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Research in International Business and Finance

journal homepage: www.elsevier.com/locate/ribaf

Going greener, performing better? The case of private family firms

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ARTICLE INFO

JEL Classification:

M10

M14

O13

Keywords:

Family firms

Green innovation

Performance

Top management team

Upper echelons

ABSTRACT

In line with recent developments stressing the contextual sensitivity of the performance implications of sustainable development goals, this article explores the relationship between green innovation adoption and performance in private family firms. Drawing on the upper echelons theory, this research suggests that the influence of green innovation adoption on performance is contingent upon two important family-firm specific sources of top management team (TMT) diversity: family involvement and generational involvement. Using a sample of 191 private family firms, our results show that the positive impact of green innovation adoption on performance is attenuated as the ratio of family members involved in the TMT increases. In contrast, a higher number of generations involved in the TMT strengthens the positive relationship between green innovation adoption and performance. Our findings contribute to the scarce literature on sustainable development goals and green innovation in the family business context, stressing that the type of family involvement in the TMT conditions the ability of private family firms to turn green behaviors into performance gains.

1. Introduction

Over the last decades, Sustainable Development Goals (SDGs) have received increasing attention from researchers due to their role in economic development, employment and environmental preservation (Dorninger et al., 2021). Most works have shown interest in studying SDGs in large firms (Bai et al., 2019; Huang and Wang, 2020; Rehman et al., 2021), whereas private family firms have been largely overlooked (Aiello et al., 2021). Yet, scholars argue that analyzing SDGs in this type of organizations is particularly relevant since they care more about stakeholders (Cennamo et al., 2012), act as benevolent citizen of their community (Le Breton-Miller and Miller, 2016) and are highly concerned with the protection of the ecosystem and the environment for next-generation family members (Delmas and Gergaud, 2014). In addition, given the ubiquity of private family firms across the globe (De Massis et al., 2018a), it has become imperative to account for their specific nature with respect to SDGs to enrich the ongoing debate on the organizational forces that drive sustainable practices (Miroshnychenko and De Massis, 2022).

Prior research emphasizes the multidimensionality of SDGs that encompass social, economic and environmental dimensions (Casini et al., 2019; Huan et al., 2021). Given its critical importance for mitigating climate change, the environmental dimension of SDGs has received increasing interest from scholars that explore a large variety of organizational practices aimed at reducing gas emissions and

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<https://doi.org/10.1016/j.ribaf.2022.101784>

Received 22 September 2021; Received in revised form 15 June 2022; Accepted 3 October 2022

Available online 8 October 2022

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increasing environmental well-being (Ramzan et al., 2021; Sheikh, 2019; Ullah et al., 2021; Yu et al., 2020). Within this research stream, several studies have directed their attention towards green innovation adoption, i.e., the adoption of new technical improvement or administrative practices that significantly attenuates environmental risk, impact and pollution (Aboelmaged and Hashem, 2019). However, the analysis of green innovation practices in private family firms is only emerging (Ardito et al., 2019), most scholars claiming that innovation decisions in these firms are driven by criteria that go beyond financial objectives, including stakeholder and community protection (Cennamo et al., 2012), which stimulates proactive environmental (innovation) practices (Huang et al., 2009; Kim et al., 2017; Mariani et al., 2021).

While the current body of literature has delved into the antecedents of green innovation adoption in private family firms (Ardito et al., 2019; Dangelico et al., 2019), no study to date has empirically investigated its performance implications. This is a major gap considering that the distinctive traits of private family firms in terms of resource allocation, human capital and networks (Calabrò et al., 2019) might place them in a favorable position to draw the financial benefits of green innovations. Indeed, previous works points out that private family firms typically make parsimonious use of their resources (Duran et al., 2016), invest continuously in employee training programs to acquire highly technical skills (Neckebrouck et al., 2018) and establish long-term relationships with key external stakeholders that provide area-specific knowledge (Mani and Durand, 2019). In this article, we argue that these idiosyncratic features might significantly enhance their ability to cope with the challenges of green innovations that require more resources, diversified knowledge and specialized skills to generate performance gains (Tang et al., 2018).

Several studies have also highlighted that the top management team (TMT) is crucial to elucidate the performance outcomes of green innovation (Lee et al., 2021). This is even more likely in private family firms where family members usually occupy TMT positions (Alayo et al., 2019; Sánchez-Marín et al., 2020) and have significant influence in the design and the day-to-day implementation of strategic choices (Scholes et al., 2021; Neffe et al., 2021). In that context, the family's participation in the TMT drives specific sources of TMT diversity that influence innovation strategy and its performance outcomes (Arzubiaga et al., 2019; Matzler et al., 2015). Drawing on the upper echelons theory (Hambrick and Mason, 1984), this study proposes to examine how the relationship between green innovation adoption and performance is affected by the most salient family firm-specific sources of TMT diversity (Kraiczky et al., 2014): family involvement in the TMT, i.e., the ratio of family members in the TMT (Bauweraerts et al., 2020), and generational involvement, i.e., the number of generations involved in the TMT (Sciascia et al., 2013). Our contention is that each source of family-induced TMT diversity must be considered separately since they may represent either an asset or a liability for the conversion of green innovation into profits (Kraiczky et al., 2014).

Based on a sample of 191 Belgian private family firms, hierarchical ordinary least square (OLS) regressions show that green innovation adoption has a positive influence on private family firms' performance. Our results also indicate that family involvement in the TMT weakens the positive relationship between green innovation adoption and performance, whereas generational involvement strengthens this positive link. Altogether, these findings have some managerial implications. First, by highlighting the positive performance consequences of green innovation adoption, this study could be of high interest for family business advisors that can use it to make family owners and managers more conscious of the value creating potential of green innovation practices. In other words, this research could be very helpful in convincing reluctant family owners and managers about the benefits of green innovation. This could also drive some reflections among family members about the importance of considering other organizational and environmental practices that support the sustainable development of the business while keeping it profitable. Furthermore, our results also indicate that TMT composition should be correctly balanced to reap the financial benefits of green innovation. Indeed, having multiple generations involved in the TMT and avoiding an excessive proportion of family managers in the upper echelons represent two key conditions to foster green innovation effectiveness. These findings could thus contribute to sensitize family owners and managers to the importance of fostering TMT diversity through the involvement of succeeding generations and nonfamily managers to support green innovation efforts.

Beyond these practical implications, this study provides several theoretical contributions to the SDGs, green innovation and family business literatures. First, by clarifying the relationship between green innovation adoption and performance in private family firms, this research addresses a recent call for more context-based analyses of the performance implications of sustainable practices rooted in the environmental dimension of SDGs (Martí-Ballester, 2021). Indeed, given the multidimensional and context-sensitive nature of SDGs, studying how the materialization of their individual dimensions impact performance in specific organizational settings is insightful to reconcile conflicting findings about the SDGs-performance link (Muhmad and Muhamad, 2020). In this study, we underline that private family firms represent an ideal context for achieving greater performance from green innovation adoption, thereby deepening our knowledge of the business contexts in which the pursuit of sustainable practices related to the environmental dimension of SDGs contribute to value creation (Mariani et al., 2021). Second, this article is the first to dress a more accurate picture of the green innovation-performance relationship in private family firms by highlighting how different types of family influence affect this link. Studying the effect of various forms of family influence is insightful to better reflect the heterogeneous features existing among family firms (Calabrò et al., 2019) and delineate how they shape the ability of these firms to turn green innovation into profits. More specifically, this research disaggregates family influence into family and generational involvement in the TMT, shedding new light on the advantages and disadvantages of distinctive sources of family-induced TMT diversity for green innovation effectiveness. By dressing such a nuanced perspective, this study refines our knowledge on the bright and dark sides of family influence (Dyer, 2018) and adds to recent research developments calling for the systematic integration of family firm-specific sources of TMT diversity into the analysis of innovation and performance (D'Allura, 2019). Lastly, this article contributes to the upper echelons theory at a broader level. Upper echelons theorists have recently received criticism for mainly focusing on generic demographic variables (e.g., age, educational background, tenure) that do not fully capture the cognitive complexity of the TMT (Neely Jr et al., 2020). This study attempts to overcome this limitation by acknowledging the pivotal role of family-induced TMT diversity (i.e., family and generational

involvement) in shaping the TMT's cognition. In doing so, this research refines our understanding of the deep-level factors of TMT composition that condition family firm outcomes (Pittino et al., 2020). In addition, while family business scholars have widely acknowledged dominance as one prominent aspect of family influence in the upper echelons of private family firms (Halder et al., 2021), this study stresses the importance of considering its multifaceted nature by highlighting the contrasted effects of family and generational involvement in the TMT. As such, this article offers a more fine-grained view of the variegated influence the family might have as the dominant faction of the TMT.

