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LUIGI CAPOANI
ANDREA IZZO
PIERGIORGIO MARTINI

RELATIONAL ASSETS AND SME PERFORMANCE

THE ROLE OF MANAGERS' PROFESSIONAL NETWORKS

Managers' professional connections represent a relevant lens for understanding differences in business performance and financial soundness in small and medium-sized enterprises (SMEs). Drawing on an empirical study conducted on a sample of French firms operating in the advertising industry, this paper examines the impact of board members' professional networks on SME productivity. The analysis combines two statistical techniques: linear regression and Principal Component Analysis (PCA). The results indicate that professional relationships of members of the board influence firm performance and soundness, albeit to a limited extent. Nevertheless, these networks provide valuable resources and opportunities, indirectly contributing to business success. Overall, our findings enrich the existing literature by partially addressing the lack of empirical evidence on this topic and by offering useful managerial insights to enhance SME competitiveness and resilience.

MANAGERS//PROFESSIONAL RELATIONSHIPS//CONNECTIONS//COSTS//PERFORMANCE//SMES

LUIGI CAPOANI
is currently a researcher at Ca' Foscari University of Venice and Adjunct Professor of International Economics and Industrial Economics and Policy at the same university. He earned an international PhD from the University of Salerno and completed a visiting fellowship at the University of Birmingham.

ANDREA IZZO
is a Data Analyst at a technology firm based in Turin, specializing in Probability and Statistics (R programming, MATLAB), and IT and Programming (C++). Additionally, he serves as a Research Assistant at the European Youth Think Tank based in Strasbourg, focusing on data analysis and statistical modeling.

PIERGIORGIO MARTINI
is a Data Analyst with expertise in Probability and Statistics, skilled in Python and R. He currently serves as Research Assistant at the European Youth Think Tank in Strasbourg, where he applies his data analysis skills to support strategic decision-making.

INTRODUCTION

Connections between managers today represent a key to understanding inter-firm dynamics and identifying further opportunities for growth. This aspect is particularly relevant in the case of small and medium-sized enterprises (SMEs), where the role of the manager complements that of the Board of Directors (BoD), both of which are crucial to firm success. In France, the context of our study, SMEs are strategic players in the economic system. Moreover, the professional networks among board members emerge as a relevant factor, especially in the communications sector. This is the case for advertising agencies, which make up the sample in our empirical analysis, where such networks serve as promoters of competitiveness, organizational

resilience, and innovation. The proactive use of these professional connections, in fact, results in more efficient marketing decisions by managers (Gilmore et al., 2006). As a result, corporate relationships frequently generate various benefits, such as the exchange of information and know-how or the development of bigger, stronger networks of alliances.

This study deals specifically with two types of connections: direct ones, which link managers to the BoDs they sit on (i.e., the companies they lead), and indirect ones, which tie them to other boards. This research aims to analyze the impact of such professional relationships on corporate performance, focusing on SMEs. In recent years, several authors (Mazel and Vajčnerova, 2015; Rogan and Mors, 2016; Roffia et al., 2021; Da Fonseca et al., 2024) have investigated the connections-performance relationship, employing both qualitative and quantitative methods. However, small sample sizes, the questionable accuracy of the methods, or incomplete datasets have led to a serious gap in the literature with respect to empirical analyses on this topic. Indeed, there are limited, systematic analyses that accurately quantify the effects of managers' professional networks on SME performance, especially in sector-specific contexts. The present study therefore aims to fill this gap.

Existing studies provide useful insights: on the one hand, through the use of econometric models and quantitative techniques (linear regression and PCA), researchers isolate the impact of relational and managerial variables on firm performance; on the other hand, by analyzing large datasets, they manage to obtain results that are statistically representative of the sector in question. Building on this framework, our paper provides new empirical evidence, helping to strengthen the bridge between management theory and practice and enriching the academic debate on the strategic role of managerial social capital in SMEs.

In line with the above objectives, we examine a sample of French enterprises. The choice of this context is justified primarily by the vast French SME landscape, which represents almost the entirety of the entrepreneurial and economic fabric of the country. More precisely, SMEs account for 99.9% of enterprises and approximately 42% of GDP. This configuration translates into a massive quantity of analyzable data (European Commission, 2025). Indeed, our dataset includes information on as many as 1,207 French companies similar in size. The crucial importance of SMEs in the French economy is further confirmed by a joint report by Bpifrance, KfW, CDP, and ICO (2015).

From a cultural point of view, moreover, partly by virtue of historical legacies, French SMEs show a marked hierarchy and centralized authority (Riess, 2010), which are inevitably reflected in interpersonal relationships in these often family-owned companies. The combination of structural and cultural factors that characterize French industry therefore makes this context particularly well-suited to the aims of this paper.

Our investigation is divided into three stages. The first, mainly theoretical in nature, provides a review of the main conceptual approaches developed in the literature; the second is more technical, offering an econometric and statistical analysis of the data; finally, the results are discussed in the last section. Specifically, our empirical analysis measures the impact of professional networks among board members on firms' productivity and financial performance. Confirming the hypothesis being tested, our data show a direct, positive relationship between firm turnover and net profits as well as the characteristics of professional connections. Instead, return on equity (ROE) appears to be less sensitive to these factors. In addition, these relationships also appear to have a partial impact on corporate strength, indicative of an entrepreneurial organization capable of self-financing, adapting to changes of various kinds, and coping with different types of debt.

In conclusion, this study analyzes specific managerial dynamics, offering valuable insights pertinent to corporate practice, particularly for firms geared toward optimizing performance through the strategic management of professional networks.

LITERATURE REVIEW AND HYPOTHESES

Managerial skills, networking, and access to resources

For SMEs to be effective and eventually expand, managers must be able to collect and use relevant information within a reasonable timeframe, while also leveraging cross-functional knowledge and skills. Neglecting to do so can prove detrimental, particularly for companies seeking new opportunities (Cisi et al., 2018; Iurkov and Benito, 2020). In this context, networking – understood as a process of collaboration with stakeholders – represents a particularly constructive mechanism for coping with uncertainty in the economic environment and for stimulating SME growth (Birley et al., 1991). Networking may also be interpreted as a form of social cooperation, as it entails the integration of knowledge, skills, and resources aimed at promoting value-creating actions (Toivola, 2005).

More recently, several studies have suggested that allocating an optimal level of resources to professional networking is vital not only for firm growth, but also for survival (Nu'man et al., 2020). Capoani and Izzo (2024), for example, examine how managerial characteristics such as personality traits and network breadth positively influence the performance of SMEs in the transportation sector. Similarly, Donckels and Lambrecht (1995) observe that the size and composition of a manager's network of contacts, including ties with universities and research institutes, have a significant impact on the effectiveness of decisions related to business expansion; this is primarily thanks to better access to strategic resources and information.

Entrepreneurs build their networks by actively engaging with the external environment to acquire the resources they need, which they personally shape and manage, especially in the SME context (Birley, 1990; Birley et al., 1991). In this regard, managerial cooperation and coordination assume a central role in fostering an environment in which, despite the constraints associated with small firm size, substantial improvements in organizational stability can be achieved through the development of robust support networks (Szarka, 1990).

Social capital, strategic alliances, and performance

The external networks of SMEs are critical because they provide access to vital support, information, and resources, such as goods, services, commodities, and data. Consequently, SME board members must be able to strategically leverage the social capital deriving from their professional relationships and build on that capital in order to ensure rapid market entry, business expansion, and operational continuity. The relatively lower structural complexity of SMEs allows managers to exercise greater managerial discretion in interpersonal relationships, enabling more direct and effective coordination (Kindström et al., 2024). This has contributed to the emergence of the figure of the *network manager*, which has recently become crucial to SME success. This professional is responsible for cultivating and nurturing external networks of contacts (Agostini et al., 2015).

It is therefore evident that the value of such relationships extends well beyond sales-related activities. This view is supported by studies showing that cooperation among corporate boards can amplify firms' innovation outcomes by generating mutual benefits (Chen et al., 2024). In this context, SMEs gain significant advantages by forming strategic alliances with other firms; this in turn gives rise to collaborative networks based on shared objectives not only in innovation, but also in training, research, and development activities. These alliances enable firms to overcome structural limitations (Ricciardi, 2008) while simultaneously raising managerial awareness of the strategic importance of extensive networking. Such benefits are particularly relevant in the long run, as they prove more valuable than an exclusive short-term focus on maximizing sales.

Also noteworthy are the differences between large enterprises and SMEs in terms of relationship networks. While managers in the first context typically have greater opportunities to establish privileged relationships with financial institutions, their counterparts in SMEs generally operate under tighter constraints and more limited access to such

relationships (Gharsalli, 2019). Nevertheless, an extensive network of social relationships capable of building up trust between board members and loan officers, for example, represents a key strategic resource for firms that require external financing but have uncertain or opaque reputations in the eyes of investors (Moro and Fink, 2013; Jackowicz and Kozłowski, 2019). It can therefore be argued that a wide, well-developed professional network, by guiding strategic and financial decisions, facilitates access to debt financing at lower costs and under more favorable contractual conditions (Moro and Fink, 2013; Muna et al., 2023).

