

# **The role of CEO Human Capital on Family Firms' Ability to Invest in Innovation**

## **ABSTRACT**

This study investigates the influence of CEO specialized managerial ability on innovation input in family firms. Specialized Ability Index (SAI) to quantify CEOs' firm-specific expertise. Based on a dataset of 56 publicly traded family firms, which includes 292 firm-year observations from 2015 to 2020, our findings show a positive relationship between CEO specialized managerial ability and family firm's R&D expenses, supporting the critical role of deep expertise and nuanced understanding of industry trends for promoting innovation. However, this effect diminishes when the firm is led by a family CEO or with the increase in family board members. Thus, the results of the study find the evidence to confirm the socio-emotional view that family firms prioritize preserving their legacy over undertaking risky innovation. The study contributes to the literature on family business leadership by integrating the concept of CEO's specialised managerial ability and exploring links among managerial ability, innovation, and family governance.

**Keywords:** family firm; innovation; R&D; human capital; family CEO, family board influence

## INTRODUCTION

Management scholars emphasize the critical role of leadership skills at the top-management level in influencing strategic decision-making and organizational performance (Carpenter et al., 2004). According to Upper Echelons Theory (Hambrick & Mason, 1984), CEOs' personal characteristics, such as education, age, and prior experience, shape their cognitive functions, biases, and value systems, directly affecting strategic decisions (Kano & Verbeke, 2019; Xu, 2023). Within this framework, an important distinction, rooted in the concept of human capital, emerges between generalist and specialist CEOs (Becker, 1962). The differentiation between these two types of CEOs is rooted in the idea of human capital (Becker, 1962). General human capital includes skills that are not specific to any organization and transferable across firms or industries, while firm-specific human capital is about the skills valuable only within one organization.

While generalist CEOs tend to be more versatile and expected to catch up or even outperform specialists in the long run, specialists may have deeper expertise in their niche (Epstein, 2021). Additionally, specialist CEOs possess a more comprehensive view of the firm and its market surroundings, and their incentives tend to be closely aligned with those of the company, which enables them to be more competent and driven in long term (Gounopoulos & Pham, 2018). This distinction is particularly relevant for family businesses, where specialist CEOs can leverage deep firm-specific knowledge and emotional attachment to align strategic decisions with long-term family and organizational goals. Additionally, family firms often have limited innovative capacity due to cautious attitudes (REF) and limited resources (REF). By focusing on the family business context, our study investigates the influence of CEO specialized managerial ability on the company's innovative capacity measured by research and development expenses, answering the

research question: *Does CEO specialized managerial ability influence family firms' R&D expenses?*

To do so, we build our definition of the specialized managerial ability following the work of Custódio et al. (2013), based on the number of positions held across various firms and industries and/or whether CEO worked in a multi-division conglomerate as well as if they already held a CEO position prior to current occupation. We theorize that a CEO with higher specialised managerial ability would incentivize more innovation investment in terms of R&D spending in family firms. We base our argument on the idea that, although generalist CEOs bring strategic flexibility and risk tolerance to the firm, they may struggle with aligning resources and capabilities for effective R&D expenses (Custodio et al., 2019; Li & Patel, 2019). In contrast, specialized CEOs possess deep industry expertise, which allows them to spot market trends, allocate resources effectively, and identify high-value innovation opportunities, while still operating with respect to the company heritage (missing references). This capability is particularly important for family firms, where strategic decisions must align with organizational values and long-term orientation (Schmid et al., 2014).

Making a step further, we suggest that family influence might weaken the alleged positive relationship between CEO specialized managerial ability and R&D expenses. This is because family CEOs tend to be more risk-adverse and often prioritize socio-emotional wealth preservation over purely financial or strategic goals, which can lead to a more cautious approach to R&D expenses (Gomez-Mejia et al., 2010). Furthermore, family CEOs' willingness to safeguard the firm's legacy and ensure its long-term orientation often leads to a preference for conservative strategies that align with the family's long-term goals but may limit the firm's capacity to capitalize on innovative opportunities (Zellweger et al., 2012). Therefore, we expect that if CEO being a part

of the family would attenuate the positive relationship between CEO specialized managerial ability and R&D expenses. Finally, we suggest that the main relationship will be negatively moderated by the presence of family members in the board, which translate in higher family control over decision-making processes. We build this hypothesis on the idea that a family-dominated board often limits the CEO's autonomy and discretion (Minichilli et al., 2010), particularly in high-risk areas like R&D, thereby diluting the positive impact of specialized managerial ability on innovation investments.

To test our hypotheses, we construct a balanced family firm panel dataset using the data from NRG Metrics and Thomson Reuters Refinitiv databases. Our dataset consists of 292 firm-year observations based on the data from 56 publicly traded firms from all over the world over the timespan of 2015-2020. To examine the relationship between CEO specialised managerial ability and R&D expenses, we construct a Specialized Ability Index (SAI) using methodology from Custódio et al. (2013). Our results show a positive and significant relationship between CEO specialized managerial ability and R&D expenses in family firms, supporting our hypothesis. Furthermore, moderation analysis reveals that this positive relationship decreases when the CEO belongs to the family owning the firm and with an increased number of family members on board, implying that family domination potentially limits CEO's managerial discretion in strategic decision-making.

Our study aim makes several key contributions to the understanding of innovation in family firms. First, it introduces the concept of CEO specialized managerial ability and shows that it positively influences R&D expenses by leveraging their industry-specific knowledge. Second, it highlights the role of CEO family status and the risk-averse behaviour in strategic decision-

making. Lastly, it adds to an ongoing discussion of general vs specialised human capital and its role in fostering innovation as we explore the influence on the innovation input rather than output.

## THEORETICAL BACKGROUND

### CEO managerial ability

Leadership plays a critical role in strategic decision-making, its consequences were extensively studied in the leadership literature (Baghdadi et al., 2023; Carpenter et al., 2004; Custódio et al., 2019; Hambrick & Mason, 1984; Lu et al., 2024), as well as in its family business branch (Kraiczy et al., 2015; Schmid et al., 2014b; Skorodziyevskiy et al., 2024). Prior research mostly focused on observable managerial characteristics such as age (Herrmann & Datta, 2006; Huang et al., 2012; Serfling, 2014), tenure (Wang & Poutziouris, 2010), gender (REF) and education (RED), while recently a more complex concept of managerial ability gets further attention in the leadership research (Demerjian et al., 2012). The term encompasses manager's wisdom, expertise and capability that promote value generation (Holcomb et al., 2009; Magerakis, 2022) and in broad terms refers to CEO talent used to maximize shareholder's profits (Demerjian et al., 2012). Managerial ability is an important part of human capital (Francis et al., 2008; Mishra, 2014; Yuan et al., 2019) and higher managerial ability enhances manager's forward-thinking aptitude (Demerjian et al., 2013).

CEO managerial ability has been associated with a number of organisational performance outcomes (Chrisman et al., 2015; P. R. Demerjian et al., 2013; Gan, 2019; Lin et al., 2021; Magerakis, 2022; Yuan et al., 2019). For instance, Hambrick & Mason (1984) establish that the main factors influencing CEO's cognitive functions, value system, and formation of potential bias are education, age, and prior professional experience. These traits significantly impact strategic

decision-making, innovation and diversification strategies affecting company's overall performance (Evdokimov et al., 2022; Wang et al., 2016; Zhou et al., 2024).

Even though the main research remains focused around the consequences of managerial ability on various individual and organisational level outcomes, within this academic conversation, an important stream of literature emerged, based on a crucial distinction between general and specialised managerial ability (Custódio et al., 2013; Murphy & Zabochnik, 2007; Smith & White, 1987). The difference comes from the two types of human capital (Becker, 1962). General human capital includes skills that are not specific to any organization and transferable across firms or industries, while firm-specific human capital is about the skills valuable only within one organization. Scholars are debating which side of managerial ability is associated with effective leadership. Some promote generalists as they easily transition from one industry to another without losing effectiveness (Custódio et al., 2019; Katz, 1971; Xu, 2023). Others argue that accumulated specialised know-how stimulates yet unexplored and potentially risky innovations (Koo, 2019) and is associated with increased firm performance (Agnihotri & Bhattacharya, 2021; Zhou et al., 2024).

