

Determinants of Green Innovation in Family Firms

Ramona Waldau¹, Melina Roser², Torsten Wulf¹ and Marc Steffen Rapp²

¹Research Group of Strategic and International Management, Marburg, Germany

²Management Accounting Research Group, Marburg, Germany

waldau@staff.uni-marburg.de

roser@staff.uni-marburg.de

torsten.wulf@uni-marburg.de

rappm@wiwi.uni-marburg.de

Abstract: Family firms represent a unique kind of company and extent research characterizes them to be rather risk-averse in their commitment to innovation but consider them to be more efficient in their innovation efforts in contrast to non-family firms. Although family firms have a widespread impact on the worldwide economy, there has been limited research on the heterogeneity in their innovation behavior in both family firm and innovation literature. The growing body of research on green innovation indicates that it is a distinct type of innovation due to its unique characteristics and common knowledge on general innovation in family firms cannot be transferred to their behavior with respect to green innovation. Therefore, we aim to investigate why family firms engage in green innovation and which factors determine their green innovation performance. To investigate this new phenomenon and contribute to theory, we conduct a multiple-case study based on a sample of German family firms from different industries by collecting and analyzing data from both publicly available sources and interviews conducted with the top management of these firms. Thereby, these firms cover the spectrum family firm heterogeneity in this field ranging from high to low green innovation performance and their approach to green innovation supports our argumentation. Our findings suggest that family firms develop and adopt green innovation due to their SEW aspirations, as these lead them to think and invest for the long term. If they engage in the development and implementation of green innovation, however, their success depends on their familiness, namely their social capital, human capital, and financial capital, as these resources are crucial to successfully manage the complexity of the green innovation development process. This study is equally important for researchers, practitioners, and policy makers as it highlights the key obstacles and requirements for family firms to successfully develop and implement green innovation.

Keywords: Family firm, green innovation, case study, German family firms

1. Introduction

Family firms are acknowledged as playing a crucial role in the global economy as they contribute to prosperity, competitiveness, and innovation (e.g., Aldrich and Cliff, 2003; La Porta, Lopez-De-Silanes and Shleifer, 1999). Their success of developing and implementing green innovation is critical to the desired green transformation of the global economy (Bammens and Hünermund, 2020). Thereby, green innovation has been shown to improve competitiveness and firm operating performance (e.g., Chiou et al, 2011; Holzner and Wagner, 2022). However, family firms have been found to innovate less and vary greatly in their innovation input (Duran et al, 2016). Despite being more responsive to stakeholders and concerned about reputation (e.g., Berrone et al, 2010; Gómez-Mejía et al, 2011), the interplay of green innovation and family firms has been little explored.

We aim to explore why family firms engage in green innovation and which factors determine their green innovation performance as family firms inhibit unique characteristics such as high levels of family control and socioemotional wealth (SEW) preservation goals (e.g., Gómez-Mejía et al, 2011). We conduct a multiple-case study based on 13 German family firms with both high and low green innovation performance (Eisenhardt, 1989; Yin, 2018). We find evidence that family firms develop and adopt green innovation due to their SEW aspirations as these lead family firms to think and invest for the long term. However, the green innovation success of family firms depends on their distinctive familiness, in this case their social capital, human capital, and financial capital, to effectively manage the intricate operations of green innovation development.

Our findings present novel insights as previous research has focused on the differences between family and non-family firms and general innovation. We analyze the reasons for the heterogeneity in green innovation performance among family firms and reply to future research avenues proposed in the literature review by Calabrò et al (2019). Our qualitative study design allows us to dive deeper in the underlying motivations and reasons for observed family firm behavior regarding green innovation compared to previous quantitative studies (e.g., Bammens and Hünermund, 2020; Bendell, 2022). As current literature on general innovation in family firms suggests that family firms generally display lower levels of engagement in innovation (Chrisman et al, 2015; Duran et al, 2016), we contradict these findings for green innovation based the SEW aspirations present in all cases. Further, we introduce familiness as the key differentiating factors for family firms' heterogeneity in their

green innovation performance which has not been successfully linked in its entirety to green innovation in prior research. So far research has only searched for evidence between a single kind of resource and green innovation in family firms, e.g., firm size as a proxy for financial capital (Huang, Yang and Wong, 2016). The significance of this research is two-folded. First, we lay an important basis for further quantitative research to analyze the most relevant drivers. Second, our findings can guide family firm owners, practitioners, and policy makers in developing effective strategies and policies that foster green innovation in family firms as the most common form of business (La Porta, Lopez-De-Silanes and Shleifer, 1999).