Geographical proximity also plays a relevant role, as shorter distances between firms typically pave the way for more frequent interactions, thereby multiplying opportunities for mutual influence among SMEs (Fracassi, 2017). Similarly, strategic alliances based on shared goals strengthen reciprocal trust, reduce the risk of opportunistic behavior, and promote the exchange of knowledge, skills, and technological innovations (Cisi et al., 2018; Iurkov and Benito, 2020). This means that by establishing networks of professional relationships, firms can extend their market reach geographically and identify new business opportunities. At the same time, the strategic management of stakeholder networks enhances corporate competitiveness by leveraging the distinctive competencies of the actors involved, thereby generating greater competitive advantage (Pastore, 2009). These dynamics contribute both to higher sales and profitability and a sharper ability to adapt to market changes, ultimately fostering greater industry stability (Muna et al., 2023). In line with this perspective, Kussudyarsana et al. (2023) emphasize the critical role of social capital and relational networks in strengthening SME resilience during global crises.

Digital networking and new technologies

In addition, the success and growth of SMEs are increasingly affected by the adoption and integration of new technologies, which have radically transformed the competitive landscape (Hönigsberg and Dinter, 2019). This transformation makes it necessary, more than ever before, to analyze managers' behavioral patterns in the digital sphere as well. The active use of social media and digital platforms has created new networking opportunities for SME managers, enabling them to connect with customers and other industry professionals, participate in online events and conferences, and enhance corporate visibility. As a result, the effective integration of digital tools into networking strategies has become imperative (Foltean et al., 2019).

Quantitative approaches and empirical findings on managerial networking

The qualitative research we reviewed shows a progressive deep dive into the analysis of professional networks through the use of quantitative techniques based on numerical data, further consolidating the understanding of the dynamics involved. The empirical literature applies statistical and econometric methods to assess the impact of professional networks on firm performance, relying on official datasets. Surveys such as that conducted by Da Fonseca et al. (2024) highlight the positive impact of professional connections on financial efficiency, at least in the case of public enterprises. Similarly, Wang et al. (2024), using linear regression analysis, find a positive correlation between CEOs' professional relationships in SMEs and sustainable innovation. Agarwal (2020) likewise demonstrates how board size and managerial structure influence firm performance, while emphasizing the importance of constructive communication among board members.

From a complementary perspective, other studies examine the role of managers' individual characteristics and their perceptions of the value of professional relationships. Zuchowski and Brelik (2017) find that 71.4% of female managers and 61.5% of male managers believe that professional relationships enhance corporate development. Moreover, education levels are positively correlated with support for strategies aimed at strengthening professional connections. Accordingly, SMEs led by more experienced and highly educated individuals

tend to exhibit stronger business performance and higher growth potential, as shown by Marconatto et al. (2022). Empirical evidence further supports this view: experience – understood as the managerial positions held in previous organizations – is considered a crucial criterion in the selection of new board members, as highlighted in the OECD's (2015) corporate governance report. Reinforcing these findings, Aladejebi (2020) analyzes how firm characteristics and formal networking are closely linked to SME growth in Nigeria, demonstrating the tangible benefits of professional networks.

Overall, these studies underscore the critical role of management and professional relationships in shaping SME competitiveness. Unlike large firms, SMEs often lack standardized management and control procedures; consequently, strong professional networks provide essential support, resources, and information, enhancing firms' ability to respond to challenges and fostering business development.

In light of the evidence discussed above, managers' social capital – more precisely defined as the set of professional and personal relationships developed by business leaders throughout their careers – emerges as a resource of primary importance for firms. Generally speaking, managers with greater experience and seniority have built stronger and more diverse networks, which facilitate access to strategic resources, tacit knowledge, and relational opportunities. Such connections also shore up managerial decision-making, support innovation, and improve strategic management, thereby positively affecting firm performance. Consistent with Kor (2003), the experience accumulated by members of the top management team contributes significantly to collective strategic competence and the ability to seize new growth opportunities, particularly in entrepreneurial firms.

The theory of weak ties and structural gaps

Not all leaders have the same professional networks, nor do all ties have the same value. Two fundamental theoretical perspectives address this issue in the literature: the theory of weak ties (Granovetter, 1973) and the theory of structural holes (Burt, 1992). According to Granovetter, the presence of weak ties between individuals – namely, less intense social relationships – fosters more diverse information flows by erecting "bridges" between otherwise disconnected networks, proving indispensable in identifying new opportunities. By contrast, strong ties, such as friendships or family relationships, are characterized by greater emotional closeness, which strengthens involvement and enables more intense, albeit generally more homogeneous, information exchange. These ties also display high levels of transitivity: if a board member maintains strong relationships with both actors A and B individually, there is a high probability that a social connection will also develop between A and B.

As a result, individuals who more readily establish strong ties tend to build denser and more structured networks, within which flows of resources and information become consolidated. Such flows can reduce the cost of monitoring and transmitting information while simultaneously boosting business productivity (Granovetter and Barbera, 2004). Alongside strong ties, it is worth noting that the creation of weak ties within a community enables potential subgroups to connect with broader informational and relational networks, thereby contributing to greater overall cohesion (Kurgan et al., 2020).

The theory of structural holes further explains how an individual's position within a network can influence entrepreneurial success. Structural holes refer to situations in which two actors in the same professional network possess complementary information but are not directly connected. In such cases, the absence of a direct relationship limits the effective exchange of information and knowledge (Ciulli et al., 2019). The literature shows that the impact of knowledge acquired through professional networks is greater when such knowledge is accessible to individuals occupying positions that allow them to bridge these gaps. In particular, people endowed with interpersonal, linguistic, and cultural skills (relatively rare attributes) can act

as intermediaries between unconnected groups or actors, facilitating information flows and trust building, even across social and institutional boundaries (Cuypers et al., 2020).

Consequently, actors A and B may communicate only through the intervention of a third party occupying a privileged position within the network. This third actor, commonly referred to as a bridge or broker, benefits from informational and relational advantages derived from connecting otherwise separate nodes, as described in Burt's (2004) framework. In contemporary contexts, brokerage roles also emerge in digital environments, where online networks expand opportunities for intermediation. Indeed, contacts established through digital platforms can translate into new professional and career opportunities. For example, Rajkumar et al. (2022) show that, in the case of LinkedIn, strong ties have little impact on occupational mobility, whereas weak ties are significantly more productive in generating new opportunities, precisely because they connect distinct networks.

In sum, individuals occupying central positions within social networks capture, filter, store, and transmit information, thereby informing communication between parties who were previously separated by informational gaps. In such systems, managers can maximize the benefits associated with these bridges by identifying and cultivating relationships with key actors or by assuming brokerage roles themselves. Encouraging diversity within professional networks and promoting communication and collaboration across groups or subgroups can help fully exploit the potential of structural bridges (Ciulli et al., 2019; Cuypers et al., 2020).

To fully capitalize on these opportunities in business contexts, it is also essential to invest in individual development by strengthening networking capabilities and providing targeted training, particularly with regard to the effective use of digital platforms. In this regard, managerial behavior can be analyzed along four dimensions: the manager's aptitude for developing professional and social networks (Ostgaard and Birley, 1994), the number of relational activities they undertake, the intensity of their interactions with third parties, and the manager's perceived prestige (Barnir and Smith, 2002). In light of this, we can examine the structure of professional relationships within and between firms through indirect nodes and interconnections among individuals. This allows us to analyze the relationship between managers' social embeddedness and SME productivity.

Research hypothesis

Based on the literature we reviewed, the theoretical frameworks discussed above, and prior empirical evidence, we formulated the following hypotheses to empirically investigate the role of professional relationships within BoDs in shaping the business performance of small and medium-sized enterprises.

> Hypothesis 1. *The professional relationships and networking activities of SME BoDs positively affect firm turnover by facilitating access to new business opportunities and strategic collaborations, as suggested by the theories of weak ties and structural holes. Accordingly, we predict a statistically significant relationship between the quality and extent of board members' professional networks and the economic performance of SMEs.*

> Hypothesis 2. *Individual characteristics of board members, such as corporate experience and seniority, are positively correlated with the financial strength of SMEs. Accordingly, we predict that more experienced managers contribute to more robust strategic management, resulting in improved financial performance indicators, including turnover, net income, and ROE.*

EMPIRICAL INVESTIGATIONS

The conceptual model

In order to assess the impact of board members' professional networks on firm performance, it is crucial to examine the individual characteristics of each manager, taking into account not only

indirect relationships with other managers but also direct relationships with firms (as well as relevant performance indicators). As anticipated in the introduction, empirical investigations play a complementary role to the qualitative analysis we conducted, providing analytical support and empirical validation for the arguments we advance.

The *Société.com* website offers a rich database containing economic and financial data on French companies, which is particularly useful for investigating SME performance. Conversely, the *Dirigeant.com* platform provides detailed information on approximately five million French executives, including directors, CEOs, board members, and managers. This database also contains information on their mandates and "networks of influence," obtained by mapping their ties with other companies and economic actors. By combining data from these two sources, it was possible to analyze the effects and potential benefits that business interconnections generate in terms of firm performance.

