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Family vs. Non–Family Firms: A Comparison of Innovation, Internationalization, and Resilience

Thesis presented by

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for the degree of

Doctor of Philosophy

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Author Declaration

"This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledge and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism and intellectual property."

Name: Yuping Yin Date: 08/08/2024

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Abstract

Long-term survival is the most basic goal of an enterprise. Among the key factors affecting the survival of businesses, firstly, innovation, through investment in research and development to improve or refine products or processes, helps businesses to develop unique core competencies, and becomes a key driver of sustainable development in a competitive market. Secondly, internationalization has become a key strategy for firms to gain sustainable competitive advantage by improving existing resources, expanding into new markets and enhancing knowledge. Finally, proper crisis management also plays an essential role in determining the future success of an organization and its survival in times of crisis by increasing its level of resilience. For family firms that carry generations of people, they possess a stronger willingness to survive than non-family firms. This is due to the fact that family members are deeply attached to the mission and values of the business making them more focused on the long-term development of the business. In the field of family business research, as family firms are a heterogeneous group, the interactions between family members, the family and the firm, and the impact of these interactions on organizational outcomes have become an important topic in distinguishing between family and non-family firms in terms of the development of innovative activities. At the same time, the unique governance characteristics exhibited by family firms, such as the family ownership structure, and the impact of family members' involvement in management on the family's important strategic decisions, such as internationalization, also deserve further research. Finally, the role of family ownership, family governance in the crisis management of family firms and the resilience of family firms in the backdrop of the COVID-19 pandemic deserve further reflection.

This study investigates family business performance in innovation, internationalization and resilience by applying a series of Probit, Tobit models. With data from the World Bank Enterprise Survey dataset (2019-2020) and Follow-up on

COVID-19 (rounds 1, 2 and 3), this study contributes to the research in the field of family firms by conducting three empirical studies. These studies focused on several research questions, namely （1) Are the factors driving innovation and the innovation behavior of family-owned firms different to non-family-owned firms？ (2)What is the role of internal family governance and the influence of external stimuli (competition) on innovation？ (3) Do family businesses and non-family businesses differ in their levels of internationalization? (4) Can innovation mediate the internationalization outcomes of family-owned vs non-family-owned businesses? (5) How well did family firms adapt to the COVID-19 pandemic compared to non-family firms? (6) Do innovation activities, management practices and family governance moderate the adaptability of family firms in response to shocks?

In terms of innovation in family firms, my findings confirm that family firms have the ability to innovate, especially in terms of product innovation, process innovation, external knowledge acquisition and R&D investment. Therefore, managers and owners of family firms should strongly support family firms in implementing these innovative activities, which can be a unique characteristic of family firms over non-family firms, thus helping family firms to become more competitive. Many of the innovation metrics are negatively impacted when family members comprise more than 50% of the management team. Therefore, appointing non-family CEOs or hiring a certain percentage of non-family managers is an important governance measure to overcome possible nepotism and thus increase the innovation potential of family firms. From an internationalization perspective, my study demonstrates that family ownership serves as an advantage that makes family firms more likely to internationalize than non-family firms. Therefore, family managers or owners need to understand that family influence can be positive in terms of internationalization.

In the light of the crisis, my research argues for the positive role of family ownership and resilience in the face of external shocks. This study emphasizes the positive

correlation between innovation (product innovation, process innovation, internal R&D investment) and family governance in moderating family resilience, respectively. Thus, this study provides family firm owners and managers with priorities on how to prepare for unexpected crises in order to better protect the continuity of family firms. Specifically, on the one hand, family firms increase their internal R&D investment and accumulate internal resources, which can serve as an insurance policy against future exogenous shocks. On the other hand, maintaining continuous innovation creates a supportive environment for the firm to better cope with exogenous shocks, and it is therefore also crucial for managers to encourage their employees to think outside the box and thus contribute to the introduction of new products and services. I conclude by highlighting the limitations of this research work as well as pointing the way for future research.

Chapter 1 Introduction

1.1 Context of This Study

One of the fundamental goals of any business is long-term survival. The sustained existence of a company hinges primarily on its ability to maintain profitability and is influenced by various elements, including the market characteristics (Agarwal and Gort, 2002; Audretsch and Mahmood, 1995; Mata et al., 1995), the life cycle of the sector (Agarwal, 1997), the sector's technological intensity (Aghion et al., 2001; Audretsch, 1995; Mata et al., 1995; Schumpeter, 1942), firm size and age (Cefis and Marsili, 2006; Evans, 1987; Geroski, 1995; Sutton, 1997), character traits of the founder (Vivarelli and Audretsch, 1996; Colombo and Grilli, 2005; Saridakis et al., 2008; Napolitano et al. , 2015), its financial constraints (Bellone et al., 2008; Headd, 2003), its innovation activity (Cefis and Marsili, 2006; Ericson and Pakes, 1995; Hall, 1999; Pérez et al., 2004), and its pre-entry experience (Boeker, 1988; Klepper, 2002). Among the various factors that affect the life of businesses, innovation is the most prominent one (Ortiz-Villajos and Sotoca, 2018). Indeed, in a tough global competitive environment, innovation is a crucial determinant of a firm's survival (Bessant, 2019). Innovation is not only an indicator of a company's competitive edge, success and long-term viability (Gaitán-Angulo et al., 2016; Helmers and Rogers, 2010). Additionally, it is recognized as the driving force behind a nation's economic growth (Hasan and Tucci, 2010; Thompson, 2018).

Although family businesses constitute around 80% of the global corporate structure, their primary common challenge worldwide is ensuring existence and longevity (Miroshnychenko et al., 2021). Porfírio et al. (2020) conducted a study and discovered that roughly 30% of family businesses manage to endure into the second generation, while only 13% make it to the third generation, and a mere 3% are able to live beyond the fourth generation. Non-family firms' longevity is defined as survival over the

average life span as discussed by Ahmad et al. (2021). The longevity of family firms is deeply rooted in the trans-generational succession, which is considered the most crucial phase in family businesses, as highlighted by Löhde et al. (2020), Sharma and Salvato (2013), Thomas Markus Zellweger et al. (2012). The current conceptual framework of sustainable longevity fails to consider innovative behavior, which is the most crucial determinant of family business sustainability (Grissa & Lakhal, 2023). Previous studies has identified several external factors which give rise to the variations in innovation amongst family firms and non-family firms (e.g., industry type, market dynamics, global region, environmental turbulence (Miller and Le Breton-Miller, 2021). However, family firms as a heterogeneous group, the interactions among family members, family units, and firms, and the fact that these interactions can affect organizational outcomes become a crucial issue that distinguishes family firms from non-family firms in terms of the implementation of innovative activities (Sharma and Salvato, 2013). In other words, a central issue seems to be the influence of the family itself on facilitating or limiting innovative behavior (Löhde et al., 2020). Similarly, Calabrò et al. (2019) contend that the majority of family business research has been carried out by family business researchers, and well-known innovation researchers have neglected the family dimension in their study, making family business innovation research a neglected field.

Internationalization is also known as a key strategy for firms to remain competitive and even survive (Kontinen and Ojala, 2010). Owing of the convergence of family and business, family-owned businesses exhibit a number of distinctive corporate governance traits that significantly influence the firm's strategic objectives and outcomes such as its international activities (Brunninge et al., 2007). Specifically, these features, which include, for example, the structure of ownership, the current generation that manages the firm, the executive board of company, the degree of composition of external managers, and the effect of supervision and advisory

committees on internationalization, warrant further research (Brunninge et al., 2007, 2009). Finally, the proficiency in managing situations of crisis also plays a crucial role in deciding the future success and survival of an organization (van der Vegt et al., 2015). Amidst a state of unpredictability, family businesses must cultivate organizational resilience to effectively respond to the intricacies of their environment and alleviate it prior to it happens (Williams et al., 2017; Williams and Shepherd, 2016). From the perspective of Gallopín (2006), Danes (2006), capitalizing on the adaptive resilience capacity of families after natural disasters can facilitate constructive responses that are critical to the long-term sustainability of family firms.

This thesis has three focuses: 1) Innovative behaviour of family firms and the moderating role of family governance and competition. 2) Internationalization behaviour of family firms and the mediating role of innovation. 3) Resilience of family firms in the face of covid-19 and the moderating role of innovation, management practices and family governance. Specifically, the three areas listed above are examined in three empirical chapters addressing the following research questions:

[1] Are the factors driving innovation and the innovation behavior of family-owned firms different to non-family-owned firms?

[2] What is the role of internal family governance and the influence of external stimuli (competition) on innovation?

[3] Do family businesses and non-family businesses differ in their levels of internationalization?

[4] Can innovation mediate the internationalization outcomes of family-owned vs non-family-owned businesses?

[5] How well did family firms adapt to the COVID-19 pandemic compared to non-family firms?

[6] Do innovation activities, management practices and family governance moderate the adaptability of family firms in response to shocks?

One of the motivations for this study comes from the fact that an intriguing interesting paradoxes of family firms resides in their innovative nature. Traditionally, family firms have been perceived as conservative, reluctant to embrace change, and inclined to avoid taking risks (Sharma et al., 1997; Ward, 1997; Naldi et al., 2007). According to this perspective, there should be a negative correlation between innovation and family involvement, which is supported by Chen and Hsu (2009). However, family firms should be motivated to innovate because innovation generates prosperity of firms and unveils new business opportunities (Chesbrough, 2010). Moreover, innovation decisions are consistent with the survival instincts of family firms and the typical focus on long-term continuity (Calabrò et al., 2019). Therefore, to identify the importance of innovation in this debate, this paper breaks down the performance of family firms in terms of product innovation, process innovation, knowledge sourcing, and R&D investment and compares their performance to non-family firms.

Existing research widely acknowledges the impact of firms' ownership structure on their internationalization, which demonstrates that the identity of the dominant ownership coalition frequently determines whether or how a company performs satisfactorily at export (Fernández and Nieto, 2005). Indeed, to be able to precisely identify what owners are truly aiming to achieve through their international endeavors, it is crucial to comprehend their objectives, which is in line with the notion that objectives serve as a significant indicator of firm outcomes (Feranita et al., 2017). Family businesses offer a special environment for examining export performance in regard to the role of unique goals that are family-specific and family-centred, as opposed to traditional firm-oriented goals (Aparicio et al., 2019). This study therefore examines the heterogeneity of family firms by understanding their internationalization choices and behaviors, and their overall export performance (De Massis et al., 2018).