The remainder of this article is structured as follows. We first discuss the theoretical background of the study and develop the research hypotheses. The next section explains the data collection method and measures used in the study. We then present the results. Finally, we discuss our findings, acknowledge the study's limitations, explain its implications, and suggest directions for future research.

2. Theoretical background and hypotheses development

2.1. SDGs and green innovation adoption in family firms

Sustainable development is a wide concept that has yielded plenty of definitions in the academic literature (Di Vaio et al., 2020; Mensah, 2019). Among them, the most frequently cited is that of the World Commission on Environment and Development (WCED) (e.g., Ernst et al., 2022; Imran et al., 2014), according to which sustainable development refers to a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, p. 43). To foster sustainable development, the United Nations General Assembly designed a document presenting 17 SDGs and 169 targets that provide guidelines aimed at supporting social inclusion, environmental sustainability, and economic development at the horizon of 2030 (Monteiro et al., 2019). A central argument of this document is that sustainable development strongly depends on the management of the natural environment and its resources, explicitly calling on corporations for a better integration of environmentally-oriented practices (Centobelli et al., 2020).

Driven by the tightening of environmental standards set up by the climate change agreements (Umar et al., 2020) and the greater awareness of the benefits of environmentally-oriented activities by managers and investors (Wong et al., 2018), an emerging research stream has concentrated its attention on studying environmental sustainability (Ullah et al., 2021). This has resulted in an increasing number of works dealing with green innovation adoption, i.e., "the production, assimilation, or exploitation of a product, process, service, or method that significantly reduces environmental risks, pollution, and other negative impacts" (Abouelmaged and Hashem, 2019, p. 857), in large manufacturing or service firms (e.g., Bai et al., 2019; Huang and Wang, 2020; Rehman et al., 2021), whereas the family business context has been rarely considered (Aiello et al., 2021). Indeed, prior studies have largely investigated various aspects that contribute to sustainable development in family firms, including corporate social responsibility and environmental management, but only few of them have specifically targeted green innovation (Mariani et al., 2021). There is thus a promising avenue for further investigation given the increasing interest of private family firms in engaging in green innovation practices (Ardito et al., 2019). This article tries to bring novel insights into this line of research by exploring the relationship between green innovation and performance in family firms.

2.2. Green innovation adoption and performance in family firms

Green innovation adoption has become a significant means to develop a competitive advantage and sustain firm performance (Zhang et al., 2019). In that sense, previous works suggest that, through their active involvement in green innovation, firms can enhance their reputation, affirm their brand name, attract new customers, develop breakthrough innovations, reduce costs and increase resource efficiency to outperform their competitors in the marketplace (e.g., Lin et al., 2013; Tang et al., 2018; Xue et al., 2019). Empirical evidence tends to corroborate this line of argumentation since most studies report a positive relationship between various forms of green innovation behaviors and firm performance (see Tang et al. (2018) for a comprehensive review). However, recent studies call for more contextualization of the performance implications of green innovation, arguing that the organizational, institutional and environmental contexts condition the pecuniary realization of green innovation initiatives (de Azevedo Rezende et al., 2019; Guo et al., 2020; Zhang et al., 2020). Ascribing to that view, this research proposes to investigate the relationship between green innovation adoption and performance in private family firms.

In the scarce literature at the intersection of the green innovation and family business literature, most studies have compared family and nonfamily firms in their approach to green innovation, yielding mixed findings. On the one hand, some scholars argue that family owners' long-term orientation and strong desire to perpetuate a good family image and reputation across generations make family firms more inclined to adopt green innovative behaviors (Ardito et al., 2019; Huang et al., 2009; Kim et al., 2017). On the other hand, some researchers suggest that the risk-averse culture of family firms reduces their propensity to commit considerable amounts of resources to green innovation because its payoff remains relatively uncertain (Huang et al., 2016; Samara et al., 2018). Other studies also reveal no significant differences between family and nonfamily firms in their inclination towards green innovation even though they are not sharing the same motivations to engage in green behaviors (Dangelico et al., 2019; Doluca et al., 2018). While no consensus emerges on the question whether family firms are more oriented towards green innovation than nonfamily firms, we believe that less controversy will surround the performance implications of green innovation in private family firms. More specifically, we posit that private family firms are perfectly equipped to efficiently convert green innovation into profits for several reasons.

First, due to their strong influence over the organization, their undiversified wealth and their reluctance to renounce family control,

family owners have an important incentive to ensure efficient monitoring of (green) innovation developments (Demian et al., 2018). Using their disproportionate power in the business to closely monitor and influence managers, family owners can glean crucial information about the promise of green innovation initiatives and structure managerial activities in a way that reduces inefficiencies resulting from the pursuit of diverging projects by managers (Duran et al., 2016). Moreover, as family owners are unwilling to rely on external financial resources (Ramalho et al., 2018), their higher level of control enables them to guarantee that the firm’s internal resources are parsimoniously allocated (Hu and Hughes, 2020), thereby enhancing the transformation of green innovation activities into performance gains.

Second, family owners’ propensity to establish and perpetuate long-term relationships with stakeholders allow them to expand the firm-level network (Mani and Durand, 2019), which contributes to acquire specific resources and capabilities that support the implementation of green innovation. Indeed, many studies have shown the essential role of stakeholders in providing information and knowledge outside the firm’s core domain to secure the pecuniary realization of green innovation efforts (e.g., Dangelico and Ponzandolfo, 2015; Fliaster and Kolloch, 2017; Liu et al., 2021). For instance, Dangelico (Dangelico, 2016) stresses the need for building strong relationships with stakeholders both within (suppliers and customers) and outside the supply chain (government agencies and nongovernmental organizations) to ensure the successful deployment of green innovation. In a similar vein, Arfi, Hikkerova and Sahut (Arfi et al., 2018) reveal that the combination of knowledge from various stakeholders is key to secure the financial benefits of such initiatives. Through their superior ability to develop trust-based relationships with their stakeholders (Zellweger et al., 2019), private family firms are thus particularly well-equipped to integrate novel ideas and perspectives from their networks to support the transformation of green innovation into profits.

Third, private family firms usually possess an outstanding human capital that can contribute to the financial success of green innovation. As with external stakeholders, family firms build long-lasting relationships with their employees that are often considered as an extension of the family (Vallejo, 2009). Accordingly, employees are highly committed to the organization and, thanks to their longer tenure, acquire experience and develop task-, product- and market-specific knowledge (Duran et al., 2016). In addition, prior research points out the proclivity of some family firms to generously invest in off-site training, which tends to be less firm-specific, to complement employees’ tacit knowledge and reinforce their commitment to the business (Neckebrouck et al., 2018). Building on this superior human capital, family firms are more able to develop a comprehensive strategic decision-making process, which fosters thorough analyses of strategic options and their effective implementation (Carr et al., 2020). This is especially important for the financial success of green innovation which is conditional on the realization of tests and experiments that allow decision-makers to reduce the uncertainty surrounding the financial outcome of green-oriented initiatives (Tang et al., 2018). Based on this discussion, we argue that private family firms will be particularly suited to effectively convert green innovation into performance. Thus, the following hypothesis is proposed:

Hypothesis 1. The relationship between green innovation adoption and performance is positive in private family firms.

