes, making it advantageous when the available respondent pool is limited ((Hair et al., 2024). Although determination of appropriate sample size is one of the critical issues in SEM, however, there is no consensus in the literature regarding what would be the appropriate sample size for SEM (Tabachnick and Fidell, 2001; Kline, 2005). A number of researchers (e.g., Tabachnick and Fidell, 2001) argue that a minimum sample size of between 100 - 150 is considered an acceptable sample size for conducting SEM.

Results. The structural model demonstrates satisfactory explanatory power. The explained variance (R^2 and adjusted R^2) values indicate that the model accounts for substantial variance in the endogenous constructs. Specifically, the model explains 48.7% of employee sustainable performance, 59.9% of job performance, 57.7% of job satisfaction, 53.0% of organisational citizenship behavior, and 67.1% of organisational commitment. In contrast, intention to quit shows relatively low explanatory power ($R^2 = 0.194$), suggesting that turnover intention may also be influenced by contextual and labour market factors. The similarity between R^2 and adjusted R^2 values indicates model stability and limited bias due to model complexity.

Effect size analysis shows that intention to quit has a slight effect on job performance, whereas job performance has a very strong effect on employee sustainable performance. Job satisfaction shows small effects on both employee sustainable performance and intention to quit. Organisational citizenship behavior and organisational commitment contribute positively to job performance with small-to-moderate effects. Psychological contract fulfilment shows strong effects on job satisfaction, organisational commitment, and organisational citizenship behavior, indicating that it is a central driver of employees' attitudes and behaviours. Trustworthiness demonstrates somewhat effect on job satisfaction and a strong effect on organisational commitment but only small effects on intention to quit and organisational citizenship behavior. Interaction effects of trustworthiness between intention to quit and psychological contract fulfilment are generally small, indicating a limited moderating influence.

Predictive relevance analysis using the Stone–Geisser Q^2 statistic confirms that the model has predictive capability (Stone, 1974). All endogenous constructs produce Q^2 values greater than zero. Intention to quit shows relatively low predictive relevance, whereas job satisfaction, organisational citizenship behavior, job performance, employee sustainable performance, and organisational commitment demonstrate moderate to strong predictive power. These results confirm the model's ability to predict key organisational outcomes (Hair et al., 2024).

Overall model fit is satisfactory. The Goodness-of-Fit index exceeds the threshold for a large effect size (Tenenhaus et al., 2005). In addition, the standardised root mean square residual (SRMR) is below the recommended threshold of 0.08, indicating acceptable model fit (Hu and Bentler, 1999; Hair et al., 2024).

Hypothesis testing shows that eight of the fourteen hypotheses are supported while six are rejected. Psychological contract fulfilment does not significantly influence intention to quit (H1: $\beta = 0.011$, $p = 0.938$), leading to the rejection of H1. However, psychological contract fulfilment significantly and positively affects job satisfaction (H2: $\beta = 0.590$, $p < 0.001$), organisational commitment (H3: $\beta = 0.501$, $p < 0.001$), and organisational citizenship behavior (H4: $\beta = 0.621$, $p < 0.001$). Therefore, H2, H3, and H4 are supported. Job satisfaction significantly influences intention to quit (H5: $\beta = 0.362$, $p = 0.007$), but the relationship is positive rather than negative as hypothesised. Because the direction contradicts the hypothesis, H5 is rejected. Job satisfaction also positively affects job performance (H6: $\beta = 0.192$, $p = 0.033$), supporting H6. Intention to quit does not significantly influence job performance (H7: $\beta = 0.048$, $p = 0.501$), leading to the rejection of H7. Organisational commitment significantly and positively affects job performance (H8: $\beta = 0.319$, $p = 0.001$), supporting H8. Similarly, organisational citizenship behavior positively influences job performance (H9: $\beta = 0.328$, $p < 0.001$), supporting H9. Job performance strongly predicts employee sustainable performance (H10: $\beta = 0.698$, $p < 0.001$), confirming H10.

Regarding moderation effects, trustworthiness significantly moderates the relationship between psychological contract fulfilment and intention to quit (H11: $\beta = -0.219$, $p = 0.001$). The negative coefficient indicates that higher perceived trust weakens employees' intention to quit when psychological contract fulfilment is high. Therefore, H11 is

supported. However, the moderating effects of trustworthiness on the relationships between psychological contract fulfilment and job satisfaction (H12), organisational commitment (H13), and organisational citizenship behavior (H14) are not statistically significant. Consequently, H12, H13, and H14 are rejected.

These findings highlight the central role of psychological contract fulfilment in shaping positive work attitudes and behaviours. When employees perceive that organisational promises are fulfilled, they experience higher job satisfaction, stronger organisational commitment, and greater engagement in discretionary behaviours that benefit the organisation. This result supports psychological contract theory, which suggests that employees evaluate employment relationships based on whether organisational obligations are honoured (Rousseau, 1995). Fulfilled obligations strengthen perceptions of reciprocity and fairness within the employment relationship (Cropanzano and Mitchell, 2005). Empirical evidence also shows that psychological contract fulfilment contributes positively to job satisfaction across organisational contexts (Gan et al., 2020). The strong relationship between psychological contract fulfilment and organisational commitment supports prior findings that fulfilled obligations enhance employees' attachment and identification with the organisation (Meyer and Allen, 1997; Coyle-Shapiro and Conway, 2005). When organisations consistently fulfil commitments, employees develop stronger loyalty and willingness to remain.

Psychological contract fulfilment also increases organisational citizenship behavior. Employees who perceive fairness and organisational support tend to reciprocate through voluntary behaviours beyond formal job requirements (Zhao et al., 2007). These behaviours enhance cooperation and organisational effectiveness (Podsakoff et al., 2000). Although traditional turnover models predict that job satisfaction reduces intention to quit (Tett and Meyer, 1993), the results show a positive relationship. This unexpected finding may reflect employees' consideration of external career opportunities or advancement prospects (Lee et al., 2023). Turnover intention may therefore be influenced not only by satisfaction but also by labour market opportunities and career aspirations (Griffeth et al., 2000).

The results also confirm that job satisfaction positively affects job performance, as satisfied employees tend to be more motivated and engaged (Judge et al., 2001). In contrast, intention to quit does not significantly influence job performance. Employees may maintain acceptable performance even when considering leaving, particularly in professional environments with strong performance expectations (Jiang et al., 2017). Both organisational commitment and organisational citizenship behavior significantly contribute to job performance. Employees who feel attached to the organisation are more likely to exert additional effort (Meyer and Allen, 1990), while citizenship behaviours foster cooperative environments that enhance productivity (Podsakoff et al., 2000). Finally, job performance strongly predicts employee sustainable performance. This finding supports the view that sustainable performance reflects the ability to maintain effective job outcomes over time while preserving employees' psychological and professional resources (De Jonge and Peeters, 2019; Ji et al., 2021).

Moderation analysis further shows that trustworthiness reduces employees' intention to quit when psychological contracts are fulfilled. Trustworthiness reflects perceptions of competence, benevolence, and integrity within organisational relationships (Mayer, Davis and Schoorman, 1995). When organisational actors are perceived as trustworthy, fulfilment of obligations becomes more meaningful and reduces uncertainty in the employment relationship (Dirks and Ferrin, 2002). However, trustworthiness does not significantly moderate the relationships between psychological contract fulfilment and job satisfaction, organisational commitment, or organisational citizenship behavior. This suggests that psychological contract fulfilment alone may be sufficient to generate positive attitudes and behaviours without additional trust reinforcement. Job satisfaction and organisational commitment are primarily shaped by employees' evaluations of whether organisational obligations are fulfilled (Rousseau, 1995; Meyer and Allen, 1997), while organisational citizenship behavior may be driven more by internalised norms of cooperation and prosocial motivation (Organ, 1997; Podsakoff et al., 2000).

Research limitations. Despite its contributions, this study has several limitations that provide opportunities for future research. First, the sample focuses exclusively on Chinese expatriates working in Thailand, which may limit the generalisability of the findings to other international contexts. Future studies could extend the investigation to expatriates from different nationalities or examine similar relationships across other ASEAN host countries, allowing broader cross-cultural comparisons within the China–ASEAN region. Second, the use of self-reported survey data may raise concerns related to common method variance and potential social desirability bias. To strengthen measurement validity, future research could incorporate multi-source data, such as supervisor assessments, peer evaluations, or objective performance indicators, particularly when examining constructs such as job performance, organisational citizenship behavior, and employee sustainable performance. Third, although trustworthiness was examined as a moderating variable in this study, future research could explore additional contextual or individual boundary conditions. Variables such as cultural intelligence, language proficiency, leadership style, perceived organisational support, and institutional distance between home and host countries may further shape expatriates' attitudes and behavioural outcomes. Fourth, this study relies on cross-sectional survey data, which restricts the ability to establish causal relationships among psychological contract fulfilment, trustworthiness, work attitudes, and performance outcomes. Future research could employ longitudinal or time-lagged research designs to capture how expatriates' perceptions and behaviours develop over different stages of international assignments. Finally, future studies may benefit from adopting qualitative or mixed-method approaches, including interviews or case studies, to provide richer insights into how Chinese expatriates interpret psychological contracts and trustworthiness in real organisational settings.

Managerial implications. This study also provides important managerial implications for Chinese MNEs operating in Thailand and ASEAN. The results highlight the central role of psychological contract fulfillment in strengthening expatriates' job satisfaction, organisational commitment, and OCB. Expatriate management should therefore extend beyond formal contracts and compensation to include clear expectations, career development, and organisational support in unfamiliar cultural contexts. The moderating role of trustworthiness (ability, benevolence, and integrity) further suggests that expatriates respond more positively when managers are perceived as competent, ethical, and supportive. Developing trust-based leadership can therefore reduce uncertainty and psychological strain during expatriate assignments. Moreover, the relationships between job attitudes, job performance, and sustainable performance indicate that expatriate success should be evaluated not only through short-term results but also through long-term effectiveness and well-being. Accordingly, Chinese MNEs should promote sustainable performance through balanced workloads, cross-cultural training, and continuous support. Finally, in the ASEAN context—where relational norms and informal coordination are prominent—encouraging extra-role behaviors and trust-based relationships is essential for long-term organisational effectiveness and regional legitimacy.

Originality of the paper. This study refines psychological contract paradigm by positioning trustworthiness as an asymmetric boundary condition rather than a universal amplifier of exchange-based reactions. The findings show that trustworthiness significantly moderates the relationship between psychological contract fulfillment and intention to quit, but not its effects on job satisfaction, organisational commitment, or OCB. This pattern suggests that trust is particularly consequential for withdrawal-related cognitions, where uncertainty and vulnerability are most salient, thereby challenging the assumption that trust uniformly strengthens exchange outcomes. (Organ, 1997; Simon et al., 2025).

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Reconfiguring Global Value Chains through Reshoring: An Evaluation Model for the Ceramic Industry

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Abstract. *This research employs the Circularity, Economic Resilience and Sustainability (CERES) model to evaluate sourcing configurations for a strategic raw material in the Italian ceramic sector amid geopolitical disruption and a circular transition. The study focuses on feldspathic fluxes in the Sassuolo district and develops a proof-of-concept simulation that combines a bi-objective optimization structure with a decision framework integrating economic cost, geopolitical disruption exposure, supply resilience, and circular performance. The first objective function (Z_1) captures the total expected economic burden of sourcing, including procurement, configuration, reshoring, and disruption costs. The second objective function (Z_2) captures circular sustainability through the Integrated Circular Readiness (IRC) index, which is based on virgin raw material substitution, servitization potential, territorial contribution, and logistics carbon impact. Using firm-level data, the simulation compares business-as-usual global sourcing, nearshoring, and reshoring. Results show that business-as-usual global sourcing occupies the least favorable position in the Integrated Sustainability Performance (ISP) space, while nearshoring and reshoring offer progressively stronger economic–circular performance. The paper interprets these configurations through a Circular Business Model lens, providing a strategic reading of sourcing transition pathways in hard-to-abate manufacturing.*
Keywords: *circular supply chain management; geopolitical risk; circular business models; sourcing resilience; global sourcing, reshoring.*

Framing of the research. The global commodity sourcing model that underpinned resource-intensive manufacturing rested on structural assumptions that are no longer guaranteed: political stability in extractive regions, low-cost maritime logistics, and a regulatory environment that externalized environmental and social costs. COVID-19 exposed fragilities in geographically concentrated supply chains; the Russia-Ukraine conflict triggered energy price volatility and disrupted transport routes; and EU sustainability regulation — through the Green Deal, CSRD, EU Taxonomy, and Critical Raw Materials Act — is imposing new obligations for traceability, impact measurement, and circular integration on European manufacturers (Lin et al., 2024).

For the Italian ceramic tile industry — a globally significant, hard-to-abate sector anchored in the Sassuolo district — these pressures are particularly acute. In this sector, global sourcing has been historically associated with quality upgrading rather than cost minimization. The industry is structurally dependent on raw materials sourced from geopolitically sensitive regions: feldspathic fluxes from Turkey, ball clay fluxes from Ukraine, Eastern European and North African deposits, and industrial minerals concentrated in politically unstable or logistically vulnerable areas (Javed et al., 2025). The traditional equilibrium among cost, availability, and quality that justified global procurement is no longer self-evidently optimal when disruption costs, environmental externalities, and circular-economy requirements are incorporated. Interruptions to logistics flows, rising transport costs, carrier scarcity, and export restrictions show that conventional assumptions underpinning global raw material sourcing can no longer be taken for granted (Choudhary et al., 2023).