A final motivation for this research stems from the term 'resilience' used by scholars to characterize the capacity of a system or organization to withstand change and

unfavorable circumstances (Cumming et al., 2005). Firms are systems that function in dynamic and ever-changing environments that pose a threat to their long-term survival (Acs and Audretsch, 1987). During such circumstances, companies modify their organizational structures, strategies, and behaviors to cope with changes in the operating environment, with the aim of discovering new opportunities for business (Audretsch et al., 2014; Sherif, 2006). Staw et al. (1981) and Meyer (1982) were pioneers in the study of resilience at the organizational level, particularly investigating how organizations react to external threats. It is challenging to evaluate how businesses behave during turbulence and crises, particularly in family businesses where family control and management involvement either directly or indirectly affects firm behavior (Marshall and Schrank, 2020). Natural disasters do not only cause physical harm to the assets, infrastructure, and primary markets of family firms, nevertheless it also have a detrimental impact on the psychological and personal well-being of family owners (Marshall et al., 2015). This further complicates disaster recovery by challenging the owners' capacity to proficiently guide the company during the post-disaster phase. Therefore, examining the resilience of family firms in the face of external shocks creates an opportunity to help future family firms withstand any difficult times (Doern, 2016; Schrank et al., 2013).

In addition to this, a number of factors were taken into account in the survey data used. For example: (1) Innovation is recognized as an important driver for organizations to cope with unstable business environments (Dovbischuk, 2022). However, scholars lament that the literature has a very limited understanding of whether innovation impacts family firms differently during crises (Erdogan et al., 2020; Leppäaho and Ritala, 2022). (2) Over the past decades, scholars have viewed good human resource management practices as one of the key roles for firms to successfully adapt to crisis situations (Avey et al., 2008; Ngoc Su et al., 2021). The reason for this is that management practices have transcended their traditional function in workforce management and transformed into a more strategic role by recognizing employees as

valuable assets that contribute to the long-term viability of the business as well as strengthening the organization, particularly during periods of economic decline (Bustinza et al., 2019; Naznin and Hussain, 2016). However, the body of knowledge on family business crisis management has a very limited understanding of the management practices deployed to foster organizational resilience (Calabrò et al., 2021; Ngoc Su et al., 2021). (3) Some previous evidence suggests a positive or negative relationship between excessive family member involvement in management and firm performance (e.g., financial performance, internationalization, and R&D investments) (Ramírez et al., 2021; Ruiz-Palomo et al., 2019). However, it is unclear to what extent family involvement in management affects the resilience of family firms, i.e., the trade-off between socio-emotional wealth gains and financial loss objectives ("hybrid gambles") during external shocks (Amore et al., 2022). Therefore, this study examine the adaptive resilience of family firms as well as setting three moderating variables of innovation, management practices and family management to test the moderating effect on the adaptive resilience of family firms.

1.2 Contribution of This Thesis

The specific academic contributions of each empirical chapter are summarized below.

Chapter 3 is the first of three empirical chapters in this thesis. This chapter examines the innovation behaviour of family-owned firms versus non-family-owned firms. The role of internal family governance and the influence of external stimuli (competition) on innovation are also considered. The main contribution of Chapter 3 to the existing literature is to enrich existing literature of family firms' innovation. The most controversial paradox in the previous family business literature is the innovative character of family firms (Llach and Nordqvist, 2010). On the one hand, family firms have traditionally been viewed as conservative and risk-averse, thus avoiding innovation (Chen and Hsu, 2009; Serrano-Bedia et al., 2016). On the other hand, the literature discusses that family firms innovate more than non-family firms due to their focus on long-term goals and continuity (Sirmon and Hitt, 2003). However prior

literature has always lacked in-depth understanding about whether the innovative behavior of family firms is indeed different from that of non-family firms. The evidence presented in this study demonstrates the family businesses are capable of conducting a variety of innovative and research-related activities. The present study examines the impact of family ownership on the innovative behavior of family firms by considering six different indicators including (i) internal R&D expenditures, (ii) external R&D expenditures, (iii) external knowledge acquisition, (iv) new product to the firm (NtF) innovations, (v) new product to the market (NtM) innovations, and (vi) process innovations. Due to the familial nature of family businesses, the common language and experience of family members can facilitate more effective communication and information sharing as well as the blending of individual and team knowledge (Daspit et al., 2018).

Another contribution in Chapter 3 focuses on the internal governance literature on family firms, in particular the impact of the dimensions of family participation in governance on innovation. The majority of the body of research to date concentrates on a direct relationship between innovation inputs or outputs and family governance. (Cucculelli et al., 2016; Manzaneque et al., 2018). Nevertheless, the extent to which family members hold senior managerial positions and their impact on innovation outcomes has been widely overlooked (Calabrò et al., 2019). Furthermore, investigations into internal governance, specifically examining the relationship between family management and innovation, have primarily concentrated on a limited set of innovation activities (i.e., product innovation only) in family firms (Migliori et al., 2020). This paper explores the extent to which the presence of family members (as opposed to non-family members) in managerial positions affects innovation, and also considers whether it has an impact on broader innovation activities. The paper finds that a high propensity of family member involvement in top management positions can reduce innovation.

Chapter 4 examines how family businesses internationalize and the mediating role that innovation can play in that process. The contribution of Chapter 4 to the existing literature is mainly that our study helps to further reconcile the previous discussion in the literature that there is a key divergence in the extent of internationalization between family and non-family firms. Specifically, part of prior literature in the field of family business found that family firms do not tend to have different internationalization outcomes relative to non-family firms (Alessandri et al., 2018; Arregle et al., 2017; Gómez-Mejía et al., 2011). In the context of the growing literature on the internationalization of family firms, our study provides empirical evidence based on the resource based theory. Differing internationalization outcomes may be due to their 'familiness' characteristics and, as previous literature has suggested, family firms benefit from enduring shared meanings, including values, norms and beliefs, which contribute to the development and formation of social capital strengths that distinguish them from other firms (Erdogan et al., 2020; Rau et al., 2019; Sirmon and Hitt, 2003; Sorenson et al., 2013).

The second contribution of the Chapter 4 is to examine the mediating role of innovation activities in the internationalization of family firms. While there is substantial evidence in the prior literature exploring the impact of innovation on firms' export performance (Wu and Qu, 2021), there are fewer studies that explore the role of innovation in family firms, and in particular the impact of innovation activities on family firm internationalization (Alayo et al., 2021; Casprini et al., 2020). Existing studies have investigated the moderating effect of R&D investments on family firm internationalization (Fang et al., 2018; Lin & Wang, 2021; Purkayastha et al., 2018), but this measure fails to take into account the commercialization success of innovations, which naturally provides important perspectives on the internationalization prospects of family firms. This study breaks through this limitation by adopting a multi-country research approach to explore the impact of innovation (i.e., product and process innovation) on the export behavior of family

firms. Therefore, the main findings of this study are (i) family firms are more likely to internationalize than non-family firms, (ii) innovative firms are more likely to internationalize than non-innovative firms, and (iii) innovation is equally important for internationalization outcomes in both family and non-family firms.

Chapter 5 investigates the resilience of family firms in the face of the COVID-19 pandemic and take into account the role of innovation, management practices and family governance as important mechanisms that enable family firms to remain viable in the face of challenging circumstances. Chapter 5 significantly enhances the current body of literature by contributing to the literature on how family ownership facilitates firms' responses in the face of extreme shocks. It explores both conceptually and empirically the intrinsic mechanisms that drive firm resilience in times of crisis. In doing so, it contributes to unravel the 'black box' of family firm resilience in the context of COVID-19. Previous research on the resilience of family firms in response to crises such as political revolutions (Mzid et al., 2019), financial crises (Aldamen et al., 2020; Amato et al., 2020; Garel and Petit-Romec, 2021), and earthquakes (Salvato et al., 2020). While studies on the resilience of family firms in the context of pandemics has resulted in the emergence of an exciting new field, scholars have also lamented that explanations for the resilience of family firms in response to COVID-19 have not been clearly conceptualized and empirically tested (Kraus et al., 2020). The only literature exploring family firms' response to COVID-19 outbreaks is limited to qualitative methods and the psychological capital (e.g., affective, cognitive, self-efficacy) dimensions of family managers (McHiri, 2023). Rovelli et al. (2022) emphasize that, as economies are currently in a historic moment, more empirical research should focus on whether the uniqueness of family firms compared to non-family firms affects their resilience in a pandemic. This paper responds directly to this call by providing a conceptual framework that delves into the mechanisms that drive family firm resilience and provides the first empirical test of this concept. The results of this research are the first of their kind in the literature, are applicable to

different contexts, and may provide valuable perspectives for family business owners, managers, and policymakers.

Second, another contribution of Chapter 5 is to contribute to a deeper understanding of the role that innovation plays in determining the resilience of family firms in times of crisis. The existing literature has a very limited understanding of whether innovation makes a difference to family firms during a crisis (Erdogan et al., 2020; Leppäaho and Ritala, 2022). Specifically, a large body of existing literature suggests that exogenous shocks trigger specific behavioral outcomes for family firms and suggests that intense external environmental changes drive family firms' innovation efforts, such as reinventing their business models, increasing investments in R&D, and launching new products or services (Soler-Porta et al., 2022; Sun et al., 2019; Williams and Shepherd, 2016; Zahra, 2022) Thus, a prominent research gap is how innovation, and in particular "the unique innovation dynamics of family firms due to the internationalization and reinterpretation of knowledge" (Soluk et al., 2021; p.365), affects the adaptability of family firms to external shocks (Erdogan et al., 2020). This study examines the impact on the resilience of family firms by introducing innovation activities introduced before the pandemic and those implemented during the pandemic. In brief, main finding of this study is that family firms are more resilient to COVID-19 shocks than non-family firms. Family firms that invested in internal R&D and implemented new product (radical) innovations prior to the COVID-19 outbreak show greater adaptive capacity. This study challenges the common view that all types of innovation are key strategies to help family firms adapt to crisis. Family firms that introduced incremental and experimental innovations during the crisis were less successful in translating the innovation premium into adaptive gains. While management practices are not a significant factor influencing adaptation, the configuration of high family involvement in governance is a way for family firms to achieve excellence in adaptation, suggesting how the unique human capital endowment of family firms can provide family firms with a comparative advantage.