While previous studies widely recognized the necessity to refine our understanding of the green innovation-performance relationship by identifying moderating variables (e.g., Aguilera-Caracuel and Ortiz-de-Mandojana, 2013; Tang et al., 2018; Xue et al., 2019; Zhang et al., 2019), no research to date has adopted such an approach in the family business context. This is quite surprising considering the extensive literature acknowledging the heterogeneity of family firms and its effect on their ability to turn strategic decisions into performance gains (Berrone et al., 2020; Dyer, 2018; Hansen et al., 2020; Kinias, 2022). This study aims to address this gap by investigating how the main family firm-specific sources of TMT diversity affect the relationship between green innovation adoption and performance: family involvement in the TMT, i.e., the proportion of family members in the TMT (Kraiczky et al., 2014), and generational involvement, i.e., the number of generations simultaneously involved in the TMT (Sciascia et al., 2013). An illustration of our conceptual model is presented in Fig. 1.

2.3. The moderating role family firm-specific sources of TMT diversity

Most research studying the effect of the TMT on the firm’s strategy and outcomes relies on upper echelons theory (Hambrick and Mason, 1984). The central tenet of this theory is that TMT members’ values, personalities and experiences exert great influence on their

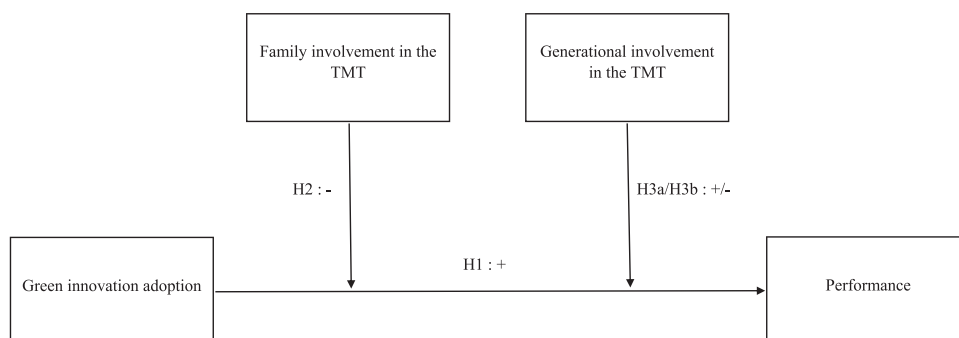


Fig. 1. Conceptual model.

vision, perception, interpretation, strategic choices, and ultimately on firm outcomes (Chen et al., 2019; Fernando et al., 2020). Decisions and organizational actions are thus the result of behavioral factors that mirror the idiosyncrasies of decision-makers (Hambrick, 2007). Upper echelons theorists have widely explored how individual executives' characteristics and traits impact organizational decisions and performance (Arena et al., 2018; Bauweraerts et al., 2022; Wang et al., 2016), some of them emphasizing the role of the dominant coalition, e.g., the TMT, whose characteristics may also influence strategic choices and firm outcomes (Nielsen and Nielsen, 2013). Their rationale is that the TMT's cognition, shaped by the variety of educational and functional backgrounds, values, experiences, connections and networks of TMT members, is a key factor in explaining differences in organizational decisions and firm outcomes (Sirén et al., 2018). In line with that view, recent evidence indicates that TMT characteristics may drive significant differences in the ability of the firm to convert green innovation initiatives into profits (Ma et al., 2021).

The centrality of the TMT in private family firms has recently come to the fore in upper echelons discussions, mainly because family influence significantly affects the TMT's decision-making process (Bauweraerts et al., 2020). Indeed, due to their dual roles as owners and managers, family members have more opportunities for getting involved in discretionary domains to direct the firm's strategy (Halder et al., 2021). Not only they orientate and ratify strategic choices in their ownership role, but they are also actively participating in the day-to-day implementation of those choices to fulfill their managerial role (Kraiczy et al., 2014). While family membership of TMT members gives them greater latitude to influence the firm's strategic choices and outcomes (Carr et al., 2020; Kelleci et al., 2019), the interaction between family and nonfamily members as well as the coexistence of multiple generations in the TMT foster cognitive diversity and lead to potential new challenges resulting from the consideration of sometimes diverging goals (Kraiczy et al., 2014). As a result, several scholars have highlighted the complexity surrounding family firm-specific sources of TMT diversity, claiming that family influence in the TMT can take various forms and induce different effects (e.g., Min, 2021; Pittino et al., 2018; Sanchez-Famoso et al., 2019). Drawing on that logic, we distinguish between family involvement in the TMT and generational involvement as sources of family firm-specific diversity and explore their effects on the relationship between green innovation adoption and performance.

2.3.1. Family involvement in the TMT

The degree of family involvement in the TMT is recognized as a decisive factor in shaping the firm's strategy (e.g., Alessandri et al., 2018; Arzubiaga et al., 2019) and performance (e.g., Cirillo et al., 2017; Hoffmann et al., 2016). Building on this literature, we investigate how the proportion of family members in the upper echelons affects the relationship between green innovation adoption and performance.

Many studies indicate that the dark side of family involvement materializes when the ratio of family members in the TMT reaches higher levels (e.g., Bauweraerts et al., 2020; Chirico and Bau, 2014). Under this configuration, the redundancy in family members' networks and connections limits the access to new diverse information and resources required for sustaining the effective implementation of green innovation projects (Huang et al., 2016). The underrepresentation of nonfamily managers also deprives the organization of crucial knowledge and expertise to bring novel insights and critical perspectives in the TMT (Kraiczy et al., 2014). In other words, the TMT lacks cognitive diversity since the increased presence of family members fosters homogeneity in knowledge and perspectives, which hampers constructive debate around the pecuniary realization of green innovation initiatives. Furthermore, when a small proportion of nonfamily managers are involved, bringing heterogeneous knowledge and ideas in the TMT, their voice is often overlooked because of the family's excessive power (Tabor et al., 2018). This alters the ability of private family firms to capitalize on cognitive diversity to efficiently select and exploit green innovation initiatives. Besides, an increased ratio of family members in the TMT is often the consequence of nepotistic appointments of family managers regardless of their qualification and experience (Firfiray et al., 2018). Accordingly, private family firms suffer from a lack of managerial ability to deal with the complexity surrounding green innovation. Finally, a larger number of family members involved in the TMT can foster the emergence of relational conflicts among family managers. As a result, family TMT members will be distracted from their main tasks and will spend more time to resolve intrafamily tensions and restore family cohesion (Chirico and Salvato, 2016). In addition to a lack of cognitive diversity in the TMT, private family firms will therefore incur significant distraction costs that hamper their ability to timely turn green innovation into greater performance. Based on these arguments, we propose the following hypothesis:

Hypothesis 2. Family involvement in the TMT negatively moderates the relationship between green innovation adoption and performance in private family firms, such that higher percentages of family members in the TMT will attenuate the positive effect of green innovation adoption on performance.