The 1,207 SMEs in the study were selected from French firms operating in the marketing sector, where social ties play a fundamental role in day-to-day activities, advertising agencies being a notable example. This focus is motivated by the aim of exploring managerial relational dynamics in an industry that is particularly sensitive to communication skills and professional networks, which constitute strategic intangible assets for firm performance. Sectoral consistency ensures contextual homogeneity, facilitates the comparability of observations, and reduces unexplained variability arising from structural differences across industries. An additional strength of the sample is access to reliable, comprehensive, and well-structured data from specialized, well-established platforms. Moreover, the sample size is sufficiently large to allow for statistically meaningful analysis, even though it does not cover the entire population of firms operating in the sector.

Econometric data processing methods were adopted for the empirical investigation. First, multiple linear regression analysis was used to examine relationships and correlations between one dependent variable and two or more independent variables. In this study, the objective was to assess whether firm performance – measured through indicators such as turnover, net income, and other financial metrics – could be explained by specific characteristics related either to professional relationships or to individual attributes, such as direct connections with other firms or managerial age. Subsequently, principal component analysis (PCA) was applied to pare down the dimensionality of the dataset. Through PCA, we analyzed the data in their multidimensional form, which allowed us to discern underlying relationships among variables related to managers and firms, and enabled us to extract new synthetic indicators capable of summarizing these interconnections.

Explanation of the sample and variables

To select the sample and the variables (presented in Table 1 at the end of this section), we collected information from the two platforms introduced in the previous section. The first, *Société.com*, is a leading provider of legal and financial information on French companies. It offers a comprehensive and detailed database, refreshed daily using data provided by nearly ten million companies, and collects information on company registrations, modifications, and deletions from various public and official sources, including the Registry of Commerce and Companies (RCS) and the related *Infogreffe* registers, the National Institute of Industrial Property (INPI), public GIE (*Groupement d'Intérêt Économique*), and the National Institute of Statistics and Economic Studies (INSEE). Weekly and monthly updates are also generated on companies' financial statements, turnover, official documents, operations, and subsidiaries. Additional data are sourced from private entities, as well as the companies themselves. This being the case, the database allows access to a wide range of company-level information for research purposes, market analysis, credit assessment, and other applications. Moreover, the platform provides a financial analysis for each company based on three synthetic indicators: company rating, balance sheet, and profitability.

TABLE 1. INITIAL VARIABLES CONSIDERED FOR THE ANALYSIS (LR = LINEAR REGRESSION, PCA = PRINCIPAL COMPONENT ANALYSIS)

Dependent variable	Description	Source	Type	Method
Number of employees	Between 5 and 50 for all companies.	Société.com	Independent	LR, PCA
Age of the company	Number of years the company has been in business.	Société.com	Independent	LR, PCA
Revenues	Total sales of goods or services invoiced during a fiscal year, before taxation. This is a good indicator of a company's activity and size.	Société.com	Employee	LR, PCA
VA	Value Added: The difference between the value of the output of goods and services and the costs incurred in production. This measures the value of output realized by a firm.	Société.com	Independent	LR
EBITDA	Gross Operating Margin: The company's profit before taxes, interest, depreciation and amortization are subtracted,	Société.com.	Independent	LR
Net income	The difference between a company's total income and expenses, which represents the actual profit after subtracting all expenses and costs of production.	Société.com	Employee	LR
Indirect links with companies	The number of indirect connections the company has with other companies.	Société.com	Independent	LR, PCA
Direct links with individuals	The number of direct connections the company has with other board members.	Société.com	Independent	LR, PCA
Value-added rate	Performance as a percentage of the production tool, i.e., the firm's contribution to the value of production.	Société.com	Independent	LR
Number of terms	Total number of terms in office of the board member. When there are several board members, this number is the average of their terms.	Dirigeant.com	Independent	LR, PCA
Age of leader	This refers to the head of the company.	Dirigeant.com	Independent	LR, PCA
Direct links with companies	Number of direct connections the manager has with other firms. In case of multiple board members, shared activities were considered only once.	Dirigeant.com	Independent	LR, PCA
Indirect links with individuals	The number of indirect connections the manager has with other individuals (manager-company-individual ties). Individuals here are all co-agents of the manager in question for the firms they have in common. In the case of multiple board members, the link between them was considered only once.	Dirigeant.com	Independent	LR, PCA
Total links with other companies	Sum of all direct and indirect ties to firms.	Processing	Independent	LR
Total links with individuals	Sum of all direct and indirect ties to people.	Processing	Independent	LR
Total links	Sum of all ties between firms and individuals.	Processing	Independent	LR
ROA	Return on Assets: The percentage ratio of net income to total assets. This is an index of a company's profitability, representing the ability to achieve a result using all company assets.	Processing	Employee	LR
ROE	Return on equity, the profitability of the company expressed by the ratio of net income to shareholders' equity.	Processing	Employee	LR
Labor productivity ratio	This is an efficiency indicator that measures how much value or economic output is produced for each unit of labor employed.	Processing	Employee	LR

The second platform, *Dirigeant.com*, is an extension of the first and is itself a primary source of information on the professional relationships of French managers. It offers detailed mapping of board members and executives for approximately five million corporate managers and similarly draws on public and official sources, such as the RNCS and INSEE. The platform allows users to search for information on specific board members using criteria such as the individual's name, business sector, or company name. In addition, *Dirigeant.com* provides comprehensive visual maps illustrating the connections between firms and their board members. This database therefore represents a *sui generis* tool for collecting business-related data that are publicly accessible, supporting both professionals and organizations in their decision-making activities.

Together, these two platforms serve as structured portals for data extraction based on predefined criteria, thereby minimizing the risk of errors and missing information. Turning now to the present study, our sample consists of French advertising companies with between 5 and 50 employees and covers the year 2024. It was constructed with the aim of ensuring statistical representativeness and accuracy in the estimation process. After applying a set of filtering criteria, the initial sample of 1,207 firms decreased to 1,044 observations after excluding cases with unusable or missing data. Despite this reduction, the final sample is still sufficiently robust to support meaningful empirical analysis, although it does not encompass the entire population of firms operating in the sector.

The marketing sector, which is the focus of our study, relies heavily on networks of professional contacts, as well-developed relational capital can significantly enhance the quality and impact of advertising campaigns. Nevertheless, the sample presents certain limitations. In particular, we cannot ensure that the selected firms fully represent all types of businesses in the sector, which may lessen the generalizability of our findings. Furthermore, as discussed later, potential sources of bias, such as omitted variable bias, cannot be entirely ruled out. Future research could further corroborate the validity of the results by extending the analysis to other geographical contexts and by employing alternative datasets to delve deeper into the underlying relational dynamics.

Correlation matrix

Before constructing the regression models, we examined the linear relationships among the variables using a correlation matrix. This tool provides an initial overview of the associations between indicators related to professional influence networks and firm productivity, offering useful guidance for selecting the variables to include in subsequent empirical models. This methodological choice is motivated by the need to prevent multicollinearity issues and to conduct a preliminary assessment of the coherence between the above hypotheses and the data.

As shown in Figure 1, there is a relatively high initial correlation (0.642) between the variables *Number of Employees* and *Turnover*, indicating that firms with a larger workforce tend to achieve higher turnover. With respect to network-related variables, the data confirm that professional relationships – both direct and indirect – are positively associated with firm performance. In particular, direct connections between individuals and indirect connections between firms exhibit positive correlations with turnover, suggesting that an extensive, well-structured network constitutes a competitive asset for SMEs.

Although these correlations are not particularly high, this result is not unexpected, given that firm turnover is a complex outcome affected by multiple factors. Nonetheless, these positive correlations can be interpreted as preliminary empirical support for our research hypotheses, justifying further investigation through multivariate regression analysis.

Linear regression

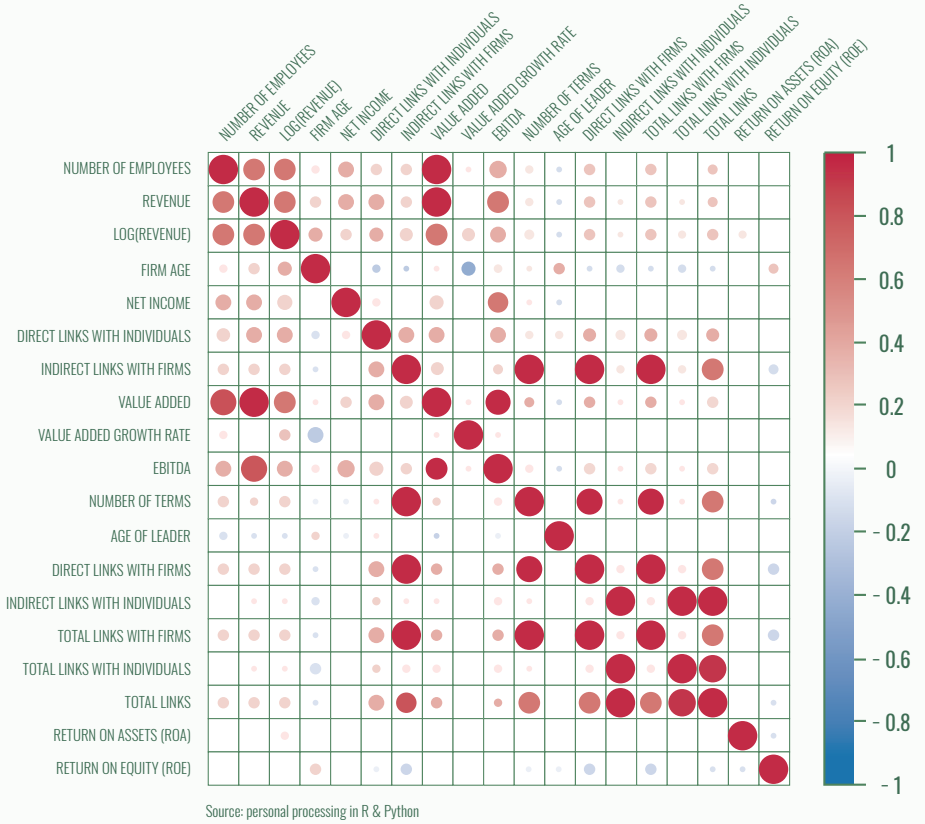
The model

As explained earlier, in order to assess whether firm performance can be influenced by specific characteristics of managers (e.g. their ability to establish professional ties) we adopted a linear regression model. In its general form, the model can be expressed as follows:

$$\rho = B_1 D + B_2 A + \varepsilon$$

where the dependent variable ρ represents firm performance (e.g., turnover, ROA, etc.), D is a set of independent variables related to the board member (such as age, number of professional connections, and other individual characteristics), and A represents a set of firm-level regressors (such as number of employees, firm age, and other organizational attributes). The coefficients B_1 and B_2 capture the marginal contribution of the variables included in D and A, respectively, in explaining firm performance. The error term ε accounts for unobserved factors