The supply chain management and operations research literature has increasingly adopted analytical frameworks addressing sustainability, resilience, and circularity. Within this stream, research on circular supply chain management (CSCM) has developed a typology of circular strategies, repositioning circularity as a strategic industrial lever rather than merely a dimension of environmental compliance (Kategaya and Yavuz, 2025). In parallel, supply chain resilience literature has produced models that capture disruption probabilities and recovery capacities, with geopolitical risk increasingly conceptualized as structural rather than episodic (Bednarski et al., 2025). At the same time, complex sourcing strategies, such as AI-driven, dual, or hybrid sourcing, increasingly depend on firms' digital maturity (Fornasiero and Tolio, 2025; Niu et al., 2025). Furthermore, multi-objective optimization has demonstrated the tractability of jointly addressing cost and sustainability objectives (Bhawna et al., 2024). Despite these advances, the integration of these three strands into a unified, applied decision-making framework remains underdeveloped. Specifically, there is a lack of models capable of simultaneously evaluating economic efficiency, geopolitical resilience, and circular sustainability within a defined industrial sourcing context.

Three key knowledge gaps underpin the present research. First, applied models that simultaneously evaluate cost, geopolitical risk, and circularity in manufacturing supply chains remain scarce. Existing firm-level approaches are fragmented and fail to capture supply chain behavior under both stable and disruptive conditions (Bhawna et al., 2024). Second, operationalized circularity metrics that enable meaningful supplier comparisons remain underdeveloped, particularly when suppliers differ in geographic proximity, logistics, secondary material use, and territorial embeddedness

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(de Koning et al., 2024). Third, sector-specific interpretive frameworks that translate sourcing optimization outcomes into actionable circular business configurations remain scarce, especially within the ceramic industry (Van Loon et al., 2021).

Purpose of the paper. This study applies the CERES (Circularity, Economic Resilience and Sustainability) model to identify and compare sourcing configurations within the Integrated Sustainability Performance (ISP) space, jointly evaluating strategic sourcing costs and circularity performance under geopolitical disruption. The configurations generated by the model are then interpreted through a Circular Business Model (CBM) lens, providing a strategic reading of alternative pathways available to firms within the ceramic district under crisis conditions. Unlike decision-support approaches that assess cost, geopolitical risk, and circularity separately, CERES is an original bi-objective tool for sourcing in the ceramic sector, developed within the Viability for circuLar manufacTuring (VOLT) project. Its analytical structure combines strategic sourcing cost — including procurement, disruption, and configuration-related costs — with the circular and territorial performance of sourcing alternatives, captured through the Integrated Circular Readiness (IRC) index. This research addresses two questions:

1) Which sourcing configurations emerge when strategic sourcing cost and circularity performance are jointly assessed within the Integrated Sustainability Performance space?

2) How can these configurations be interpreted as circular business model transition pathways for the ceramic sector?

To address these questions, the study focuses on strategic procurement of raw materials in the Sassuolo district, particularly feldspar fluxes and clays previously classified as "high-risk" using an adapted Kraljic matrix. The analytical horizon is medium-term, enabling the model to account for investments associated with reshoring and nearshoring strategies.

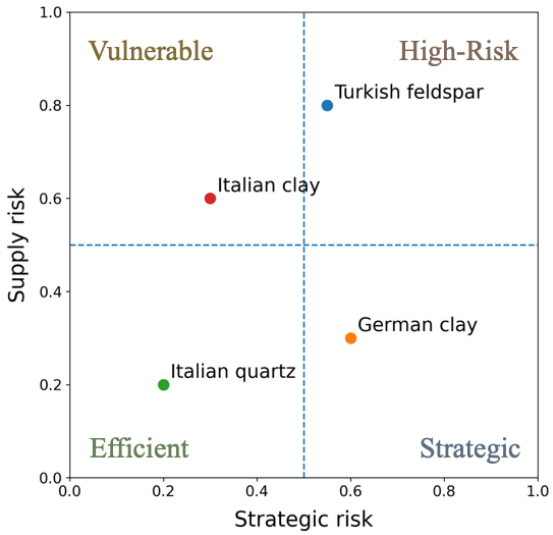
Methodology. The methodology adopted in this study is based on CERES, a model developed within the Viability for circuLar manufacTuring (VOLT) research project for the Italian ceramic tile industry. It unfolds across four integrated phases: (1) theoretical-conceptual model construction; (2) strategic prioritization through Kraljic matrix analysis; (3) mathematical formalization; and (4) operationalization through indicator construction and numerical simulation. Together, these phases translate a broad conceptual framework into a "bi-objective" Pareto frontier model in which sourcing alternatives are evaluated along two analytical dimensions: strategic sourcing cost and circularity performance.

The theoretical architecture of CERES is built around five interacting constructs. Integrated Sustainability Performance (ISP) represents the systemic output of the supply chain, combining economic competitiveness, reduced environmental impact, and territorial social value (Hervani et al., 2022). The ISP is used as a two-dimensional space in which different sourcing alternatives are positioned based on strategic sourcing cost and circularity performance. Geopolitical Risk (GR) is operationalized as the probability and severity of supply interruptions linked to political instability, route concentration, and export restrictions. GR is treated as a structural parameter to be incorporated into procurement decisions rather than an exceptional shock (Bednarski et al., 2025). Digital Maturity (DM) captures the firm's capacity to monitor, anticipate, and dynamically adjust sourcing decisions through ERP-IoT systems, predictive analytics, and digital twin infrastructures, functioning as a moderating variable that enables advanced sourcing strategies. Circular Supply Chain Management practices (CSCM) are evaluated across four strategic logics – narrowing, closing, slowing, and intensifying – representing the operational levers for circular transition (Kategaya and Yavuz, 2025). More specifically, narrowing reduces virgin resource use, closing recovers and reintegrates materials, slowing extends material use through more contained supply configurations, and intensifying increases utilization through service-based arrangements. Finally, Resilient Sourcing Strategies (RSS) encompass the full configuration space of procurement alternatives – global, regional, domestic, AI-driven, dual sourcing, and hybrid – as structural responses to geopolitical and circular pressures (Niu et al., 2025). In the conceptual model, GR and institutional pressures act as external drivers, RSS and CSCM practices as mediating mechanisms, DM as a moderator, and ISP as the systemic output. This conceptual architecture is subsequently translated into the formal structure of the CERES model: Z1 represents the strategic sourcing cost dimension, including procurement costs, disruption-related expected costs, and the economic implications of alternative sourcing configurations under geopolitical risk, whereas Z2 captures circular and territorial performance through the IRC-based assessment. The joint behavior of these two objective functions defines the ISP space within which alternative sourcing configurations are evaluated and interpreted.

The operationalization begins with a strategic analysis based on an adapted Kraljic matrix for the ceramic industry. In this study, this matrix is not developed as a stand-alone analytical output, but used as the result of a prior screening exercise classifying critical raw materials for the ceramic supply chain. Within CERES, its function is to justify the prioritization of the materials subsequently analyzed. In line with recent work that adapts Kraljic-type tools for sustainability-oriented procurement decisions (Corsini et al., 2024), raw materials are classified along two risk dimensions. Supply risk captures the potential for disruption or cost volatility arising from external conditions; in this study, it reflects exposure to carbon-related regulatory pressure, geopolitical instability, social fragility, macroeconomic and financial uncertainty, and long-term reserve availability. Strategic risk, in turn, captures the extent to which a material affects broader business objectives in terms of competitiveness, adaptability, and resilience; it is therefore associated with transportation costs, inbound logistics complexity, and storage capacity. Taken together, these two dimensions distinguish between longer-term structural vulnerability and more immediate operational exposure, defining four categories: Efficient, Vulnerable, Strategic, and High-Risk. Their aggregation follows a data-driven scoring procedure based on PCA-derived weights. Figure 1 presents a simplified extract of this prior Kraljic classification. As shown, Turkish feldspar is

positioned in the high-risk quadrant, which justifies its selection as a critical raw material for subsequent analysis through the CERES model.

Figure 1: Simplified Kraljic matrix for raw material screening in the ceramic supply chain



Empirical data for the simulation are provided by a globally leading firm in the Italian ceramic tile industry, ensuring that the model reflects real operational and sourcing conditions. The CERES model is structured around four formal sets: materials, potential suppliers, geopolitical risk scenarios, and alternative sourcing strategies. Key exogenous parameters include unit purchase costs, logistical costs, reshoring investment costs, supplier capacities, scenario probabilities, expected supply loss rates, minimum demand levels, and suppliers' digital maturity. Decision-making is captured through three types of variables: quantities purchased from each supplier, activation of domestic suppliers, and selection of sourcing strategies. The economic and circular implications of this architecture are formalized below through two complementary objective functions, namely Z_1 and Z_2.

The first objective function, Z_1, represents the economic sustainability of the sourcing configuration and formalizes the cost-side implications of geopolitical risk, and the selection of a resilient sourcing strategy. It captures the total expected cost of the selected sourcing strategy by integrating four components: direct material procurement costs, strategy-related sourcing costs, reshoring investment costs, and expected disruption costs associated with geopolitical risk scenarios. In this way, Z_1 reflects the model's core economic rationale: quality-driven global sourcing configurations may become economically less attractive once reconfiguration efforts and exposure to disruption are explicitly incorporated into the decision framework.

$$Z_1 = \sum_{i \in I} \sum_{j \in J} c_{ij} x_{ij} + \sum_{s \in S} f_s y_s + \sum_{r \in R} \rho_r z_r + \sum_{\omega \in \Omega} p_\omega \, DC_\omega$$

In this formulation, $c_{ij}x_{ij}$ captures direct procurement costs associated with material flows, $f_s y_s$ represents strategy-specific sourcing or configuration costs associated with the activation of more complex sourcing strategies, such as AI-driven, dual, or hybrid sourcing, which typically require a minimum level of DM to be effectively implemented, $\rho_r z_r$ denotes reshoring-related investment costs, and $p_\omega DC_\omega$ captures the expected disruption cost under each geopolitical scenario ω, weighted by its probability of occurrence. Accordingly, Z_1 does not measure purchase cost alone, but the total expected economic burden of each sourcing configuration.

The second objective function, Z_2, represents the circular sustainability of the sourcing configuration and formalizes the contribution of circular supply chain management (CSCM) practices through the Integrated Circular Readiness (IRC) logic. Consistent with recent CSCM research that frames circularity through strategies such as narrowing, closing, slowing, and intensifying resource flows, Z_2 captures four complementary dimensions of circular performance: virgin raw material substitution, servitization potential, territorial contribution, and logistic carbon impact. These dimensions operationalize circular strategies, which are selected in response to the material's sourcing risk profile as identified by the adapted Kraljic matrix. Thus, Z_2 evaluates both suppliers' circular characteristics and their strategic relevance within a given sourcing context. Importantly, the relative weights assigned to these four dimensions are not arbitrary but are derived from this sequential logic, whereby the material's Kraljic positioning informs the appropriate circular strategy mix, and that mix determines the relative importance of each dimension within the IRC.

For each supplier j, the Integrated Circular Readiness index is defined as:

$$IRC_j = w_1 VRS_j + w_2 SP_j + w_3 TC_j + w_4 LCI_j$$

The second objective function aggregates the circular value generated by the selected sourcing configuration, weighted by the quantity of material i sourced from each supplier j:

$$Z_2 = \sum_{i \in I} \sum_{j \in J} x_{ij}\, IRC_j$$

In this formulation, VRS_j denotes the virgin raw material substitution rate for supplier j, capturing the share of recycled material, by-products, or regenerated waste in the total supplied input. SP_j represents the servitization potential index, reflecting the supplier's systemic readiness to support circular supply chain practices through return-oriented arrangements and information-sharing capabilities. TC_j denotes the territorial contribution index, capturing the supplier's social and territorial contribution through a hybrid proxy that combines socio-economic evidence and geographical proximity. Finally, LCI_j represents the logistic carbon impact indicator, capturing the CO_2 impact associated with transporting the material from the supplier to the manufacturing site. The weights w_1, w_2, w_3, and w_4 reflect the strategic weighting assigned to each dimension within the IRC. This relationship between Kraljic positioning, circular strategy mix, and dimension relevance is summarized in Table 1. Accordingly, Z_2 maximizes the overall circular value of the sourcing configuration by aggregating the circular performance of the selected suppliers, weighted by the material flows assigned to them.

Table 1: Strategic mapping between Kraljic quadrants, circularity strategies, and IRC dimensions

Kraljic quadrant	Circular strategy mix	Dominant dimensions	Secondary dimensions
Efficient	Narrowing + Intensifying	VRS / SP	LCI
Vulnerable	Narrowing + Slowing	VRS / SP	TC / LCI
Strategic	Closing + Intensifying	SP / VRS	LCI
High-Risk	Narrowing + Closing + Slowing	VRS / SP	TC / LCI

Because Z_1 and Z_2 are naturally conflicting, the model produces a Pareto frontier rather than a single optimal solution, allowing decision-makers to explore trade-offs between cost efficiency and circular performance. In this sense, the Pareto frontier defines the ISP space within which alternative sourcing configurations can be positioned and compared based on their joint economic and circular performance.