1.3 Data Sources

This section presents an overview of the data used in each empirical Chapter (Chapter 3, 4, and 5). It draws primarily from the World Bank Enterprise Survey (2019–2020) and the COVID-19 Enterprise Follow-up Surveys. The sample was refined to include only countries with complete data on family ownership, innovation activities, exporting activities and resilience, resulting in a robust dataset for examining firm-level dynamics across different economies.

The data used in Chapter 3 are from the World Bank Enterprise Survey. This survey, known as the Enterprise Survey (ES) or the Business Environment and Enterprise Performance Survey (BEEPS), is conducted jointly by the World Bank Group, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB) and the European Commission (EC) in European and Central Asian countries. The ES is a company-level survey which captures a representative sample of the private sector of the economy considered. The survey is designed to provide information on a wide range of business environment topics including innovation, access to finance, corruption, infrastructure, crime, competition, and firm performance. Chapter 3 employs the 2019-2020 wave of the ES, which provides data on 47 countries. However, in the sample, five of these countries (Zambia, Haiti, Rwanda, South Africa, and Gauteng) were excluded due to missing data on family ownership. Also, four further countries (Belgium, Ireland, Luxembourg, Netherlands) were removed because of the absence of R&D information. The final sample consists of 38 countries which comprise 5 emerging economies, 10 developed countries and 23 developing countries. This provided a dataset covering 21,885 firm observations, of which approximately 46% were family businesses and 54% were non-family businesses.

The data applied in Chapter 4 is consistent with that in Chapter 3, after excluding countries with missing key indicators (such as family ownership, exporting activities,

and innovation activities), the sample includes 38 countries covered by the 2019-2020 wave of the ES, including 10 developed countries such as Italy and the Czech Republic, 5 emerging economies such as Russia and Poland, and 23 developing countries such as Mongolia and Albania. This dataset contains a series of key indicators required for the empirical analysis in this chapter, such as family ownership, export activity, innovation activity, and sub-groups such as company size, company age, and industry sectors. Finally, this paper collected a total of 9,589 observations, of which 68.5% of firms are family businesses and 32.5% of firms are non-family businesses.

The empirical analysis in Chapter 5 is based on the data from ES 2019-2020 wave of the World Bank COVID19 Enterprise Follow-up Surveys (CEFS) (Round 1, 2, and 3) conducted during the COVID-19. These CEFS were conducted by The World Bank Corporate Analysis Department in three rounds based on the WBES sample and data via telephone interviews from May 2020 to August 2021. This novel dataset makes it possible to measure the external shock caused by the pandemic and how it affects private businesses. As the follow-up COVID-19 surveys were only conducted in 36 countries, the initial sample size and country coverage used in this Chapter are determined by CEFS. Ultimately, this chapter's empirical study covers 21 countries, including 10 developed countries, 2 emerging economies and 9 developed countries. Finally, the total of 20445 samples are covered in the dataset, of which 88.6% of firms are family firms and 11.3% firms are non family firms.

1.4 Structure of This Thesis

Chapter 2 reviews the existing literature on family ownership and firm innovation, internationalization, and resilience, and how market competition, management practices, and family governance impact family innovation and resilience, respectively. The chapter presents the theoretical framework of this study based on the Resource Based Theory, Agency Theory, Socio-Emotional Wealth, Sustainable Family Business Theory and also discusses the manifestation of familiness in family firms. Finally, the chapter discusses in detail family firms and innovation, family and family governance, internationalization of family firms, resilience of family businesses, competition and human resources management practices..

Chapter 3 is the first empirical chapter of this thesis. The research in this chapter investigates the innovative behavior of family firms based on the World Bank Enterprise Surveys 2019-2020 dataset covering data from 38 countries (Eastern Europe, Central Europe, and East Asia). A series of Probit models are applied to assess how family firms differ from non-family firms in terms of product innovation, process innovation, R&D investment and knowledge acquisition. The moderating effects of market competition and family governance on the implementation of innovative activities by family firms are also investigated. This paper is published as: Yin, Y., Crowley, F., Doran, J., Du, J., & O'Connor, M. (2023). Research and innovation and the role of competition in family owned and managed firms in the *International Journal of Entrepreneurial Behavior & Research*, 29(1), 166-194 which is a 3* ABS journal.

Chapter 4 is the second empirical study of this research. This study examines how family businesses internationalize and the mediating role that innovation can play in that process. The data is obtained from the World Bank Enterprise Survey and consists of 9,589 family and non-family firms across 38 countries during the period

2019-2020. Propensity Score Matching (PSM) techniques and a series of Probit and Tobit models are used to examine the impact of family ownership and innovation on internationalization. This chapter is under consideration for publication in *The Journal of Family Business Strategy (2* ABS).*

Chapter 5 is the final empirical study in this research. This study explores the resilience of family firms in the face of the COVID-19 pandemic and identifies the moderating role of innovation, management practices, and family governance in explaining their resilience. The data for this study is a unique dataset consisting of the 2019/2020 World Bank Enterprise Survey and a follow-up survey conducted during COVID-19. Principal score matching and a series of empirical models are used to test the hypotheses of this paper. The findings suggest that family firms are more resilient to COVID-19 shocks than non-family firms. Family firms that invested in internal R&D and implemented new product (radical) innovations prior to the COVID-19 outbreak exhibit greater adaptive capacity. This study challenges the common view that all types of innovation are key strategies to help family firms adapt to crises. Family firms that introduced incremental innovations during the crisis were less successful in translating the innovation premium into adaptive gains. While management practices are not a significant factor influencing adaptation, the configuration of high family involvement in governance is a pathway to adaptive excellence in family firms, suggesting how the unique human capital endowment of family firms can bring comparative advantage to family firms. This chapter is under consideration for publication in *Family Business Review (3* ABS).*

Chapter 6 presents the conclusions of this study by compiling the key findings from the different empirical chapters of this thesis. I also provide recommendations for policymakers, discuss the limitations of this study, and elaborate on an agenda for future research.

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Chapter 2 Literature Review

2.1. Introduction

As a common form of business organization worldwide, family businesses have a significant impact on propelling the global economy (Benedict, 1968; De Massis et al., 2018; Memili et al., 2015; Zapata-Cantu et al., 2023). In the literature, family firms are generally defined as any firm where the founding family or individual owns a fraction of the firm or holds a position on the board of directors (Ang et al., 2000; Barth et al., 2005; Cronqvist and Mattias, 2003; La Porta et al., 1999; Miller et al., 2007). Scholars have developed a detailed meaning of family business based on the following three categories: (1) ownership (2) control and (3) management (managerial roles played by family members) (Chrisman et al., 2015).

Through the lens of ownership, family businesses are a special case of controlling shareholders (Anderson and Reeb, 2003; De Massis et al., 2021; Demsetz and Lehn, 1985; Demsetz and Villalonga, 2001; Rau et al., 2019). In other words, the key variables that distinguish family firms from non-family firms in relation to non-economic goals, ethics, and family governance is the ownership of the firm by one or more controlling families (Astrachan et al., 2002; Barontini and Bozzi, 2018; Bergamaschi and Randerson, 2016; Neubaum et al., 2019). Therefore, a broad discussion of the dimensions related to family control of equity include (1) the same family being the controlling shareholder (ultimate owner) of more than 10% of the direct and indirect voting power (Ghaleb et al., 2020; Santos et al., 2014) (2) the largest shareholder owning at least 10% and the family or the largest shareholder controlling more than 51% of the direct voting power or controlling more than twice the direct voting power of the second-largest shareholder (Barontini & Caprio, 2006)

(3) setting the threshold level of the ownership of the same family at more than 50% of the equity as a typical characteristic of a family business (Camisón-Zornoza et al., 2020; Molly et al., 2010; Westhead and Cowling, 1998). Further, Daspit et al. (2018) argue that family ownership may differ across six dimensions, with each combination being a key indicator of differentiation from non-family firms due to their potentially different impacts on both family firms and their outcomes. These six dimensions are (1) the number of relatives involved in ownership, (2) the proportion of firm ownership held by relatives, (3) the dispersion of ownership among relatives, (4) the relationship between owners, (5) the demographic characteristics of owners, and (6) the extent to which owners are involved in corporate governance.

The key point is that, by virtue of ownership, family firms enjoy a degree of control over the firm, and family owners may use these rights to influence the decision-making process of the organization and view the governance structure as a tool to strengthen their control and pressure executives to achieve family goals (Carney, 2005; Gómez-Mejía et al., 2011). Thus, a definition that envisions a dominant, controlling coalition that shapes the vision of the inter-generational firm is proposed (Schulze et al., 2003; Stewart and Hitt, 2012).

Ownership is not the only important factor in the definition of a family business (Arregle et al., 2021; Pieper et al., 2008). In addition to ownership, family control and corporate governance may also be reflected in key management positions held by family members (Dyer and Whetten, 2006; Koji et al., 2020). Similarly, Chandler (2015) argues that control of family firms is held by family members, who maintain a high level of involvement in the firm's management activities and may even serve directly as the firm's senior management. Specifically, family members play a role in managing the business by acting as members of the board of directors, and in some cases, directly serving as key executives of the company and effectively implementing strategic decisions made by the family (Daspit et al., 2021; Dekker et al., 2015).

Therefore, from the perspective of control, a firm in which family members are involved in core management, and control the operation and development of the firm, can be called a family firm (Glowka et al., 2021; Tan et al., 2021). Similarly, Yeh and Chiu (1996) summarized the definition of family firms by arguing that the founding family not only owns an absolute percentage of the shares of the firm, but also needs to be represented on the board of directors and have absolute control over the decisions of the firm. In addition to this, other studies have also emphasized that at the beginning of the establishment of a family business, family members often have both ownership and control of the business (Bouzgarrou and Navatte, 2013; Camisón-Zornoza et al., 2020; Sun et al., 2024). This is due to the fact that family firms are known to have fewer independent directors and are more likely to have dual CEO roles (Voordeckers et al., 2007). Thus, it is furthermore important to consider a stricter definition of family firms that considers the managerial dimension in addition to ownership (Anderson and Reeb, 2004). For example, some scholars (Anderson and Reeb, 2003; Anderson and Reeb, 2004) consider a family business if there is partial ownership by the founding family and the CEO is also a member of the family.