The structure of the paper is as follows. The next section provides an overview on the current state of research, whereas the third section illustrates the methodology of this paper. The fourth section reports and discusses the main findings of the multiple case study, and the last one concludes, draws practical implications, and outlines avenues for future research.

2. Literature review

The topic of family firm innovation is of high strategic importance because innovation allows them to enhance their performance and create long-term value across generations (Eddleston, Kellermanns and Sarathy, 2008; Kellermanns et al, 2012). Research has shown that family firms follow a different innovation approach than non-family firms. In their conceptual paper, Li and Daspit (2016) propose four different innovation strategies by family firms, which depend on two factors, i.e., the level of family involvement in management and the family's non-economic SEW goals. These reflections have also been backed up by empirical research. In a meta-analytical analysis of 108 primary studies, researchers prove that family firms' innovation input, output, and ratio depend on the family CEO generation, family CEO founder status, and country-level factors. In general, family firms display lower levels of innovation input but achieve a higher output than non-family firms due to a higher conversion rate (Duran et al, 2016). In line with these findings, Kammerlander et al (2020) find that the share of family versus non-family members in the top management team as well as the family CEO's non-economic goals significantly influence, respectively moderate the family firms' pursuit of exploratory and exploitative innovation based on survey data from 109 family and non-family firms.

However, insights on family firms' behavior regarding general innovation cannot be transferred to green innovation as previous research has confirmed that green innovation differs from general innovation (Holzner and Wagner, 2022; Horbach, Oltra and Belin, 2013; Rennings, 2000). Green innovation has been defined as the creation of new products, processes, or similar leading to environmental improvements (OECD, 2010). More specifically, green innovation inhibits an amplified societal interest (Horbach, Oltra and Belin, 2013; Rennings, 2000), has high levels of interdependencies and complexity (Fontoura and Coelho, 2022), and represents a risky high-stakes strategic choice (Holzner and Wagner, 2022; Roper and Tapinos, 2016). Due to the idiosyncrasies of green innovation firms face new challenges and opportunities regarding their performance and reputation. For example, Chiou et al (2011) find evidence that green innovation as a mean to improve the environmental performance suppliers lead to significant improvements in the focal firms' environmental performance and competitive advantage based on a sample of 124 Taiwanese firms.

Thus, little is known about how the idiosyncrasies of green innovation affects the investment decisions of family firms. Research has so far identified few external and internal drivers for green innovation performance of firms. First, regulatory and normative pressures drive the adoption of green innovation (Bendell, 2022; Berrone et al, 2013; Huang, Ding and Kao, 2009). Berrone et al (2013) analyze environmental patents from 326 US-American firms and find that both regulatory and normative pressures can foster green innovation as firms seek legitimacy and compliance. As one of the first, Huang, Ding and Kao (2009) consider the difference between family and non-family firms in Taiwan and show that family firms pay more attention to pressure from their internal stakeholders compared to regulatory and market pressures and their non-family counterparts. Additionally, Bendell (2022) finds a higher likelihood for family firms to invest in green innovation with a high perceived threat of stricter regulations in the future based on quantitative data from 121 US-American family and non-family firms. Second, internal factors impact firms' green innovation performance, too. Firm size is an important factor as larger firms have access to more financial resources which enables them to invest in risky green innovation processes as Huang et al (2016) shows in a sample of 640 Taiwanese family and non-family firms. Another key determinant is the availability of green knowledge (Aiello et al, 2021) and capabilities required for green innovation, e.g., green dynamic capabilities (Singh et al, 2022) or leadership skills (Begum et al, 2022; Singh et al, 2020), which firms can also acquire by collaborating with other firms across their supply chain (Ben Arfi, Hikkerova and Sahut, 2018). However, researchers are not agreed yet concerning the impact direction of (family) firm governance, i.e., whether higher levels of family control impacts green innovation positively due to their

long-term SEW goals and stakeholder orientation (e.g., Bammens and Hünermund, 2020; Bendell, 2022) or negatively due to their risk aversion (e.g., Aiello et al, 2021; Huang, Yang and Wong, 2016). In their study of 633 German firms, Doluca, Wagner and Block (2018) discover that family firms have started off with a more cautious approach compared to non-family firms, demonstrating a higher aversion to risk. However, as time progressed, they have caught up and adopted a strategy that is characterized by lower volatility and a stronger focus on long-term objectives. Based on survey data from 4,009 German family and non-family firms, Bammens and Hünermund (2020) show that both their reputation motive and transgenerational control intentions are important family goals differentiating family from non-family firms.