Overall, researchers agree that CEO's managerial ability is crucial for reaching long-term success (Agcayazi et al., 2024; Li & Patel, 2019), effectiveness (Andreou et al., 2017; Gan, 2019), and creating shareholder value (Betzer et al., 2020; Holcomb et al., 2009). In our study we focus on family firms, which represent a special organisational setting characterised by the influence of family and non-financial goals on corporate governance (Chrisman & Patel, 2012; Sciascia et al., 2015).

## **The role of the CEO in Family Firms**

Leadership literature places CEO in the key role within the firm, saying that they accumulate most power within the organisation (Busenbark et al., 2016), are able to overlook all departments (Hambrick & Fukutomi, 1991) and determine firm's performance, growth, survival, and overall strategic direction performance (Carpenter et al., 2004; Finkelstein et al., 2009; Quigley & Graffin, 2017; Ramón-Llorens et al., 2017). The same relationship holds in family firms, where CEO also plays a crucial role in determining the strategy and achieving success (Martino et al., 2020; Orens & Reheul, 2013; Skorodziyevskiy et al., 2024). Here, however, CEO is interlinked with the family itself, its goals, and succession choices (Daspit et al., 2016; Waldkirch, 2020; Waldkirch et al., 2018).

One of the main differences between family and non-family firms is that the former goes beyond financial goals. The concept of socio-emotional wealth suggests that family forms place great importance on the firm's longevity (Habbershon & Williams, 1999) and family owners are considered to be loss-averse (Gomez-Mejia et al., 2010) as they are hesitant to invest in new undertakings due to higher uncertainty and risk as well as potential dilution of control (Cabrera-Suárez et al., 2001; Naldi et al., 2007).

Naturally, the subject of CEO identity emerges within the research avenue of family business leadership (Bettinelli et al., 2022), comparing family and nonfamily managers and exploring the effects on organizational outcomes (Chrisman et al., 2013, 2014; Gómez-Mejía et al., 2007; Jaskiewicz et al., 2017). Even though the research lacks agreement in pointing out the superior CEO identity, scholars agree that family CEOs increase the performance by being more committed to long term goals set by a family (Chrisman et al., 2013). Family CEO's socio-emotional attachment to the firm is more likely to make them act altruistic towards the family

(Schulze et al., 2002), and to perceive performance consequences of excessive risk more sensitively. At the same time, nonfamily CEOs are more risk-tolerant (Herrmann & Datta, 2005; Miller et al., 2014).

Overall, prior research shows that the role of CEO has been associated with many organisational outcomes, such as efficient investments (Gan, 2019), resource allocation (Agnihotri & Bhattacharya, 2021; Chahyadi et al., 2021), international expansion (Xu, 2022), and corporate social responsibility (Yuan et al., 2019). Among them a large stream of literature is dedicated to studying its effects on innovation (Agnihotri & Bhattacharya, 2021; Custódio et al., 2019; Gan, 2019; Lin et al., 2021; Ma et al., 2021). Often, researchers in the field of innovation favour general managerial ability, claiming that it increases strategic flexibility and risk-taking (Custódio et al., 2019; Lazear, 2012; Park et al., 2024). However, those studies often focus on the effects of CEO's leadership role and managerial ability on innovation output and tend to overlook the innovation inputs, thus creating a restrictive view (Agnihotri & Bhattacharya, 2021; Chahyadi et al., 2021).

In line with human capital theory, CEO managerial ability can directly influence innovation inputs, or namely research and development expenses, since higher industry-specific expertise allows the CEO to better identify R&D opportunities (West & Iansiti, 2003). Simultaneously, a well-established intra-industry network as well as prior experience enable managers to better estimate investment costs (Park & Tzabbar, 2016) and channel R&D expenses (Bell, 2005; Faleye et al., 2018). For those reasons we decide to adopt a specialised managerial ability view and argue that deep expertise would allow CEO to increase innovative input via R&D expenses.

## Human Capital Theory

The study relies on the human capital theory in seeking an understanding of how CEO specialised managerial ability affects firm's ability to increase research and development expenses in the family firm context. The theory was introduced by Schultz (1961) and (Becker, 1964), who defined human capital as skills and knowledge accumulated to improve productivity, the later focusing on the microeconomic perspective of the theory. This study relies on the formal definition provided by Hillman & Dalziel stating that human capital is manager's "expertise and reputation" (Hillman & Dalziel, 2003, p. 383), later expanded in the context of family firms to include attitudes and motivation (Dawson, 2012). The human capital theory links managerial expertise to firm's performance highlighting that accumulated firm-specific human capital creates organisational gains (Danes et al., 2009; Dawson, 2012). It emerges from the productivity theory and the notion that both individuals and entities invest in human capital, same as they do in physical capital, to improve productivity and achieve better performance (Becker, 1964; Schultz, 1961).

The theory posits that human capital is built over time and depends on many social factors such as upbringing, education, and experience, making it most difficult to emulate (Barney, 1991). Already in his early work Becker (1964) highlights the importance of family influence on individual's human capital, especially when it comes to values, habits and skill development (Dawson, 2012). In the context of family businesses, this influence not only shapes the future manager, but prevails over time, creating a closely intertwined relationship, which in turn produces unique long-term-oriented human capital (Zellweger, 2007). This is one of the most important resources for the family firm as it acts as a value creation mechanism (Sirmon & Hitt, 2003).

When it comes to strategic decision-making, human capital theory explains how managers use their experience and skills learned over the course of their careers and how such accumulated

human capital is a driver behind organizational performance (Becker, 1975). ~~In one of the early conceptual studies Michael (1961) rely on human capital theory to hypothesise that future decision makers would emerge from competent managers who possess technical capability as well as broader, creative mindset. More recently, Custódio et al. (2013) build up on that theory and describe CEOs with higher specialised managerial ability as the ones who possess deep industry expertise.~~

Even though adopting this framework is relatively new for family business literature, some authors investigated the relationship between accumulating human capital over time and CEO career development, showing that there is no significant difference between family and nonfamily CEOs and claiming that the accumulated experience is a more important predictor than family connection (Salvato et al., 2012; Waldkirch, 2020). Additionally, specialised expertise of the family, internal conflicts or parental altruism can limit CEO managerial ability (Schulze et al., 2001, 2003). Since CEO managerial ability and personal traits developed over time affect strategic actions (Graham et al., 2013) this could pass on risk-aversion and cautious approach to R&D expenses from the managing family to the CEO (Schmid et al., 2014).

### **The Impact of CEO Managerial Ability on Innovation in Family Firms**

Prior research established that CEOs with higher specialization are more knowledgeable about yet unexplored and potentially risky innovations in the particular field, encouraging the firm to pursue such actions, using their accumulated knowledge and experience (Koo, 2019). Relying on the human capital theory, we argue that CEO human capital has a significant impact on R&D commitment and innovation investment. Particularly, CEO with industry expertise use their knowledge of the market trends and obtain professional connections to allocate resources and

particularly invest more in R&D (Bell, 2005; Faleye et al., 2018). Specialized human capital, or, in other words, deep industry expertise, helps leaders understand which investment opportunities are worth pursuing and which technological innovation is more likely to increase efficiency (West & Iansiti, 2003), as opposed to general skills, which may turn out to be irrelevant in the scope of a particular industry (Reuber & Fischer, 1997; Becker, 1964).

Further, human capital theory suggests that CEOs with more general industry knowledge and transferrable skills may find it difficult to navigate R&D expenses in an unfamiliar industry since they tend to rely on their past learnings (Hamori & Koyuncu, 2015). Li & Patel (2019) find that CEOs with higher general managerial ability struggle to align company resource at their disposal with the external market landscape and have lower R&D commitment since they have less of a grasp of internal organization and how the firm's capabilities relate to technological development or resource allocation. And while the general human capital allows CEO to formulate a more intrepid innovation strategy, their partial incompetence in internal resource allocation may limit them from large R&D spending (Crossland et al., 2014).