In the next sections, the familiness of family firms, the mechanisms that distinguish family firms from non-family firms (ownership and governance, Resource Based View, Socio-Emotional Wealth, Sustainable Family Business Theory, Agency Theory) and the manifestations of family firms are discussed in detail.

2.2 Family Firms - 'Familiness'

Familiness is frequently employed as a distinguishing factor that distinguishes family firms from non-family firms (Pearson et al., 2008). In its original version, the concept of familiness was defined using a resource-based view as a particular combination of capabilities and resources (i.e., the essence of the firm) unique to the firm because of family involvement (Habbershon and Williams, 1999). This unique collection of resources affects the capabilities of the family firm, leading to competitive advantage,

which ultimately translates into superior performance (Habbershon and Williams, 1999). Pearson et al. (2008) further develops the addition of the social capital dimension to elaborate on familiness. That is, the behavioral and social resources that arise as a result of family interactions and participation in the firm are referred to as familiness. Specifically, a particular combination of structural, cognitive, and relational dimensions of family-related resources creates the capabilities of the family firm (Nahapiet and Ghoshal, 1998; Pearson et al., 2008). Examples include effective information acquisition and communication and collective action (Adler and Kwon, 2002), enhancement of internal focus and protection against external influences (Broccardo et al., 2019), and maintenance of the family's long-term goals (Diaz-Moriana et al., 2024). A crucial component of this definition of familial is "closure," which strengthens internal concentration and guards against external influences, and " stabilization of the family nucleus and maintenance of the family's long-term goals in the firm are often the core objectives of the business" (Pearson et al., 2008, p.961). This is the primary objective of the family firms which promotes an internal perspective of social capital (Pearson et al., 2008). Crucially, studies using the resource-based view to analyse family firms recognize the nature of the competitive advantage derived from the 'family' (Arregle et al., 2007; Chirico and Nordqvist, 2010). For instance, family firms are distinguished by extraordinary commitment, long-term goals, collective identity, strong family values, and an ambition to ensure businesses' survival across generations (Pearson et al., 2008; Sirmon & Hitt, 2003). Scholars have emphasized the role of familiness in supporting the competitive advantage and performance of family firms (Chrisman et al., 2015; Chua et al., 2012; Habbershon et al., 2003; Pearson et al., 2008)

2.3. What Makes Family Firms Different To Non-Family Firms?

2.3.1. Ownership and Governance

A fundamental characteristic of family firms is family ownership (Dawson and

Mussolino, 2014). The specificity of family firms is reflected in the interaction of the two systems: family and firm (Bennedsen et al., 2010; Chrisman and Patel, 2012). When family ownership exists in a firm, it brings competitive advantages that cannot be replicated: first, family bonds and blood ties provide an effective foundation for trust-based governance (Ang et al., 2000). This alignment of interests and goals of family members based on blood ties reduces transaction costs (Chrisman et al., 2003; Schulze et al., 2003). Second, the participatory and controlling position of family ownership can effectively address agency issues that arise due to the separation of ownership, supervision, and management in non-family firms (Corbetta and Salvato, 2004). Specifically, studies show that family firms are generally managed by the owner, and the family and the firm are aligned in terms of economic vs. non-economic objectives (Chrisman et al., 2003; Meckling and Jensen, 1976; Pierce et al., 2001). Family agents engaged in different managerial tasks have an advantage in monitoring each other due to kinship, and thus can effectively avoid agency conflicts arising from the opportunistic behavior of agents due to the separation of powers (Stewart, 2003). On the other hand, private property rights can reduce agency costs even in family firms where ownership and management are separated (Burkart et al., 2003). Ownership of family firms is concentrated in the hands of decision makers, who have special blood ties to each other (Brunninge and Nordqvist, 2004). Given the close ties between family wealth and firm wealth, family shareholders are highly motivated to monitor management and can discourage managers from plundering the owner's wealth through additional consumption, extra perks, or inefficient resource allocation (Berrone et al., 2012). A concentrated ownership position also enables family shareholders to minimize free-rider behavior and improve firm performance (De Massis et al., 2013; Madden et al., 2020). Because of this, family firms are considered a low-cost form of organizational regulation (Kollitz et al., 2019).

Finally, the long-term outlook of family firms and their intent to secure both the firm's

and the family's reputation, and to avoid accounting and financial scandals, motivates family managers and owners to be more concerned with long-term interests and to be more reputation-oriented due to the family's emotional ties to the firm (Anderson and Reeb, 2003; Astrachan and Jaskiewicz, 2008; Block, 2011). Thus, the family or family group's influence in terms of ownership, governance, and corporate goals and strategies is what distinguishes family firms (Chua et al., 1999; Cordeiro et al., 2021; Déniz and Suárez, 2005).

2.3.2. Resource Based Theory

Penrose (1959) first put forward the idea that a firm is a series of resources in her book The Theory of Firm Growth. Wernerfelt (1984) subsequently formalized the term Resource-Based View (RBV). Firms in the same industry have different resource endowments which are at the core of firms' efforts to gain and sustain a competitive advantage. Firms' proprietary resources are also the basis for firms to reduce their dependence on the external environment. Barney (1991, p.101) further explains that resources are "all assets, capabilities, organizational processes, firm attributes, information, knowledge and other assets owned or controlled by the firm." He also utilizes the VRIN framework to focus on resource characteristics, arguing that valuable, rare, unique, and non-substitutable resources within the firm are the key to sustainable competitive advantage. These heterogeneous resources are the key to establishing competitive barriers and gaining sustainable profitability (Makadok, 2001). At the same time, the logical starting point for the implementation of differentiation strategies in business organizations lies in the possession of unique resources, organizational experience, and the ability to integrate and manage these resources (Heck, 2004; Kellermanns and Eddleston, 2004; Nordqvist, 2005).

Family firms exhibit distinct difference from non-family firms in terms of the resources endowment and the way in which they allocate them (Levie and Lerner, 2009). The main characteristic of family firms is that individuals are connected

through family ties (Cabrera-Suárez et al., 2001; Frank et al., 2017). This unique bundle of resources, termed ‘familiness’, due to the systematic interactions between the family, its individual members, and the firm, can exert a meaningful influence on family firms (Duran et al., 2016; Kraus et al., 2016). Specifically, families can bring three types of resources to the firm: financial capital, human capital, and social capital (Heider et al., 2022).

First, family firms tend to establish conservative financial policies and are not as indebted to short-term outcomes as non-family firms, which can allow family firms to pursue creative and innovative strategies (Dreux, 1990). This is because non-family firms finance their resource structure via equity, debt and / or internal financing whereas the family's primary objective is to keep the firm passed down from one generation to the next (Forcadell et al., 2018). Therefore, family managers prioritize the impact of financial decisions on family control rather than conducting a thorough evaluation of complex financial matter (e.g. optimal leverage) (McMahon and Stanger, 1995). As a result, family firms prefer less risky or conservative financial choices (Randøy and Goel, 2003). Increased debt is more likely to cause family owners to lose control of the family (Astrachan and McConaughy, 2001; Gallo et al., 2004). For family firms, business failure means not merely loss of individual wealth but also loss of family human capital (Blanco-Mazagatos et al., 2007). In addition to this, the aspiration to sustain the business for future generations offers a unique motivation to efficiently oversee capital (Gallo and Vilaseca, 1996; McConaughy and Phillips, 1999). This investment strategy develops ideal patient capital (Charles, 2014; Miller and Le Breton-Miller, 2005), which is capital invested for the long term, and consequently there is little threat of liquidation (Ernst et al., 2012).

The most important resources in family firms are usually related to human capital i.e. knowledge, skills, and abilities (Heider et al., 2022). Compared to non-family firms, human capital in family firms is unique and complex due to the dual relationship of

family members involved in both the family and the firm in their personal and professional lives (Sirmon and Hitt, 2003). First, family firms have strong relationships and trust among its members and are able to establish solid communication mechanisms (Miller and Le Breton-Miller, 2005). The presence of strong loyalty, trust, and communication, which are rooted in a sense of belonging and commitment, can result in increased employee satisfaction (Miller and Le Breton-Miller, 2005). Consequently, family firms tend to be more attentive to the needs of their employees compared to non-family firms (Tagiuri and Davis, 1996). Second, the tacit, hard-to-imitate knowledge possessed by family members, even when new family members are introduced to the firm at a young age, becomes an inimitable resource and provides family firms with the opportunity to develop in-depth, firm-specific knowledge (Chirico and Salvato, 2008; Dyer and Whetten, 2006; Lane et al., 2006; Sirmon and Hitt, 2003). Third, family members are willing to make great effort to acquire more knowledge of work-related technologies and skills (Eddleston et al., 2018). This intention stems from their exceptional cooperation and teamwork, driven by the shared objective of advancing the organization's interests and benefiting its members (Eddleston et al., 2018). That is, human capital specific to family firms can be acquired via training and experience development within the family firm, which allows individuals to acquire critical skills for work-related tasks (Sardeshmukh and Corbett, 2011).

However, human capital in family firms has its disadvantages. On the one hand, because family firms mostly select family members for positions, the emphasis on external expertise and university training in promotion decisions in non-family firms is difficult to achieve in family firms (Covin, 1994). This means family members may have deficiencies in their expertise and there is a risk of family member incompetence (Sharma and Irving, 2005). On the other hand, nepotism may exist in family firms, which not only reduces the efficiency and professionalism of the firm, but also makes non-family members feel excluded from utilizing their abilities and thus choosing to

leave the firm (De Massis et al., 2013).

Social capital consists of three dimensions: structural, cognitive, and relational (Nahapiet and Ghoshal, 1998). The structural dimension is determined by network relationships and configurations; the cognitive dimension is shaped by shared language and values, and the relational dimension is established through trust, norms, and obligations (Sirmon and Hitt, 2003). Each dimension of family business social capital involves the relationship between family members' personal relationships and the organization, which is crucial for family businesses to access other forms of intellectual, human, or financial capital (Dawson, 2012). The social capital of family firms is strengthened by the strong connections existing between family members and stakeholders, often established over generations, offering a network of contacts for reciprocal advice and communications, and establishing many formal and informal collaborations, which are key elements in facilitating the implementation of breakthrough strategies in family firms (Le Breton–Miller and Miller, 2015; Sanchez-Famoso et al., 2019). Overall, social capital can be categorized into internal and external aspects. Due to the familial nature exhibited by family firms, their own historical accumulation and long-term human capital, family firms gain from internal social capital such as a high degree of tacit understanding among family members (Arregle et al., 2007). At the same time, family firms also have strong external social networks, due to the long-term accumulation of contacts, which allows family firms to gain knowledge and resources from other networks (Gómez-Mejía et al., 2011).