2.3.2. Generational involvement

Representing another important family-firm specific source of diversity, generational involvement may also affect the ability of private family firms to turn green innovation into performance gains. Previous studies find evidence that the implication of multiple generations in the upper echelons fosters cognitive diversity (Kraiczy et al., 2014), because family managers differ in their knowledge, skills, experience and education according to the generation to which they pertain (Pittino et al., 2020). While older generations usually possess strong tacit knowledge about the business, younger generations can bring novel ideas and perspectives to the TMT as a result of their outside experience before joining the family business (Kellermanns et al., 2008) or their greater sensitivity to market, technological and societal changes (Woodfield and Husted, 2017). Such cognitive diversity in the TMT can lead to better problem solving and improved decision-making quality by stimulating creative approaches to effectively identify and exploit emerging opportunities (Sciascia et al., 2013). This is particularly important for the financial success of green innovation that requires organizations to build and renew diverse sources of knowledge to cope with the complexity of technoeconomic problems (Martínez-Ros and Kunapatarawong, 2019).

In addition, the involvement of multiple generations in the TMT contributes to the perpetuation of the family values across generations (Jaskiewicz et al., 2015) and reinforces the sense of belonging and identification of family managers to the family business (Wielsma and Brunninge, 2019), which makes them highly committed to the long-term survival of the firm (Cherchem, 2017). This strong affiliation to the family and the business can foster unity in the family group and the creation of a social context that promotes knowledge integration with the aim of making decisions based on closely calculated risks and systematic approaches to avoid jeopardizing the future of the company (Eddleston et al., 2013). For instance, TMT family members from younger generations, who mostly rely on their tacit knowledge to make decisions, are more likely to incorporate the greater knowledge of TMT family members from later generations in decision-making. As a result, the TMT will more systematically collect and analyze information about the pros and cons of emerging projects to reduce the uncertainty surrounding their pecuniary realization (Hsu and Chang, 2011). This is very valuable for the conversion of green innovation initiatives into profits since their anticipated returns remain highly unpredictable (Roper and Tapinos, 2016).

Beyond the cognitive benefits of multigenerational family TMTs, some scholars suggest that generational involvement in the TMT encompasses a relational dynamic that induces several costs (Sciascia et al., 2013). Specifically, they argue that the implication of multiple generations in the TMT is a source of relational conflicts among family managers that are sometimes pursuing diverging goals and agendas (Rousseau et al., 2018; Sanchez-Famoso et al., 2019). Indeed, as succeeding generations join the TMT, family managers become more likely to behave as nurturer of their own family branch rather than preserving the wealth of the firm or their nuclear family, leading to relational conflicts among family managers from earlier and later generations (Sciascia et al., 2014). As previously highlighted, such conflicts can alter the ability of private family firms to take advantage of cognitive diversity in the TMT (Chirico and Salvato, 2016) to support the effective implementation of green innovation. As there is no empirical evidence on whether the detrimental effect of relational conflicts offset the advantages of cognitive diversity, we suggest the following competing hypotheses:

Hypothesis 3a. : Generational involvement positively moderates the relationship between green innovation adoption and performance in private family firms, such that higher numbers of generations involved in the TMT will accentuate the positive effect of green innovation adoption on performance.

Hypothesis 3b. : Generational involvement negatively moderates the relationship between green innovation adoption and performance in private family firms, such that higher numbers of generations involved in the TMT will attenuate the positive effect of green innovation adoption on performance.

3. Method

3.1. Sample

The data collected in this study targets Belgian private family firms, defined here as non-listed Belgian firms where more than 50% of shares are owned by a single family and at least two members of the same family occupy positions in the firm's governance bodies (Vandekerckhof et al., 2018). Belgium represents an ideal national setting to conduct our research since more than 65% of private firms have a single family as main shareholder (Lambrecht and Broeckart, 2018) and green innovation input indicators of Belgian companies are very close to the average of the European Union (European Commission, 2019).

A priori selecting private family firms remains complicated for family business scholars, especially in Belgium where no comprehensive register of Belgian family firms exists (Corten et al., 2017). Accordingly, we used the Bel-First database of Bureau Van Dijk that provides information about board members to identify potential family firms. Specifically, we screened whether the firm has the name of one of the directors or whether two or more directors have the same family name (Bauweraerts and Colot, 2017). Firms were considered as potential family firms if they met at least one of these criteria. To account for the specificity of our research question, the firms had to meet additional conditions: (1) having at least 20 full-time employees because micro and small firms rarely operate with a real TMT (Rovelli et al., 2020); (2) operating in the primary and secondary sectors where firms are more inclined to engage in green innovation behaviors (Stucki et al., 2018). Based on these criteria, we identified 7754 companies from which we drew a random sample of 2000 potential private family firms.

We addressed a paper questionnaire to the CEO of these 2000 companies to collect data about green innovation strategy, ownership structures and managerial issues. We asked the CEO to answer the survey since s/he is considered as the most reliable key informant to obtain information on the firm's strategy and overall functioning (Calabrò et al., 2013). We received an exploitable response from 208 potential private family firms, yielding a response rate of 10.4%. This is in line with prior research focusing on private family firms (e.g., Blanco-Mazagatos et al., 2018; Murphy, 2005). Applying our family business definition, we excluded 17 private nonfamily firms, resulting in a final sample of 191 private family firms.

To check for potential nonrespondent bias, we randomly selected 100 nonresponding firms from our initial sub-population of 2000 companies and performed a Kolmogorov–Smirnov (K-S) test (Siegel and Castellan, 1988) between responding and nonresponding firms. We did not find any significant differences with respect to firm size (combined K-S distance = 1.02, $p > 0.10$), firm age (combined K-S distance = 0.88, $p > 0.10$) and sector affiliation (combined K-S distance = 0.12, $p > 0.10$). As late respondents are more similar to nonrespondents (Armstrong and Overton, 1977), we also compared the answers of the first 20% of respondents and the last 20% of respondents through t-tests. Again, no significant differences in firm size (t -value = 0.347, $p > 0.100$), firm age (t -value = 0.3844, $p > 0.10$), and industry affiliation (t -value = .408, $p > 0.10$) were observed, indicating that nonrespondent bias is not a major problem in our study. Common method bias is also mitigated in our research since we relied on publicly available accounting data from the Bel-First database to build our dependent variable while the explanatory variables were retrieved from the

questionnaires (Conway and Lance, 2010).

3.2. Variable description

To mitigate potential reverse causality problems, we created a two-year lag between the dependent variable and the explanatory variables (Zhang et al., 2019).

3.2.1. Dependent variable

In this study, $performance_{t+2}$ is measured using gross margin, operationalized as the difference between sales and the cost of goods sold scaled by sales (e.g., De Massis et al., 2018b; Martínez-Alonso et al., 2020). We opted for this measure of firm performance for several reasons. First, prior research indicates that gross margin offers better predictive power than other measures or ratios derived from the income statement, investors placing great emphasis on this indicator to value a company and establish earnings forecasts (Kesavan et al., 2010). Additionally, noncash expenses, such as amortizations, taxes or interests, are not included in the calculation of gross margin, allowing us to rely on a performance measure which is not affected by the variability in accounting practices, tax treatments or financial investments (Martínez-Alonso et al., 2020). Accordingly, using gross margin should offer a better reflection of the manager's influence on firm performance, which is central in this study that explores the impact of family-induced diversity in the TMT on the ability of the organization to turn green innovation adoption into performance gains.

3.2.2. Independent variable

In line with previous studies (e.g., Aboelmaged and Hashem, 2019; Kusi-Sarpong et al., 2015), *green innovation adoption (GIA)* is measured with a four-item five-point Likert scale where 1 signifies "strongly disagree" and 5 signifies "strongly agree". Factor loadings, Cronbach's alpha, composite reliability (CR) and average variance extracted (AVE) are above the recommended thresholds (see Table 1) (Hair et al., 2010).

3.2.3. Moderating variables

Family involvement in the TMT is obtained by dividing the number of family TMT members by the total number of TMT members (Arzubiaga et al., 2019). *Generational involvement* is captured by the number of generations simultaneously involved in the TMT (Pittino et al., 2020).