For numerical simulation, the model focuses on a representative strategic material – a feldspathic flux with an annual demand of 36,000 tonnes – using real procurement and performance data from the firm. This material falls within the High-Risk quadrant of the adapted Kraljic matrix and is therefore associated with a circular strategy mix that combines narrowing, closing, and slowing approaches. Three sourcing channels are considered: a global supplier, a regional EU/Mediterranean supplier, and a domestic supplier, with unit costs of 110 EUR/t, 75 EUR/t, and 40 EUR/t, respectively, and distinct IRC scores. In the ceramic tile industry, sourcing decisions have historically been driven not only by cost minimization but also by product quality and technological performance. The shift from local red clays to higher-quality, more plastic white clays enabled the production of larger-format, higher-value tiles, while Turkish feldspars became critical as fluxing materials to support the firing behavior of these compositions. Accordingly, the global sourcing baseline should be interpreted as a quality-driven configuration rather than a cost-minimizing one.

Since the simulation focuses on relocation-based sourcing alternatives rather than advanced configurations such as AI-driven, dual, or hybrid sourcing, digital maturity is not explicitly computed in the numerical results. Two geopolitical scenarios are modeled: a "normal" scenario as stable baseline for conventional cost assessment, and a "severe crisis" scenario with differentiated supply-loss rates to assess CERES under disruption conditions. Reshoring investment for the domestic supplier is set at 300,000 EUR/year, reflecting realistic extraction-site activation and compliance costs.

Through this setup, the CERES model provides an empirically grounded framework for evaluating sourcing strategies that balance economic efficiency, supply resilience, and circular value in a resource-intensive industrial context.

Results. The simulation generates three sourcing configurations within the ISP space: Business as Usual (BAU), Nearshoring (NEAR), and Reshoring (RESH). Table 2 and Table 3 report the key values underlying both objective functions: Z_1 includes direct procurement, reshoring investment, and expected disruption-related costs, while Z_2 is calibrated through the four IRC dimensions.

The economic comparison distinguishes between a stable-cost baseline and the CERES expected Z_1. The stable-cost baseline includes only direct procurement and reshoring investment. CERES expected Z_1 additionally incorporates two geopolitical scenarios: a normal scenario (p=0.70) with no significant supply loss, and a severe crisis scenario (p=0.30) with differentiated supply-loss rates: 40% for the global supplier, 10% for the regional supplier, and 0% for the domestic supplier.

The Z_2 values are stylized and hypothetical calibration points used to calibrate the IRC under the three sourcing profiles. Each IRC dimension is assigned one of four stylized levels of circular integration: limited (0.20), emerging

(0.40), structured (0.60), and advanced (0.80). Since the reference material falls within the High-Risk quadrant, the IRC weighting gives greater relevance to VRS and SP, while TC and LCI play a secondary role, consistent with the narrowing, closing, and slowing strategy mix.

Table 2: Main values of the economic objective function Z_1

Scenario	Sourcing profile	Stable-cost baseline (€)	Crisis supply-loss rate	Expected disruption cost (€)	CERES expected Z_1 (€)
BAU	Global sourcing	3,960,000	40% global	475,200	4,435,200
NEAR	50% global + 50% regional	3,330,000	40% global; 10% regional	278,100	3,608,100
RESH	Domestic sourcing	1,740,000	0% domestic	0	1,740,000

Table 3: Main values of the circular objective function Z_2 through IRC calibration

Scenario	VRS (w = 0.33)	SP (w = 0.29)	TC (w = 0.19)	LCI (w = 0.19)	IRC (Z_2)
BAU	0.20	0.20	0.20	0.40	0.25
NEAR	0.40	0.60	0.60	0.80	0.55
RESH	0.80	0.80	0.80	0.80	0.80

Note: Weights correspond to the High-Risk quadrant of the adapted Kraljic matrix. IRC dimension values are stylized calibration points and do not represent empirical measurements.

In the BAU scenario, the full annual demand of 36,000 tonnes is sourced globally. This yields the highest CERES expected Z_1, 4,435,200 EUR, due to direct procurement costs and disruption exposure. Under the severe crisis scenario, a 40% supply-loss rate reduces the net received quantity to 21,600 tonnes, creating a supply deficit of 14,400 tonnes. In circular terms, BAU corresponds to a predominantly limited IRC profile: VRS, SP, and TC are calibrated at the limited level, while LCI reaches only an emerging level. BAU therefore achieves an IRC value of 0.25 and represents the least favorable economic–circular configuration.

The NEAR scenario allocates demand equally between global and regional suppliers, with 18,000 tonnes sourced globally and 18,000 tonnes regionally. Economically, this reduces CERES expected Z_1 to 3,608,100 EUR, mainly by lowering disruption costs. Under the severe crisis scenario, the global share faces a 40% supply-loss rate, while the regional share faces a 10% loss rate, resulting in a net received quantity of 27,000 tonnes and a supply deficit of 9,000 tonnes. From a circular perspective, NEAR represents a transition toward a more structured sourcing profile: VRS remains at an emerging level, while SP and TC reach structured levels and LCI reaches an advanced level. This yields an IRC value of 0.55, indicating a substantial economic–circular improvement over BAU.

Under the RESH scenario, all 36,000 tonnes are sourced domestically. This yields the lowest CERES expected Z_1 of 1,740,000 EUR, even including the 300,000 EUR reshoring investment, because disruption costs are eliminated. In the severe crisis scenario, the domestic supplier is unaffected by supply loss, so the full demand of 36,000 tonnes is met and no supply deficit occurs. From a circular standpoint, RESH corresponds to an advanced IRC profile across all four dimensions, with high material substitution, systemic and informational integration, territorial contribution, and logistical efficiency. Consequently, RESH achieves an IRC value of 0.80, the highest among the evaluated configurations.

Taken together, the results show a clear progression across the three sourcing configurations. BAU combines the highest stable-cost baseline with the highest disruption exposure and a limited circular profile. NEAR reduces both the stable-cost baseline and the expected disruption cost, while moving toward structured circular integration. RESH achieves the strongest joint performance: its stable-cost baseline already includes the reshoring investment and remains the lowest among the three alternatives, while its zero-disruption cost and advanced IRC profile further reinforce its position within the ISP space.

Figure 2: Positioning of sourcing configurations in the ISP space (Z_1–Z_2)

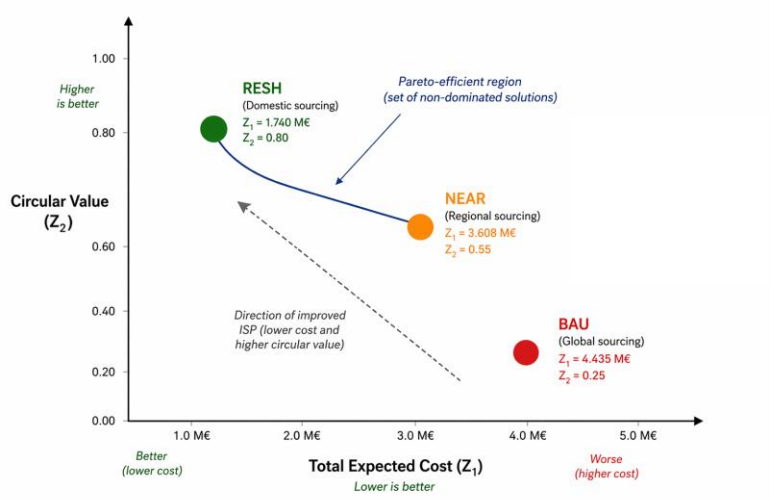


Figure 2 visualizes these configurations within the ISP space, making the overall pattern clear: BAU occupies the least favorable position, NEAR marks a clear improvement in both economic and circular terms, and RESH defines the most efficient configuration toward lower cost and higher circular value.

Interpreting these configurations through a circular business model lens highlights three distinct pathways. The BAU scenario reflects a predominantly linear configuration, marked by limited circular integration and high exposure to external disruptions. The NEAR scenario corresponds to a partially circular configuration, in which shorter supply chains and improved coordination enable intermediate levels of material recirculation and system efficiency. The RESH scenario represents a highly integrated circular configuration that combines strong material substitution, systemic coordination, and territorial embeddedness, thereby reinforcing both resilience and local value creation.

Research limitations. The present study has several limitations that constrain the generalizability of its findings. First, the numerical simulation is based on industrial-scale data for a limited set of strategic raw materials in the Italian ceramic district and should therefore be interpreted as an initial proof of concept rather than a fully generalizable empirical validation of CERES. In addition, the global sourcing baseline reflects a quality-driven configuration specific to the ceramic tile industry rather than a cost-minimizing benchmark, which limits the direct transferability of the numerical results to other sectors.

Second, the IRC weights are currently set through strategic prioritization aligned with the adapted Kraljic matrix and the associated circular strategy mix. Future research should refine this weighting system through formal multi-criteria methods such as AHP, TOPSIS, or Bayesian inference, thereby enhancing the objectivity and replicability of the composite index.

Third, Digital Maturity is recognized in the model as an enabler of more advanced sourcing configurations, but it is not explicitly operationalized in the simplified simulation presented in this paper. The analysis focuses on relocation-based strategies — BAU, NEAR, and RESH — rather than on digitally intensive configurations such as AI-driven, dual, or hybrid sourcing.

Finally, the CBM pathways discussed in this paper remain exploratory because they are derived from a single-material simulation. Further developments of CERES should test the model across broader material portfolios and industrial contexts, validate the CBM interpretation across additional raw materials, and incorporate dynamic transition pathways, investment timing, market evolution, and digital maturity thresholds to better represent the evolution of the ISP space over time.

Managerial implications. The results of the CERES model have relevant implications for procurement management and industrial strategy in the ceramic sector and, more cautiously, for other hard-to-abate manufacturing industries facing similar raw material vulnerabilities.

The most fundamental implication concerns the limits of partial cost logic as the dominant criterion for sourcing decisions. In the ceramic tile industry, global sourcing should not be interpreted simply as a low-cost option, but as a historically quality-driven configuration associated with specific product and technological requirements. The simulation shows that this configuration combines the highest stable-cost baseline with the highest exposure to disruption, whereas reshoring remains the lowest-cost configuration, even after accounting for the annual reshoring investment. For the single material analyzed, the expected annual cost advantage of reshoring over global sourcing exceeds 2.7 million EUR. From this perspective, Total Cost of Ownership frameworks should incorporate geopolitical disruption costs as a standard accounting category rather than an exceptional risk provision.

The ISP space representation offers a structured basis for comparing sourcing alternatives in terms of both cost efficiency and circular performance. Rather than presenting sustainability as a cost center, the CERES results suggest that

circular sourcing strategies may become economically preferable once full-cost accounting is adopted. This also suggests that sustainability governance should be integrated into procurement strategy rather than treated as a separate compliance function. The IRC framework also supports supplier assessment beyond conventional criteria such as price, quality, and delivery reliability by incorporating material circularity, systemic integration, territorial contribution, and logistical carbon intensity.

The CBM pathways suggest a possible phased transition strategy for the Italian ceramic district: firms with high global exposure may prioritize nearshoring as an achievable first step and domestic reshoring as a medium-term target, while digitally enabled sourcing configurations remain a longer-run extension of CERES. Finally, digital maturity should be interpreted as enabling infrastructure for future AI-driven, dual, or hybrid sourcing strategies, rather than as an operational result of the present simulation.

Originality of the paper. The paper makes three contributions to the management literature. The first is the formal integration of economic cost, geopolitical disruption risk, and circular sourcing value into a single bi-objective optimization model. Prior research has addressed these dimensions separately: supply chain disruption modeling has focused on probability-weighted cost functions; circular supply chain management has developed typological frameworks without formal optimization structures; and multi-objective sustainability models have treated cost and environmental impact without incorporating the geopolitical dimension (Bhawna et al., 2024). CERES brings these dimensions together within a single analytical structure, whose ISP space makes explicit the joint economic–circular positioning of alternative sourcing configurations. The theoretical contribution is therefore not the empirical finding that relocation strategies may outperform global sourcing in the case analyzed, but a formal decision-support logic connecting sourcing resilience, geopolitical exposure, and circular supply chain management.

The second contribution is the construction of the IRC as a composite operational metric that translates circular supply chain management constructs into quantitative, normalized, and comparable supplier scores. In this way, the IRC helps bridge the gap between theoretical circularity frameworks and empirically measurable procurement variables identified in the literature (de Koning et al., 2024; Van Loon et al., 2021). Its four-dimensional structure and Kraljic-informed weighting procedure make it both theoretically grounded and sector-specific. At the theoretical level, the IRC advances circular supply chain management by linking circular strategies — narrowing, closing, slowing, and intensifying — to measurable supplier-level dimensions and by showing how their relative importance can vary with the strategic risk profile of the material.