2.3.3. Socio-Emotional Wealth (SEW)

The concept of Socio-Emotional Wealth (SEW) was initially introduced by Gómez-Mejía et al. (2007). SEW describes which refers to the non-economic utility or benefits that family members receive from running and managing the family business through their roles as owners, decision makers and managers (Gómez-Mejía

et al., 2007). Since SEW describes the pursuing of non-economic goals by family businesses and influences strategic decisions related to the protection or enhancement of existing endowments, SEW serves as a key factor in distinguishing family firms from non-family firms (Swab et al., 2020). Subsequently the most influential conceptualization of SEW was proposed by Berrone et al. (2012; p.259) namely that SEW consists of "[...] the stock of affectively relevant value that a family derives from its controlling position in a given firm". Indeed, SEW theory combines and extends upon the behavioral agency theory and prospect theory (Wiseman and Gomez-Mejia, 1998). The essence of SEW theory is that family businesses prioritize the safeguarding of SEW, which is closely linked to non-economic goals (Wiseman and Gomez-Mejia, 1998).

The loss and gain of SEW is an essential point of reference in the strategic decision-making process of family firms, which tend to be characterized by SEW loss aversion rather than risk aversion (Jones et al., 2008). Family businesses face a loss of SEW may exhibit either risk aversion or risk seeking behavior, determined by the specific types of risks involved, such as performance hazard risk and venturing risk (Gómez-Mejía et al., 2011; Gómez-Mejía et al., 2007). Performance hazard risk involves negative outcomes associated with decision choices (March and Shapira, 1992). In the face of greater failure rates and below-target performance, family firms may be inclined to take higher performance-related risks if it is necessary to protect SEW (Gómez-Mejía et al., 2007). Venturing risk, which refers to the search for alternative routines and opportunities when firms are not satisfied with the status quo, i.e., when performance is below target, is also an indicator of venture capital (Bromiley, 1991). In this case, family firms are less inclined to make business decisions that trigger fluctuations in performance, to avoid risk and maintain SEW, even if they take greater performance risks (Gómez-Mejía et al., 2007).

Berrone et al. (2012) proposed five dimensions of SEW, termed FIBER: (i) family

control and influence, (ii) family members' identification, (iii) binding social relationships, (iv) family members' emotional attachment, and (v) inheritance through dynasty. A fundamental assumption of SEW is that it is family control and influence that facilitates the ability of families to preserve their SEW (Berrone et al., 2012). One potential consequence of strong family-firm ties is the identification of family members with the firm. As a result, stakeholders, both internal and external, regard the company as an extension of the family itself (Berrone et al., 2010). Internally, this identification can have a significant impact on employee attitudes as well as on other internal processes and the quality of the services and products they provide (Carrigan and Buckley, 2008). Externally, family members cautious about the external reputation they present to clients, suppliers, and other external stakeholders as a result of this identification (Micelotta and Raynard, 2011). Binding social relationships are those between the firm and various stakeholders (e.g., with employees), which are often intimate and might even resemble family. In addition, family businesses frequently have a strong sense of community involvement, actively supporting associations and participating in various community activities (Berrone et al., 2012). The emotional bond among family members is related to the impact of emotions within the family business environment. Family businesses can serve the family by meeting emotional needs for belonging, cohesion and security (Berrone et al., 2012). Finally, an inter-generational vision of dynastic succession, by keeping the company under family control for future generations by renewing the family-firm linkage relationship, is considered to be at the heart of family business concerns (Hsu and Chen, 2024).

In summary, family ownership confers unique characteristics on family businesses, with family owners preferring non-economic benefits over other types of business owners (Brundin et al., 2008). Non-economic benefits include the psychological satisfaction and sense of belonging that comes from owning a business, the emotional connection to a family business, the aspiration to retain family control, the

perpetuation of family culture through inter-generational transmission, the preservation of the family's unique social capital, and altruistic considerations for family members (Chen et al., 2014; Zhu et al., 2013). Therefore, SEW theory is well placed to explain the specificity of family behavior (Thomas M. Zellweger et al., 2012). If measured only from the perspective of the firm, the theory cannot explain why business owners choose to give up in the face of better investment opportunities and growth chances, and what the reasons are for such irrational decisions (Dyer and Whetten, 2006). Although it is also more difficult for ordinary entrepreneurs to relinquish control, they do not hesitate in the face of high economic benefits (Mahto et al., 2010). Family entrepreneurs prefer to bear certain economic losses, and control becomes the main guiding factor for family business strategic decisions (Schulze & Kellermanns, 2015). Family wealth will disappear if the management of the business quickly goes wrong; even if this happens, the family will not easily accept external funds for fear that their control will be weakened, which will damage the family's SEW (Pieper et al., 2008).

2.3.4. Sustainable Family Business Theory (SFBT)

SFBT was initially proposed by Stafford et al. (1999). SFBT emphasizes that family is regarded as a logical social framework, and the long-term viability of the family business depends on both the success of the business itself and the effective functioning of the family unit (Stafford et al., 1999). Individuals within the family system or the business system could impact some aspects of both systems (Heck and Trent, 1999). SFBT emphasizes the connection of human, financial, and social capital, and resource transactions during periods of stability and turbulence, the multidimensionality of family and business accomplishments, and the complicated effect of these elements on long-term viability (Stafford et al., 2010). Astrachan (2003; p.570) has commented that the SFBT both conceptually and empirically "[...] exemplifies what is at the heart of the family business field: the study of the reciprocal

impact of family on business".

Indeed, the SFBT postulates that the interactions between its subsystems—the family and the business — are what determine the unique behavior of the family business system based on the systems theory and resource-based view (Chadwick and Dawson, 2018). Utilizing its resources, the family subsystem accomplishes family-related goals, which may encompass both subjective aspects such as emotional well-being, as well as objective aspects such as financial health (Meier and Schier, 2021). The firm subsystem as well utilizes its family-independent resources to accomplish its business goals (Danes et al., 2008). The two subsystems engage in mutual interaction with each other so that firms and families benefiting from each other's resource base (Frank et al., 2017). Specifically, families provide resources (e.g. social capital, human capital, financial capital) for family business performance, sustainability, long-term survival, and social responsibility (Danes et al., 2008). The importance of managing human capital in achieving success in family businesses is emphasized by the presence of both positive and negative traits (Unger et al., 2011). This is due to the human capital theory suggests that there is a positive relationship between productivity and human capital (Astrachan and Kolenko, 1994). Second, social capital refers to the goodwill among family members and between the family and its firm and community (Dyer and Whetten, 2006). Human capital is represented in individuals, whereas social capital is reflected in the relationships between family members and formal social institutions (Sanchez-Ruiz et al., 2019). How social interactions' structure, substance, and quality affect other resource flows and advance sustainable development is the primary concern of the social capital process (Salvato and Melin, 2008). For example, trust among family members is more advantageous than in non-family firms in fostering cooperation and teamwork and is more likely to attract other family human and financial resources (Steier, 2001). Thus, family social capital becomes an important information resource for identifying and capitalizing on business opportunities (Hendry et al., 1991; Mulholland, 1997), providing access to finance for

the business (Danes, 1994), and increasing customer and worker loyalty and commitment (Danes, 1994). Finally, the definitions of financial and physical capital include cash, credit, and various financial investments owned by individual family members or firms, together with property and equipment (Danes et al., 2008). The greatest attraction of family capital is the interaction between resources, e.g., when a family business needs family capital or financing, it needs to draw on the family's human and social capital (Danes and Stafford, 2011).

SFBT also argues that family firms exhibit greater resilient to external disturbances due to a buffer provided by family resources (Stafford et al., 1999). As a result, SFBT theory is often applied to the study of the resilience that firms exhibit against external shocks such as natural disasters (Mzid et al., 2019; Ramírez-Solís et al., 2022). Responses to disruptions, in the context to SFBT, are adjustments made within one system (e.g., a firm or a household) to adapt to the needs of another system in the presence of unusually burdensome demands (Danes et al., 2008; Stafford et al., 1999). These responses can be measured by patterns of adjustment. Adjustment patterns are automatically activated when a family business experiences a disaster or other severe disruption (Miller et al., 2000). Family functional integrity, the cognitive tendency to arrange for consistency, and the pattern of adaptation to disturbances serve as a complete set of mechanisms to help family firms activate automatically in the event of an external shock (Haynes et al., 2011). Firstly, adaptation, partnership, growth, emotion, and determination as components of the functional integrity of the family imply that trust, creativity, and openness among family members lead to higher levels of responsiveness in family interactions resulting in a more resilient family business in the face of external shocks (Danes and Morgan, 2004; Stewart and Danes, 2001). Secondly, a tendency toward schedule congruence as resilience contributes to more efficient decision-making in family firms, enhances co-operation and teamwork, and increases the resilience of family firms in the face of external shocks (Avery and Stafford, 1991). Finally, the adaptive change/disturbance model can help family firms

make quick adjustments in family-firm interactions when the firm is hit by a disaster or other major shock by (a) reallocating personal time; (b) obtaining extra help; (c) adjusting family resources; (d) adjusting firm resources; and (e) interweaving tasks to help the family firm weather the storm (Fitzgerald et al., 2001; Miller et al., 2000).