3.2.4. Control variables

Following extensive literature on family firm performance (e.g., Hansen et al., 2020; Hernández-Perlines et al., 2021), we included a set of firm-level and industry-level characteristics as control variables. We controlled for *Firm size* since prior literature has largely highlighted that larger firms benefit from economies of scale that enhance firm performance (Hall and Weiss, 1967). *Firm size* is calculated as the natural logarithm of the number of employees (Basco, 2014). We incorporated a variable capturing *Firm age* given its potential influence on firm performance through routinization, accumulated reputation and organizational rigidity (Coad et al., 2018). *Firm age* is computed as the number of years since the firm's creation (Hernández-Perlines et al., 2021). As previous works indicate that increasing levels of debts positively affect firm performance by reducing managers' opportunistic behavior thanks to the intensified influence of lenders on corporate decisions (Jensen, 1986), we added a variable labeled *Leverage* corresponding to the ratio of total debts to total assets (Bauweraerts et al., 2021). We also accounted for the impact of *Financial slack* that can stabilize the core activities of the business and stimulate strategic behaviors oriented towards value creation (Cyert and March, 1963). *Financial slack* is captured by the ratio of quick assets to liabilities (De Massis et al., 2018b). Considering the large number of studies stressing the equivocal effects of *Family CEO* on firm performance (Dyer, 2018), we included a dummy variable taking the value of 1 when the CEO is a family member, 0 otherwise (Miller et al., 2013). Finally, in line with prior research emphasizing that industry membership affects performance through strategic perspectives and actions that contribute differently to value creation (Short et al., 2007), we controlled for the industry effect by including a dummy variable representative of the distinction between the primary (agriculture and food) and the secondary sector (industry).

Table 1

Validity of the green innovation adoption scale.

	Loadings	α	CR	AVE
Green innovation adoption (GIA) (Aboelmaged and Hashem, 2019)		0.822	0.735	0.700
GIA1. My firm adopts fewer inputs to minimize the environmental risks	0.812			
GIA2. My firm adopts cleaner technologies	0.832			
GIA3. My firm reuses or recycles inputs, materials and wastes	0.841			
GIA4. My firm cannot substitute toxic materials with eco-friendly ones ^a	0.857			

Notes: α : Cronbach's alpha; CR: Composite reliability; AVE: Average variance extracted.

^a reversed item.

Table 2
Descriptive statistics and correlation matrix.

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. Performance _{t+2}	3.97	2.42	1.00									
2. Green innovation adoption (GIA)	12.25	6.54	0.37 ***	1.00								
3. Family involvement in the TMT	0.58	0.22	-0.12 *	-0.13 *	1.00							
4. Generational involvement	1.42	0.67	0.12 *	0.12 *	0.25 ***	1.00						
5. Firm size ^a	63.17	12.17	0.14 **	0.08	-0.08	-0.05	1.00					
6. Firm age ^a	45.32	17.25	0.09	0.07	-0.07	-0.06	0.16 **	1.00				
7. Leverage	0.32	0.17	0.07	0.08	-0.05	0.03	0.12 *	-0.04	1.00			
8. Financial slack	0.11	0.08	0.24 ***	0.13 *	-0.12 *	0.05	-0.08	-0.05	-0.15 **	1.00		
9. Family CEO	0.53	0.16	-0.15 **	0.16 **	0.21 ***	0.22 ***	-0.07	-0.09	-0.16 **	0.12 *	1.00	
10. Primary sector	0.47	0.21	0.08	0.05	0.03	0.04	0.06	0.05	0.08	-0.05	0.05	1.00

*p < 0.10; **p < 0.05; ***p < 0.01.

^a Notes: Untransformed values are reported for the mean and the standard deviation. the logarithmic transformation is used to calculate the correlations and run the regression analyses.

4. Results

4.1. Descriptive statistics

Descriptive statistics and correlations are presented in Table 2. On average, family firms employ 63.17 workers, are 45.32 years old and have 1.42 generations involved in the TMT. The percentage of family members in the TMT is 58%, while 53% of family firms are led by a family CEO. GIA ($p < 0.01$), generational involvement ($p < 0.10$), firm size ($p < 0.05$), financial slack ($p < 0.01$) and leverage ($p < 0.05$) are positively correlated with performance, whereas family CEO ($p < 0.05$) and family involvement in the TMT ($p < 0.10$) have a negative correlation with performance.

4.2. Regression analysis

To test our hypotheses, we ran hierarchical OLS regressions using the *robust* command with the Stata v.15 software to mitigate heteroskedasticity concerns (Steijvers and Niskanen, 2014). To detect potential multicollinearity issues, we computed the variance inflation factors (VIF). The maximum VIF value in our regressions is 2.02, well below the cut-off of 10, indicating that multicollinearity is not a serious problem (Hair et al., 2010).

Table 3 presents the results of our regression analysis. Model 1 is our baseline model that includes only the control variables. In line with prior research, firm size ($\beta = 0.078$, $p < 0.05$) (Chu, 2011), leverage ($\beta = 0.142$, $p < 0.05$) (Tsuruta, 2015) and financial slack ($\beta = 0.127$, $p < 0.01$) (Vanacker et al., 2017) have a positive influence on performance, whereas family CEO has a negative effect on performance ($\beta = -0.124$, $p < 0.05$) (Jiang and Peng, 2011). We also observe that firm age and firm affiliation to the primary sector do not exert any significant influence on performance. Model 2 indicates that GIA is positively related to performance ($\beta = 0.215$, $p < 0.01$), validating Hypothesis 1. Model 3 tests the direct effect of our moderating variables and reveals that family involvement in the TMT has a negative impact on performance ($\beta = -0.184$, $p < 0.10$). In contrast, generational involvement is positively related to performance ($\beta = 0.176$, $p < 0.10$). In Model 4, the interaction between GIA and family involvement in the TMT is negative and significant ($\beta = -0.112$, $p < 0.01$), whereas the interaction between GIA and generational involvement has a positive and significant impact on performance ($\beta = 0.104$, $p < 0.01$). These results indicate that family involvement in the TMT (generational involvement) negatively (positively) moderates the relationship between GIA and performance, supporting Hypotheses 2 and 3a.

Following Aiken et al.'s (1991) recommendation, we plotted the significant interaction effects in Figs. 2 and 3 to better illustrate our findings. The “low (high) family involvement in the TMT” and “low (high) generational involvement” lines show the effect of GIA when the values of family involvement in the TMT and generational involvement are one standard deviation below (above) the mean. In line with Hypothesis 2 and 3, Fig. 2 shows that the relationship between GIA and performance is weaker when the ratio of family members in the TMT is high, whereas the presence of multiple generations in the TMT increases the strength of the GIA-performance

Table 3
Regression analyses.

Variables	Model 1	Model 2	Model 3	Model 4
Constant	0.081 *** (0.003)	0.079 *** (0.003)	0.083 *** (0.003)	0.073 *** (0.002)
Firm size	0.078 ** (0.021)	0.065 ** (0.017)	0.072 ** (0.020)	0.080 ** (0.023)
Firm age	0.059 (0.043)	0.047 (0.034)	0.049 (0.035)	0.062 (0.046)
Leverage	0.142 ** (0.041)	0.127 ** (0.031)	0.133 ** (0.035)	0.130 ** (0.033)
Financial slack	0.127 *** (0.004)	0.114 *** (0.004)	0.136 *** (0.005)	0.122 *** (0.004)
Family CEO	-0.124 ** (0.032)	-0.118 ** (0.030)	-0.132 ** (0.039)	-0.129 ** (0.035)
Primary sector	0.087 (0.059)	0.068 (0.042)	0.077 (0.050)	0.072 (0.045)
Green innovation adoption (GIA)		0.215 *** (0.005)	0.219 *** (0.005)	0.222 *** (0.006)
Family involvement in the TMT			-0.184 * (0.085)	-0.179 * (0.084)
Generational involvement			0.176 * (0.082)	0.164 * (0.078)
GIA* Family involvement in the TMT				-0.112 *** (0.003)
GIA*Generational involvement				0.104 *** (0.002)
R ²	0.21	0.27	0.32	0.40
Adjusted R ²	0.14	0.20	0.23	0.31
F-stat	3.05 ***	3.22 ***	3.43 ***	3.98 ***

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Standard errors are reported within brackets. Secondary sector is our reference sector.