The third contribution is interpreting the resulting sourcing configurations through a Circular Business Model lens. Unlike CBM taxonomies constructed through qualitative typologization or single-firm case analysis, this paper interprets the three simulated configurations — BAU, NEAR, and RESH — as circular transition pathways derived from the model's economic and circular performance patterns. They are therefore analytically linked to the simulated sourcing configurations rather than presented as independent archetypes. This extends the systemic multi-level CBM framework of Rovanto and Bask (2021) into the domain of quantitative supply chain strategy for hard-to-abate manufacturing, while providing an interpretive roadmap from linear global sourcing toward more circular, resilient, and territorially embedded supply chain configurations. More digitally intensive CBM configurations, including AI-driven circular logistics, platform-based coordination, and industrial symbiosis networks, are positioned as future extensions of CERES rather than as outputs of the present proof-of-concept simulation

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Scalability Without Trade Offs: International Scaling in Hybrid Firms

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Abstract. *Scaling is often treated as a single phenomenon in international business literature, yet research approaches it through two distinct lenses guided by organizational purpose. In social entrepreneurship (SE), scaling is primarily associated with expansion of social impact. In for-profit research, by contrast, scaling denotes rapid economic growth achieved with less than proportional increases in resources, emphasizing growth achieved by doing more with fewer resources. Although both perspectives address closely related dynamics of growth and expansion, they have developed in isolation. Hybrid firms, characterized by dual economic and social missions, increasingly challenge this separation by growing revenues and social outcomes in parallel across countries, raising questions about how such scaling is achieved. These questions are critical because international scaling that delivers economic profitability and preserves social objectives has been shown to be difficult, let alone at the same time.*

This study adopts a resource-based perspective to conceptualize scalability as an organizational capacity that enables international expansion without proportional increases in resource inputs. It examines how hybrid firms build scalability across heterogeneous markets through resource orchestration and explains why some configurations allow international scaling to reinforce, rather than erode, the firm's resource base, thereby integrating insights from scaling and international business research.

Keywords: *scalability; purpose; international scaling; qualitative case study; abductive research;*

Framing of the research. The concept of scaling has attracted increasing attention from both academia and practice. Existing literature suggests that despite being fewer in number, scaleups outperform their counterparts (Acs and Mueller, 2008; Halabisky et al., 2006), generating a greater societal impact in terms of employment, value creation, and diffusion of innovation (Belitski et al., 2023). As its relevance has increased, academic research on scaling has developed along distinct streams that reflect differences in organizational purpose (Tippmann et al., 2023). In social entrepreneurship, scaling is primarily associated with expansion of social impact (e.g., Bloom & Chatterji, 2009; Rangan & Gregg, 2019), captured through reach, diffusion of mission, or numbers of beneficiaries, whereas research on for profit firms defines scaling as a process of growth with less than proportional increases in resources (Palmié et al., 2023), typically focusing on economic outcomes. Entrepreneurship research distinguishes scaling from generic growth: while growth means any increase in size, scaling refers to growth achieved with less than proportional (Palmiè et al., 2023) or even without (Coviello et al., 2024) increases in resources - essentially, "doing more with less". While the two perspectives address related dynamics, they have largely evolved in parallel, leaving open questions about how firms pursue scaling when economic and social objectives coexist. This gap is increasingly important as boundaries between social and profit purposes become blurred in practice (Battilana & Lee, 2014), as many hybrid firms were born. Hybrid firms are those firms that pursue a profit-impact objective and that need to scale their business across markets, thus internationalizing, to achieve the spreading social impact. Thus, Hybrid firms (HFs) challenge the siloed perspectives described above by embedding financial performance and social or environmental impact within a single organizational purpose (Doherty et al., 2014). In their attempt to maximize both impact and reach, many hybrid firms pursue international scaling by replicating their solutions across multiple markets (André & Pache, 2016; Tippmann et al., 2023). Consequently, the internationalization process becomes central to achieve scaling. At the same time, these firms often depend on locally embedded, context specific activities and intensive human engagement. Such features heighten organizational complexity, exacerbate tensions between profit and purpose (Lall & Park, 2022; Ebrahim et al., 2014), and hinder replication across heterogeneous institutional and market contexts, making international scaling especially challenging. Prior research has mainly attributed these difficulties to the risk of mission drift inherent in dual-purpose organizations (Ebrahim et al., 2014). Actually, we argue that the challenge may lie in the lack of the underlying capacity of this process, thus scalability. This emphasis leaves open a more fundamental challenge: how hybrid firms can create scalability in ways that allow them to grow without drifting from their mission. Whereas existing work often treats scalability as an exogenous attribute of scale free or digital resources (Giustiziero et al., 2023), this study conceptualizes scalability as an emergent capacity that arises from resource orchestration and allows to achieve growth with less than proportional inputs.

Resource based theories emphasize value creation and appropriation through valuable, rare, inimitable, and non substitutable resources (Barney, 1991); however, they were not developed to explain non proportional growth. Similarly, Penrosean theory explains firm growth through the redeployment and versatility of resources (Penrose, 1959) but does not explicitly address conditions under which firms expand across markets without proportional increases in resource inputs. As a result, existing resource based perspectives leave open questions about how scalability itself is constructed.

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Furthermore, considering scalability at the international level implies complementarity with, but also a conceptual distinction from, existing theories of internationalization and resource-based perspectives. Traditional International Business research conceptualizes international expansion primarily as a process of growth unfolding through sequential commitments and localized resource accumulation (Johanson & Vahlne, 1977). Within this literature, internationalization is typically explained through two dominant logics. The gradual or Uppsala model describes international expansion as a step-by-step process in which firms enter psychically close markets, rely on simpler entry modes, and increase their international involvement as experiential knowledge accumulates (Johanson & Vahlne, 1977; 1990). In contrast, the international new venture or born global perspective (Oviatt & McDougall, 1994; Hennart et al., 2021) explains early and rapid internationalization by emphasizing firms that enter distant markets from inception despite limited resources, relying on entrepreneurial orientation, founders' prior international experience, and network-based resources, niche business models, rather than on incremental resource accumulation. While the born global perspective explains how firms internationalize early with scarce resources, it remains largely silent on how firms sustain growth across markets without proportional increases in organizational inputs over time.

Despite these differences, both perspectives primarily focus on explaining the initiation and speed of international expansion. In doing so, they tend to treat international growth as a process that entails increasing resource commitments over time, whether incrementally or rapidly from the outset. What distinguishes them is therefore how fast and how early firms commit resources internationally, rather than whether international expansion can occur without proportional increases in organizational inputs.

Yet we follow Palmié et al. (2023) and suggest that (international) scaling emphasizes how firms organize and deploy core resources so that they can be replicated across markets with limited additional inputs. This is particularly evident in digital and platform-based contexts, where standardized architectures and centralized resource bases enable replication across countries at low marginal cost (Coviello et al., 2024; Monaghan et al., 2020). Beyond the traditional IB view of standardization and adaptation, the integration of the SE view will sensitize and inform about the context-dependence of resources, those being held and those needed for international scaling. Overall, international scaling challenges growth-centric assumptions in IB by suggesting that geographic expansion may not necessarily require (over)proportional increases in resources. International scaling focuses on the non-proportionality of the input-output relationship: how some companies manage to grow their output and international impact without increasing their organizational inputs in the same way. Scalability can be the missing conceptual link for understanding this distinction.

As the following summary shows (Table 1), extant research offers limited insight into how scalability is created and sustained when firms with economic and social objectives scale internationally, and each stream leaves questions open. Furthermore, whether and how digital resources in hybrid firms come into play needs to be explored. As a result, we lack understanding of how scalability operates in organizations that balance profitability and impact, especially when scaling involves cross-border adaptation due to institutional heterogeneity, and the need of mission preservation. Moreover, while digitalization is widely recognized as a driver of scalability in for-profit settings, its role in building scalability in organizations with hybrid purposes remains underexplored (Assenova, 2020; He et al., 2022). Addressing this gap requires integrating insights from the literatures on scaling, international expansion, and organizational hybridity, which have largely developed in isolation.

Table 1. Core assumptions and puzzles in scaling literature

Core assumption	Implication for scalability across markets	Unresolved puzzles motivating this study
International expansion requires proportional accumulation of country-specific resources (Johanson & Vahlne, 1977; Penrose, 1959)	Geographic scope increases coordination costs and limits efficiency at scale	How can firms expand across multiple markets without proportional increases in localized resources
Scalability depends on the possession of scale-free resources with declining marginal costs (Giustiziero et al., 2023; Somaya et al., 2024)	Firms with scale-free resources should scale more easily across contexts	How is scalability created when core activities appear context-dependent or resource intensive
Digitalization enables replication and reduces marginal costs of expansion (Adner et al., 2016)	Digital platforms support international scaling	How does digitalization enable scalability when firms must preserve mission and legitimacy across heterogeneous contexts
Dual missions increase organizational complexity and constrain scalability (Battilana & Lee, 2014; Bacq & Eddleston, 2018)	Tensions between profit and impact limit growth	Under what conditions can hybridity support rather than constrain scalability
Scaling is primarily assessed through impact expansion (Ebrahim et al., 2014)	Impact growth does not imply organizational scalability	How do firms build organizational models that support both economic and social scaling

Source: authors' elaboration

Purpose of the paper. Building on this framing, this study conceptualizes scalability as an emergent organizational capacity that allows firms to increase the value they create at a higher rate than the growth of resources committed to the focal business (Giustiziero et al., 2023; Somaya et al., 2024). While recent work on scalability has emphasized scale free intrinsic characteristic of resources as key enablers of non-proportional growth, often treating scalability as an exogenous attribute of specific resource types (Giustiziero et al., 2023; Somaya et al., 2024). This approach is less applicable to hybrid firms operating across heterogeneous institutional environments and relying extensively on non-scale free resources such as locally embedded activities and human intensive processes (Battilana & Lee, 2014; Bacq & Eddleston, 2018). Responding to calls to endogenize scalability (Giustiziero et al., 2023), this study adopts a resource based perspective and draws abductively on Resource Orchestration Theory. Resource Orchestration Theory shifts attention from resource possession to managerial action, focusing on how resources are structured, bundled, and leveraged over time (Sirmon et al., 2007; 2011).

Applying this perspective to International Business, the study wants to complement the growth centric views that assume international expansion requires proportional accumulation of country specific resources (Johanson & Vahlne, 1977; Bartlett & Ghoshal, 1989; Verbeke, 2013) with a different perspective. While prior research has acknowledged that digital and platform based firms may internationalize rapidly and at low marginal cost (Monaghan et al., 2020; Coviello et al., 2024), the organizational mechanisms enabling non proportional international expansion remain underspecified. Responding to calls to endogenize scalability (Giustiziero et al., 2023), the study aims to understand how scalability can be constructed and sustained when operating across multiple markets while pursuing dual economic and social missions. Responding to calls to endogenize scalability (Giustiziero et al., 2023), rather than treating scalability as an intrinsic property of particular resources, it examines how firms create and sustain scalability as they expand internationally while pursuing both economic and social objectives.

Methodology. The research is exploratory, aiming at understanding complex phenomena from a holistic perspective. A multiple case study design is therefore suitable (Ghauri & Gronhaug, 2010), as it allows contextualized analysis and supports theory building (Ghauri et al., 2020). Case selection followed purposive, theory-driven sampling (Piekkari et al., 2010; Dubois & Gadde, 2017). We targeted firms with a declared hybrid identity (e.g., mission, communication, B-Corp certification) and evidence of scalability, defined as the capability to grow with less than proportional resource increases (Coviello et al., 2024). Following prior studies, we identify four criteria that indicate the presence of such a capability: 1) demonstrate disproportionate growth relative to costs, for example through declining marginal costs as output expands, a feature particularly salient in digital resource bundles (Giustiziero et al., 2023) 2) replicability of the business model, routines, platforms, or processes across markets or customer segments (Mula et al., 2024) 3) scalable digital infrastructures, enabling expansion without equivalent resource increases (Grimstad et al. 2025) 4) output metrics that capture when investments in scaling begin to translate into profitability or at least positive operating margins. This ensures that growth trajectories rely not only on continuous rounds of investment but on a disproportionate increase in output relative to inputs (Coviello et al., 2024). Case firms had to meet a minimum of three out of the four criteria to be considered eligible. This approach balances inclusivity with rigor, avoiding over-restrictive sampling while maintaining theoretical alignment.

We relied on both primary and secondary data from multiple sources. We collected primary data through semi structured interviews guided by an interview protocol. This protocol covered specific topics and facilitated probing for precise examples of emerging issues and themes during the interview. We recorded all interviews and transcribed them verbatim using Microsoft Teams option. Interview protocol was mainly standardized across cases, with some changes based on key characteristics of the company. Primary data was used as a starting point to develop an in-depth understanding of the two cases, drawing on internal perspectives and managerial interpretations of the firms' strategies and missions.

At the same time, companies are well-known and extensively covered in public sources, which provide rich information that is rarely systematically analyzed in qualitative research. We therefore relied on a broad set of secondary data to complement the primary interviews. News coverage from LexisNexis was used to trace key organizational events and changes over time, as well as how the firms were portrayed externally. Given the high public visibility of the companies, initial searches resulted in more than 10,000 articles. To ensure relevance and focus, we applied targeted search strings aligned with our research questions, substantially reducing the number of articles included in the analysis. These data were complemented with company documents, including public materials such as annual reports, websites, and press releases, as well as private documents shared with us after the interviews. These sources provided detailed information on strategic priorities, organizational changes, and business model development. We also used digital media, particularly YouTube interviews, which were valuable for capturing entrepreneurs' reflections on firm evolution and decision-making. We purposefully selected videos that provided relevant information into strategy and organizational development, excluding promotional or purely marketing-oriented content.

Results. This study examines how hybrid firms create scalability across international markets and how scalability shapes the relationship between economic and social outcomes during international expansion. By shifting attention from scaling outcomes to the organizational capacity that enables non-proportional expansion, the analysis identifies three mechanisms through which scalability is constructed in practice: (1) structuring a reusable core with modular international replication,

(2) making resources scalable through organizational design, experimentation, and prioritization, and (3) embedding mission-aligned decision rules into digital systems.