In the family business context, the role of the CEO is particularly nuanced due to the intertwining of family dynamics and business systems (Schmid et al., 2014b; Skorodziyevskiy et al., 2024). Unlike CEOs with higher general managerial ability, who may lack a specific understanding of industry-specific trends and technological advancements, CEOs with specialized managerial abilities are uniquely positioned to leverage their deep industry expertise to identify and capitalize on innovation opportunities that align with the firm's strategic goals and resource constraints. This capability is especially critical in family firms, where the alignment of strategic decisions with the family's legacy and long-term orientation is paramount (Schmid et al., 2014b). Furthermore, the trust and stability provided by family firms create a constructive and fruitful

environment for specialized CEOs to make risky yet calculated R&D decisions (Schmid et al., 2014b). Thus, we posit that in family firms, an increase in CEO specialized managerial ability is likely to drive an increase in R&D expenses, leveraging their expertise to balance risk and reward in innovation-related investments.

***Hypothesis 1:** In family firms, the increase in CEO specialized managerial ability leads to increased R&D expenses.*

### **The Moderating Effect of Having a Family CEO**

In family firms CEO family vs nonfamily identity plays a unique role in influencing strategic decisions. While family CEO's emotional bond with the firm often fosters a cautious approach to risk and innovation, it also allows them to exercise significant managerial discretion (D'Allura et al., 2024). This ambivalence creates a unique scenario where to evaluate the relationship between specialized managerial ability and R&D expenses. On the one hand, the deep industry expertise of a specialized CEO offers valuable insights into innovation opportunities and resource allocation, which can enhance the firm's R&D commitment. On the other hand, the family CEO's inherent priority to maintain control and protect the socio-emotional wealth of the firm may prevent these initiatives, leading to more conservative behaviours to minimize perceived threats to the family's control and legacy, even at the expense of potential innovation gains. Further, family businesses rather prefer to stay away from financing innovation using debt, as they are usually reluctant to lose managerial control (Le Breton–Miller & Miller, 2006). Consequently, family ownership decreases the firm's level of risk and makes them follow more conservative and somewhat restrictive strategies (Astrachan & Jaskiewicz, 2008; Ratten & Tajeddini, 2017; Zellweger et al., 2012). Accordingly, appointing a family CEO is considered a mechanism of socio-emotional wealth preservation (Naldi et al., 2013) as having a member of the family as a

top-tier decision-makers leads to a higher degree of managerial discretion and aligns the views of the principal (firm ownership) and the agent (CEO). This allows family CEOs to make even counter-intuitive investment decisions in favour of maintaining their own authority and family control (König et al., 2013; Kotlar et al., 2013). Building on this reasoning, we argue the following: ***Hypothesis 2: In family firms, the CEO being a family member negatively moderates the positive relationship between CEO's specialized managerial ability and R&D expenses.***

### **The Moderating Effect of Family Board Presence**

Family business researchers agree that the presence of family members on the board can have a strong influence on the firm decision-making processes (Anderson & Reeb, 2004), yet little is known about its influence on managerial ability (Baghdadi et al., 2023). More in detail, literature highlights that a high number of family members on the board foster more conservative and risk-averse decisions due to their focus on preserving socio-emotional wealth and ensuring the long-term orientation of the firm (Chrisman & Patel, 2012). This creates an environment where managerial ability is constrained, particularly in the context of R&D expenses. This idea is supported by significant empirical findings, which show that family involvement negatively influences R&D expenses (Anderson & Reeb, 2003; Liang et al., 2013; Matzler et al., 2015).

Further, having many family members sitting on the board can limit the CEO's autonomy and discretion in strategic decision-making. Family-dominated boards tend to control every CEO's move, questioning the decisions that do not align with their values and priorities (Minichilli et al., 2010). This creates an environment where the CEO's freedom to make decisions is constrained, particularly in the context of R&D expenses, which imply higher risks. Moreover, family board members' attention on preserving control and ensuring stability can prevent the firm from fully

capitalizing on the CEO's expertise, thereby diluting the positive relationship between specialized managerial ability and R&D expenses.

Consequently, a board characterized by a high presence of family members may be inclined to adopt a conservative approach to decisions, which hinder the firm's willingness to engage in innovation or commit resources to R&D projects. This translates into restraint to the CEO discretion. For these reasons, we expect that, even when a CEO with a higher specialized managerial ability proposes initiatives grounded in deep industry expertise, the inherent risk-aversion of family members may inhibit the CEO's ability to implement the proposed R&D strategies.

***Hypothesis 3:** In family firms, the increase in the number of family members present on the board negatively moderates the positive relationship between CEO's specialized managerial ability and R&D expenses.*

Figure 1 below provides a graphic representation of the hypotheses and proposed research model.

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Insert Figure 1 about here

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## **METHODS**

### **Data and Sample**

To test our hypotheses, we relied on a database we constructed considering publicly traded family firms from 2015 till 2020. To identify family firms, we followed common research practices considering at least 5% of equity shares owned by a family as a threshold (Berrone et al., 2010) and using the NRG Metrics dataset as a primary data source; this dataset is based on publicly

available data retrieved from company statements, annual financial reports, public announcements and press releases and is recognised and previously used in the family business field of research (Delis et al., 2020; Miroshnychenko et al., 2021; Rovelli et al., 2024). In doing so, we identified 2216 listed family firms. We then used the NRG Metrics dataset to gather CEO-level information, such as tenure, gender, duality, age, and, complemented with information from LinkedIn. Finally, we collected financial and firm-level data from the Thomson Reuters Refinitiv database and country-level data from the OECD Data Explorer. Due to missing data, mainly pertaining to the challenge of finding useful information to compute the Specialized Ability Index for each CEO in the sample, our final balanced panel dataset includes 56 firms with 292 firm-year observations.

### **Variables**

Our dependent variable, which measures family firms' innovation input, is *R&D expenses*. In line with prior managerial research (Chen & Hsu, 2009), we considered the natural logarithm of research and development expenses for a given firm  $i$  at time  $t$ .

To measure the specialized managerial ability of family firms' CEOs (i.e., our main independent variable), we adapted the General Ability Index (GAI) developed by (Custódio et al., 2013). The original GAI measure consists of five main components that capture the CEO's previous experience and professional background in publicly traded firms: (1) number of positions held during her/his career, (2) number of firms as well as (3) industries, where s/he worked, (4) whether s/he already worked as a CEO at a different firm, and (5) whether s/he worked for a conglomerate firm in the past (Custódio et al., 2013). After computing the GAI index following the approach of Custódio et al. (2013), we generated the variable *Specialized Ability Index (SAI)* by inverting GAI: for each observation  $t$ ,  $SAI_t = r(max) + r(min) - GAI_t$ , where  $r(max)$  and  $r(min)$  are the maximum and the minimum values of GAI respectively. The resulting variable *SAI* is

perfectly negatively correlated with GAI. Since all five components have positive coefficient signs, a higher index value corresponds to a higher level of CEO specialised managerial ability. In other words, CEOs with a higher *SAI* are considered to be more specialists than CEOs with a lower *SAI*.

Our two moderating variables are *family CEO* and *family board presence*. The former is a dummy variable equal to 1 if the CEO belongs to the family owning the firm, 0 otherwise. *Family board presence* is instead a continuous variable measuring how many board members belong to the family owning the firm.

Finally, we included several variables to control for time-varying characteristics that can influence firm innovation inputs. First, we considered a number of CEO-level control variables: *CEO age*, which is associated with risk-taking and openness for disruption (Acemoglu et al., 2014), *CEO gender*, a dummy variable equal to 1 if the CEO is male, 0 if female, *CEO tenure*, which can be linked to the accumulation of firm-specific knowledge (Chen et al., 2021), and *CEO duality*, a dummy variable equal to 1 if the CEO is also the chairman of the board, 0 otherwise. Second, we included a list of firm-level controls: *firm size*, measured by the book value of the total assets (Miroshnychenko et al., 2021), to compare firms with the same market power, risk exposure, and investment opportunities; *firm age* computed as the number of years since the firm has been established; *past performance* in terms of  $ROA_{t-1}$ , which may significant influence firm's decisions and growth (Fang et al., 2021); *debt ratio*, computed by dividing total liabilities by firm's shareholder equity, and *CAPEX intensity*, measured by capital expenditures over firm's revenue in a given year (Hitt & Tyler, 1991), to account for financial leverage; and *recoverable slack*, measured as the ratio of selling, general and administrative expenses over revenues, to take into account organisational resilience (Marlin & Geiger, 2015). Lastly, we include three macro controls

to account for country-level differences following the methodology of Miroshnychenko et al. (2021): *GDP growth* (annual growth rate in GDP for each country  $c$  calculated in percent), *trade balance* (sum of exports and imports over GDP at the year of measurement), and country's *inflation rate* in a given year  $t$ . Finally, all models include industry dummies and year dummies to account for potential unobserved heterogeneity across different industries and time periods.