2.3.5. Agency Theory in Family Firms

The formulation of agency theory can be traced as far back as the research assertion of Berle and Means (1932) that mass production brought about an increase in the size of firms and the widespread use of industrial technology, and that the ownership of firms' wealth has become more decentralized. Thus, it implies that individuals with ownership of the wealth lack the corresponding right to control it, and those with control of the wealth may not be able to own it (Berle and Means, 1932). The above assertion about ‘separation of powers’, known as the "Burleigh-Means proposition", suggests that the separation of powers brings more managerial control (Wang & Guo, 2019). Due to the existence of conflict of interest exist among managers and owners, managers will prioritize to their own interests rather than the interests of owners (Tafel-Viia & Alas, 2009). Thus, solving the conflict of interest between managers and owners has become the core issue of corporate governance, which has also become the prototype of the principal-agent theory (Vilaseca, 2002). It was not until 1976 that the concept of agency costs was introduced by Meckling and Jensen (1976), whose classic study emphasized the contractual issues between the principals (usually owners) and the agents (usually managers) of a firm, and that the separation of ownership and control may lead to agency costs due to differences in preferences. In family firms, the original agency theory suggests that conflicts of interest are greatly reduced due to the high degree of centralization of ownership and management (Meckling & Jensen, 1976). In reality, agency relationships are not as homogeneous in family firms as the dominant principal-agent model suggests. Schulze (2022) identifies the theoretical flaws of the J/M (Jensen and Meckling) model, specifically

regarding private property rights and the unity of power. This shortcoming not only reducing the effectiveness of control mechanisms from the outside but also bring the threats of altruism and self-control to the firm (Schulze, 2022). Altruism imposes unique agency costs on family firms and allows for variation among family firms (Jayantilal et al., 2023). For example, paternalistic altruism adopts altruism by hiring adult children into the firm and then offering them above-market contracts and benefits (Lim et al., 2010). This parental altruism may turn into favouritism for the hired children encouraging them to free-ride thus creating moral hazard, delays and adverse selection problems for some family businesses (Lubatkin et al., 2005).

While agency problems in family firms may be slight severe than in non-family firms, agency theory is silent about competitive advantages that result from different control mechanisms (Chrisman et al., 2004). Family firm researchers generally agree that not only does agency cost I exist in family firms, but agency cost II is more prominent in family firms (Baker and Hall, 2004; Geiger and Wuensch, 2007). Agency cost I refers to the agency cost triggered by the opportunistic behavior of agents (Singla et al., 2014). Agency cost II refers to the phenomenon of large shareholders infringing on the interests of small and medium shareholders triggered by the conflict between large shareholders of the firm and small and medium shareholders of the firm (Filatotchev and Wright, 2011). Agency cost II is more prominent in family firms in the form of conflicts between family and non-family shareholders (Chua et al., 2009; Sauerwald et al., 2016).

Not to be overlooked, the governance mechanisms in family firms exhibit substantial differences compared to those in non-family firms (Madison et al., 2016). Traditional family governance is a form of informal relational governance that is characterized by family shared values, nepotism, and trust (Mustakallio et al., 2002). This governance mechanism brings family members together through blood or kinship ties, resulting in a convergence of their objectives and a shared focus on the enterprise's long-term

growth (Madison et al., 2016). Consequently, it mitigates opportunistic behavior and contributes to the reduction of agency costs (Fama and Jensen, 1983). In the last ten years, agency theory has generated novel viewpoints and concepts in the field of family firm research, such as the psychological ownership of executives can mitigate the agency issue in family firms (Löhde et al., 2021; Madison et al., 2016). This is because the family owner has a strong influence on almost all psychological and situational factors of organizational behaviour (Corbetta and Salvato, 2004). Therefore, the aspirations and objectives of the agent and the family business owner can coincide when an executive has a strong sense of ownership, which helps convert non-family executives' 'agentic' tendencies into psychological ownership (Sieger et al., 2013). Similarly, executives' organizational identification affects firms' agency costs, with higher organizational identification motivating executives to protect the firm's image and interests, leading to lower agency costs (Boivie et al., 2011).

2.4. Manifestations of Familiness in Firms

Familiness makes a family business unique in two ways: the constituent of family involvement and the nature of that involvement (Frank et al., 2010). The family's involvement in ownership, management, or control is taken into account by the components of involvement as discussed by Chrisman et al. (2015). It establishes the minimal bar for a firm to be classified as a family firm and is the fundamental prerequisite for a family to exert influence over the family firm. This method argues that a firm can be considered a family business if family involved in ownership, management, or control over it (Pearson et al., 2008). According to the essence approach, when a family controls a business and exhibits an inter-generational vision for it, it creates a sense of personal and social fulfillment, which motivates family members to protect the firm's interests , placed the firm's goals above their personal goals, as well as contributing human, social and financial capital to the firm, creating a characteristic resilience especially in times of crisis (Arregle et al., 2007; Zahra et

al., 2008; Danes et al., 2009). Family involvement can lead to various forms of support. For instance, family members can offer financial backing by accessing external sources of income, emotional support by expressing encouragement (Danes et al., 2009). Also, family members can contribute to instrumental support to the family businesses by sharing their experience, skills and knowledge (Danes et al., 2009). This is how the essence approach captures the heterogeneity of family firms by allowing different types of family firms and behaviors to be described (Westhead and Howorth, 2007). It depicts the processes and behaviors that go beyond ownership and management, and give rise to competitive advantage (Zellweger et al., 2010). It also illustrates inter-generational vision as an important component embodied by family firms (Zellweger et al., 2010).

2.4.1. Firm Characteristics and Broad Behaviors

Family firms are a type of organization that has a unique business vision and objectives due to the active involvement of the controlling family (Gala and Julio, 2016). Thus, family control is one of the core characteristics that differentiate family firms from other forms of organization (Jocic et al., 2023). Family control describes the fact that the family retains control over the business, which can be achieved in a variety of ways, such as through family shareholdings and family members sitting on the board of directors (Helsen et al., 2017). As far as corporate governance is concerned, the agency problem arising from family control is a hot topic in this field of research (Pindado et al., 2015) because it leads to principal-to-principal conflicts (Dharwadkar et al., 2000; Young et al., 2008). Some of the most serious principal conflicts occur when a family's most powerful shareholders enjoy control beyond their economic rights in family firms (Liu and Magnan, 2011; Muñoz-Bullon et al., 2018). In the area of corporate strategy, the impact of family control revolves around family firms' human resources (Hauswald et al., 2016), internationalization (Liang et al., 2014) and innovation strategies (Classen et al., 2012; Duran et al., 2016; Gala and

Julio, 2016; Liang et al., 2014; Souder et al., 2017; Wang and Wu, 2018). Furthermore, considering the impact of family control on corporate governance and corporate strategy, financial structural issues such as debt, financing (Allouche et al., 2008; Muñoz-Bullón et al., 2023), financial performance (Gómez-Mejía et al., 2014; Young et al., 2008), merger and acquisition (M&A) performance (Caprio et al., 2011) and market value (Villalonga and Amit, 2006) are also impacted by family control. There is evidence that family firms are less inclined to utilize debt financing due to the fear of loss of control and therefore have a less leveraged capital structure relative to non-family firms (Mishra and Mcconaughy, 1999; Pindado et al., 2012). At the same time, debt financing increases the risk of corporate bankruptcy, thereby jeopardizing the SEW of family firms (Gómez-Mejía et al., 2010). Family managers are exempt from capital constraints imposed by the owner family (Carney, 2005) and have a lower propensity to incur debt (Górriz and Fumás, 1996). The lack of financial resources makes it more difficult for family managers to develop proactive strategies (Miles et al., 1978) prompting them to avoid proactive acquisitions and other acquisition strategies (Ben-Amar and André, 2006; Caprio et al., 2011).

2.4.2. Family Firm Resilience

Organizational resilience refers to a firm's capacity to effectively absorb, cope and take advantage of the disruptions brought about by changes in the environment (Lengnick-Hall and Beck, 2016). According to Mzid et al. (2019), resilience refers to the allocation of resources (e.g. knowledge, skills, financial resources, emotional, network, and structural capabilities) across the organization to promote the identification and asses potential problems. Firms also improve decision-making processes by actively participating in daily practices and paying attention to external cues (Williams et al., 2017). In family firms, adaptive capacity is recognized as the use of various strategies by family firms to manage the resources that may be needed in challenging periods. In order to effectively respond to crises, family firms employ

exceptions to the norm, such as mobilizing family resources by being adaptable enough to modify leadership practices and decision-making processes to assist the firm successfully surmount difficult times (Gudmunson and Danes, 2013).

Family businesses have a variety of advantageous resources that help them weather difficult times. Firstly, human capital derived from implicit knowledge specific to a firm, hard work and extraordinary dedication developed by the business family through shared values is recognized as being able to provide a safety net for family firms in crisis (Baù et al., 2021; Cunningham et al., 2016). In detail, human capital in family firms positively influences the success of family capital through the experience, morality, value, education background, time and energy of each family member involved in the firm (Sirmon and Hitt, 2003). Their high regard for family values, long-term orientation, and dedication to building strong social connections and tendency to create a familial environment are conducive to effectively managing emotions, psychological risks, and employee satisfaction when facing of crises (Bartik et al., 2020; Llanos-Contreras et al., 2019). This strong emotional commitment of employees is manifested through their loyalty and dedication to the organization in the face of external shocks thus creating favourable working conditions for family firms to cope with crises and acting as a resilience advantage for family firms (Miller and Le Breton-Miller, 2005).

Secondly, social capital can play a key role in firms' capacity to anticipate, avoid and adapt to external shocks (Ortiz-de-Mandojana and Bansal, 2016). Social relationships at work are associated with individual and organizational resilience (Fredrickson, 2001; Cameron et al., 2004; Spreitzer et al., 2005; Seligman, 2002). An illustration of this is the crucial role that interpersonal support, encompassing social, emotional, and moral aspects, plays as a key component of organizational resilience (Carver, 1989). The literature suggests that family firms possess distinct advantages in the development and utilization of social capital, which can enhance their resilient in

response to shocks or disasters (Gedajlovic and Carney, 2010; Gittell et al., 2006; Pearson et al., 2008). From one particular point of view, the interpersonal interactions among group members who offer moral, social, and emotional support to one another define a firm's reaction to exogenous shocks (Carver, 1989). The deep connections that individuals establish in family businesses with other members of close-knit communities, like families, are a source of internal or bonding social capital and are distinguished by 'emotional intensity' and intimacy (Marsden and Campbell, 1984; p.498; Adler and Kwon, 2002). Anchored in family relationships, this emotional carrying capacity plays an important role in building resilience in family businesses by fostering cohesion, encouraging co-operation, ease of co-ordination and promoting moral and psychological interpersonal support (Danes et al., 2009; Heaphy et al., 2018). When disaster strikes, familial ties activate critical supportive procedures that "enable the family system to come together in times of crisis, buffer stress, reduce the risk of dysfunction, and support optimal adaptation" (Walsh, 2003; p.3). On the other hand, family firms' external or bridging social capital derives from the particularly close ties that the family's enduring network of individuals have developed with stakeholders (Miller et al., 2015). These relationships enable them to be bountiful and responsive business partners (Miller et al., 2015). In the event of an external shock or crisis, the family's longstanding network of personal relationships with customers, suppliers and financiers facilitates a range of adaptive economic activities such as digitization through exchange of information, co-operation, and the exploration of novel ways to quickly reconfigure and adjust resources, thus becoming a resilience advantage for the family firm (Dyer et al., 2014).