Mechanism 1: Structuring a scalable core with modular international replication. Scalability in international markets emerged from the deliberate construction of a replicable organizational core combined with modular and peripheral local adaptation. Rather than relying on progressive accumulation of country specific resources, firms organized international expansion around selective replication, rendering core resources reusable across contexts. Local resources were positioned as complementary inputs that enabled activation, legitimacy, and market access, without becoming primary cost drivers. This design prevented local activities from turning into binding constraints on growth and allowed firms to expand across markets without building heavy organizational infrastructures. The unit of replication varied across cases, including digital platforms, operational models, cities, sectors, or social ecosystems, depending on the nature of the business. Modularity enabled firms to confine adaptation to specific elements such as content, value propositions, services, or product design, while preserving a standardized core. Over time, replication was supported by codified routines and playbooks that disciplined international expansion, often developed through early failures and subsequent learning. Scalability thus relied on defining what was repeated, what remained flexible, and how replication routines were progressively formalized.

Mechanism 2: Making resources scalable through organizational design and experimentation. Firms relied on experimentation, prioritization, and disciplined pacing to ensure that scarce resources such as time, human effort, and engineering capacity were deployed only when initiatives demonstrated clear potential. High speed experimentation enabled rapid learning and reduced the risk of committing resources prematurely, while prioritization mechanisms helped eliminate initiatives with limited impact or scalability. Non scale free activities were not eliminated but reorganized so they did not become bottlenecks as scale increased. Manual, labor intensive processes were often embraced early on to learn the work, set standards, and establish quality thresholds, and were later translated into standardized routines, tools, or technologies that reduced marginal costs. Organizational design choices such as centralized high impact functions, generalist roles, and network based coordination further supported scalability by limiting overhead and allowing firms to grow output without proportional increases in inputs.

Mechanism 3: Embedding mission aligned decision rules into digital systems. Scalability was sustained by embedding mission aligned decision rules into digital systems that constrained opportunistic growth and limited mission drift as scale increased. Rather than relying on informal controls or local interpretation, firms codified priorities, trade offs, and ethical boundaries directly into everyday operations, ensuring consistency across markets. These system level constraints often required accepting slower short term growth or foregone revenues in order to preserve long term purpose. Revenue models were designed so that economic activity and social impact were tightly coupled, making growth in users, transactions, or partners automatically translate into mission consistent outcomes. Digital systems standardized how impact was generated, measured, and communicated, stabilizing the relationship between profit and purpose across contexts. As a result, profit and impact scaled through shared resource loops, where the same organizational and digital resources simultaneously supported financial sustainability and the expansion of social outcomes.

Together, these mechanisms explain how hybrid firms are able to expand across heterogeneous markets without proportional increases in resource commitments, thereby mitigating coordination costs and tensions between profit and purpose. Interpreting these mechanisms through Resource Orchestration Theory (Sirmon et al., 2007; 2011) allows the study to move beyond resource possession and to show how managerial action - through structuring, bundling, and leveraging - enables scalability to emerge as an organizational capacity (Giustiziero et al., 2023; Somaya et al., 2024).

Confronting these findings with International Business literature allows the study to refine the process of international expansion. The three mechanisms identified in this study show how firms reorganize international expansion around a reusable core and modular adaptation, allowing them to scale across markets without rebuilding localized infrastructures in each country. In this way, scalability reframes internationalization not as the accumulation of country-specific resources, but as the reuse and redeployment of organizational resources across contexts.

The study shows that through resource orchestration, hybrid firms actively transform initially rival or context-dependent resources into configurations that behave as non-rival over time. By codifying routines, standardizing governance mechanisms, and embedding mission-aligned rules into organizational systems, firms enable international expansion without proportional resource accumulation. In doing so, the study extends IB research by showing that scalability across markets is not achieved by eliminating rival resources, but by organizing international expansion around non-rival resource configurations that can be leveraged repeatedly across heterogeneous institutional contexts.

Research limitations. This study focuses on hybrid firms that exhibit evidence of scalability, defined as the ability to grow with less than proportional increases in resources. While this choice is theoretically motivated for examining how scalability is constructed in practice, the analysis may primarily capture scaling trajectories that have progressed beyond early or interrupted stages. As a result, dynamics associated with incomplete, stalled, or abandoned scaling efforts may not be fully observed. In addition, the reconstruction of scaling processes relies on retrospective accounts of organizational decisions and developments. Although triangulation with secondary sources supports the credibility of these

reconstructions, some micro level dynamics and alternative paths that were considered but not pursued may not be fully visible.

Managerial implications. This study shows that scaling across markets does not require prioritizing profit at the expense of broader societal goals. Instead, it demonstrates that profit and purpose can be deliberately integrated through how firms design and manage scalability. For managers, the key implication is that social objectives do not need to remain peripheral or symbolic, but can be embedded into the scalable core of the business.

The findings clarify how this integration can be achieved in practice by defining what is replicated across markets, by structuring local adaptation so that it supports rather than constrains growth, and by organizing resources in ways that allow expansion without proportional increases in inputs. In doing so, the study provides managers with concrete guidance on how to move beyond a profit only logic and implement scalable models that jointly generate economic performance and societal impact. At the same time, the study can provide knowledge on the elements that enable the creation of entrepreneurial ecosystems where firms can scale while generating a societal impact. Instruments at policy level are already in place, especially at the European Level, as the EU Commission emphasizes the relevance of scaling for the European ecosystem, noting that scaleups typically produce at least 10% more output than other SMEs with equal resources (Odenthal, European Commission). Yet, existing policy frameworks are with an economic focus rather than complementing it with a societal impact.

Originality of the paper. This paper conceptualizes scalability as an endogenous organizational capacity that can be deliberately constructed through the orchestration of resources, routines, and decision rules, rather than as an exogenous attribute of specific technologies or resource types. By focusing on how scalability is created, the analysis shifts attention from observed scaling outcomes to the underlying conditions that enable growth with less than proportional increases in inputs.

The study examines this capacity in the context of hybrid firms, where economic and social objectives coexist within the same organization. While prior research has emphasized the tensions associated with dual missions, this paper shows how scalability can be constructed without separating or subordinating social and economic goals, addressing an area that remains underexplored.

The paper further situates scalability within International Business research by using it to explain international expansion without proportional accumulation of resources. Rather than treating internationalization primarily as incremental growth, scalability is used to reinterpret how firms organize and replicate activities across markets.

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The role of Corporate Heritage in Market Selection and Market Entry strategies: A multiple case study of the Italian Food & Beverage Industry

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Abstract. *Corporate heritage is increasingly recognized as a strategic resource that can convey legitimacy, trust, and authenticity. As its interpretation is rooted in the past and local context, we propose it might have implications on firms' internationalization process adopting a new institutional theory perspective. Organizations operating cross borders deal with several different contexts, which affect their decision-making; in particular, the institutional environment produces isomorphic phenomena among firms to appear legitimate. From this perspective, the informal institutions that arise from preestablished cognitive frameworks might have a deep influence on the strategies of internationalized companies endowed with corporate heritage. Consequently, we conceptualize corporate heritage as a system of informal institutions to study the implications that it might have on foreign market selection and entry. Our analysis is based on a multiple case study in the context of the Italian Food & Beverage industry. We outline a preliminary finding that links corporate heritage and entry mode choices, furthering international business and corporate heritage literature.*
Keywords: *corporate heritage; international business; market selection; entry mode; internationalization; Food & Beverage industry*

Framing of the research. *Over the last two decades, the concept of corporate heritage has gained growing attention in the corporate management and communications research fields, as it offers an interesting perspective on how organisations create and manage value over time. Heritage is a deeply rooted historical construct that shapes organisational identity (Balmer, 2013; Balmer & Burghausen, 2019). The etymology of the word itself ("to pass on") suggests that corporate heritage should not be reduced to mere history; instead, it encompasses an aspect of legacy, i.e. transmitting something to future generations (Burghausen & Balmer, 2014b). This trait d'union between temporal dimensions is distinctive of corporate heritage, as it represents "all the traits and aspects of an organisation that link its past, present and future in a meaningful and relevant way" (Burghausen & Balmer, 2014b, pp. 394-395). In this sense, corporate heritage overcomes the conceptualisation of corporate history, that is "an interpreted account of the historical trajectory and development of an organisation, representing an attempt in the present to explain, celebrate, justify, or otherwise make sense of changes over time" (Burghausen & Balmer, 2014b, pp. 392-393).*

The corporate communications literature has detailed six criteria to recognise corporate heritage, i.e.: omnitemporality, institutional trait consistency, tri-generational hereditary, augmented role identities, multigenerational stakeholder utility, and management tenacity (Balmer, 2013; Balmer & Burghausen, 2019). The expression corporate heritage identity indicates a peculiar identity type composed by institutional traits that have maintained their relevance over time (Burghausen & Balmer, 2014a). Because of the "transtemporal" facet, organisations must find a balance between continuity and change; indeed, corporate identity and its heritage traits are continuously under stakeholder scrutiny, which may lead to new interpretations and transformations over time, posing challenges for big and small enterprises (Balmer, 2011, 2013). If managed with the proper stewardship, organisations can leverage their heritage to build authenticity and reputation (Balmer, 2013; Hakala et al., 2011; Wiedmann et al., 2013). Moreover, "bi-lateral trust" must exist between corporate heritage institutions and stakeholders to have a legitimate and trustworthy corporate heritage identity (Balmer, 2011).

Corporate heritage contributes to perceptions of legitimacy and reliability because it encompasses the values, symbols, stories and traditions of an organization that are historically embedded in the local context in which the entity was founded or operates (Spielmann et al., 2021). These elements form a system of meanings and practices that guide organizational behaviour and stakeholder expectations over time. Consequently, corporate heritage acquires meaning within a specific context; if removed from that context, its interpretation might shift, as the context both forms and shapes the interpretations of heritage traits. This issue is particularly relevant for internationalised firms endowed with corporate heritage, as they operate across diverse socio-cultural and institutional environments.

However, only few previous works have investigated the relation between firm internationalization and corporate heritage. Kano and Verbeke (2018) conceptualized that heritage assets (family values, reputation, legacy routines) shape strategic choices, including internationalization pace and partner selection, in family firms. Similarly, Arikan et al. (2022) provided a microfoundational explanation of how legacy organizational elements shape internationalization cognition and processes. Yet, these contributions do not explicitly address how corporate heritage may affect corporate level decision-making related to the internationalization process phases, such as foreign market selection or entry mode.

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International Market Selection (IMS) and Foreign Market Entry (FME) represent strategic decisions that are central to the success of a firm's international competitive strategy (Francioni & Martín Martín, 2024). IMS is commonly described as the process through which firms evaluate and select foreign markets – namely specific countries or cross-national segments – in which they intend to expand (Papadopoulos & Martín Martín, 2011). This process requires a complex reasoning under conditions of bounded rationality and may be influenced by organizational characteristics such as firm size and international experience (Benito, 2015; Papadopoulos & Martín Martín, 2011; Simon, 1959). In parallel, FME decisions concern the modality through which firms enter foreign markets, ranging from non-equity modes – such as exports and contract agreements (the latter including licensing and franchising) – to equity modes, namely Joint Ventures (JVs), strategic alliances, and Foreign Direct Investment (FDI), whether through greenfield or acquisitions (Pan & Tse, 2000).

IMS and FME choice are closely interrelated and often occur concurrently (Papadopoulos & Martín Martín, 2011). To explain these strategic choices, the international business (IB) literature has developed several theoretical perspectives. The OLI paradigm conceptualizes international expansion as the outcome of ownership, location and internalization advantages, largely grounded in resource, efficiency and cost considerations (Dunning, 1988; Makino & Neupert, 2000). Transaction Cost Theory suggests that firms select entry modes that minimise transaction costs, ranging from market-based arrangements to hierarchical control structures (Rindfleisch, 2019). The Uppsala model instead emphasises a gradual internationalisation process, whereby firms expand progressively into more psychically distant markets as they accumulate knowledge and commit resources over time (Johanson & Vahlne, 1977, 1990).

More recent IB research has increasingly recognized the importance of context, giving rise to theoretical approaches that emphasise the role of institutions in shaping firm's choices. Institutional theory explores the influence of formal and informal constraints within the institutional environment on organizational behaviour (Peng et al., 2008). Institutions can be understood as the shared "rules of the game in a society" that structure interactions among actors (North, 1990, p. 3). An important distinction between formal and informal institutions must be made to clarify their potential effects: formal institutions consist of codified rules such as laws and regulations, while informal institutions refer to unwritten norms, values, customs, and shared understanding that guide behaviour within a society (North, 1990, 2010).

The dynamic combination of these creates the institutional environment, which becomes an area of interaction that can be interpreted and negotiated (Dau et al., 2022).

Organisations are one of the many actors that are bounded to these social rules, which shape organisational behaviour and determine the scope of business opportunities; in turn, the institutional environment can be modified by firms' actions (North, 1990).