### **Empirical Model**

To address the issue of endogeneity, we adopted the commonly used (Heckman, 1979) two-stage regression method. After an initial test, we selected the *geographic mobility* of the CEO as an instrument as it is highly correlated with her/his *SAI* and at the same time not related to R&D expenses. We measured *geographic mobility* as a dummy variable equal to 1 if the CEO has a different nationality and/or s/he was born in a different country from the one where the family firm s/he currently leads operates, 0 otherwise. In general terms, this variable is highly related to the concept of general and specialised managerial ability ( $\rho = -0.412$ ,  $p\text{-value} = 0.002$ ), while it is exogenous and unrelated to the family firm's R&D expenses ( $\rho = 0.068$ ,  $p\text{-value} = 0.062$ ). According to the first-stage regression results, we calculate the *Inverse Mills ratio (IMR)* that we later included in all subsequent models as a control variable. The results of the first-stage regression are presented in Table 2, Model 1 in the Appendix. The fact that *IMR* does not have a significant coefficient in the main estimation models provides us with additional reassurance that we do not have a self-selection bias when it comes to R&D expenses. Additionally, in order to avoid the selection bias, some of the missing data on CEO age, tenure, and experience was collected manually using the publicly available open source of LinkedIn. Moreover, we used a 1-year lag between the depended variable and all other predictors to decrease the chance of reverse causality (Fang et al., 2021; Matzler et al., 2015). For this reason, we collect data from 2014 till

2020, while our analysis is based on 2015-2020 time period. Lastly, prior to performing the regression analysis, we employed the Hausman specification test to validate the choice of methodology (Hausman, 1978). The test result ( $\chi^2 = 27.10$ ,  $p = 0.0566$ ) indicates that we fail to reject the null hypothesis and its more suitable to analyse our data using a random-effect model.

## RESULTS

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Insert Table 1 about here

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Table 1 shows the descriptive statistics and pairwise correlations. The average SAI is 2.16, while 55.5% of the family firms in the sample are led by a family CEO; moreover, 11.8% of the firms in the sample do not have a family representative on the board, with the highest number of family members on the board being 10. CEOs age ranges from 38 to 94 years old with 1 to 63 years of tenure within their respective firms. Only 6.7% of the observations have a female CEO. 46.9% of CEOs in the sample also hold a Chairman position. The oldest firm in the sample is 157 years old with the mean value for firm age equal to 56.3 years. The majority of the firms are US based (56.6%), followed by France, Austria, The UK, Germany and Italy. *SAI* and *R&D expenses* appear to be positively and significantly correlated ( $\rho = 0.104$ ,  $p\text{-value} = 0.041$ ), which is in line with our claims in Hypothesis 1. Moreover, while *family CEO* does not significantly correlate with *R&D expenses* ( $\rho = 0.014$ ,  $p\text{-value} = 0.786$ ), a positive and significant correlation emerged with *SAI* ( $\rho = 0.224$ ,  $p\text{-value} = 0.000$ ), suggesting that family CEOs might be more specialized than nonfamily ones. Finally, *family board presence* is negatively and positively correlated with *R&D expenses* ( $\rho = -0.125$ ,  $p\text{-value} = 0.014$ ) and *SAI* ( $\rho = 0.095$ ,  $p\text{-value} = 0.010$ ), respectively.

Despite the results of the correlation analysis do not indicate multicollinearity issues, we additionally performed a variance inflation factor analysis (VIF). The results range between 1.15 and 2.31, supporting the absence of multicollinearity (Neter et al., 1996).

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Insert Table 2 about here

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Table 2 shows the results of the longitudinal regression analysis. We begin with first stage regression of Heckman (1979) two-stage method to address potential threat of endogeneity. We find that the selected *geographic mobility* instrument variable is significant (beta = -0.385, p-value = 0.042), so we proceed with a calculating an *Inverse Mills Ratio* and including it in the later empirical models. Model 2 is the baseline regression that includes only control variables. From this model, it emerges a positive and significant relationship between *firm size* and *R&D expenses* (beta = 0.858, p-value = 0.000), which is in line with common logics in the field on innovation as well prior research, suggesting that the larger family firms are able to invest more in innovation via R&D spending. Model 3 additionally includes the independent *SAI (Specialized Ability Index)* variable, which positively and significantly relates to *R&D expenses* (beta = 0.134, p-value = 0.014). This result supports Hypothesis 1, showing that the increase in CEO specialized managerial ability relates to an increase in the family firm's innovation spending; this result is also supported by the following models.

Model 4 includes the direct effect of the two moderating variables. Only *family board presence* shows a significant, and positive, relationship with the *R&D expenses* (beta = 0.095, p-value = 0.011), suggesting that family firms with more family members involved in the board tend to have a higher R&D spending. Models from 5 and 6 show the results of the two moderating

effects, which were tested one by one. In Model 5 we tested the moderating effect of *family CEO* on the relationship between *SAI* and *R&D expenses*, which is significant and negative (beta = -0.504, p-value = 0.032). In line with Hypothesis 2, the fact that the CEO is a member of the family owning the firm weakens the positive relationship between her/his specialized managerial ability and the family firm's R&D expenses. As shown in Figure 2, in family firms led by a family CEO having a higher *SAI* even leads to a decrease in *R&D expenses* or in other words decreases the readiness to invest in innovation.

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Insert Figure 2 about here

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Model 6 depicts the moderating effect of *family board presence*. In line with Hypothesis 3, the results confirm a negative and significant moderating effect on the relationship between *SAI* and *R&D expenses* (beta = -0.058, p-value = 0.059). A closer look at the Average Marginal Effects (Figure 3) shows the relationship between *SAI* and *R&D expenses* is positive and significant when the presence of family members in the board is limited (0, 1, or 2 family directors); the relationship decreases with *family board presence* up to the point it loses its significance. This suggests that, when more than 2 family members are involved in the board, the specialized managerial ability of the CEO has no more influence on the family firm's decisions to invest in R&D.

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Insert Figure 3 about here

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## **Robustness tests**

We run some additional analyses to confirm our findings and ensure robustness. First, we tested again our hypotheses by measuring *firm size* in terms of sales (Fang et al., 2021; Kraiczy et al., 2014; Rahaman, 2011) as well as number of employees (Ettlie & Rubenstein, 1987); the use of these alternative measures of *firm size* did not affect results. Additionally, we run our analyses by substituting our continuous *SAI* variable with a *specialist CEO dummy*. In line with the original work of Custódio et al. (2013), this dummy is equal to 1 if the *SAI* for a given CEO at a given year is equal to or higher than the sample median value of the index in the same year, 0 otherwise. The coefficient of the main variables of the study preserves their direction of influence; however, the moderating effect of *family CEO* loses significance.

## **DISCUSSION**

In our study we explore the influence of CEO specialized managerial ability on innovation investments in family businesses. Our findings show that, in family firms, CEOs specialized managerial ability is positively associated with R&D expenses. If on the one hand the analysis supports the established notion that CEOs who accumulated firm- and industry-specific human capital are better at understanding a firm's need for innovation and addressing it more effectively via R&D expenses (Agnihotri & Bhattacharya, 2021; Bell, 2005; Faleye et al., 2018; Koo, 2019). On the other hand, the investigation shed new light on the concept of specialised managerial ability and the role of CEO human capital in the previously unexplored research setting of family businesses.

Nevertheless, our findings also reveal that this positive relation is contingent upon the CEO being a family member. Specifically, the positive influence that the professional expertise

connected to specialized managerial ability has on R&D expenses is negatively affected by family CEOs. This is explained by the fact that family CEO tend to show a conservative attitude toward innovation investments, link to their willingness to preserve the firm legacy and ensure its long-term orientation. This finding contributes to the literature on family business leadership (Benedetti et al., 2025; Waldkirch, 2020) by highlighting the multifaceted role of family CEOs, extending and supporting a broader view of the role of CEO in endorsing strategic choices, by relying on the specific context of family firms that is characterized by the tendency to compare and contrast the attributes belonging to family vs. nonfamily CEOs.