FIGURE 1. PEARSON CORRELATION COEFFICIENTS



Source: personal processing in R & Python

and potential measurement errors affecting the dependent variable (Trivisano and Fabrizi, 2013).

The estimated coefficients of a multiple regression model measure the expected change in the dependent variable associated with a one-unit change in a given explanatory variable, holding all other regressors constant (the *ceteris paribus* interpretation). In the following section, the selection of variables used to construct the different regression specifications is examined in greater detail, after which the model deemed most appropriate is identified and analyzed in depth.

Selection of variables

Several model hypotheses were considered, each assuming a business performance indicator as the dependent variable. Initial results suggested that ROA and ROE are not the most appropriate variables for constructing a valid predictive model, as neither yielded statistically significant regression parameters (i.e., the F-tests did not report p-values below 0.05). Instead, the best-performing model uses *log(turnover)* as the dependent variable, together with a number of explanatory variables related to the characteristics of managers and firms. Having identified more than one possible model, we then applied the *Bayesian Information Criterion* (*BIC*) to select the optimal specification and ultimately opted for the model providing the lowest BIC value. Table 2 provides a summary of the models we tested.

According to the criteria described above, we chose to analyze the highlighted model (4), with $R^2 = 0.687$. The resulting equation is:

$$\log(\text{turnover}) = \beta_0 + \beta_1 (\text{n. of employees}) + \\ + \beta_2 (\text{firm age}) + \beta_3 (\text{labor productivity ratio}) + \\ + \beta_4 (\text{leader age}) + \beta_5 (\text{direct links with individuals}) + \\ + \beta_6 (\text{total links with firms}) + \varepsilon$$

The logarithmic transformation of turnover was adopted to mitigate potential bias caused by the non-linear distribution of the data, making the model more robust and accurate in predicting business performance. To ensure consistency and reliability, three survey units (the firms Mediacite, Rouge et Noir Image, and Fun&Smile) were also excluded because they exhibited values classifiable as outliers, which could have compromised the statistical validity of the analyses. This decision allowed for more robust and interpretable results, as confirmed by goodness-of-fit indicators and diagnostic metrics.

Multicollinearity statistics

To assess the presence of multicollinearity, we conducted an analysis of variance inflation factors (VIFs). VIFs indicate the extent to which a variable can be explained by the other regressors

TABLE 2. ESTIMATES OF COEFFICIENTS USING LINEAR REGRESSION BETWEEN DEPENDENT VARIABLES (COLUMNS) AND INDEPENDENT VARIABLES (ROWS). THE T-VALUES ARE SHOWN IN PARENTHESES

Variable	(1) ROA	(2) ROE	(3) ROE	(4) Revenues	(5) Revenues	(6) Revenues	(7) Net income	(8) Net income
Value added			–0.003 (–1.14)				0.1554 (23.67)	0.1567 (23.12)
Value added rate	0.0117 (1.95)	0.0003 (0.03)	0.0043 (0.40)				–164.2693 (–0.93)	–164.1172 (–0.93)
Age of leader	0.0012 (1.55)	0.0018 (0.64)	0.082 (0.26)	0.0025 (–2.58)		0.0006 (0.67)	528.2031 (1.03)	509.7335 (0.99)
Age of company	0.0120 (0.71)	0.0278 (0.97)	0.0416 (1.38)	0.0092 (9.91)			–1.534.57 (–3.11)	–1.525.0318 (–3.09)
Direct links with companies					1.7973 (178.81)			
Direct links with individuals	0.392 (0.09)	3.9601 (5.62)		0.0884 (4.75)		0.0935 (4.81)		
EBITDA		0.002 (0.84)	0.004 (1.31)					
Number of employees	0.0030 (–0.08)	–0.0129 (–0.19)	0.0427 (0.60)	0.0388 (33.32)		0.040 (33.44)		
Indirect links with companies	0.0012 (-0.03)	–0.8400 (–10.60)						
Indirect links with individuals					–0.0565 (–2.25)			217.5714 (3.09)
Labor productivity ratio				1.25e–06 (27.31)		0.0004 (26.48)		
Number of terms	0.0005 (0.01)	0.8504 (9.77)	–0.0272 (–0.96)					–458.1547 (–0.89)
Total links with companies				0.009 (2.22)	–08974 (–180.07)	0.0008 (1.78)		
Total links							37.07 (0.36)	–71.0408 (–0.13)
Total links with individuals					0.0568 (2.27)			
Intercept	1.4270 (1.24)	–6.2633 (–3.20)	–0.9750 (–0.54)	4.9787 (84.15)	4.4919 (179.22)	5.0187 (81.30)	–8.685.225 (–0.29)	–5.730.8655 (–0.19)
BIC	6.525.0	7.629.1	7.723.8	482.3	1.044.2	569.8	27.995.8	28.006.8
Adjusted R^2	0.0016	0.0953	–0.0020	0.6874	0.4583	0.6581	0.3562	0.3568

Source: authors' own work in R & Python

TABLE 3. VIF VALUES OF INDIVIDUAL VARIABLES

Variable	VIF
Number of employees	1.095302
Age of company	1.104083
Labor productivity ratio	1.018701
Age of leader	1.086443
Direct links with individuals	1.125467
Total links with companies	1.124040

Source: authors' own work in R

in the model; values greater than 10 are typically considered indicative of severe multicollinearity. In the present case, VIF values are low for all variables (Table 3), thereby confirming the absence of multicollinearity in the model.

Residual analysis

A regression residual is defined as the difference between the observed value and the value estimated by the model. Among the various analyses that can be conducted on these quantities, graphical methods allow us to verify the correspondence between the observed values and the basic assumptions of the linear regression model. The scatter plot presented below (Figure 2) reveals whether the residuals display a structured and recognizable pattern with respect to the expected values of the dependent variable. The graph also shows that the assumption of homoscedasticity – understood as constant variance of the error terms – is satisfied. According to this assumption, the residual values should be randomly distributed with constant variance. As we can observe, the proposed model appears adequate and reliable, as the points are randomly scattered in the graph. Furthermore, the distribution of residuals is generally centered around zero, with no evident systematic patterns or recognizable trends that would indicate serious violations of the underlying assumptions. Although there is a slightly greater dispersion of negative residuals at higher than predicted values, this behavior is not particularly pronounced or concerning, especially given the presence of more than 1,000 observations in the sample. Therefore, the size and distribution of the data support the reliability of the model and its consistency with the classical assumptions of linear regression.

The scatter plot of the residuals shows a higher concentration at lower predicted values of *log(turnover)* and greater dispersion at higher predicted values, resulting in a fan-shaped configuration commonly referred to as the *megaphone pattern*. Figure 3 assesses the validity of the statistical model by comparing the distribution of the residuals with a normal distribution. If the empirical distribution follows the theoretical one, the assumption underlying the use of the linear model is satisfied. As shown in the figure, overall the points are well aligned with the theoretical reference line, with only minor deviations at the extremes (tails of the distribution), which do not significantly compromise the validity of the model. This result confirms that the residuals, in approximate terms, can be considered normally distributed.

Classical model assumptions and fundamental property of homoscedasticity

The linear regression model is considered appropriate, well defined, and correctly specified when it satisfies a set of underlying assumptions. In our study, the fundamental property of homoscedasticity appears to be met, as shown by the graphical analyses discussed above. This condition can be examined more closely through an F-test, which measures whether the variables in question exhibit constant variance.

Figure 4 illustrates the comparison between the observed values of the logarithm of turnover and the values predicted by the model, highlighting both the confidence interval (light blue line) and the prediction interval (dashed red line). Most observations are close to the central line, which represents perfect correspondence between predicted and observed values, and almost all points fall within the prediction interval, indicating good model reliability. Moreover, the width of the interval remains relatively constant across the range of predicted values, suggesting the absence of systematic variation in the residuals.