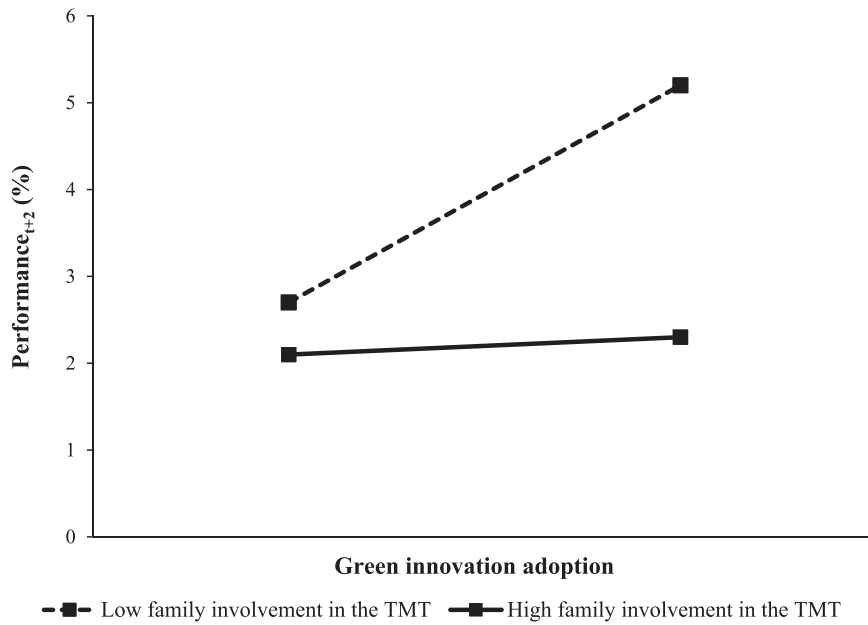


Fig. 2. The moderating influence of family involvement in the TMT on the relationship between green innovation adoption and performance.

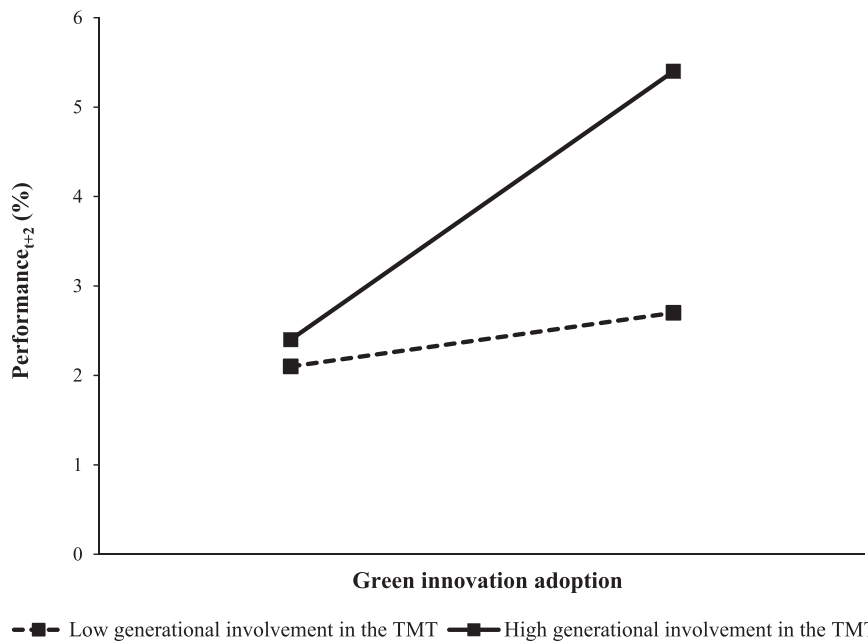


Fig. 3. The moderating influence of generational involvement in the TMT on the relationship between green innovation adoption and performance.

link.

4.3. Robustness checks

We conducted several robustness checks to strengthen the validity of our findings. First, we used a two stage least squares (2SLS) approach to check for potential endogeneity problems in our model since GIA could also result from firm performance (reverse causality). Following Wooldridge (Wooldridge, 2002) recommendation, we selected multiple instrumental variables that were highly correlated to the potentially endogenous regressors (GIA) but not to the dependent variable (performance): firm eponymy (a dummy variable taking the value of 1 when the firm carries the name of the owning family, 0 otherwise) and the existence of green subsidies (a

Table 4
Robustness checks.

Variables	Model5 Performance _{t+3}	Model6 Performance _{t+3}	Model7 Performance _{t+3}	Model8 Performance _{t+3}	Model9 Performance _{t+1}	Model10 Performance _{t+1}	Model11 Performance _{t+1}	Model12 Performance _{t+1}	Model13 ROA _{t+2}	Model14 ROA _{t+2}	Model15 ROA _{t+2}	Model16 ROA _{t+2}
Constant	0.062 *** (0.002)	0.054 *** (0.002)	0.051 *** (0.002)	0.068 *** (0.003)	0.090 *** (0.004)	0.092 *** (0.004)	0.089 *** (0.004)	0.099 *** (0.005)	0.121 *** (0.006)	0.115 *** (0.005)	0.124 *** (0.006)	0.130 *** (0.007)
Firm size	0.075 ** (0.020)	0.062 ** (0.016)	0.068 ** (0.018)	0.060 ** (0.015)	0.075 * (0.035)	0.064 * (0.030)	0.067 * (0.031)	0.072 * (0.033)	0.089 *** (0.004)	0.075 *** (0.004)	0.079 *** (0.004)	0.085 ** (0.004)
Firm age	0.052 (0.041)	0.045 (0.032)	0.040 (0.029)	0.057 (0.043)	0.032 (0.030)	0.035 (0.033)	0.029 (0.027)	0.034 (0.032)	0.044 (0.040)	0.042 (0.038)	0.047 (0.043)	0.049 (0.045)
Leverage	0.137 ** (0.039)	0.124 ** (0.030)	0.131 ** (0.034)	0.127 ** (0.031)	0.138 ** (0.043)	0.124 ** (0.038)	0.128 ** (0.040)	0.119 ** (0.033)	0.142 *** (0.007)	0.152 *** (0.007)	0.159 *** (0.008)	0.147 *** (0.004)
Financial slack	0.121 *** (0.004)	0.118 *** (0.004)	0.115 *** (0.004)	0.111 *** (0.004)	0.108 *** (0.003)	0.097 *** (0.003)	0.102 *** (0.003)	0.094 *** (0.003)	0.131 *** (0.007)	0.142 *** (0.007)	0.138 *** (0.007)	0.152 *** (0.008)
Family CEO	-0.120 ** (0.030)	-0.115 ** (0.027)	-0.128 ** (0.035)	-0.130 ** (0.037)	-0.087 * (0.040)	-0.075 ** (0.034)	-0.096 ** (0.044)	-0.082 ** (0.037)	-0.129 *** (0.006)	-0.123 *** (0.006)	-0.132 *** (0.006)	-0.126 *** (0.006)
Primary sector	0.075 (0.062)	0.063 (0.049)	0.069 (0.056)	0.060 (0.039)	0.052 (0.047)	0.063 (0.058)	0.058 (0.053)	0.061 (0.056)	0.059 (0.052)	0.065 (0.058)	0.048 (0.042)	0.053 (0.046)
Green innovation adoption (GIA)		0.189 *** (0.004)	0.192 *** (0.004)	0.198 *** (0.004)		0.108 * (0.045)	0.112 * (0.052)	0.103 * (0.043)		0.245 *** (0.007)	0.252 *** (0.008)	0.249 *** (0.007)
Family involvement in the TMT			-0.165 * (0.076)	-0.161 * (0.074)			-0.120 (0.092)	-0.109 (0.082)			-0.184 ** (0.051)	-0.189 ** (0.054)
Generational involvement			0.159 * (0.072)	0.155 * (0.070)			0.131 (0.105)	0.127 (0.100)			0.182 * (0.086)	0.187 * (0.090)
GIA* Family involvement in the TMT				-0.102 *** (0.003)				-0.057 * (0.024)				-0.135 *** (0.004)
GIA*Generational involvement				0.095 *** (0.002)				0.048 * (0.021)				0.127 *** (0.004)
R ²	0.20	0.26	0.31	0.39	0.17	0.19	0.24	0.30	0.24	0.29	0.35	0.42
Adjusted R ²	0.13	0.19	0.22	0.30	0.10	0.11	0.13	0.17	0.19	0.24	0.30	0.37
F-stat	3.02 ***	3.20 ***	3.36 ***	3.74 ***	2.68 **	2.87 ***	3.13 ***	3.28 ***	3.18 ***	3.39 ***	3.43 ***	4.08 ***