Hence, a significant gap in research remains regarding the heterogeneity of green innovation performance among family firms and the underlying factors that contribute to this heterogeneity (Calabrò et al, 2019). Our study seeks to address the research question, *“Why do family firms engage in green innovation and what determines their green innovation performance?”* We hope to advance green innovation and family firm research by examining the factors that facilitate or hinder family firms' successful engagement in green innovation.

3. Methodology

We conducted a multiple case study applying a polar type theoretical sampling logic to provide an in-depth real-world perspective and extend emergent theory (Eisenhardt, 1989; Yin, 2018).

Case selection. We followed a three-step selection process to select our cases. First, we set our focus on German family firms which represent the backbone of the German economy and have a rich history of innovation across industries (Bergfeld and Weber, 2011). A firm is considered to be a family firm if at least 50% of decision-making rights are in the possession of a family unit (Bammens and Hünermund, 2020; Chua, Chrisman and Sharma, 1999). Second, we assessed the green innovation performance of 84 non-listed family firms from an external perspective based on consultation with eight industry experts ex ante and contacted the top and bottom 10%. The cases were added to the study by a replication logic to ensure external validity reaching the theoretical saturation level after 13 cases (Yin, 2018). Our cases operate in different industries, but most of them are B2B firms (8 of 13) as opposed to B2C firms. They also differ regarding the level of family involvement in management as only two cases have a non-family versus a family CEO and the average share of family members in board are 52%. Our sample also displays a rather wide range of which generation runs the company, namely from the 1st to the 13th generation, so that results are not limited to a certain level of family involvement in management and age of family firm. However, the sample is comparable concerning the level of family ownership, since all cases exhibit more than 50% of family ownership. Further, firm size is similar as all cases except for one have less than 5,000 employees which is important to ensure comparability as relevant resources for green innovation depend on firm size (Hao, Zhang and Wei, 2022; Huang et al, 2016).

Third, we performed a final ex-post evaluation of the family firms' green innovation performance based on the criteria defined by Tseng et al (2013). We identified seven high-performing, i.e., above-average, and six low-performing, i.e., below-average, family firms.

Data collection and analysis. We relied on input data from two main sources to triangulate the collected data and to increase the construct validity. First, we collected information about the firm's management team, the owning family, the firm itself, the industry, and the firm's green innovation performance based on publicly available data. Second, we conducted semi-structured interviews with (non-)family CEOs and managers from the top management responsible for the firm's sustainability strategy in 2022. We used case study protocols and one case database to increase our study's reliability and ensure a structured analysis process (Yin, 2018). We employed a highly iterative process based on three stages of analysis (Eisenhardt, 1989; Yin, 2018). First, we conducted a within-case analysis by semi-openly coding all case data. Second, we searched for cross-case patterns as we compared the groups for within-group similarities, but also intergroup differences for each driver and verified our two-tail approach as the identified drivers manifested differently in the two groups (Tseng et al., 2013). Third, we consolidated our findings, compared them with previous literature, and shaped our propositions to maximize their explanatory power between low- and high-performing family firms as well as within these groups.

4. Findings

4.1 Family firm SEW aspirations

Based on our observations, the key factor why family firms engage in green innovation is their goal to develop and sustain their SEW. The characteristics of green innovation, i.e., amplified societal interest and high-stakes strategic choice, correspond to family firms' goal to preserve their SEW which differentiate family from non-family firms. Thereby, SEW comprises the families' emotional requirements that are fulfilled by the non-monetary aspects of the firm (Gómez-Mejía et al, 2007).