Finally, in the opinion of Sreenivasan and Suresh (2023), maintaining financial reserves in a way that is adaptable enough to handle unforeseen circumstances is a crucial component of cultivating resilience. Financial reserves enable organization to weather the storm by reserving act as a buffer against losses. As a result, organizations with a grater financial reserve are more successfully equipped to handle

changes in the environment and to absorb crises and new opportunities (Han et al., 2018). The financial capital of family firms has a long-term perspective and is more inclined to build substantial financial redundancy due to their desire for inter-generational transmission (Miller et al., 2015). As a result, in the face of a crisis, family firms are able to apply more flexible financial reserves compared to non-family firms (Miller and Le Breton-Miller, 2005). To put it in another way, family firms with superior financial capabilities can minimize the impact of a crisis and thus adapt better to new environments (Lengnick-Hall and Beck, 2016).

In summary, the unique human, social and financial capital of family firms makes family firms superior to other firms in terms of resilience (Mzid et al., 2019; Naldi et al., 2007). In addition to this, Calabrò et al. (2021) emphasize that survival capital in the unique combination of resources present in family firms can also be a positive attribute of the resilience advantage of family firms. Essentially, the personal resources that family members bring to the firm can serve as a protective cover for the family firm during economic downturns and crises (Sirmon and Hitt, 2003). Survival capital is unique and cannot be imitated for any particular business or family (Schulze et al., 2003). It signifies the ability of family members to enhance the financial and non-financial resources of a firm confronting an economic existential threat (Amato et al., 2020; Haynes et al., 2011). For example, in tough periods, families are compelled to leverage their personal assets and seek external financial resources to provide survival capital for the firm (Danes and Brewton, 2011). Alternatively, members who are actively engaged in the family business may also seek some kind of support from older generations who aren't directly involved in the family business, as well as from both closest and far-reaching relatives (DeTienne and Chirico, 2013). Due to blood and family ties, the aforementioned relatives might step in and help the particular family business via loans or unpaid work, for example, thus increasing the resilience of the family business (Żukowska et al., 2021).

2.4.3. Family Firms & Innovation

2.4.3.1. Family Firms SEW & Innovation

The existing literature clearly presents the mechanisms of family control on the strategic decisions of family firms regarding innovation inputs, innovation outputs, and adoption of new technologies (see for example Block et al., 2023; Diéguez-Soto et al., 2018; Matzler et al., 2015; Sanchez-Famoso et al., 2019). There are two conflicting schools of thinking regarding innovation strategies, through the lens of SEW, within family firms. SEW theory suggests that the introduction of external strategic investors, non-family technologists, and R&D outsourcing affects family members' control over the firm's strategy and technological development trajectory, which threatens and undermines the preservation of the family's SEW (Berrone et al., 2010). This can be perceived as a critical loss by the decision makers of family firms, who then opt for reducing innovation investment and R&D outsourcing (Duran et al., 2016; Kotlar et al., 2014). On the other hand, from the perspective of inter-generational inheritance intentions, SEW theory emphasizes the desire for lineage continuity and the perpetuation of the firm motivates long-term oriented behaviors among family members, leading to the investment of more patient financial capital, such as increased investment in innovation (Martínez-Alonso et al., 2022). Indeed, SEW is not a single dimension (Thomas M. Zellweger et al., 2012). As scholars' knowledge of the dimensions of SEW has deepened, in addition to some of the literature has begun to focus on the five dimensions of SEW (known under the FIBER acronym), there are two types of SEW goals: constrained and extended (Berrone et al., 2012). In detail, constrained SEW goals focus on priorities centered on family goals and often run contrary to the interests of non-family stakeholders and companies (Le Breton – Miller and Miller, 2013). These priorities may include allowing family members to dominate management and board positions, engaging in unrewarding altruism or nepotism, and the result may be insufficient innovation as a result of overly conservative strategies to maintain family control (Lubatkin et al.,

2005).

Extended SEW goals incorporate very different priorities and may yield positive results (Schierstedt et al., 2020). These priorities involve making investing in a business to enhance the family's reputation among stakeholders and fostering ongoing relationships with partners to increase the company's chances of survival (Cennamo et al., 2012). In this case, the positive returns will trigger a series of innovative activities such as R & D investment, and the benefits to the enterprise may be more long-term (Cennamo et al., 2012). In other words, extended SEW goals, have a long-term focus and include the well-being of future family generations in their decision-making behavior (Miller & Le Breton − Miller, 2014). Combining restricted and extended SEW, Laffranchini et al. (2020) and Gjergji et al. (2022) conclude that the positive relationship between SEW and family firms' innovation investment. The results showed that only constrained SEW (family control willingness) inhibits family firms' innovation investment, while extended SEW (family inheritance willingness) promotes firms' innovation level. Thus, this theoretical development implies that SEW may not be a determinant of how much firms choose to invest in innovation, but rather more attention to the specific type of SEW.

2.4.3.2 Family Firms and Innovation Inputs

With respect to innovation inputs, it is generally believed that the better the ability and willingness of the family to control the firm, the more the innovation strategy choices will serve the fulfillment of the family's non-economic goals, which results in a low-risk appetite for resource allocation in family firms and reduces the organization's R&D intensity (Feranita et al., 2017; Wu et al., 2022). In the case of internal R&D, family firm decision makers will take a more cautious and conservative approach to this innovation strategy choice out of the need to avoid SEW loss to maintain family members' control preferences (Gómez-Mejía et al., 2007). In terms of strategic decision-making, the investment required for internal R&D is often

unsustainable by family firms' own finance accumulation alone, and there is a strong need to bring in external investors. This increases the likelihood that strategic investors and banks will intervene and constrain the decision-making freedom of family firms, posing a threat to the need for family members to maintain control over strategic decisions (Allouche et al., 2008; Duran et al., 2016; Gómez-Mejía et al., 2011; Zhu et al., 2013). At the same time, in-house R&D processes are highly complex and specialized and cannot be separated from the support of non-family technologists (Gomez-Mejia et al., 2011).

However, the involvement of non-family technologists significantly reduces family members' control over the innovation process and technological development trajectory of family firms for three reasons (Gómez-Mejía et al., 2011). Firstly, delegation to non-family technologists means that the command structure of the organization's R&D department will be independent of the family, reducing family decision-makers' control and knowledge of the firm's innovation process and future technological direction (Gómez-Mejía et al., 2011). Second, the introduction of non-family technologists also further amplifies the high level of information asymmetry characterizing internal R&D, increasing the uncertainty of the innovation process. Third, the many differences between family and non-family members in terms of motivation and career goals also increase the conflict of goals between them over the trajectory of technological development in the family firm (Gómez-Mejía et al., 2011). Further, in terms of goal compatibility (compatibility of dominant alliance goals and firm goals), Jiang et al. (2020) outline the different mechanisms by which family control affects family firms' short- and long-term R&D investments. The study concludes that, firstly, family firm dominant alliance goals (i.e., family goals) are short-term control and long-term inheritance, while non-family firm dominant alliance goals (i.e., executive team goals) are short-term compensation and lack of personification for long-term dominant alliances. Secondly, regardless of the organizational form, the long and short-term goals of the firm are the same. Along this

logic, compared to non-family firms, which have compatible short-term goals and incompatible long-term goals, family firms, on the contrary, exhibit poor short-term goal compatibility but compatible long-term goals. As a result, family firms will be more inclined to opt to increase their long-term R&D investment and reduce their short-term R&D investment efforts than non-family firms (Choi et al., 2015; Schmid et al., 2014; Sciascia et al., 2015).

Apart from avoiding the weakening of family control and influence, the reasons why family firms are less inclined to opt for in-house R&D are also based on a resource-based view. Internal R&D implies that family firms use their own capital, knowledge, know-how, technology and R&D teams to carry out innovation activities independently within the organization, which is highly dependent on a large investment in dedicated investments such as tacit knowledge, human capital, and physical assets, and the insufficiency of their own endowment of innovation resources tends to limit family firms' freedom to choose internal R&D (Berchicci, 2013). Existing studies have shown that in terms of human resources, concerns about the introduction of non-family technologists and the existence of nepotism have led to family firms typically having a lower level of employee quality (Chen and Hsu, 2009), and the lack of high-quality talent can result in family firms having less access to information about potential innovation and growth opportunities and slower task management and execution, which is not conducive to family firms' internal R&D (Muñoz-Bullón and Sanchez-Bueno, 2011). In terms of financial resources, to be able to retain family ownership and control of the firm, family members are usually unwilling to rely on external financing or bear the high agency costs of debt, which results in family firms' investment capacity often being limited by internal funds, thus increasing the difficulty of internal R&D implementation (Chen and Hsu, 2009; Muñoz-Bullón and Sanchez-Bueno, 2011).

According to the SEW, external technology acquisition poses relatively little threat to

family control and influence in terms of strategic decisions, the innovation process and the trajectory of technological development, thus effectively avoiding the loss of SEW and making it more likely to win over family business decision makers (Classen et al., 2012; Han et al., 2021; Pu, 2023). Although external technology acquisition is costly, it often also requires the introduction of a lending bank or strategic investor, which to some extent affects the discretion of family members in strategic decision-making. However, from the perspective of the innovation process, the accelerated applied research feature of external technology acquisition can help family firms to skip the most risky stage of basic R&D and go directly to the stage of commercialization or new product launch or release to the market stage, which greatly reduces information asymmetry and strengthens the family's control and influence over the firm's innovation process (Kotlar et al., 2013; Tsai and Wang, 2009). Meanwhile, in terms of controlling the trajectory of technological development, technologies acquired externally to the organization are mostly selected from the quality pool of the technology market (Hung and Tang, 2008), and the characteristics of maturity, visibility, and controllability help family firms to quickly screen and eliminate potential targets while also enabling the organization to focus on understanding specific targets to accurately foresee their future direction of technological development (Bala et al., 2017; Randhawa et al., 2016). In addition, from a resource based view, family firms' choice of external technology acquisition as an innovation strategy also stems from the flourishing of innovation resources external to the organization. The emergence of a range of emerging innovation resources such as enhanced external supplier capabilities, increased external options for idea commercialization, as well as the mobility of technicians leading to knowledge dispersion and the proliferation of start-ups due to the exponential growth of venture capital has opened up new possibilities for family firms when deciding upon their innovation strategy (Rothaermel and Alexandre, 2009; Van de Vrande, 2013). This emergence of a range of new innovation resources, such as the proliferation of start-ups provides new possibilities for family firms' innovation

strategy choices, and access to exogenous knowledge, technology, and other valuable resources (Rothaermel and Alexandre, 2009; Van de Vrande, 2013). This provides an excellent compromise for family firms to make up for the lack of their own endowment of innovation resources (Kotlar et al., 2013).