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. Standard errors are reported within brackets. Secondary sector is our reference sector.

dummy variable taking the value of 1 when the firm receives public funding for green innovation, 0 otherwise). Subsequently, we ran the *ivendog* command with the Stata v.15 software to obtain the results of the Durbin–Wu–Hausman χ test and the Wu–Hausman *F*-test. Both tests were not significant (Durbin–Wu–Hausman χ test: 0.865, $p = 0.273$; Wu–Hausman *F*-test: 0.823, $p = 0.241$), indicating that endogeneity is not a major concern in our model. Accordingly, the results of the OLS procedure reported in Table 3 are unbiased (Davidson and Mackinnon, 1983). Second, we tested the sensitivity of our findings to the lagging nature of our model by reiterating the analysis with a one-year and a three-year lag between the dependent and the independent variables. As observed in Table 4, the direct effect of GIA on performance as well as the moderating influence of both family involvement in the TMT and generational involvement are significant but weaker in magnitude when performance is measured in $t + 1$. This is in line with prior research highlighting that green innovation behaviors require minimum two years to fully materialize in performance gains (Zhang et al., 2019). Third, we replicated the analysis with return on assets (net income/total assets) (ROA) in $t + 2$ as dependent variable. We opted for this accounting indicator to ensure comparability with previous studies since ROA is the most widely used performance measure in the family business context (Hansen and Block, 2020). The results reported in models 13–16 of Table 4 corroborate our initial findings. Finally, we replicated the analysis with ROA in $t + 1$ and $t + 3$ (results available request). As was the case with gross margin, the direct effect of GIA on ROA as well as the moderating impact of both family involvement in the TMT and generational involvement were significant but weaker in magnitude when a one-year lag between the dependent and the explanatory variables was considered.

5. Discussion

The study of SDGs in family businesses remains poorly developed, few works investigating how these firms contribute to social inclusion, environmental sustainability or economic development through the implementation of specific organizational practices (Ernst et al., 2022). Considering the critical importance of the environmental pillar of SDGs for mitigating existing and potential threats on the global environment (Umar et al., 2020), this study feeds into this discussion by addressing the paucity of research on green innovation in private family firms (Ardito et al., 2019). Specifically, it proposed to investigate whether the adoption of green innovation practices drives profits in this particular context, providing novel insights into how organization-level environmental practices rooted in SDGs foster family firm performance.

Results from a sample of 191 Belgian private family firms indicate that green innovation adoption is positively related to performance. This is in line with prior research conducted in other organizational contexts which underlines that green innovation practices provide business value by reducing production waste and increasing productivity, thereby enhancing performance (Huang and Li, 2017; Zhang et al., 2020). More specific explanation for this finding is that family owners' incentives for monitoring (Demant et al., 2018) as well as private family firms' greater access to trusted network partners (Zellweger et al., 2019) and outstanding internal human capital (Neckebrouck et al., 2018) enhance the transformation of green innovation into profits. Indeed, effective monitoring from family owners allows the firm to parsimoniously exploit the firm's human capital and external network ties (Duran et al., 2016), fostering the combination of knowledge from internal and external stakeholders whose benefits for the pecuniary realization of green innovation has been widely demonstrated (Arfi et al., 2018; Liu et al., 2021). Our results therefore tend to corroborate the general assumption that private family firms are highly effective at managing sustainable practices that contribute to the enduring health of the business and the environment (Le Breton-Miller and Miller, 2016).

Our findings also indicate that the green innovation adoption-performance relationship is contingent upon family-firm specific sources of TMT diversity. On the one hand, increasing levels of family involvement in the TMT hampers the ability of private family firms to turn green innovation into profits. The main explanation is that excessive family participation in the TMT deprives the organization of crucial knowledge from nonfamily managers (Tabor et al., 2018) and fosters the emergence of intrafamily conflicts (Chirico and Salvato, 2016), thereby altering the ability of private family firms to take advantage of cognitive diversity to efficiently draw financial benefits from green innovation practices. In addition, increased family presence in the TMT is often the result of systematic nepotistic appointments of family managers regardless of their qualification and prior experience (Firfiray et al., 2018). This can induce a lack of managerial capacity, which is particularly detrimental for the pecuniary realization of green innovation that requires high-quality human capital to cope with its managerial complexity (El-Kassar and Singh, 2019). Overall, this finding substantiates recent literature suggesting that too much family involvement in management is conducive to ineffective sustainable practices oriented towards the preservation of the environment (Miroshnychenko and De Massis, 2022).

On the other hand, generational involvement positively moderates the relationship between green innovation and performance, suggesting that the presence of multiple generations in the TMT enhances the pecuniary realization of green innovation practices. This finding tends to indicate that the heterogeneity of knowledge, skills and educational background brought by an increasing number of family members from different generations enhances cognitive diversity (Pittino et al., 2020), which in turn improves the conversion of green innovation into performance (Martínez-Ros and Kunapatarawong, 2019). Interestingly, it also appears that the negative effect associated with high levels of generational involvement, i.e., the emergence of intrafamily conflicts among family managers from different generations, does not seem to play a decisive role. In other words, when the number of generations involved in the TMT increases, the advantages of cognitive diversity for the transformation of green innovation into performance tend to outweigh the detrimental effect of intrafamily conflicts. A justification for this could be that the implication of more generations in management makes the TMT highly concerned by sustainability and environmental issues. Indeed, the presence of younger generations in the TMT can sensitize older generations about the importance of preserving the environment to perpetuate the family legacy across generations (Dangelico et al., 2019). As a result, intrafamily conflicts are less likely to occur due to TMT members' shared concern about the implementation of green innovation practices that would contribute to securing transgenerational succession. Another potential explanation lies in the fact that the presence of multiple generations in the TMT is not necessarily associated with high levels of family

involvement in the TMT. Under these circumstances, generational involvement would be more likely to drive tensions and animosity among factions of family managers from different generations (Pittino et al., 2020).