FIGURE 2. SCATTER PLOT OF RESIDUALS

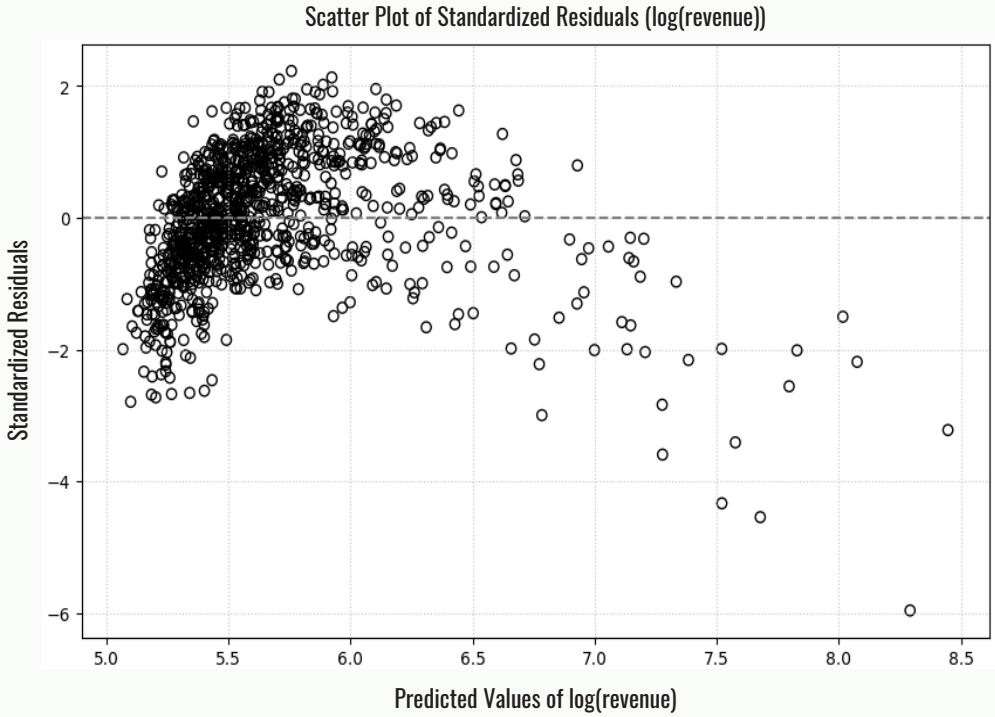


FIGURE 3. Q-Q PLOT OF RESIDUALS

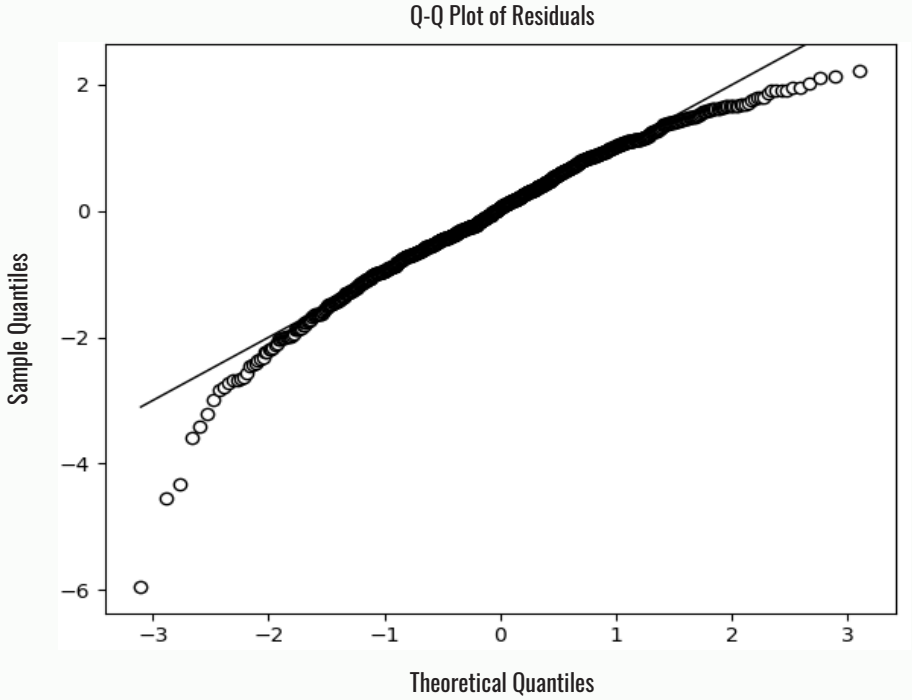
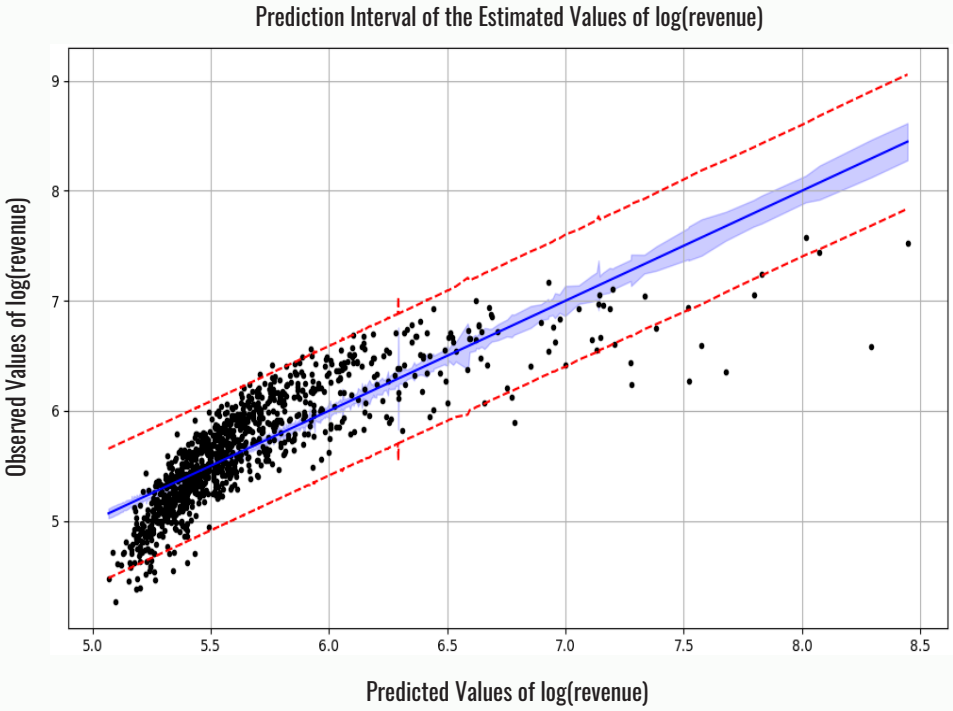


FIGURE 4. PREDICTION INTERVAL FOR EXPECTED VALUES



Taken together, these elements reinforce the evidence in support of the homoscedasticity assumption and suggest that the linear model we adopted is appropriate, stable, and well specified with respect to our sample. Nevertheless, it is important to note that this type of regression analysis may still present limitations if certain key variables influencing firm performance are omitted from the model, potentially leading to biased results.

Principal component analysis

Objectives of PCA

Principal component analysis is a factor analysis technique theorized by Karl Pearson in 1901 and further developed by Harold Hotelling in 1933. This multidimensional method uses several interrelated variables to identify the principal factors underlying the structure of the relationships observed in the correlation matrix (Pearson, 1901). The factors considered in this technique are those that best summarize the resources of board members and allow for the identification of the most significant dimensions with respect to firm characteristics. This approach provides a clearer representation of the influence exerted by managerial relationships on capital and financial performance, thereby facilitating the interpretation of the results.

Starting from the correlation matrix – at least in the case of standardized data, as with our study – PCA makes it possible to derive a smaller number of correlated variables. By eliminating redundant information obtained from observing these variables, the analysis can be done on a single Cartesian plane. Therefore, with this method, we can single out the connections and relationships that have the greatest impact on business performance. Further study subsequently provides insight into whether and how managers' professional ties may represent a competitive advantage or, conversely, a risk factor.

Correlation matrix

As mentioned earlier, the PCA method is applied to the correlation matrix of all the basic variables producing a synthesis of the initial data with minimal loss of information. Table 4 below provides an initial picture of the relationships we found.

Considering that the indicators in the rows and columns are identical, on the diagonal of the matrix are equal to 1. Each row variable also determines a positive or negative correlation – of higher or lower magnitude – with respect to the column variables. We ran correlation analysis as an essential preliminary step to explore the links between the variables in question and to detect any significant linear relationships. The main advantages of this technique are the simplicity of interpretation and the ability to provide a clear indication of potential collinearity, which is also useful for subsequent factor analysis. However, we should note that correlation does not imply causation, and non-linear relationships may not be revealed. For this reason, the results were complemented with more advanced multivariate methods, such as principal component analysis (PCA).

Selecting principal components

Eigenvalues represent the variance explained by each component; in other words, there are as many eigenvalues as there are explanatory variables in the correlation matrix. The largest eigenvalue corresponds to the variance explained by the first principal component, the second largest eigenvalue corresponds to the variance of the second principal component, and so on, up to n components, where n indicates the number of variables. The ratio between each individual eigenvalue and their total sum expresses the proportion of variance explained by each component. For each eigenvalue, the corresponding eigenvector is calculated; this represents the vector of coefficients that multiply the original variables in the linear combination used to obtain the new components. The rotation matrix V is therefore the matrix of eigenvectors, in which each row corresponds to an eigenvector associated with a specific eigenvalue. It is necessary to verify that the length of each eigenvector is equal to 1 and that their scalar product is equal to 0, ensuring orthogonality among the components.