Within this perspective, the new institutional theory (Powell & DiMaggio, 2012; Scott, 2001) offers a useful lens for examining the relationship between corporate heritage with IMS and FME. Institutions provide regulative, normative and cognitive frameworks that both constrain and enable organizational action. On the other hand, organizations tend to conform to institutionalized expectations to appear legitimate, producing isomorphic patterns of behaviour within organizational fields (DiMaggio & Powell, 1983; Scott, 2001). In this sense, decision-making may follow a logic of appropriateness, whereby actors enact socially defined roles and rules rather than purely efficiency-driven choices (March & Olsen, 1989). Over time, such processes contribute to the diffusion and reproduction of institutional practices through coercive, normative and mimetic mechanisms, generating path-dependent organizational trajectories isomorphism (Mizruchi & Fein, 1999; Powell & DiMaggio, 2012). Informal institutions play a particularly relevant role in contexts characterized by uncertainty, where actors rely on shared norms and taken-for granted cognitive structures to guide their decisions (Kostova et al., 2019; Scott, 2001).

In this framework, corporate heritage may be conceptualized as a set of historically embedded informal institutions rooted in corporate identity. Through enduring values, traditions, narratives and organisational practices, corporate heritage contributes to shaping the normative and cognitive frameworks within which firms interpret strategic choices. Owning to its "transtemporal" character, corporate heritage may therefore generate forms of organisational path dependence that influence how firms approach international expansion. At the same time, when firms operate across borders, they are exposed to multiple institutional environments, both in their home and host countries, which may impose different or even conflicting legitimacy expectations (Kostova & Zaheer, 1999). In such circumstances, corporate heritage may be considered as a form of path-dependency that might influence foreign market selection and entry, producing implications in terms of isomorphic behaviours in the internationalisation process.

Purpose of the paper. *This paper aims to answer the following research question: how does corporate heritage influence firm's market selection and choice of entry mode?*

Corporate heritage has been defined as a multidimensional construct encompassing organizational traits that have remained meaningful over time and that maintain a deep connection with the context in which they emerged (Balmer, 2013; Spielmann et al., 2021). Because of this transtemporal nature, corporate heritage links past organisational practices and values with present and future strategic organizations. As such, it may shape decision-making processes, organisational behaviour and stakeholder relationships, as heritage traits can be continuously interpreted and valorised over time (Balmer, 2017; Napolitano et al., 2018; Pecot et al., 2018).

While existing studies recognize corporate heritage as a valuable resource for differentiation and competitive advantage, especially in branding and consumer perception (Balmer & Greyser, 2006; Hakala et al., 2011; Pecot et al.,

2019), its potential role in shaping strategic decisions related to internationalisation has received comparatively limited attention.

Methodology. *This research adopts a qualitative inductive research design, based on a multiple case study methodology (Stake, 1995). We chose this approach as it is well suited for new research areas for which existing theory is lacking. The multiplicity feature guarantees more robust evidence through the triangulation of different data collection methods, which is valuable for theory-building. Furthermore, case studies are an effective method to address 'how' and 'why' questions, thereby aligning with the purpose of this research (Eisenhardt, 1989; Rowley, 2002).*
The study's empirical analysis focuses on the Italian Food & Beverage industry, a choice justified by the following rationale. First, Italy is a country with a long-standing tradition in several manufacturing sectors – such as fashion, furniture, food processing and automative – due to deep linkages with its cultural scenario. The Italian Food & Beverage industry in particular is characterised by a prevalence of enduring companies that leverage tradition, craftmanship and authenticity to conquer both local and foreign consumers (Garofano et al., 2020). Moreover, given the context-specific nature of corporate heritage, adopting an industry-focused perspective may enable to identify specific mechanisms typical of the industry.

Hence, we focus on the Food & Beverage industry, which represents a central pillar for the national economy: the turnover of the industry, amounting to €156 billion according to ISTAT data for 2021, represents 14.5% of the total value of the manufacturing sector. In addition, Italian companies have an international orientation, as shown by the predominant role of F&B products within Italy's agri-food trade, accounting for approximately 86% of exports and nearly two-thirds of imports in 2022 (Castellotti et al., 2024). Therefore, considering the above-described context, the Italian Food & Beverage industry is a particularly fertile ground for studying the strategic implications of corporate heritage on internationalisation strategies of Italian companies, in relation to market selection and entry mode choices.

For what concerns case selection, we identified three purposeful-sampling criteria (Patton, 2014): i) the company operates with its core business in the Food & Beverage industry; ii) the company's corporate heritage fulfils the "tri-generational/50-year corporate heritage requisite" (Balmer, 2011, 2013); iii) the company conducts operations outside Italy via equity or non-equity entry modes. Based on these criteria, we drew up a prospective list of 21 companies from the database of "Centromarca" (Associazione Italiana dell'Industria di Marca) – which gathers almost 200 associated companies operating in sectors producing durable and non-durable consumer goods – and from the associates of "Associazione Marchi Storici d'Italia". From this list, seven companies agreed to be interviewed and participated in the research project: Riso Scotti, Illycaffè, Acetaia Giusti, Mutti, Antica Pasta Italiana, Lavazza e Lucano 1894. One of the selected companies – renamed Antica Pasta Italiana – preferred to stay anonymous.

The empirical analysis relies both on primary and secondary data. We collected primary data through semi-structured interviews, which consisted of ten questions built with a 'how' and 'why' form, related to corporate heritage, market selection, and market entry modes. We interviewed one managerial figure per company, occupying leadership positions in the sales, marketing, communication and/or export department. We chose not to focus only on international business leaders as corporate heritage is a significant cross-cutting dimension, especially embedded in marketing processes and communication; for instance, in one case the international business head of the firm purposefully redirected us to another colleague working in the communication division. Nevertheless, we still selected managers involved in the internationalization process of the company. Table 1 presents key details of the case firms and the informants that took part in the data collection. The eight interviews were conducted online via videoconferencing platforms (such as Microsoft Teams and Google Meet), via telephone call or in presence. They were audio-recorded with the participants' consent and transcribed within five days from the interview. After double-checking by the authors, we sent to each participant the interview transcript for approval, with the freedom of making any further integration or correction, where necessary. All interviews were conducted in Italian from January 2026 to March 2026, with an average duration of 37 minutes each. Subsequently, the primary data will be triangulated using secondary data retrieved from proprietary websites, companies' monographies, and newspaper articles, to enhance the reliability of the data by adopting multiple perspectives (Stake, 2006).

Data analysis was subsequently conducted following the Gioia methodology (Gioia et al., 2013), which is particularly suitable for qualitative studies in IB, and it enables the development of a proper data structure and a clear presentation of the findings (Magnani & Gioia, 2022). The data analysis of the qualitative interviews was based on a rigorous iterative process that required the researchers to compare data and theoretical foundations for each case. As a first step, we familiarised with the interview transcripts to develop a proper understanding of the company and its features. The most relevant informants' quotations were analysed to identify first-order codes, which were clustered to form coherent categories (Gioia et al., 2013). Currently, this phase has been only partially completed, as the data collection is ongoing and not all the transcripts have been approved. We will proceed in the following steps of the Gioia methodology to develop the final findings: we will merge similar categories according to their thematic relationship and develop second-order concepts; then, key aggregated dimensions will be identified to abstract from the empirical level to the theoretical level and create conceptual categories (Gioia et al., 2013). The final stage of analysis will consist in applying a gradual abduction to systematically combine qualitative data with extant theory with the purpose of building new theorical insights.

Table 1. Key information of selected cases

Company	***Foundation date***	***Turnover (2024, mil/€)***	***% of foreign sales***	***Informant Role***	***Interview duration (minutes)***
Riso Scotti S.p.A.	*1860*	*276*	*40%*	*International Sales Director*	*31*
Illycaffè S.p.A.	*1933*	*630*	*69.4%*	*Global Brand Manager*	*45*
Acetaia Giusti S.r.L.	*1605*	*20*	*60%*	*Marketing & Communication Manager*	*20*
Mutti S.p.A.	*1899*	*703*	*59.4%*	*Global Corporate Communication & PR Manager*	*51*
Antica Pasta Italiana	*XIXth century*	*4,900*	*63.9%*	*Export Manager*	*52*
Luigi Lavazza S.p.A.	*1895*	*3,35*	*73%*	*Global Marketing Director*	*21*
Lucano 1894 S.r.L.	*1894*	*20*	*12%*	*Marketing Manager* *Global Trade Marketing Manager*	*36* *39*

Source: Authors' elaboration from informants (turnover, % of foreign sales, informant role) and companies' management reports (foundation date, turnover, % of foreign sales)

Results. *Considering that the data collection and analysis phases are currently underway, the findings presented at this stage should be regarded as preliminary. Nevertheless, an initial assessment has produced the following relevant insights.*

With regard to FME choices, the analysed cases appear to favour entry modes that allow firms to preserve and transmit corporate heritage in the transition from the home to the host country, as well as its subsequent translation in marketing and communication practices. Corporate heritage is perceived by firms as a source of competitive advantage and, consequently, as a strategic resource that should remain protected and consistent across markets, similarly to other critical assets under the firm's control, such as intellectual capital. In this sense, corporate heritage appears to span multiple layers of intellectual capital: it is embedded in organisational processes and routines and contributes to the creation of trust and legitimacy in stakeholder relationships, thus resembling a form of relational capital.

Moving beyond the theorization of corporate heritage as an identity dimension composed of values, symbols, stories and traditions, the preliminary evidence suggests that its context-dependent nature and its interpretation as a set of informal institutions embedded within the firm may influence entry mode decisions. On the one hand, it may guide managerial decision-making by shaping how firms evaluate the risk-control trade-off of entry modes. On the other hand, it may limit the adoption of less resource-committing entry modes (e.g. exports), which offer lower control and, therefore, may be considered as less suitable for safeguarding and coherently transmitting corporate heritage in foreign markets.

For instance, Acetaia Giusti opted for high involvement entry modes (e.g. subsidiaries) to enter key markets such as Korea and the US in order to maintain stronger control ad alignment on corporate heritage. In particular, the company progressively transitioned from local management structures to the presence of Italian personnel in these markets. Rather than relying primarily on on-site training of local staff, Acetaia Giusti preferred to employ personnel who already possessed a deep understand of its corporate heritage.

A similar pattern can be observed in the case of Illycaffè, leading coffee maker founded in Trieste. The firm established international branches of its Coffee University – an international centre of knowledge supporting every aspect of the supply chain through training, research and the promotion of the culture of quality coffee – in several key markets, where subsidiary or owned trading and distribution company were already present, resulting in a degree of alignment between the location of these educational initiatives and the firm's organizational presence.

Research limitations. *Given the exploratory nature of the study, it presents some limitations. First, the research concerns a specific industry (i.e. the Food & Beverage industry) that has its own distinctive features, which could influence and limit the study's findings and their generalizability. Second, the Italian context is the setting of our study and therefore the analysis is limited to the Italian competitive environment. Third, despite being a multiple case study analysis – which, compared to a single case design, ensures more robust research outcomes (Rowley, 2002; Stake, 1995) – with a proper number of cases (Yin, 2017), the sampling is more oriented towards larger companies for a reason of availability of interviewees, providing an unequal representation of the empirical context.*

Based on these limitations, we suggest that future research could replicate the study in another sector – for example the Fashion industry, also known for a strategic valorisation of corporate heritage (Cooper et al., 2015; Jackson, 2019) – and explore beyond the Italian cultural setting to discover if the findings are related to the national context and if the strategic role of corporate heritage in international strategies is perceived differently in other countries, leading to new implications. In addition, it could be interesting to extend the debate with a deeper focus on SMEs and test if their peculiarities have some kind of reflection on the operationalisation of corporate heritage.

Managerial implications. *The preliminary research finding strengthens the view of heritage as a valuable resource for competitive advantage in the international context, where firms can leverage the heritage traits of their identity. In*

addition, the study provides insights to practitioners into the current strategic implementation of corporate heritage in the internationalization process. It also gives advice on how corporate heritage should be enacted, interpreted and operationalised, as well as its potentialities or limits when expanding internationally.

Originality of the paper. *Our investigation provides original contributions at the intersection between corporate heritage and internationalization strategies, two research streams that rarely interact. To the best of our knowledge, this is the first study to investigate the strategic implications of corporate heritage in market selection and entry mode choices, as the integration of these topics is still unexplored. It extends the current international business literature and corporate heritage literature respectively by adding a new relevant internationalization determinant (i.e. corporate heritage) to the institutional theoretical framework (Dau et al., 2022) and goes beyond the predominant focus on marketing and communication that has characterized corporate heritage studies till now (Balmer, 2011, 2013; Balmer & Burghausen, 2019). Another innovative trait of the research consists in moving the focus from the brand to the corporate level, which allows to explore corporate phenomena, such as internationalization. Finally, the study opens the debate and future line of enquiry on corporate heritage and its strategic integration in decision-making.*

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Universities as Orchestrators of International Entrepreneurial Ecosystems

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Abstract. *Entrepreneurial ecosystems are usually tied to a specific place - a city, a region, a country. But can a university deliberately build one that crosses national borders? This paper argues that it can and shows how this happens in practice. We examine three programs run by a single European university - referred to here as Program A, Program B, and Program C - that together span the micro, meso, and macro levels of an emerging international entrepreneurial ecosystem. Using a nested case analysis approach and drawing on Stam's (2015) entrepreneurial ecosystem framework, we show that the three programs do not simply operate in parallel — they are deliberately coordinated by the university, which acts as a central orchestrating node connecting all three levels simultaneously. Together they produce four types of capital: human capital, social capital, institutional capital, and market capital, which jointly support productive international entrepreneurship. Our main argument is that international entrepreneurial ecosystems do not have to emerge spontaneously from geographic clusters. They can be deliberately constructed through sustained multilevel governance and universities are particularly well positioned to do this, because they hold legitimacy across education, research, and policy at the same time, something that private actors and governments alone typically cannot achieve.*
Keywords: *international entrepreneurial ecosystems, nested ecosystems; university as orchestrator; transnational entrepreneurship*

Framing of the research. *Over the last decade, research on entrepreneurial ecosystems (EE) has grown considerably and produced sophisticated frameworks for understanding how actors, institutions, and resources interact to support productive entrepreneurship (Stam, 2015; Spigel, 2017; Audretsch et al., 2024). Despite this progress, most of the literature remains strongly focused on territory - that is, ecosystems are typically defined at the regional or national level, with relatively little attention to internationalization. Even less attention is paid to the question of who builds such international configurations, and how this process takes place (Theodoraki & Catanzaro, 2022; Ceci et al., 2026).*

A second gap concerns the role of universities. The "entrepreneurial university" tradition (Etzkowitz, 2003) documents well how higher education institutions contribute to national innovation systems - through spin-offs, knowledge transfer, and industry partnerships. More recently, some scholars have also begun to examine how universities enable international entrepreneurial learning (Laine et al., 2025). However, most studies still treat universities as participants within ecosystems rather than as architects of them. The governance mechanisms through which universities can intentionally coordinate cross-border actors, align incentives, and build multilevel support structures remain almost completely underexplored.