SEW aspiration. We identified two subsequent drivers of family firm SEW aspiration, i.e., transgenerational control intentions and local embeddedness. The families' desire to pass on their firm to subsequent generations (Berrone, Cruz and Gómez-Mejía, 2012; Zellweger et al, 2012) is a positive driver for green innovation as all cases acknowledge the importance of green innovation for their future success. They view environmental laws as a risk to their long-term survival and recognize the demand for green innovation from customers and employees. They agree that family firms with high ecological footprints will not survive in the long run and cannot be passed onto future generations. Further, we observed that family firms' local embeddedness, i.e., their ties and commitment to the local community (Niehm, Swinney and Miller, 2008), promote green innovation, since these allow them to maintain their positive reputation as a valuable member of this community. Since all cases are influenced by social values and norms of the community, they aim to meet the increasingly challenging sustainability requirements of political and civil stakeholders.

For instance, the CEO of a low-performing case describes the various pressures and their effects on his firm:

"I would say that the risk of doing nothing regarding green innovation is significantly higher than trying and failing – just think about the regulation. You can't reach certain customers and resources if you don't have a sustainable business. We can already see it now and this trend will continue to intensify."

Existing research has found that family firms tend to invest less in innovation in fear of losing their SEW (Block et al, 2013; Chrisman and Patel, 2012). However, this innovation reluctance dissolves if the long-term family firm survival is at stake (Bammens, Hünermund and Andries, 2022). Previous studies have also proven that family firms aim to form close ties to the local community as a key mechanism to protect their firm long-term (Bammens and Hünermund, 2020; Zellweger et al, 2012). First studies confirmed this effect for green innovation (Dangelico, Nastasi and Pisa, 2019).

Hence, we propose:

Proposition 1: Family firms engage in green innovation due to their transgenerational control intentions and local embeddedness.

4.2 Familiness

Our data suggests that the heterogeneity in green innovation performance of family firms can be attributed to their available resources and capabilities, also referred to as familiness, as these vary greatly between the family firms with high or low green innovation performance (Habbershon and Williams, 1999). Thereby, three specific resources of family firms determine their chances to successfully develop and implement green innovation owing to its highly complex, collaborative, and risky nature. Hence, the level of social, human, and financial capital are positive contributing factors for green innovation in family firms (see also Danes et al, 2009; De Massis et al, 2015; Dyer, 2010).

Social capital. We identified social capital as an important driver of family firms' engagement in green innovation. Social capital is defined as the networks and relationships from which resources can be accessed to create value that arise from internal as well as external sources (Adler and Kwon, 2002; Nahapiet and Ghoshal, 1998). Family firms with a high green innovation performance benefit their high levels of structural, relational, and cognitive social capital, i.e., which allow them to form trust-based collaborations based on formalized processes and dedicated sustainability strategies both internally across functions as well as externally with a large green network with a growing number of diverse partners from various industries. In contrast, low performing family firms are more reluctant to build those close partnerships within their firm and outside of their own industry due to a lack of willingness to share knowledge and lack clearly communicated strategy and governance for their green innovation. For example, the Head of Sustainability from a high-performing family firm describes it like that:

"We have been a member of different regional networks and the leading green association since the nineties. These are all cross-industry initiatives where you learn how others approach the topic of sustainability. We bring in practical contributions and get involved."

Although family firms' SEW goals can prohibit an effective use of their social capital (Ardito et al, 2019; Pucci et al, 2020), prior research mostly confirms a positive relationship between social capital and both general and green innovation as it fosters the acquisition and exchange of knowledge and necessary resources (e.g., Cuevas-Rodríguez, Cabello-Medina and Carmona-Lavado, 2014; Sanchez-Famoso, Maseda and Iturralde, 2014).

Human capital. Family firms' human capital as their knowledge and capabilities embodied in family members as well as other people within the organization (Hatch and Dyer, 2004) and in our cases, the capabilities specifically required for green innovation, i.e., green dynamic capabilities, green transformational leadership, and green creativity drive family firms' chances of success (Chen and Chang, 2013). We observed that cases with a strong green innovation performance systematically screen markets for new trends and quickly identify the need for action in relation to their own green skills. Their inspiring leaders drive the entire organization as well as key stakeholders toward a green innovation mindset to fulfil their environmental vision and are resilient in the face of obstacles and setbacks. However, low-performing cases lack an ambitious sustainability vision from their leaders as well as structured green capabilities processes and are unaware about which skills need to be built but depend more on obtainable market solutions leading to lower levels of green creativity and innovation. For example, the Head of Sustainability of a low-performing family firm had to admit:

"We were a bit slack when it came to post-consumer recycled materials. We lost perspective for a short time and that can be just enough to no longer be at the forefront of a new development."