Table 5 reports the eigenvalues, the percentage of total variance explained by each one, and the corresponding cumulative percentage. The

TABLE 4. ANALYSIS OF EXISTING RELATIONSHIPS BETWEEN OBSERVED VARIABLES (PARTIAL)

	Number of employees	log(turnover)	Seniority of the company	Number of mandates	Age of leader	Direct coll. with companies	Indirect coll. with individuals	Direct coll. with individuals	Indirect coll. with companies
Number of employees	1.0000								
log(turnover)	0.6347	1.0000							
Company seniority	0.1407	0.2765	1.0000						
Number of warrants	0.1657	0.1560	–0.0066	1.0000					
Age of leader	0.0370	0.0420	0.2726	–0.0139	1.0000				
Direct coll. with companies	0.2048	0.2153	–0.0039	0.9243	–0.0171	1.0000			
Indirect coll. with individuals	0.0138	0.0643	–0.0454	0.0277	0.0393	0.0785	1.0000		
Direct coll. with individuals	0.2012	0.2793	0.0322	0.0620	–0.0586	0.3001	0.1167	1.0000	
Indirect coll. with companies	0.2048	0.2153	–0.0039	0.9243	–0.0171	1.0000	0.0785	0.3001	1.0000

Source: author's own work in R

TABLE 5. EIGENVALUES, PERCENTAGE OF TOTAL VARIANCE EXPLAINED AND RELATIVE CUMULATIVE PERCENTAGE

Size	Eigenvalues	Percent variance	Cumulative percent variance
Dim. 1	3.177	35.803	35.303
Dim. 2	1.69	18.839	54.086
Dim. 3	1.211	14.914	67.54
Dim. 4	1.011	11.228	78.768
Dim. 5	0.819	8.097	87.865
Dim. 6	0.694	7.309	95.574
Dim. 7	0.339	3.204	99.338
Dim. 8	0.006	0.496	99.780
Dim. 9	0.004	0.110	100

Source: author's own work in R

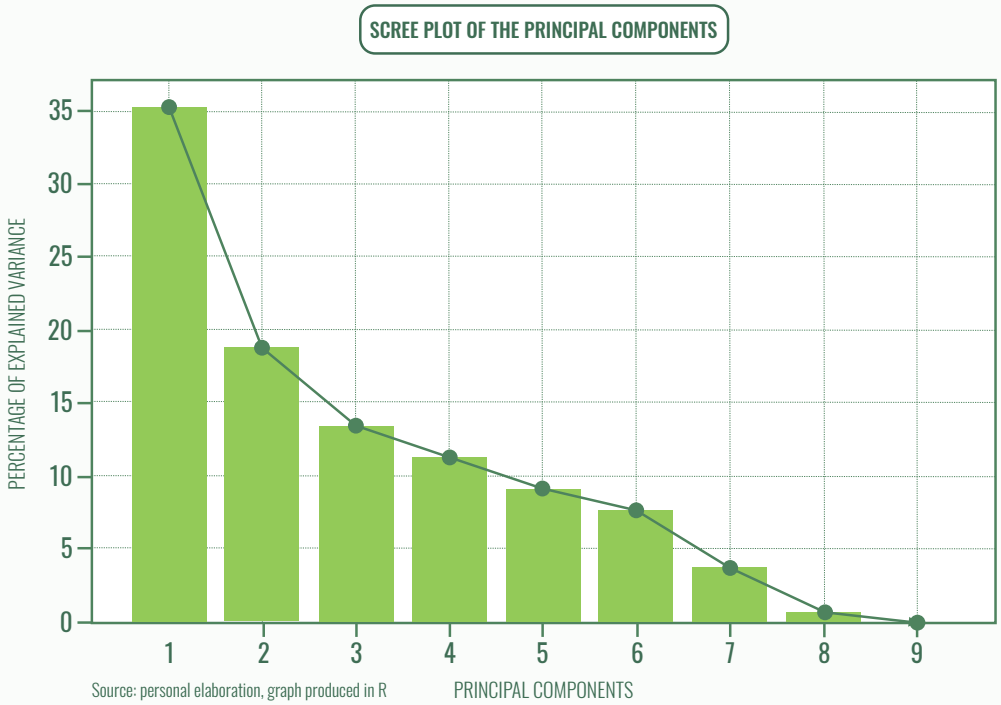
eigenvalues are arranged in descending order to indicate the relative importance and significance of the associated factors in explaining data variance. Overall, the cumulative variance explained by the first three factors amounts to 67.5% of the total variance.

In the analysis of a correlation matrix, the sum of the eigenvalues is equal to the number of variables from which the factors are extracted. In this case, there are 9 eigenvalues, and the average eigenvalue is 1.

Principal component analysis begins by summarizing the *p* explanatory variables. Provided, as already mentioned, that the data are standardized, the procedure consists of retaining only those factors with eigenvalues greater than 1 (the eigenvalue-one criterion, or Kaiser criterion). To determine this number, it is also possible to refer to the scree plot in Figure 5 (generated using *Factoextra*).

Figure 5 illustrates the percentage of variance explained by the principal components, ordered from highest to lowest, as a function of the number of factors. From this representation, it is possible to identify the point beyond which the decrease in explained variance becomes more gradual (commonly referred to as the elbow of the graph). The factors to the left of this point are considered significant. In the present case, the elbow corresponds to the third dimension.

FIGURE 5. SCREE-PLOT



Source: personal elaboration, graph produced in R

TABLE 6. RELATIONSHIP BETWEEN EACH VARIABLE AND ITS RESPECTIVE FACTOR

Variables	Comp. 1	Comp. 2	Comp. 3	Comp. 4	Comp. 5	Comp. 6	Comp. 7	Comp. 8	Comp. 9
Number of employees	0.418	0.667	0.211	0.239	–0.314	–0.205	0.372	–0.001	–0.001
log(turnover)	0.439	0.74	0.186	0.123	–0.164	0.019	–0.427	–0.001	–0.009
Age of company	0.079	0.568	–0.522	–0.096	0.195	0.582	0.115	–0.001	–0.006
Number of terms	0.891	–0.315	–0.207	0.064	–0.144	0.051	–0.009	0.193	–0.006
Age of leader	–0.006	0.302	–0.692	–0.397	0.044	–0.519	–0.037	0.003	–0.003
Direct links with companies	0.96	–0.244	–0.086	–0.015	0.038	0.009	0.004	–0.1	–0.008
Indirect links with individuals	0.115	0.014	0.35	–0.853	–0.334	0.155	0.034	0.005	–0.001
Direct links with individuals	0.392	0.256	0.449	–0.199	0.719	–0.13	0.05	0.051	0.042
Indirect links with companies	0.96	–0.244	–0.086	–0.015	0.038	0.009	0.004	–0.1	–0.1

Source: authors' own work in R

Factorial coordinates of the variables

Table 6 shows the factorial coordinates of the variables. The first principal component synthesizes the information with the least loss of data. The correlation between the new and the original variables corresponds to the angular coordinates of the variables on the new axes, which are determined by the eigenvalues – ordered in decreasing magnitude – multiplied by the corresponding angles. The resulting axis is therefore characterized by a specific direction and intensity. The largest eigenvalue corresponds to radius 1 of the first factorial circle (axes 1-2) and indicates the main direction followed by the remaining eigenvalues with lower values, as will become evident in the subsequent graphical representations.

From Table 7, we can deduce that the variables *Direct links with firms*, *Direct links with individuals*, *Indirect links with firms*, and *Number of terms* represent a primary dimension based on the correlation between the original variables and the components obtained from the analysis. Consequently, we can consider these as the variables with the greatest representative weight within the factor. *Firm strength/size* (understood in terms of *Number of employees* and *Turnover)* and *Years in business* (which include both *Leader age* and *Firm age*) represent the second and third factors, respectively.

To assess the extent to which the values were representative of the population, we considered both the absolute and relative contributions of the variables, derived these values from the difference between the observed variable and the predicted variable. The absolute contribution indicates the role played by each variable in reconstructing the variation of the factorial axis associated with a given eigenvalue. The relative contribution, instead, indicates how accurately the variable is represented on the axis: the more accurate the representation, the closer the value of the angle is to 1.