This paper tries to address both gaps at the same time. We examine three European programs where UnIT acts as lead partner. To ensure blind review, the three programs examined in this study are referred to throughout as PROGRAM A, PROGRAM B, and PROGRAM C, corresponding to the analytical level at which each primarily operates within the nested ecosystem framework. PROGRAM A is a blended intensive learning programme, PROGRAM B is an international accelerator initiative and PROGRAM C is an European Campus of City-Universities, an alliance of nine universities). Using Stam's (2015) nested ecosystem framework, we trace how each program mobilizes actors, governance structures, and different forms of capital across micro, meso, and macro levels - and how, taken together, they produce an emerging international entrepreneurial ecosystem.

Our central claim is twofold. First, international entrepreneurial ecosystems can be deliberately constructed - they do not simply emerge from geographic proximity. Second, universities - particularly those operating within international alliances - are in a uniquely strong position to act as orchestrators in this construction process, because they hold legitimacy simultaneously in education, research, and institutional policy domains. This is something that private intermediaries generally do not have.

Purpose of the paper. *Most research on entrepreneurial ecosystems treats them as geographically bounded structures - defined by a city, a region, or a country. Yet entrepreneurial activity increasingly crosses borders, and the question of how ecosystems can be built and sustained across national boundaries remains largely unanswered. Theodoraki and Catanzaro (2022) are among the few scholars who address this gap directly, showing that entrepreneurial ecosystems can extend beyond geographic borders and that a glo-cal culture - combining adaptation to local contexts with global integration - is central to making this work. However, their study, like most in this tradition, focuses on describing and mapping international ecosystem configurations rather than explaining how they are deliberately constructed and by whom.*

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More recently, Audretsch et al. (2024) take this further. They show that entrepreneurial ecosystems do not have to be tied to a specific place. Instead, a new type of ecosystem is emerging - one that sits above local ecosystems and connects them, giving entrepreneurs access to resources and knowledge from multiple locations at the same time. This kind of ecosystem does not replace local ones. It works alongside them, helping entrepreneurs go beyond the limits of their immediate context. This connects directly to the nested logic of Stam (2015) and Stam and van de Ven (2021), where ecosystem layers sit inside each other and each layer depends on the ones around it. What Audretsch et al. (2024) add is a transnational dimension to this picture: the outermost layer of a nested ecosystem does not have to be a national or regional structure - it can be a cross-border structure that links multiple local ecosystems together into a larger whole.

Following Stam (2015) and Stam and van de Ven (2021), we work with three analytical levels. At the micro level, the unit of analysis is the individual - the entrepreneur, the student, the faculty member - and the dominant dynamics are agency, human capital, and entrepreneurial cognition. At the meso level, the focus shifts to networks, organizations, and coordination: incubators, accelerators, inter-university partnerships, and support offices all function as relational infrastructure. At the macro level, institutional systems - including EU funding architectures, regulatory frameworks, and formal alliances - provide the structural incentives and constraints within which the other levels operate. We further analyse three different programs coordinated by one university we call UnIT.

The Blended Intensive Learning Programme (PROGRAM A) is coordinated by UnIT and has already run multiple editions over the last decade. Each edition combines a one-week residential entrepreneurial program in Italy with participation from partner institutions in Germany, France, Poland, Finland, and Austria, together with online collaborative activities. The primary actors are international students and faculty from partner institutions, complemented by startup founders, startup centers, and domain experts from practice.

At the micro level, PROGRAM A produces the foundational human capital of the emerging international entrepreneurial ecosystem: cross-cultural entrepreneurial competence, international opportunity recognition skills, and experiential knowledge about foreign market conditions. Students function as opportunity recognizers and business "consultants" for the startups; faculty serve as knowledge brokers; and entrepreneurs act as role models and direct "mentors". Over eleven editions, a dense informal network of alumni, faculty collaborators, and practitioners has accumulated - and this constitutes the relational substrate on which the other programs can build.

PROGRAM A governance is primarily personal and trust-based at the operational level - grounded in long-term professional relationships among partner professors - while being formally anchored in Erasmus+ agreements at the institutional level. This combination of informality and formality is characteristic of productive meso-level coordination, and it provides the social capital that may later scale into more formalized configurations.

PROGRAM B operates as an international incubation and acceleration initiative involving UnIT, partner universities in Cologne and Granada, and affiliated incubators and technology parks - including related startup centres and entrepreneurial networks in the partner universities. Its principal actors are startup founders, incubator managers, faculty with entrepreneurial experience, and international students in joint accelerator programs.

At the meso level, PROGRAM B performs what Spigel (2017) calls the relational coordination function that is constitutive of ecosystem quality. It creates an international accelerator architecture - shared governance of joint acceleration programs, coordination between incubators across three countries, and structured interactions between startups and cross-national expert networks. The recurring international meetings that bring together academics, startup founders, and incubator representatives function as ecosystem convening events that generate and maintain inter-organizational ties.

PROGRAM C (European Campus of City-Universities) is a nine-university strategic alliance, funded under the European Universities Initiative, with partners across seven EU member states. It has a formal institutional governance structure - including a General Assembly and alliance-level coordination mechanisms - and carries the institutional legitimacy of an EU-recognized higher education brand.

At the macro level, PROGRAM C provides the institutional capital that gives the emerging international entrepreneurial ecosystem its structural stability and legitimacy. The PROGRAM C brand functions as a quality signal to EU funders, industry partners, and policy actors. The alliance governance architecture aligns institutional strategies across nine universities, embedding entrepreneurial internationalization within higher education institutional frameworks rather than leaving it as a peripheral project activity.

Moreover, PROGRAM C creates a shared institutional identity - something like what Theodoraki and Catanzaro (2022) call a "glo-cal culture" - that can sustain the international ecosystem beyond individual project cycles.

Beyond its governance architecture, PROGRAM C has developed a structured, multi-level system of components that actively support entrepreneurial activity across member universities and their cities. The central element of this system is the Entrepreneurial Academy, which combines online lectures with intensive Entrepreneurial Weeks organised in rotation at different partner cities. During these weeks, student teams from all member universities work together on innovation projects connected to the United Nations Sustainable Development Goals (Stam, 2015; Audretsch et al., 2024). From a theoretical point of view, this rotating format is significant: rather than concentrating entrepreneurial education in a single location, PROGRAM C distributes this function across multiple university cities, allowing each local context to develop its own entrepreneurial conditions while remaining part of a common international structure.

A second important component is the Innovation Sphere, developed within the RI4C2 Horizon 2020 project and coordinated by the University of Jena. This component creates a shared networking space that brings together researchers, entrepreneurs, innovation managers, city representatives, and civil society organisations from all seven

partner communities (Spigel, 2017). Within this space, the Lighthouses of Innovation serve as local collaboration points where knowledge produced at the alliance level is translated into concrete innovation activities in each partner city - reflecting the Quadruple Helix model proposed by Carayannis and Campbell (2009).

A third and more recent structural element is the EITEN network - the Entrepreneurship, Innovation and Transfer Expert Network - developed as part of WP9 of the current PROGRAM C project phase. EITEN focuses on building connections between the individuals who directly support research and innovation processes across the alliance: researchers, managers, and administrators from each partner university.

Methodology. *As discussed in the previous section, relatively little is known about how international entrepreneurial ecosystems are built and sustained through deliberate governance action. The phenomenon is relatively new, and empirical documentation of such configurations remains sparse in the literature. Standard deductive approaches are therefore not well suited as a starting point for this kind of inquiry.*

We therefore proceed with an exploratory objective, based on an abductive approach. The purpose of this research is not to develop new international entrepreneurship theory from empirical data alone. Rather, existing theory and literature are folded into the analysis to help extend our understanding of international entrepreneurship and its outcomes at various levels (Davidsson, 2008). This means we move iteratively between theoretical frameworks and empirical observations, using each to refine and challenge the other.

We draw on several complementary theoretical traditions - including entrepreneurial ecosystem theory, the triple helix model of university-industry-government relations, and relational perspectives on innovation networks - all of which see universities as critical players in building entrepreneurial structures across institutional and geographic boundaries. What remains less theorized, and what we seek to advance, is the specific orchestrating role that universities can play when they operate simultaneously across micro, meso, and macro levels of an international ecosystem.

We follow a nested case analysis approach (Thomas, 2011; McGaughey, 2007). In nested studies, the breakdown of analysis occurs within the principal UnIT of analysis. In our case, we study a portfolio of internationally relevant programs within UnIT. The nested study differs from a multiple case study in that it gets its coherence from the wider case: the comparison is not between separate, independent cases, but between nested elements that only have meaning in relation to the wider whole (Thomas, 2011). This design is appropriate when the research interest lies in understanding how constituent elements together produce a systemic outcome - in our case, how three programs together constitute an emerging international entrepreneurial ecosystem.

The three programs under analysis were selected because each operates at a distinct level of the ecosystem and together, they provide multilevel coverage of UnIT's international entrepreneurial portfolio. The first is a Blended Intensive Programme (PROGRAM A) with entrepreneurial internationalization at its core, operating primarily at the micro level of individual actor development. The second is PROGRAM B, an Erasmus Strategic Partnership Programme aimed at developing migrant, female, and international student audiences for new venture creation, operating primarily at the meso level of network coordination. The third is PROGRAM C, a European Universities alliance with the overarching aim of developing entrepreneurship and innovation at systemic scale, operating primarily at the macro level of institutional governance.

UnIT thus constitutes an instrumental case (Stake, 1994) - a case selected not primarily for its intrinsic interest, but because it offers new insight into a broader theoretical question: namely, how a university, through a portfolio of projects, can build an international entrepreneurial ecosystem that fosters entrepreneurship at micro, meso, and macro levels simultaneously. The instrumental case design is appropriate here because UnIT's portfolio is sufficiently documented, accessible to the research team, and theoretically interesting as an instance of deliberate ecosystem construction.

Our analysis is both real-time and retrospective: we examine the three programs and their intersections from their respective start dates up to the current state of development. This longitudinal perspective allows us to trace not only the static structure of each program but also the dynamic processes through which inter-program connections and ecosystem-level effects have emerged over time.

Sources of data include semi-structured interviews and informal conversations with various stakeholders - program coordinators, partner university representatives, startup founders, and student participants; documentary sources such as project applications, descriptions of work packages, monitoring reports, and institutional communication materials; and direct observation, given that all authors are actively involved in at least one of the three programs under analysis.

We identify and analyse patterns of interaction, coordination mechanisms, and ecosystem outcomes that emerge across the three programs taken together. We document key facts regarding each program - including consortium composition, objectives, brief descriptions, and timeframes. To further analyse how an international ecosystem is built, the analytical framework combines content pillars (institutions, culture, actors, resources, support, markets) with systemic dimensions (structural, relational, evolutionary/spatial), explicitly tracking cross-border links, multi-level governance, and "glo-cal" culture (Isenberg, 2011; Stam & van de Ven, 2021; Theodoraki & Catanzaro, 2022;).

Results. *Universities have structural characteristics that make them particularly effective as orchestrators. They hold legitimacy across education, research, and policy domains simultaneously; they are positioned at the intersection of public and private actors; and through European frameworks such as Erasmus+ and Horizon, they have access to stable governance and financial infrastructure that private intermediaries typically lack.*

Fischer et al. (2019) show that entrepreneurial activity in universities is deeply embedded within institutional environments and organizational practices, and that individual characteristics alone cannot explain the entrepreneurial behaviour of faculty members. Their findings also reveal that formal institutional structures — incubators, technology transfer offices, entrepreneurship events — often produce limited and inconsistent effects on academic entrepreneurship, highlighting the complexity of translating governance mechanisms into entrepreneurial outcomes. This points to an important distinction: having institutional structures in place is not the same as actively orchestrating the conditions under which entrepreneurship happens. Building on this, we argue that when universities govern international entrepreneurial programs, they act not only as educational providers but as active institutional orchestrators — deliberately shaping the rules, relationships, and resource flows that structure an international entrepreneurial ecosystem. This role extends beyond the traditional conceptualization of the entrepreneurial university, which has primarily focused on knowledge commercialization and technology transfer (Etzkowitz, 2003).