In line with earlier research on innovation in family firms (Block, 2012; Chrisman et al., 2015; Matzler et al., 2015; Schmidt, 2021), our analysis shows the negative influential effect of family involvement in the board on the studied relationship between CEO specialized managerial ability and R&D expenses. The presence of family members on the board weakens the main relationship between CEO specialized managerial ability is and R&D expenses. Family-dominated boards frequently repress the CEO's autonomy and decision-making freedom, particularly when these decisions involve some level of risk, such as R&D.

As opposed to the major body of empirical studies exploring innovation in family firms (Calabrò et al., 2019) we choose an input metrics to measure innovative ability. In so doing, we add on the conversation on specialist/generalist CEO characteristics taking place in the leadership literature by changing the focal point of how scholars analyse innovation. Our results are consistent with robustness checks using alternative variable definitions and address possible endogeneity concerns.

## LIMITATIONS AND FUTURE RESEARCH OUTLOOK

Our study is nonetheless affected by the following limitations. Firstly, because of the source of the managerial ability data we concentrated on public companies only, thus, we omit a huge population of unlisted SMEs and do not include the companies from emerging economies or markets that have different cultural backgrounds. Secondly, we recognise that a large part of our dataset is USA, which limits the generalisation of the obtained results as USA is a developed economy, with strong market regulation mechanisms, well established internationalisation and innovation commitments. Additionally, researchers often focus on the CEO perspective when examining how managerial decision making affects innovative strategy. But earlier research suggests that top management teams (TMT) also play an important role in strategic decision making (Finkelstein and Hambrick, 1996). Agnihotri & Bhattacharya (2021) claim that omitting TMT is one of the reasons why studies exploring the effects of general/special managerial capital often provide inconsistent results. Therefore, the implications of the research can be majorly extended by measuring the human capital as well as other characteristics of the TMT members.

## REFERENCES

- Acemoglu, D., Akcigit, U., & Celik, M. A. (2014). *Young, restless and creative: Openness to disruption and creative innovations*. National Bureau of Economic Research.
- Agcayazi, B., Lonare, G., & Tuncez, A. M. (2024). Beyond Specialization: Generalist CEOs and Their Impact on Corporate Hedging. *Available at SSRN 4849224*.
- Agnihotri, A., & Bhattacharya, S. (2021). Generalist versus specialist CEO and R&D commitment: evidence from an emerging market. *Journal of Management & Organization*, 1–17. <https://doi.org/10.1017/jmo.2021.7>
- Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership, corporate diversification, and firm leverage. *The Journal of Law and Economics*, 46(2), 653–684.
- Anderson, R. C., & Reeb, D. M. (2004). Board composition: Balancing family influence in S&P 500 firms. *Administrative Science Quarterly*, 49(2), 209–237.
- Andreou, P. C., Karasamani, I., Louca, C., & Ehrlich, D. (2017). The impact of managerial ability on crisis-period corporate investment. *Journal of Business Research*, 79, 107–122.
- Astrachan, J. H., & Jaskiewicz, P. (2008). Emotional returns and emotional costs in privately held family businesses: Advancing traditional business valuation. *Family Business Review*, 21(2), 139–149.

- Baghdadi, G. A., Safiullah, M., & Heyden, M. L. M. (2023). Do gender diverse boards enhance managerial ability? *JOURNAL OF CORPORATE FINANCE*, 79.  
<https://doi.org/10.1016/j.jcorpfin.2023.102364>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy*, 70(5, Part 2), 9–49.
- Becker, G. S. (1964). Human capital. In *New York: National Bureau of Economic Research* (3rd edition). National Bureau of Economic Research.
- Becker, G. S. (1975). Investment in human capital: effects on earnings. In *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, Second Edition* (pp. 13–44). NBER.
- Bell, G. G. (2005). Clusters, networks, and firm innovativeness. *Strategic Management Journal*, 26(3), 287–295.
- Benedetti, C., Rovelli, P., Colladon, A. F., De Massis, A., & Matzler, K. (2025). CEO identity and media perception: The influence on family firms' brand importance. *Journal of Family Business Strategy*, 16(1), 100646.
- Berrone, P., Cruz, C., Gomez-Mejia, L. R., & Larraza-Kintana, M. (2010). Socioemotional wealth and corporate responses to institutional pressures: Do family-controlled firms pollute less? *Administrative Science Quarterly*, 55(1), 82–113.
- Bettinelli, C., Lissana, E., Bergamaschi, M., & De Massis, A. (2022). Identity in family firms: toward an integrative understanding. *Family Business Review*, 35(4), 383–414.
- Betzer, A., Lee, H. S. G., Limbach, P., & Salas, J. M. (2020). Are generalists beneficial to corporate shareholders? Evidence from exogenous executive turnovers. *Journal of Financial and Quantitative Analysis*, 55(2), 581–619.
- Block, J. H. (2012). R&D investments in family and founder firms: An agency perspective. *Journal of Business Venturing*, 27(2), 248–265.
- Brown, J. A., Anderson, A., Salas, J. M., & Ward, A. J. (2017). Do investors care about director tenure? Insights from executive cognition and social capital theories. *Organization Science*, 28(3), 471–494.
- Busenbark, J. R., Krause, R., Boivie, S., & Graffin, S. D. (2016). Toward a configurational perspective on the CEO: A review and synthesis of the management literature. *Journal of Management*, 42(1), 234–268.
- Cabrera-Suárez, K., De Saá-Pérez, P., & García-Almeida, D. (2001). The succession process from a resource-and knowledge-based view of the family firm. *Family Business Review*, 14(1), 37–46.
- Calabrò, A., Vecchiarini, M., Gast, J., Campopiano, G., De Massis, A., & Kraus, S. (2019). Innovation in family firms: A systematic literature review and guidance for future research. *International Journal of Management Reviews*, 21(3), 317–355.
- Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *Journal of Management*, 30(6), 749–778.
- Chahyadi, C., Doan, T., & Naym, J. (2021). Hiring the right CEO: how does the type of CEO industry experience affect firm performance, firm risk-taking behavior, and CEO compensation? *International Journal of Business and Society*, 22(2), 828–845.

- Chen, G., Huang, S., Meyer-Doyle, P., & Mindruta, D. (2021). Generalist versus specialist CEOs and acquisitions: Two-sided matching and the impact of CEO characteristics on firm outcomes. *Strategic Management Journal*, 42(6), 1184–1214.
- Chen, H.-L., & Hsu, W.-T. (2009). Family ownership, board independence, and R&D investment. *Family Business Review*, 22(4), 347–362.
- Chrisman, J. J., Chua, J. H., De Massis, A., Frattini, F., & Wright, M. (2015). The ability and willingness paradox in family firm innovation. *Journal of Product Innovation Management*, 32(3), 310–318.
- Chrisman, J. J., Memili, E., & Misra, K. (2014). Nonfamily managers, family firms, and the winner's curse: The influence of noneconomic goals and bounded rationality. *Entrepreneurship Theory and Practice*, 38(5), 1–25.
- Chrisman, J. J., & Patel, P. C. (2012). Variations in R&D investments of family and nonfamily firms: Behavioral agency and myopic loss aversion perspectives. *Academy of Management Journal*, 55(4), 976–997.
- Chrisman, J. J., Sharma, P., Steier, L. P., & Chua, J. H. (2013). The influence of family goals, governance, and resources on firm outcomes. In *Entrepreneurship Theory and Practice* (Vol. 37, Issue 6, pp. 1249–1261). Sage Publications Sage CA: Los Angeles, CA.
- Crossland, C., Zyung, J., Hiller, N. J., & Hambrick, D. C. (2014). CEO career variety: Effects on firm-level strategic and social novelty. *Academy of Management Journal*, 57(3), 652–674.
- Custódio, C., Ferreira, M. A., & Matos, P. (2013). Generalists versus specialists: Lifetime work experience and chief executive officer pay. *Journal of Financial Economics*, 108(2), 471–492.
- Custódio, C., Ferreira, M. A., & Matos, P. (2019). Do general managerial skills spur innovation? *Management Science*, 65(2), 459–476.
- D'Allura, G. M., Mariasole, B., & Filippi, E. (2024). Innovating with heart: family firms' decision to automate with emotional responsibility. *Journal of Family Business Management*.
- Danes, S. M., Stafford, K., Haynes, G., & Amarapurkar, S. S. (2009). Family capital of family firms: Bridging human, social, and financial capital. *Family Business Review*, 22(3), 199–215.
- Darouichi, A., Kunisch, S., Menz, M., & Cannella Jr, A. A. (2021). CEO tenure: An integrative review and pathways for future research. *Corporate Governance: An International Review*, 29(6), 661–683.
- Daspit, J. J., Holt, D. T., Chrisman, J. J., & Long, R. G. (2016). Examining family firm succession from a social exchange perspective: A multiphase, multistakeholder review. *Family Business Review*, 29(1), 44–64.
- Dawson, A. (2012). Human capital in family businesses: Focusing on the individual level. *Journal of Family Business Strategy*, 3(1), 3–11.  
<https://doi.org/https://doi.org/10.1016/j.jfbs.2011.12.001>
- Delis, M. D., Hasan, I., & Ongena, S. (2020). Democracy and credit. *Journal of Financial Economics*, 136(2), 571–596.
- Demerjian, P., Lev, B., & McVay, S. (2012). Quantifying managerial ability: A new measure and validity tests. *Management Science*, 58(7), 1229–1248.
- Demerjian, P. R., Lev, B., Lewis, M. F., & McVay, S. E. (2013). Managerial ability and earnings quality. *The Accounting Review*, 88(2), 463–498.
- Epstein, D. (2021). *Range: Why generalists triumph in a specialized world*. Penguin.