In our case, as shown in Table 8, the variables closest to a good representation are *Direct Links with Firms*, *Indirect Links with Firms*, and *Direct Links*

TABLE 7. CONTRIBUTION OF VARIABLES IN PERCENTAGE TERMS

Variables	Dim. 1	Dim. 2	Dim. 3
Number of employees	5.508	26.302	3.674
log(turnover)	6.071	32.412	2.844
Age of company	0.196	19.080	22.499
Number of terms	24.966	5.862	3.549
Age of leader	0.001	5.385	39.496
Direct links with companies	28.997	3.531	0.604
Indirect links with individuals	0.418	0.012	18.097
Direct links with individuals	25.847	3.886	16.632
Indirect links with companies	28.997	3.531	0.604

Source: authors' own work in R

TABLE 8. SQUARE OF COSINES (FIRST FOUR DIMENSIONS ONLY)

Variables	Dim. 1	Dim. 2	Dim. 3	Dim. 4
Number of employees	0.175	0.445	0.044	0.057
log(turnover)	0.193	0.548	0.034	0.015
Age of the company	0.006	0.323	0.272	0.009
Number of terms	0.293	0.099	0.043	0.004
Age of the leader	0	0.091	0.478	0.158
Direct links with companies	0.921	0.560	0.007	0.000
Indirect links with individuals	0.623	0.660	0.122	0.727
Direct links with individuals	0.354	0.654	0.204	0.026
Indirect links with companies	0.121	0.860	0.007	0.070

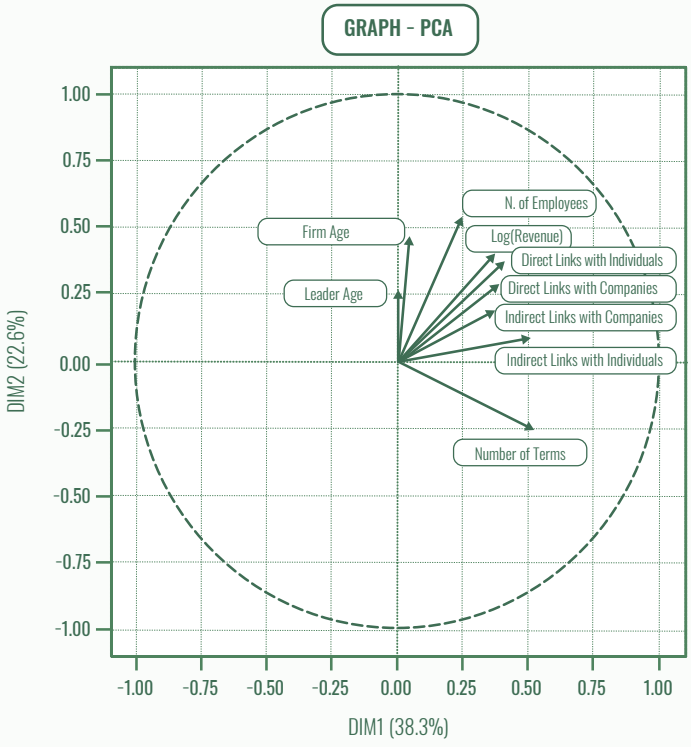
Source: authors' own work in in R

with Individuals. As we can observe in the next graph, these variables are characterized by long, well-oriented arrows, indicating a high relative contribution and a strong correlation with the first two principal components.

In factorial coordinate graphs, when the variable vectors inside the circle are all oriented in the same direction, this indicates that they are positively correlated with one another; that is, when one variable takes a high value, the others tend to follow the same pattern. Conversely, when variables are arranged perpendicularly, they are independent of one another. Finally, variables pointing in opposite directions are negatively correlated. Figure 6 shows the projection of the factorial coordinates onto the plane defined by the first two principal components (Dim.1 and Dim.2), which together explain 60.9% of the total variance.

The unit circle faithfully represents the meaning of the factorial coordinates: their squared cosines cannot exceed 1, and therefore all variables are located inside the circle. By applying the rotated Varimax solution, we can obtain a clearer and more accurate representation (values reported in Table 9), allowing us to identify the optimal combination between the original variables and the extracted factors.

FIGURE 6. FACTORIAL COORDINATE GRAPH



Source: personal processing, graph produced in R and Python

TABLE 9. CONTRIBUTION OF VARIABLES AFTER VARIMAX ROTATION

Variables	RC1	RC2
Number of employees	17.28	82.72
log(turnover)	24.03	75.97
Age of company	9.74	90.26
Number of terms	94.61	5.39
Age of leader	4.93	95.07
Direct links with companies	21.75	78.25
Indirect links with individuals	76.24	23.76
Direct links with individuals	1.42	98.58
Indirect links with companies	85.36	14.64

Source: author's own work in R

Graphical representation of observations

We can ascertain the position of a dimension summarizing the information structure contained in the original data matrix by analyzing both the position of firms (i.e., observations) and the position of variables, as discussed above. The latter allows us to precisely interpret the meaning of each variable, while with the former we can examine how observations are ordered with respect to each unit.

As with the indicators, computing the observations begins by looking at the values of the correlation matrix, arranged in descending order so that the values associated with Dim.1 are greater than those of Dim.9. Subsequently, the explained variance is derived from these values. At this stage, it is essential to determine which eigenvalues satisfy the criteria of orthogonality and unity. Accordingly, the coordinates of the observations can be calculated as the result of the row-column product between the matrix of transformed data and the matrix of observations projected onto the new axes (Dim.1 and Dim.2).

We now evaluate the distribution of the observations (i.e., the 1,044 firms) on the factorial plane 1-2 introduced earlier, shown in Figure 7. The farther a point lies to the right or left in the graph, the more it deviates positively or negatively from the mean of the first dimension. A similar interpretation applies to points located at the top or bottom of the graph with respect to the second factor: we observe a positive deviation in the former case and a negative deviation in the latter.

Conclusions regarding the model

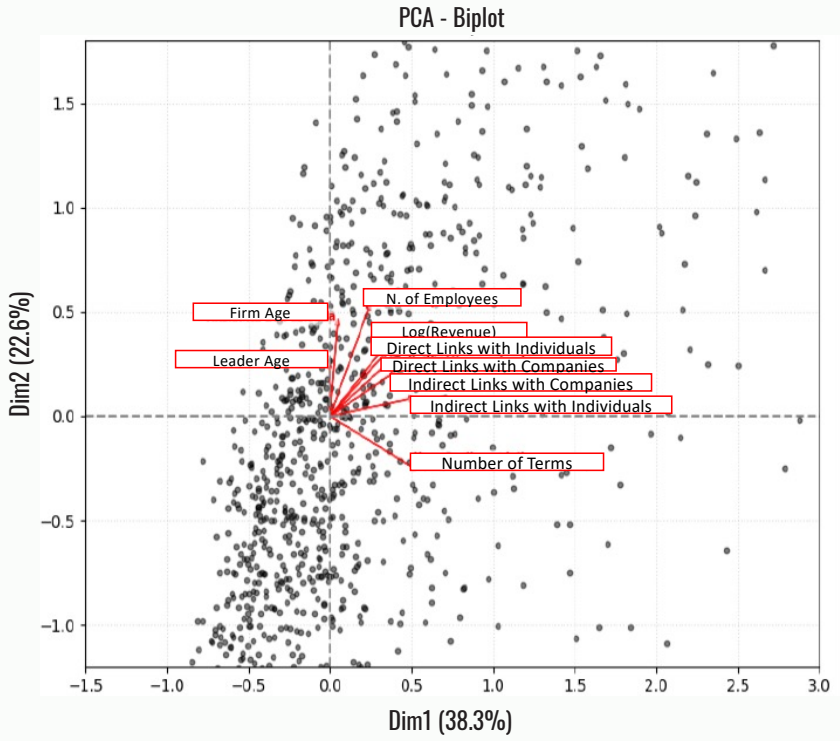
PCA pointed to two main factors (Dim.1 and Dim.2) which together explain about 61% of the total variance (38.3% for the first and 22.6% for the second), as evidenced by the scree plot (Figure 5) and the factorial coordinates (Figure 6). These components effectively synthesize the original variables, reducing the complexity of the dataset and offering a more intuitive key to understanding the relationships between firm characteristics and managerial networks.

The first dimension, graphically represented with a horizontal orientation to the right, mainly aggregates variables related to corporate structure and strength: *Number of employees*, *log(turnover)*, *Direct links with individuals*, *Direct links with firms*, *Indirect links with firms*, *Indirect links with individuals*, and *Number of terms*. These variables show significant contributions (as also confirmed by the data on contributions and squared cosines, i.e., Tables 7, 8, and 9), suggesting distinct interpretations for the dimensions in question. The first factor can therefore be interpreted as capturing the size and relational capital of the enterprise.

The second dimension, by contrast, is vertically oriented. It shows a stronger correlation with variables associated with demographics and time, particularly *Firm age* and *Leader age*, but also *Number of employees* and *log(turnover)*, which contribute substantially to this axis as well. This dimension can thus be interpreted as an indicator related to firm maturity and leadership experience. The Varimax rotation further confirms this distinction, clearly separating the variables along the two rotated axes (RC1 and RC2).

In conclusion, reiterating our findings, direct and indirect professional relationships with firms and individuals, together with the number of mandates, are strongly associated with the first factor, whereas the age of the leader and the firm are consistently

FIGURE 7. PCA - GRAPHICAL REPRESENTATION OF VARIABLES AND OBSERVATIONS



aligned with the second component. PCA has therefore proven to be a useful tool for summarizing and visualizing the relationships among the observed variables.

However, it also presents limitations that should be taken into account. First, as this type of analysis relies on the assumption of linearity, relationships that do not conform to this assumption may not be captured. Moreover, the method is sensitive to outliers, which may distort the positioning of the components. A further critical issue concerns interpretability, namely the difficulty of translating principal components – defined as linear combinations of the original variables – into concrete, intuitive concepts. Finally, the residual information loss of 39.1%, resulting from the exclusion of the last seven principal components, implies that part of the complexity of the phenomenon remains outside the representation.