5.1. Theoretical contributions

This article brings several theoretical contributions at the intersection of the SDG, green innovation and family business literatures. First, this study offers a better understanding of how green innovation adoption, as a firm-level materialization of the environmental dimension of SDGs, affects performance in the context of private family firms. In doing so, this article addresses a recent call for more context-based analyses on specific dimensions of SDGs to reconcile inconclusive findings regarding the impact of SDGs on performance (Muhmad and Muhamad, 2020; Mumtaz and Yoshino, 2021). Moreover, by stressing the moderating role of family firm-specific characteristics on the green innovation–performance relationship, this research extends our knowledge on the boundary conditions that clarify how family firms benefit (or not) from implementing environmental practices rooted in SDGs (Ernst et al., 2022). As such, this article adds to the ongoing conversation on how the heterogeneous nature of private family firms explains variation in their ability to draw profits from sustainable initiatives (Mariani et al., 2021).

Second, by highlighting the variegated effect of family-induced TMT diversity on the pecuniary realization of green innovation, this research addresses a recent call for extending our knowledge of the advantages and disadvantages of family influence (D'Allura, 2019). Indeed, our contrasted findings on the impact of family and generational involvement in the TMT underline the necessity of disaggregating family influence into various forms to correctly assess its effect on green innovation effectiveness. In so doing, we add to previous literature demonstrating that family influence is not universally beneficial or detrimental to firm performance (Hansen and Block, 2020). More specifically, by suggesting that best performance occurs when green innovation adoption combines harmoniously with family firm-specific TMT attributes, this research dresses a clearer picture of how different types and degrees of family influence condition the ability of private family firms to draw financial gains from sustainable practices.

Third, the use of upper echelons theory in the family business context is still emerging and looks promising to refine our understanding of TMT diversity (D'Allura, 2019). Indeed, recent theoretical developments urge researchers to consider deep-level factors of TMT composition that are context-specific to better grasp the cognitive idiosyncrasies of the TMT (Neeley Jr et al., 2020). By focusing on family and generational involvement in the TMT, this study addresses this call and extends our knowledge on how different sources of family-induced diversity affects the TMT's cognition. In addition, this research highlights that family-related sources of TMT heterogeneity drive cognitive and relational dynamics that highly condition the financial success of strategic choices, thereby providing deeper insights into the underlying mechanisms by which TMT diversity shapes family firm outcomes (Pittino et al., 2020). In so doing, this study also sides with recent works calling for a more nuanced view of how the family, as the dominant faction of the TMT in private family firms, affects the implementation of strategic decisions (Halder et al., 2021). Indeed, many studies highlight the notable role of family dominance in driving the firm's strategy and performance but few of them have accounted for its multifaceted nature (D'Allura, 2019). By revealing competing effects for family and generational involvement in the TMT, this article thus provides evidence of the necessity to determine how the materialization of family dominance in the upper echelons influences family firm outcomes.

5.2. Practical implications

This study has several implications for practitioners. As our results reveal a positive relationship between green innovation and performance, private family firms should be aware of the benefits of such form of innovation. Accordingly, family business advisors could play an important role in demystifying the adoption of green innovation for family owners and managers that are sometimes hesitant to engage in such practices (Huang et al., 2016). This could also foster constructive dialog about SDGs in general to emphasize the importance of considering other types of organizational, environmental or social practices that contribute to achieving SDGs. In addition, private family firms should also find the right balance in the TMT to convert green innovation into performance gains. Based on our findings, it appears that involving multiple generations and nonfamily managers in the TMT could represent an ideal solution to take advantage of cognitive diversity and ensure the effective transformation of green innovation practices into profits. Again, family business advisors could play a key role in informing family owners and managers about the advantages of including succeeding generations and nonfamily managers in the TMT for green innovation effectiveness. This could even be more important in founding generation family firms where the family founder is often reluctant to welcome alternative views from the successor(s) or external managers.

5.3. Limitations and avenues for future research

This research also suffers from several limitations that must be acknowledged to stimulate future research developments. First, due to the difficulties in gathering information about private family firms (Corten et al., 2017), this study relied on cross sectional data that are circumscribed to the Belgian context. Accordingly, conducting longitudinal analyses in other national contexts would be useful to ensure the generalizability of our findings. Second, as widely used in previous works (e.g., Aboelmaged and Hashem, 2019; Arfi et al., 2018), we applied a self-reported measure of green innovation adoption. Forthcoming research could therefore replicate our analysis with objective measurements of green innovation to enhance its validity. Third, while this study extends our knowledge of the performance implications of green innovation as a broad concept, it would be interesting to disentangle the effect of heterogeneous types of green innovation practices on performance. For instance, distinguishing between green process innovation and green product innovation could be insightful in private family firms since their lower risk-taking propensity could direct resource allocation towards

the implementation of green process innovation that produce more stable performance outcomes (Tang et al., 2018). Fourth, this research deepens our understanding of the role of family-induced TMT diversity on the green innovation-performance relationship; however, it would also be relevant to explore how other types of family influence in the organization condition the transformation of green innovation practices into profits. For example, investigating the effect of family involvement in ownership and the board could represent an important avenue for future research considering the (still) ongoing debate on the bright and the dark side of family influence for family firm performance (Hansen and Block, 2020). In a similar vein, another research avenue would be to explore whether other firm-level factors, such as firm size or age among others, and industry-level parameters condition the conversion of green innovation into performance. For example, we could expect that larger and older family firms, thanks to their greater levels of accumulated resources, knowledge and professionalization (Bauweraerts et al., 2021), would be better equipped to ensure the financial success of green innovation. We could also anticipate that family firms evolving in non-green industries (e.g., energy, transport or agriculture) would be less comfortable with green innovation that lies far from their core business and current resources and capabilities. Empirical evidence is however still needed to validate these arguments, leading us to call for future studies in that direction. Fifth, by linking green innovation adoption to family firm performance, this study targeted a very specific aspect of SDGs that was more closely related to environmental sustainability. Considering the multifaceted nature of SDGs (Monteiro et al., 2019) and the paucity of works comprehensively studying them in family firms (Mariani et al., 2021), several important unaddressed questions for future research emerge. On the one hand, it would be insightful to investigate how individual (e.g., CEO traits and personalities), organizational (e.g., firm culture and governance structure) and institutional (e.g., external stakeholders' pressure) factors affect different dimensions of SDGs. For example, future studies could analyze how governance heterogeneity among family firms influences stakeholder management strategies with industry peers and the government, which in turn could impact environmental investment decisions (Bendell, 2022). Another line of research could be to account for the variety of nonfinancial prerogatives valued by family owners to investigate how they affect the ability and willingness of family firms to engage in sustainable practices (Clauß et al., 2022). Indeed, although the ability and willingness paradox has been widely used to explain family firms' strategic decisions (Debellis et al., 2021), current works have neglected its usefulness for refining our knowledge of family business involvement in SDGs. Finally, another research opportunity would be to examine the macro-implications of the pursuit of SDGs by family firms. Indeed, even though family firms are recognized as key economic and social players, very few studies try to understand whether their inclination towards SDGs is related to environmental sustainability and economic development at local and regional levels (Amato et al., 2021). It would therefore be useful to use macro-economic approaches to study the intensity of these relationships across contexts, territories, and places.

6. Conclusions

In conclusion, this study offers new insights into the performance implications of green innovation in private family firms, acknowledging the crucial role of family-induced TMT diversity in realizing the financial benefits of green innovation practices. More precisely, this article shows that family involvement in the TMT hampers the ability of family firms to turn green innovation into performance gains, whereas generational involvement in the upper echelons strengthens the green innovation-performance relationship. Considering the need for greener enterprises to support the achievement of SDGs and the crucial role of family firms for the sustainability of the worldwide economy, we hope that this research will catalyze future research on SDGs in the family business context.

CRedit authorship contribution statement

Jonathan Bauweraerts: Writing – original draft, Writing – review & editing, Visualization, Project administration, Methodology, Data curation, Formal analysis. **Unai Arzubiaga:** Writing – original draft, Writing – review & editing, Visualization. **Vanessa Diaz-Moriana:** Writing – original draft, Writing – review & editing, Visualization.

Data availability

The authors do not have permission to share data.

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