- Ettlie, J. E., & Rubenstein, A. H. (1987). Firm size and product innovation. *Journal of Product Innovation Management*, 4(2), 89–108.
- Evdokimov, E., Hanlon, D., & Lim, E. K. (2022). Do Generalist CEOs Magnify Boardroom Backscratching? *Journal of Business Ethics*, 181(1), 221–247.
- Faleye, O., Hoitash, R., & Hoitash, U. (2018). Industry expertise on corporate boards. *Review of Quantitative Finance and Accounting*, 50, 441–479.
- Fang, H., Chrisman, J. J., & Holt, D. T. (2021). Strategic Persistence in Family Business. *Entrepreneurship Theory and Practice*, 45(4), 931–950.  
<https://doi.org/10.1177/10422587211001806>
- Finkelstein, S., Hambrick, D. C., & Cannella, A. A. (2009). *Strategic leadership: Theory and research on executives, top management teams, and boards*. Strategic Management.
- Francis, J., Huang, A. H., Rajgopal, S., & Zang, A. Y. (2008). CEO reputation and earnings quality. *Contemporary Accounting Research*, 25(1), 109–147.
- Gan, H. (2019). Does CEO managerial ability matter? Evidence from corporate investment efficiency. *Review of Quantitative Finance and Accounting*, 52(4), 1085–1118.
- Gómez-Mejía, L. R., Haynes, K. T., Núñez-Nickel, M., Jacobson, K. J. L., & Moyano-Fuentes, J. (2007). Socioemotional wealth and business risks in family-controlled firms: Evidence from Spanish olive oil mills. *Administrative Science Quarterly*, 52(1), 106–137.
- Gounopoulos, D., & Pham, H. (2018). Specialist CEOs and IPO survival. *Journal of Corporate Finance*, 48, 217–243.
- Graham, J. R., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics*, 109(1), 103–121.
- Habbershon, T. G., & Williams, M. L. (1999). A resource-based framework for assessing the strategic advantages of family firms. *Family Business Review*, 12(1), 1–25.
- Hambrick, D. C., & Fukutomi, G. D. S. (1991). The seasons of a CEO's tenure. *Academy of Management Review*, 16(4), 719–742.
- Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 9(2), 193–206.
- Hamori, M., & Koyuncu, B. (2015). Experience matters? The impact of prior CEO experience on firm performance. *Human Resource Management*, 54(1), 23–44.
- Hausman, J. A. (1978). Specification tests in econometrics. *Econometrica: Journal of the Econometric Society*, 1251–1271.
- Heckman, J. J. (1979). Sample selection bias as a specification error. *Econometrica: Journal of the Econometric Society*, 153–161.
- Herrmann, P., & Datta, D. K. (2005). Relationships between top management team characteristics and international diversification: An empirical investigation. *British Journal of Management*, 16(1), 69–78.
- Herrmann, P., & Datta, D. K. (2006). CEO experiences: Effects on the choice of FDI entry mode. *Journal of Management Studies*, 43(4), 755–778.
- Hillman, A. J., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review*, 28(3), 383–396.
- Holcomb, T. R., Holmes Jr, R. M., & Connelly, B. L. (2009). Making the most of what you have: Managerial ability as a source of resource value creation. *Strategic Management Journal*, 30(5), 457–485.

- Huang, H.-W., Rose-Green, E., & Lee, C.-C. (2012). CEO age and financial reporting quality. *Accounting Horizons*, 26(4), 725–740.
- Jaskiewicz, P., Block, J. H., Combs, J. G., & Miller, D. (2017). The effects of founder and family ownership on hired CEOs' incentives and firm performance. *Entrepreneurship Theory and Practice*, 41(1), 73–103.
- Kano, L., & Verbeke, A. (2019). Theories of the multinational firm: A microfoundational perspective. *Global Strategy Journal*, 9(1), 117–147.
- Katz, R. L. (1971). *Skills of a Effective Administrator* (E. C. Bursk & T. B. Blodgett, Eds.). Harvard University Press.
- Kitchell, S. (1997). CEO characteristics and technological innovativeness: A Canadian perspective. *Canadian Journal of Administrative Sciences/Revue Canadienne Des Sciences de l'Administration*, 14(2), 111–121.
- König, A., Kammerlander, N., & Enders, A. (2013). The family innovator's dilemma: How family influence affects the adoption of discontinuous technologies by incumbent firms. *Academy of Management Review*, 38(3), 418–441.
- Koo, K. (2019). Do not change horses: specialist CEOs enhance innovation. *Technology Analysis & Strategic Management*, 31(8), 875–887.
- Kotlar, J., De Massis, A., Frattini, F., Bianchi, M., & Fang, H. (2013). Technology acquisition in family and nonfamily firms: A longitudinal analysis of Spanish manufacturing firms. *Journal of Product Innovation Management*, 30(6), 1073–1088.
- Kraiczy, N. D., Hack, A., & Kellermanns, F. W. (2014). New product portfolio performance in family firms. *Journal of Business Research*, 67(6), 1065–1073.
- Kraiczy, N. D., Hack, A., & Kellermanns, F. W. (2015). What makes a family firm innovative? CEO risk-taking propensity and the organizational context of family firms. *Journal of Product Innovation Management*, 32(3), 334–348.
- Le Breton-Miller, I., & Miller, D. (2006). Why do some family businesses out-compete? Governance, long-term orientations, and sustainable capability. *Entrepreneurship Theory and Practice*, 30(6), 731–746.
- Lefebvre, E., & Lefebvre, L. A. (1992). Firm innovativeness and CEO characteristics in small manufacturing firms. *Journal of Engineering and Technology Management*, 9(3–4), 243–277.
- Li, M., & Patel, P. C. (2019). Jack of all, master of all? CEO generalist experience and firm performance. *Leadership Quarterly*, 30(3), 320–334.
- Liang, Q., Li, X., Yang, X., Lin, D., & Zheng, D. (2013). How does family involvement affect innovation in China? *Asia Pacific Journal of Management*, 30, 677–695.
- Lin, Z., Patel, P., & Oghazi, P. (2021). The value of managerial ability and general ability for inventor CEOs. *Journal of Business Research*, 135, 78–98.
- Lu, Q., Wan, G. G., & Xu, L. (2024). Generalist Versus Specialist CEOs and the Scope of Corporate Social Responsibility. *Journal of Business Ethics*.
- Ma, Z., Ruan, L., Wang, D., & Zhang, H. (2021). Generalist CEOs and Credit Ratings\*. *Contemporary Accounting Research*, 38(2), 1009–1036.
- Magerakis, E. (2022). The importance of managerial discretion on managerial ability–firm cash holding nexus. *Management Decision*, 60(12), 3275–3303.
- Marlin, D., & Geiger, S. W. (2015). A reexamination of the organizational slack and innovation relationship. *Journal of Business Research*, 68(12), 2683–2690.