DISCUSSION AND IMPLICATIONS

In light of our detailed statistical and econometric analyses, the dynamics of managerial relationships pose a complex challenge for modern SMEs. PCA reveals a relatively low correlation between managers' professional ties and performance indicators, suggesting a limited direct impact of the former on the latter. Similarly, multiple linear regression indicates a weak relationship between professional board contacts and financial performance. Nevertheless, these findings are sufficient to test compliance with our initial research hypotheses, particularly with regard to Hypothesis 1, while also demonstrating the robustness of the original analytical framework grounded in the theories of weak ties and structural gaps.

Our results can be partly explained by Granovetter's theory, which posits that although weak ties provide access to diverse information

and new opportunities – by connecting otherwise separate networks – their influence on firm performance may not be immediate or direct. As a result, the information conveyed through weak ties may be more effective in fostering innovation, expansion, and opportunity creation over the long term, while their impact on short-term financial performance may be less readily observable. This interpretation is consistent with the empirical evidence emerging from our analysis.

Second, prior studies have shown that interconnections among board members can enhance corporate innovation, while producing more limited effects in contexts characterized by a number of external directors or executives on boards (Chen et al., 2024). With reference to structural gaps, despite the existence of professional networks of boards of directors and managers, there may be insufficient direct connections among different groups of contacts. If the social network fails to effectively bridge these gaps, the impact on business performance is likely to be weaker, thus corroborating the results obtained from the multiple linear regression analysis. Moreover, SMEs often seek external forms of support – such as legal advisors, accountants, or business contact networks – for advice on improving governance structures (Coulson-Thomas, 2007). Although financial performance depends on a wide range of economic variables and both internal and external business dynamics, for SMEs in particular the ability to build and manage strong relational networks is becoming indispensable, especially in leveraging digital platforms and emerging technologies (Möller and Halinen, 1999). A more detailed discussion of the practical implications for managers and policymakers is provided in the following section presenting the final conclusions of the study.

Furthermore, the role of communication in managerial relationships should not be underestimated, particularly in the context of corporate sustainability. The growing demand for managers with advanced communication skills underscores the importance of integrating such competencies with efficient and coordinated operational management (Siano, 2012). With respect to Hypothesis 2, the results of both the linear regression and the PCA (as reported in Table 2 and Figure 6, respectively) indicate a positive, albeit not particularly strong, relationship between firm experience (measured by firm age and leader age) and financial performance. In the regression analysis, the estimated coefficients, although relatively small, are statistically significant, while the factorial coordinates show a positive correlation between these variables and log(turnover).

Once again, these findings are consistent with our underlying theoretical framework: the effect of experience, though limited, can be interpreted as an indirect channel through which professional networks influence firm performance. Indeed, as experience in SMEs grows, the networks made up of direct and indirect connections of managers and board members tend to expand, thereby enhancing the potential positive effects of networking on financial outcomes.

CONCLUSIONS

In the business and management context, our analysis shows that the individual competencies of each manager – including their personal characteristics and relevant variables, as well as their mapped relationships – are crucial in determining corporate strength. We focus on small and medium-sized enterprises, unlike other authors, and in this context we show that managers' professional networks play a relevant role, even in constrained settings where resources are often limited. In recent decades, SMEs have expanded both the number and the responsibilities of their board members in order to adapt to changing markets and maintain competitiveness. In addition, new strategies have increasingly centered around developing the professional networks of directors, recognizing the critical role of relational ties in building and consolidating partnerships.

Through extensive empirical analyses, we investigated the causal effects and correlations

between firm performance (measured by the logarithm of turnover) and SME characteristics such as the number of employees, managers' professional relationships, and firm age. Linear regression revealed a positive but modest correlation, while PCA confirmed our initial hypotheses. The final results show that relationships among board members significantly impact firm soundness in terms of turnover and net income, but only partially affect financial performance. In this regard, other activities should be prioritized, such as capital investment, R&D, mergers, and internalizing or outsourcing of production processes.

Our evidence also shows a positive correlation between the number of employees and turnover, derived from the linear regression model ($R^2 = 0.687$), confirming the significant impact of firm size on performance. On the other hand, although the contribution of variables related to professional networks appears smaller, it remains consistent with our initial hypotheses. Applying PCA, we were able to synthesize the variables into two main factors, which together explain 60.9% of the total variance. The integration of these approaches confirms that SME productivity depends not only on economic parameters, but also on the quality and intensity of managerial social capital. These results therefore reinforce theoretical evidence suggesting that a large, structured professional network can represent a competitive advantage for firms, even in highly dynamic industries such as advertising.

It is important to note that, in both regression analyses and PCA, specific statistical assumptions must be satisfied for the results of such empirical investigations to be valid. In the case of regression analysis, the absence of multicollinearity is crucial. For example, if managers sit on the board of directors, specific situations may arise in analyzing their interconnections. Another fundamental assumption concerns linearity in the relationships between variables, which implies a predictable trend that does not always fully capture the complexity of relational dynamics in SMEs. Finally, independence of errors and homoscedasticity are required: If residuals were correlated with other variables, any omitted information could bias the final estimates. With respect to PCA, it is essential to standardize variables prior to analysis, especially when they are measured on different scales. In addition, the first principal components should explain a significant proportion of total variance; otherwise, the technique may be of little value in reducing dimensionality.

Beyond these methodological assumptions, additional limitations should be acknowledged. The analyses detailed here are unable to capture the entire reference context, as financial performance is impacted by multiple variables not included in the models, such as innovation capacity or operational capabilities. Moreover, due to their statistical nature, the analyses fail to capture the dynamic evolution of managerial relationships over time. We therefore illustrate below alternative managerial strategies that could be adopted in the SME context to leverage results. A first step could involve promoting targeted skill-development programs for board members, creating cross-functional teams to foster knowledge sharing and innovation, and implementing performance management systems that align individual objectives with corporate goals. It is also desirable to invest in training related to innovations such as LinkedIn and other digital platforms; the use of these tools can amplify the effectiveness of networking and internal collaboration, thereby positively reverberating on professional networks by enabling faster connections and access to resources and market opportunities.

Indeed, SMEs could leverage managers' relationships both to explore strategic collaborations with other firms – leading to joint ventures or business agreements – and to develop partnerships with academic and research institutions, thereby gaining access to innovation, new technologies, and knowledge. In this regard, a focus on employer branding may also be a successful strategy, as a well-developed network of contacts not only facilitates talent recruitment but also contributes to building a strong corporate image, attracting qualified professionals, and improving market positioning. Finally, SMEs could consider introducing internal incentives for network development, rewarding managers who are able to translate their professional connections into concrete opportunities for the

firm. In sum, to achieve a sustainable competitive advantage, SMEs should adopt an integrated strategy that enhances managerial skills, professional networks, and technological innovation. We therefore hope that this study will encourage board members to devote greater effort to building and consolidating their professional networks of influence, despite the investment in time and resources that this would require.

Given these considerations, future research should be conducted on larger, more diverse samples, both geographically and temporally. Indeed, the question remains as to the extent to which our results can be generalized beyond the context of French SMEs in the advertising industry examined in this study. In particular, the positive relationship between the breadth of managers' professional networks and firm productivity suggests more ample mechanisms that may also operate in different economic contexts, especially in sectors characterized by strong interaction among firms and stakeholders, such as services, consulting, and technological innovation. The conceptual framework adopted – based on regression models and principal component analysis – lends itself to replication across countries and industries with minimal contextual adjustments. This supports the extension of the managerial implications beyond the French case, suggesting that building up professional networks and managerial connections represents a cross-cutting competitiveness factor for European SMEs.

It would also be advisable to explore alternative approaches and address emerging challenges. Along these lines, two central themes – digitization and sustainability – are gaining ground in the contemporary management landscape and represent not only growth opportunities but also key drivers of competitive advantage (Franco and Nuccio, 2021). In implementing innovative, sustainable strategies, the CEO plays a vital role in most SMEs, particularly through professional relationships that facilitate access to critical information for policy adoption (Wang et al., 2024). Supporting this view and considering the challenges associated with ensuring sustainable economic growth, Kindström et al. (2024) emphasize the need for SMEs to develop appropriate leadership structures. At the same time, it is necessary to consider managerial sensitivity to environmental issues; when it is lacking, this may hinder the effective implementation of sustainability strategies (Sampaio et al., 2012).

In conclusion, this study represents a starting point for exploring the impact of managers' professional influence networks on SME soundness and performance, while also highlighting the need for further research to identify the most effective managerial strategies for improving firm performance and competitiveness in global markets.

MANAGERIAL IMPACT FACTOR

- **Social capital as a competitive lever**: Strategic management of managers' professional networks strengthens the soundness and economic performance of SMEs, complementing traditional financial levers.
- **Networking-oriented Board of Directors**: Board composition that emphasizes relational capabilities and extensive professional networks affords better access to resources, information, and strategic collaborations.
- **Networks and alliances for innovation**: The development of structured networks facilitates partnerships, joint ventures, and collaborations with external actors, fostering innovation and knowledge transfer.
- **Digital networking as an accelerator**: The systematic use of digital platforms enhances the effectiveness of managerial networking and access to market opportunities.
- **Leadership and relational value incentives**: Training and incentive systems focused on relational skills enable the translation of managerial connections into concrete and sustainable outcomes.

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