Extant literature has found evidence that the three dimensions of green capabilities described above are positive predictors of general or green innovation in firms in general, and to some extent in family firms, because firms with these capabilities can best leverage the knowledge and capabilities of their entire organization in the innovation process (e.g., Chen and Chang, 2013; Li et al, 2020; Singh et al, 2020; Singh et al, 2022)

Financial capital. We observed that the green innovation performance is determined by family firms' financial capital (Danes et al, 2009). In the case of green innovation, we find that especially their financial flexibility (Gamba and Triantis, 2008) and long-term orientation (Anderson, Duru and Reeb, 2012; Lumpkin, Brigham and Moss, 2010) influence family firm success with regard to green innovation. More specifically, family firms' financial capital leeway increased when managers faced lower levels of financial goal pressure that allowed for the consideration of green decision criteria as they believe that green innovation investments create non-financial and financial benefits for the firm in the long-term. Moreover, financial flexibility increases through a distinguished understanding of growth as indicated by the family CEO of a family firm with high green innovation performance:

"In terms of company philosophy, it's a question of how much profit I want to make. For me: slow, steady growth, 5% to a maximum of 8% per year. That would certainly have been faster if we had renounced some ecological products."

In contrast, low-performing cases put financial goals and benefits in the foreground while allocating financial capital. They are more focused on fixed and short amortization periods or facing financial constraints which hinders their engagement in green innovation which require a longer amortization period.

Although there is no empirical research on these topics in relation to green innovation performance in family firms, previous research has confirmed the special approach of family firms concerning their financial decision making owing to their own financial dependency and long-term orientation (e.g., Dreux, 1990; Hao, Zhang and Wei, 2022; Koropp, Grichnik and Kellermanns, 2013; Sirmon and Hitt, 2003).

Thus, we propose:

Proposition 2: Family firms are more likely to achieve a high green innovation performance if their familiness in form of higher levels of social, human, and financial capital enable them to successfully develop and implement green innovation.

5. Discussion

Synthesis and contribution. Based on this multiple-case study of 13 German family firms, we found that family firms engagement in green innovation is mainly driven by their aspiration to maintain SEW (Berrone et al, 2010;

Gómez-Mejía et al, 2007). Differences in green innovation performance were attributed to the construct of familiness, namely the family firm's heterogeneity in social, human, and financial capital (Habbershon and Williams, 1999).

Our paper contributes to the literature on green innovation and family firm heterogeneity as we identify key drivers of green innovation in family firms and support that green innovation is a unique form of innovation (Horbach, Oltra and Belin, 2013; Rennings, 2000). We find that family control (Bammens and Hünermund, 2020; Bendell, 2022; Dangelico, Nastasi and Pisa, 2019) and especially familiness are essential variables to understand family firm heterogeneity (Habbershon, Williams and MacMillan, 2003). We contribute to family firm heterogeneity research in innovation (Calabrò et al, 2019), demonstrating that family firm heterogeneity can be traced back to both governance and goals instead of focusing on only one factor (Kammerlander et al, 2020; Li and Daspit, 2016).

Practical implications. This study has important implications for family firm owners and policy makers. Family firms should have a long-term green innovation strategy supported by measurable targets. Encouraging inter-firm and -industry exchange can help access external green knowledge and foster social and human capital development. Family firms can also benefit from cooperation with research institutions and specific subsidies or long-term loans from government and financing institutions for green innovation.

Limitations and future research. We reached the point of theoretical saturation with our sample size which is comparable to other family firm multiple-case studies (e.g., Dangelico, Nastasi and Pisa, 2019). We offered interviewees confidentiality and asked for honesty to counteract social desirability biases in our interviews (Randall and Fernandes, 1991). However, future research could benefit from a quantitative perspective based on larger samples and survey or secondary data with higher levels of respondents' anonymity and investigate the transferability of our results to other economic regions (Fan, Zhang and Zhu, 2021).

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