- Martino, P., Rigolini, A., & D'Onza, G. (2020). The relationships between CEO characteristics and strategic risk-taking in family firms. *Journal of Risk Research*, 23(1), 95–116.
- Matzler, K., Veider, V., Hautz, J., & Stadler, C. (2015). The impact of family ownership, management, and governance on innovation. *Journal of Product Innovation Management*, 32(3), 319–333.
- Michael, S. R. (1961). Developing Managers out of Creative Specialists. *Research Management*, 4(2), 119–131.
- Miller, D., Le Breton-Miller, I., Minichilli, A., Corbetta, G., & Pittino, D. (2014). When do non-family CEO s outperform in family firms? Agency and behavioural agency perspectives. *Journal of Management Studies*, 51(4), 547–572.
- Minichilli, A., Corbetta, G., & MacMillan, I. C. (2010). Top management teams in family-controlled companies: 'familiness', 'faultlines', and their impact on financial performance. *Journal of Management Studies*, 47(2), 205–222.
- Miroshnychenko, I., De Massis, A., Miller, D., & Barontini, R. (2021). Family business growth around the world. *Entrepreneurship Theory and Practice*, 45(4), 682–708.
- Mishra, D. R. (2014). The dark side of CEO ability: CEO general managerial skills and cost of equity capital. *JOURNAL OF CORPORATE FINANCE*, 29, 390–409.  
<https://doi.org/10.1016/j.jcorpfin.2014.10.003>
- Murphy, K. J., & Zbojnik, J. (2007). Managerial capital and the market for CEOs. *Available at SSRN 984376*.
- Nadkarni, S., & Herrmann, P. O. L. (2010). CEO personality, strategic flexibility, and firm performance: The case of the Indian business process outsourcing industry. *Academy of Management Journal*, 53(5), 1050–1073.
- Naldi, L., Cennamo, C., Corbetta, G., & Gomez-Mejia, L. (2013). Preserving socioemotional wealth in family firms: Asset or liability? The moderating role of business context. *Entrepreneurship Theory and Practice*, 37(6), 1341–1360.
- Naldi, L., Nordqvist, M., Sjöberg, K., & Wiklund, J. (2007). Entrepreneurial orientation, risk taking, and performance in family firms. *Family Business Review*, 20(1), 33–47.
- Neter, J., Kutner, M. H., Nachtsheim, C. J., & Wasserman, W. (1996). *Applied linear statistical models*.
- Orens, R., & Reheul, A.-M. (2013). Do CEO demographics explain cash holdings in SMEs? *European Management Journal*, 31(6), 549–563.
- Park, H. D., & Tzabbar, D. (2016). Venture capital, CEOs' sources of power, and innovation novelty at different life stages of a new venture. *Organization Science*, 27(2), 336–353.
- Quigley, T. J., & Graffin, S. D. (2017). Reaffirming the CEO effect is significant and much larger than chance: A comment on F itza (2014). *Strategic Management Journal*, 38(3), 793–801.
- Rahaman, M. M. (2011). Access to financing and firm growth. *Journal of Banking & Finance*, 35(3), 709–723.
- Ramón-Llorens, M. C., García-Meca, E., & Duréndez, A. (2017). Influence of CEO characteristics in family firms internationalization. *International Business Review*, 26(4), 786–799.
- Ratten, V., & Tajeddini, K. (2017). Innovativeness in family firms: an internationalization approach. *Review of International Business and Strategy*, 27(2), 217–230.

- Reuber, A. R., & Fischer, E. (1997). The influence of the management team's international experience on the internationalization behaviors of SMEs. *Journal of International Business Studies*, 28, 807–825.
- Rovelli, P., Razen, M., Benedetti, C., Schweiger, N., De Massis, A., & Matzler, K. (2024). Is Cain more able? A behavioral perspective on the relationship between family CEO birth order and family firms' CSR. *Strategic Entrepreneurship Journal*.
- Salvato, C., Minichilli, A., & Piccarreta, R. (2012). Faster route to the CEO suite: Nepotism or managerial proficiency? *Family Business Review*, 25(2), 206–224.
- Schmid, T., Achleitner, A.-K., Ampenberger, M., & Kaserer, C. (2014). Family firms and R&D behavior—New evidence from a large-scale survey. *Research Policy*, 43(1), 233–244.
- Schmidt, M. B. (2021). On the evolution of athlete anthropometric measurements: racial integration, expansion, and steroids. *Empirical Economics*, 61(6), 3419–3443.  
<https://doi.org/10.1007/s00181-020-02012-0>
- Schultz, T. W. (1961). Investment in human capital. *The American Economic Review*, 51(1), 1–17.
- Schulze, W. S., Lubatkin, M. H., & Dino, R. N. (2003). Exploring the agency consequences of ownership dispersion among the directors of private family firms. *Academy of Management Journal*, 46(2), 179–194.
- Schulze, W. S., Lubatkin, M. H., Dino, R. N., & Buchholtz, A. K. (2001). Agency relationships in family firms: Theory and evidence. *Organization Science*, 12(2), 99–116.
- Sciascia, S., Nordqvist, M., Mazzola, P., & De Massis, A. (2015). Family ownership and R&D intensity in small-and medium-sized firms. *Journal of Product Innovation Management*, 32(3), 349–360.
- Serfling, M. A. (2014). CEO age and the riskiness of corporate policies. *Journal of Corporate Finance*, 25, 251–273.
- Shen, W., & Cannella Jr, A. A. (2002). Revisiting the performance consequences of CEO succession: The impacts of successor type, postsuccession senior executive turnover, and departing CEO tenure. *Academy of Management Journal*, 45(4), 717–733.
- Sirmon, D. G., & Hitt, M. A. (2003). Managing resources: Linking unique resources, management, and wealth creation in family firms. *Entrepreneurship Theory and Practice*, 27(4), 339–358.
- Skorodiyevskiy, V., Chandler, J. A., Chrisman, J. J., Daspit, J. J., & Petrenko, O. V. (2024). The family business CEO: A review of insights and opportunities for advancement. *Journal of Small Business Management*, 62(6), 2965–3015.
- Smith, M., & White, M. C. (1987). Strategy, CEO Specialization, and Succession. *Administrative Science Quarterly*, 32(2), 263–280.  
<https://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=4013960&site=ehost-live>
- Waldkirch, M. (2020). Non-family CEOs in family firms: Spotting gaps and challenging assumptions for a future research agenda. *Journal of Family Business Strategy*, 11(1), 100305.
- Waldkirch, M., Nordqvist, M., & Melin, L. (2018). CEO turnover in family firms: How social exchange relationships influence whether a non-family CEO stays or leaves. *Human Resource Management Review*, 28(1), 56–67.

- Wang, G., Holmes Jr, R. M., Oh, I., & Zhu, W. (2016). Do CEOs matter to firm strategic actions and firm performance? A meta-analytic investigation based on upper echelons theory. *Personnel Psychology*, *69*(4), 775–862.
- West, J., & Iansiti, M. (2003). Experience, experimentation, and the accumulation of knowledge: the evolution of R&D in the semiconductor industry. *Research Policy*, *32*(5), 809–825.
- Xu, L. (2022). CEO general work experience and FDI-based internationalization. *Journal of Strategy and Management*. <https://doi.org/10.1108/JSMA-06-2022-0112>
- Xu, L. (2023). CEO general work experience and FDI-based internationalization. *Journal of Strategy and Management*, *16*(2), 323–340.
- Yuan, Y., Tian, G., Lu, L. Y., & Yu, Y. (2019). CEO ability and corporate social responsibility. *Journal of Business Ethics*, *157*, 391–411.
- Zellweger, T. (2007). Time horizon, costs of equity capital, and generic investment strategies of firms. *Family Business Review*, *20*(1), 1–15.
- Zellweger, T. M., Nason, R. S., & Nordqvist, M. (2012). From longevity of firms to transgenerational entrepreneurship of families: Introducing family entrepreneurial orientation. *Family Business Review*, *25*(2), 136–155.
- Zhou, H. Y., Liu, H., Cao, W., & Zhou, J. F. (2024). Three-way interaction effect of specialist CEOs, structural inertia, and environmental uncertainty on firm performance: evidence from Chinese manufacturing industry. *Asia Pacific Business Review*.