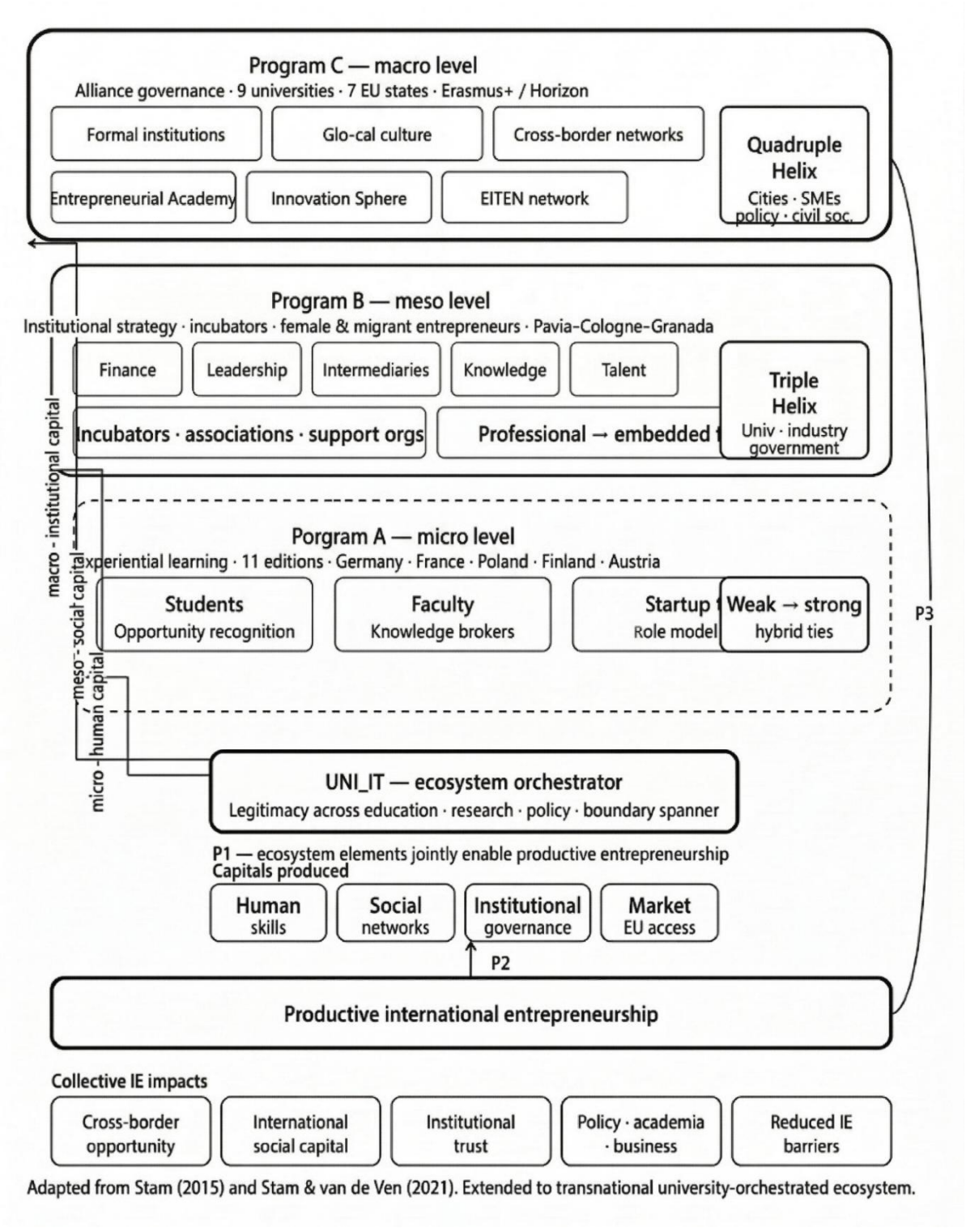
Laine et al. (2025) provide direct empirical support for how universities can actively connect entrepreneurial ecosystems across national borders, rather than simply contributing to a single local ecosystem. Studying an Erasmus+ Blended Intensive Programme, they show that a university can act as an institution that bridges separate entrepreneurial ecosystems that would otherwise have no channel to interact across geographical boundaries. Their findings show that a blended study-abroad program does more than improve student learning outcomes. It also connects local and international entrepreneurial ecosystems by facilitating exchanges and value co-creation among students, faculty, industry actors, and government stakeholders across countries, following a Triple Helix logic. This positions the university as a key player in interregional knowledge transfer and international entrepreneurship development. Their work provides empirical grounding for the claim that a PROGRAM A can function not only as an educational format but as an ecosystem-bridging mechanism - supporting the argument developed in this paper that universities can deliberately connect and construct international entrepreneurial ecosystems through structured program governance.

The nested structure of entrepreneurial ecosystems is not only a theoretical idea - but recent research also shows it takes different practical forms depending on context. Ceci et al. (2026) review 48 peer-reviewed studies and identify four types of nested configurations: startup ecosystems, entrepreneurial university ecosystems, entrepreneurial innovation ecosystems, and regional innovation ecosystems. Each type is shaped by two questions: whether the dominant logic of the system is entrepreneurial or focused on innovation, and whether the system is driven from the bottom up by actors or from the top down by governance structures. The type most relevant to this paper is the entrepreneurial university ecosystem. In this configuration, the university plays a top-down coordinating role, translating research and knowledge into entrepreneurial activity through structured governance mechanisms. This supports the central argument of this paper: UnIT does not simply participate in an ecosystem - it coordinates one, by deliberately activating three nested layers through PROGRAM A, PROGRAM B, and PROGRAM C. Ceci et al. (2026) also make a broader point that is important here: there is no single model that fits all ecosystems. Effective ecosystem governance must match its mechanisms to the specific configuration it is trying to build. This is exactly what the multilevel portfolio approach of UnIT attempts to do.

Figure 1 extends the nested ecosystem model of Stam (2015) and Stam and van de Ven (2021) to an international context. In the original model, an entrepreneurial ecosystem has two layers sitting inside each other. The deeper layer is made of framework conditions - formal institutions, culture, and networks. These are the slow foundations of the system. The layer above consists of systemic conditions - talent, knowledge, finance, leadership, intermediaries, demand, and infrastructure. These are more dynamic and closer to entrepreneurial activity. The two layers together produce productive entrepreneurship as output, and a feedback loop ensures that outcomes over time strengthen the conditions that produced them. The logic is simple: the deeper layer enables the middle layer, and the middle layer enables entrepreneurial activity. What the original model does not address is how this structure can be built deliberately across national borders, and who builds it. This is what the adapted framework tries to show.

In Figure 1, the three programs of UnIT each occupy a distinct layer of the nested structure. Importantly, the three programs do not connect to each other directly. Each one connects independently to UnIT, which sits at the centre as the orchestrating node. It is this central position that turns three separate programs into a coherent nested ecosystem. PROGRAM A sits at the innermost layer - the micro level. It works directly with individuals: students, faculty, and startup founders from partner institutions across five European countries. Through eleven editions of intensive experiential learning, PROGRAM A produces the human capital that the whole ecosystem depends on. Students develop cross-cultural entrepreneurial competence and cross-border opportunity recognition skills. Networks begin as weak professional ties and evolve into stronger hybrid ties combining social, academic, and business connections. In the terms of Stam and van de Ven (2021), PROGRAM A activates the talent and knowledge components of the systemic conditions layer. It is the generative base of the ecosystem - without it, the layers above would have no internationally capable people to work with. At this level, UnIT acts as a boundary spanner connecting universities, startups, and support actors across countries.

Figure 1 – UnIT – orchestrating an international ecosystem



PROGRAM B sits at the middle layer - the meso level. It works with organizations and the relationships between them: incubators, associations, support organizations, and university units across Pavia, Cologne, and Granada. PROGRAM B builds the social capital of the ecosystem through structured international partnerships that start as professional ties and become more embedded over time. It activates multiple systemic conditions - finance, leadership, intermediaries, knowledge, and talent - and applies a Triple Helix logic, connecting universities, industry, and government across national boundaries. PROGRAM B also has a specific inclusion dimension: it targets female, migrant, and international student entrepreneurs, creating pathways for early internationalization that the other programs do not cover. PROGRAM B does not receive inputs directly from PROGRAM A. Both programs connect to UnIT independently,

and it is UnIT that mediates the relationship between the human capital of the micro level and the organizational networks of the meso level.

PROGRAM C sits at the outermost layer - the macro level. It provides the institutional architecture that gives the whole system its stability and legitimacy over time. As a nine-university alliance across seven EU member states, with formal governance and access to Erasmus+ and Horizon funding, PROGRAM C embeds the activities of PROGRAM A and PROGRAM B within a durable frame that can survive beyond individual project cycles. Inside PROGRAM C, three components support this function: the Entrepreneurial Academy distributes entrepreneurial education across rotating partner cities; the Innovation Sphere creates shared spaces that bring together universities, cities, SMEs, policy actors, and civil society following the Quadruple Helix model of Carayannis and Campbell (2009); and the EITEN network builds the cohort of connected professionals who sustain the system at the human capital level. Together these components create what Theodoraki and Catanzaro (2022) call a glo-cal culture - local enough to fit each partner context, global enough to hold the alliance together. Like the framework conditions in Stam's original model, PROGRAM C is the deepest and slowest-moving layer - the one that makes everything else durable. PROGRAM C also connects to UnIT independently, not to PROGRAM A or PROGRAM B directly.

The three programs together produce four types of capital. PROGRAM A produces human capital - skills and international mindsets. PROGRAM B produces social capital - networks and inter-organizational ties. PROGRAM C produces institutional capital - governance structures and formal legitimacy. Together, the three programs also produce market capital - access to EU markets, cross-border incubation pathways, and soft-landing mechanisms that reduce uncertainty for internationally oriented ventures. Each type of capital feeds upward through the nested layers, all mediated by UnIT.

The collective impact is larger than what any single program achieves alone. Together, the three programs increase cross-border opportunity recognition, strengthen international social capital, build institutional trust across countries, integrate policy and business actors into a shared governance framework, and reduce the barriers to international startup creation. This is the P1 logic in the diagram: when UnIT activates all three layers simultaneously, the ecosystem elements jointly produce productive international entrepreneurship as output. The P3 feedback loop then ensures that this output flows back into the system - reinforcing the macro-level institutions, deepening the meso-level networks, and attracting new talent at the micro level. This feedback works not within one territory but across seven EU member states, held together not by geography but by the deliberate action of UnIT. This is the core extension of Stam's model: the nesting is institutional rather than geographic, the layers are deliberately constructed rather than pre-existing, and the feedback loop is governed rather than spontaneous.

Taken individually, PROGRAM A, PROGRAM B, and PROGRAM C each address a distinct ecosystem dimension. Taken together, they constitute a nested multilevel international entrepreneurial ecosystem in which UnIT acts as the central orchestrating node across all three levels simultaneously.

At the micro level, UnIT recruits and develops entrepreneurial human capital through PROGRAM A's intensive experiential programs. At the meso level, it coordinates an international network of incubators, startups, and knowledge brokers through the PROGRAM B accelerator architecture. At the macro level, it leverages the institutional authority and funding infrastructure of PROGRAM C to embed these activities within a durable strategic framework. Within PROGRAM C itself, the three-tier internal structure - the Entrepreneurial Academy, the Innovation Sphere, and EITEN - further operationalises this macro-level orchestration by distributing entrepreneurial functions across student, community, and professional support layers.

This analysis leads us to a theoretical proposition that extends existing EE theory: international entrepreneurial ecosystems do not require pre-existing geographic clusters or spontaneous emergent dynamics to form. They can be deliberately constructed through sustained multilevel governance by actors - especially universities - whose institutional mandates, resource access, and cross-sectoral legitimacy enable them to perform coordination functions across borders that neither markets nor governments alone can perform.

Research limitations. *This study has several limitations that future research should address. The analysis is based on a single university and its three programs, which limits generalizability. The direct involvement of the authors in the programs under analysis, while providing privileged access to data, also introduces the risk of insider bias. The study is retrospective rather than longitudinal, meaning it maps the structure of the ecosystem at a given point in time rather than tracking outcomes over time. Finally, the perspectives of non-university actors - startup founders, students, city representatives - are underrepresented in the current analysis and would enrich the framework considerably if examined more systematically in future work.*

Managerial implications. *For university managers and rectors, the paper suggests that international entrepreneurial impact does not require a single large initiative. A portfolio of smaller, complementary programs - each operating at a different level of the ecosystem - can produce systemic effects that exceed what any one program achieves alone. The key managerial insight is that the university must position itself as the connecting node between these programs, rather than managing them as separate administrative units. This requires deliberate cross-program coordination, shared governance thinking, and a long-term commitment that goes beyond individual project funding cycles.*

Originality of the paper. *The contribution we make is the application of the multilevel schema to programs that span national borders, where each level must be reproduced across multiple institutional contexts at the same time. The challenge lies in aligning micro-level actor motivations, meso-level coordination mechanisms, and macro-level institutional logics across different national settings - all within a single coherent governance architecture. We consider this an important new research problem that the current literature does not yet address adequately.*

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