## APPENDIX

### TABLE 1

#### Sample Descriptive Statistics: Means, Standard Deviations, and Correlations

*Note.* R&D - research and development expenses, in mio USD; SD - standard deviation;

All the definitions of variables are provided in the Data section. Industry and time dummies are not shown in the table. \* $p < .05$ .

Variables	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) R&D Expenses	1.31	4.581																	
(2) SAI	2.16	1.99	.104*																
(3) Family CEO	0.56	0.49	.014	.224*															
(4) Family board presence	1.68	1.29	-.125*	.095*	.261*														
(5) CEO age	65.49	9.85	-.153*	-.027	.064	.210*													
(6) CEO gender	0.93	0.25	.069	.094*	.024	-.019	.053												
(7) CEO tenure	21.23	12.22	.011	.150*	.446*	.173*	.354*	.154*											
(8) CEO duality	0.47	0.49	.094	.255*	.424*	-.014	-.058	.070	.199*										
(9) Firm size	250.88	52.72	.571*	-.079	-.009	-.098	-.173*	-.104*	.013	.139*									
(10) Firm age	56.34	35.21	-.025	-.163*	-.272*	-.012	.091*	-.129*	-.013	-.286*	-.004								
(11) Past performance	3.06	6.89	.388*	-.088	-.118*	-.134*	-.123*	-.126*	.025	-.202*	.373*	.076							
(12) Debt ratio	0.70	0.95	-.035	-.178*	-.025	-.070	.005	-.034	.105*	-.009	.252*	.058	.074						
(13) CAPEX intensity	0.06	0.07	-.193*	-.129*	-.084	-.106*	-.250*	.035	-.079	.063	.115*	-.219*	-.063	.148*					
(14) Recoverable slack	0.32	0.19	.330*	.071	.037	-.073	-.217	-.147*	-.021	.184*	-.019	-.178*	.122*	-.151*	.011				
(15) GDP growth	1.65	2.21	.037	.085*	-.054	-.102*	.007	.018	-.075*	.124*	.131*	-.117*	.087	-.0075	.008	-.034			
(16) Trade balance	0.49	0.31	-.199*	-.344*	.118*	.053	-.0077*	.012	-.130*	-.263*	-.312*	.156*	-.201*	-.196*	-.036	-.179*	-.247*		
(17) Inflation rate	1.26	1.65	-.283*	-.180*	.066	.042	.107*	-.225*	-.054	.005	.077	-.004	-.049	.033	-.009	-.056	.155*	.034	
(18) Geographic mobility	0.63	0.48	.068	-.412*	-.050	-.147*	.034	.109*	.011	.008	-.019	-.307*	.093	-.107*	-.096	.052	.206*	-.084*	.011

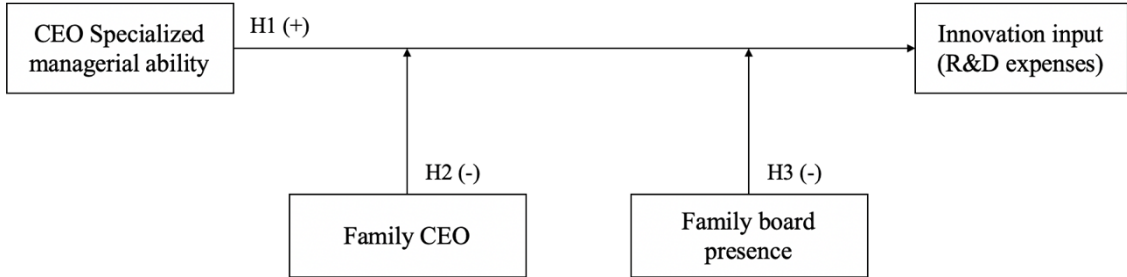
**TABLE 2**

**Random-effects regression estimations**

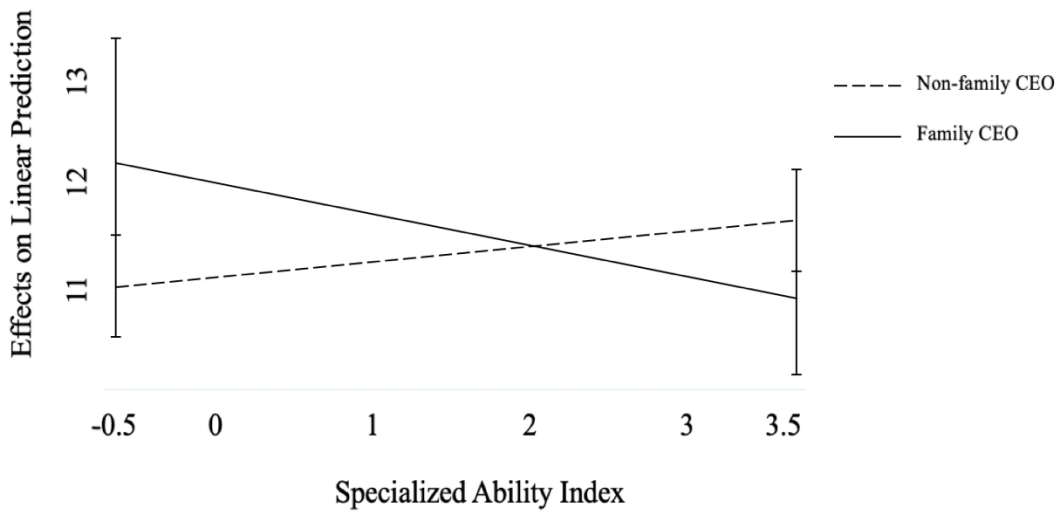
*Note: Model 1 presents a first stage of Heckman probit regression. Significance levels: \*  $p < .10$ ; \*\*  $p < .05$ ; \*\*\*  $p < .01$ .*

Dependent variable	Specialized Managerial Ability		R&D expenses			
	(1)	(2)	(3)	(4)	(5)	(6)
SAI			.134**	.134**	.166***	.204***
Family CEO				-.120	1.028*	-.083
SAI x Family CEO					-.504**	
Family board presence				.095**	.104***	.195***
SAI x Family board presence						-.058*
CEO age	-.15	.011**	.014**	.012	.010*	.010*
CEO gender	.281	-.103	-.087	-.120	-.047	-.033
CEO tenure	.008	-.015	-.018***	-.018**	-.018***	-.017**
CEO duality	.258	.028	-.017	.014	.008	-.011
Firm size	.044	.858***	.858***	.864***	.852***	.877***
Firm age	-.009***	-.056	-.002	-.002	-.005	.004
Past performance	-.037**	.005	.011	.011	.008	.008
Debt ratio	-.428***	-.002	.094	.082	.067	.076
CAPEX intensity	-1.152**	.368	1.321	1.13	.808	.766
Recoverable slack	-4.461**	.281	.479	.512	.397	.465
GDP growth	-.062**	-.017	-.007	-.015	-.014	-.011
Trade balance	-1.476***	.636	1.063	.978	.538	.826
Inflation rate	-.055	.032	.041	.006	.007	-.002
CEO Geographic mobility	-.385**					
Inverse Mills Ratio			-.299	-.237	-.171	-.186
Constant	2.324*	-6.250***	-6.932***	-6.812***	-6.958***	-7.268***
Industry dummies	No	Yes	Yes	Yes	Yes	Yes
Year dummies	No	Yes	Yes	Yes	Yes	Yes
$R^2$	0.1926	0.6762	0.6741	0.6638	0.6864	0.6756
<i>Number of firms</i>		56	56	56	56	56
<i>Observations</i>	292	292	292	292	292	292
<i>chi2-statistics</i>		214.65	220.82	226.82	234.05	232.35
<i>Absolute log likelihood</i>	-154.18					

**FIGURE 1**  
**Proposed research model**



**FIGURE 2**  
**Predicted values of *R&D expenses* for family firms led by a family and a nonfamily CEO**



**FIGURE 3**

**Average marginal effects of *SAI* on *R&D expenses* at the different levels of *family board presence* (95% confidence interval)**