2.4.3.3. Family Firms & Innovation Outputs

As for the innovation output link, SEW theory is often used to explain the theoretical mechanisms of why family firms have higher innovation output and prefer incremental innovation relative to non-family firms (Pu, 2023). Family members' focus on non-economic goals promotes the establishment of long-term oriented, trust-based social networks that bring unique resources such as experience, tacit knowledge, and human capital to family firm innovation (Carney, 2005). These advantages motivate family managers to ensure that innovation inputs are efficiently or frugally transformed into innovation outputs such as product or process innovations (Duran et al., 2016). There are two key reasons why family firms may be more innovative than non-family firms. Firstly, the high level of control over the business and the focus on non-financial objectives in family firms leads to the development of specific resource packages that favour innovation (Duran et al., 2016). In detail, given the strong desire of family firms to pursue non-financial goals, they usually have the ability and focus on fostering trust-based, long-term relationships with stakeholders across generations (Tsai, 2009). Stakeholders are also more likely to develop personal connections with the family that manages the business than with unfamiliar, cold and impersonal non-family firms (Berrone et al., 2012). The positive role of network ties in fostering innovation output has been demonstrated in previous studies, as such networks can help firms develop new products or processes by providing knowledge and resources that are not easily accessible through market exchanges (Burt, 2021; Koch, 2011). Family firms can benefit from the privileges of networks that facilitate their innovation output, allowing family firms to draw on expertise and different perspectives from different networks (e.g., suppliers, loyal customers, research

institutes) to improve their solutions or create new approaches to product development (Berrone et al., 2010). Network partnerships can also help family firms to identify potential technical or process problems providing valuable feedback that can accelerate the development of new products or processes and response to market demands (Garud et al., 2013).

Secondly, due to family business typically employ more family members, which results in family firm employees having longer tenure than non-family firm employees with more experience and deeper product and market knowledge (Goel et al., 2011). High levels of human capital have always been a breeding ground for innovation, and interactions between experienced and skilled employees can also lead to the accumulation of tacit or implicit knowledge which in turn stimulates the development of new products and processes (Dosi, 1982). Thus, the implicit knowledge possessed by employees in family firms can enhance the flow of valuable ideas across different departments, which in the long run will greatly stimulate the continuous integration of new knowledge, a crucial process in the development of new products or processes (Heider et al., 2022; Koch, 2011).

Furthermore, the ability and willingness paradox states that while long-term orientation, long tenure, implicit knowledge, social networks, and strong family ties combine to promote family firms' innovation ability, the family goal, inclination, and motivation of retaining SEW reduces family firms' willingness to innovate (Chrisman et al., 2015). Therefore,, family firms tend to be seen as a class of organizational form that favors more incremental innovation (Röed, 2016). Radical innovation is typically characterized by high risk and uncertainty, with unforeseeable rate of success and high failure rates (Barczak et al., 2009; Rubera and Kirca, 2012). Such radical innovations are often unacceptable to family firms that prioritize long-term goals and inter-generational inheritance, as they put the sustained viability of the family firm at risk (Hu & Hughes, 2020). As a result, the preservation of SEW, risk aversion, and

preference for short-term investment horizons reduce the incentives for family firms to pursue radical innovation in favour of incremental innovation (Hu and Hughes, 2020).

The evidence in the empirical literature is mixed, as family firms' willingness to make strategic innovation decisions associated with uncertain outcomes relies on their SEW priorities (Thomas M. Zellweger et al., 2012). A study by Ng et al. (2022) of how the five dimensions of SEW affect the implementation of innovation activities in family firms, based on a sample of 238 family firms in the UAE, found that SEW is a complex structure whose dimensions may place family firms at a lower level of product innovation than non-family firms and cause complex feelings between family and non-family members. This stems from the fact that every risk-related innovation activity in family firms can lead to dilemmas and ambivalence caused by conflicting SEW priorities resulting from family and business priorities, as the family needs to continually evaluate the possible gains and losses of its innovation activities from both financial and socio-emotional perspectives (Meroño-Cerdán, 2024). However, Filser et al. (2018) study on the relationship between SEW and the implementation of innovation activities by family firms, based on a sample of 348 Finnish family firms collected from 2013 and 2015, found that family emotional attachments resulting from shared experiences, values, and wealth showed a positive impact on innovation (e.g., product innovation) in family SMEs. The reason for this positive relationship may stem from the family's desire to protect its legacy over time (Hult et al., 2004). Put simply, family members who have deep emotional attachments to the company are more likely to be accountable and dedicated to the company's long-term prosperity (Corbetta and Salvato, 2004). This outweighs the potential risks associated with innovation, such as the possibility of corporate failure resulting from failed innovation (Corbetta and Salvato, 2004).

2.4.4. Family Firms & Governance

2.4.4.1. Family Governance and Firm's Performance

There is no uniform definition of family governance in the current literature (Chrisman et al., 2018; Pieper et al., 2008; Stewart and Hitt, 2012). Barbera et al. (2023) argue that governance at the level of the family firm is a system of oversight and a process of accountability with a broad range of objectives for the various stakeholders of the firm. Thus, Barbera et al. (2023; p.1086) define family governance as "the structure and means for the family to own, control and supervise the firm as well as to coordinate and manage its members in order to protect and increase the wealth of stakeholders". Family firm governance incorporates the way financial, human, intellectual, social, and organizational capital is managed (Gersick and Feliu, 2014). A combination of formal mechanisms (e.g., board of directors, legally binding agreements such as prenuptial or post-nuptial agreements, sibling partnership agreements) and informal mechanisms (e.g., advisory boards, family councils) are comprised in family firms' governance (Daspit et al., 2018). Formal governance in family firms is also known as contractual governance and involves "formal, legal and economic governance strategies" (Vandaele et al., 2007; p.240). Within this mechanism, safeguards that describe the relationship between key economic players within the family business (e.g., owners and managers), minimize the opportunistic behavior of family members and protect the exclusivity of the firm's assets are described (Barney and Hesterly, 2006). Informal governance appears a mechanism arises from the creating of social capital (e.g., trust, norms, values) and embedded in the social interaction between the business's family members and managers (Aronoff and Ward, 2016). In family firms, a shared vision (including targeted business area, expected growth rate, and profitability) among family members motivates them to pursue common goals (Mustakallio et al., 2002; Mustakallio et al., 2002). Thus, shared values and common vision can foster the establishment of trust informal governance because of its advantages, which include reduced financial reporting,

faster decision-making, and lower management costs (Songini, 2006). Thus, Family firms have a preference for informal governance in managing their businesses due to the strong emotional tie and a high degree of trust among family members (Gómez-Mejía et al., 2001).

Many scholars have linked family governance to firm performance including financial performance (Berent-Braun and Uhlaner, 2012), strategic decision-making (Mustakallio et al., 2002), firm value and innovation (Bolton and Park, 2020). Specifically, on the one hand, family governance has the capacity to enhance the quality of connections among family members of a firm, particularly in terms of fostering more cohesion, cooperation, and collaboration (Sorenson, 1999). Family governance promotes the family's commitment to a common vision and goals by facilitating social interactions and connections within the family group and the firm (Villalonga and Amit, 2006). Indirect support can be provided by prior literature on the positive effects between group dynamics and team building and firm financial performance, which thus confirms that teamwork between family members and firm employees brought about by family governance may benefit firm performance (Berent-Braun and Uhlaner, 2012). On the other hand, when leaders and executives pursue higher goals in their work, they are typically inherently driven by higher-level demands and act altruistically for the welfare of the firm (Davis et al., 1997). Family members involved in the governance of business will probably to act as stewards who will behave in a way that is beneficial to the organization and collectivist, particularly when the corporate governance structure grants them significant authority and autonomy (Davis et al., 2010; Pieper et al., 2008). In family firms, employees from family members perceive trust and managerial values significantly higher than non-family employees (Davis et al., 2010). Consequently, family CEOs and executives typically exhibit a long-term dedication to the firm, a persistent management of organizational resources, and a variety of forward-thinking concepts for generating investment (Miller and Le Breton-Miller, 2006). These provide the

right environment for a range of innovative activities to take place (Casillas et al., 2011; Sirmon and Hitt, 2003). Finally, family management can increase firm value because controlling families can reduce the likelihood of questionable or irresponsible business behavior and the free-rider problem by providing excellent oversight through long-term tenure or investing in long-term projects (Anderson et al., 2012; Anderson and Reeb, 2003; Dyer and Whetten, 2006).

2.4.5. Family Firm Exporting Behaviour

The results of existing research comparing the differences in internationalization behaviour between family and non-family firms is an important research theme in the internationalization of family firms (Arregle et al., 2007; Santulli et al., 2019; van Essen et al., 2015). These studies cover a variety of forms of firm internationalization, including (1) export trade, which refers to the percentage of sales outside the home country, and is the most common measure of internationalization (e.g. Calabrò et al., 2009; Westhead and Howorth, 2006); (2) a blend of transnational outward foreign direct investment (FDI) represented by a narrower concept of internationalization (Lu & Beamish, 2004). Compared to exports, FDI enhances organizations' ability to exert control, but it also entails substantial levels of commitment, risk, and complexity (Anderson and Gatignon, 1986). The importance of these features for the strategic decisions of family enterprises is likely to be greater than that for non-family firms. Thus highlights the relevance of comparing the behavior of family and non-family firms in the specific context of foreign direct investment (Westhead and Howorth, 2006) (3) Establishing an overseas presence enables firms to utilize their native expertise in foreign market, creating economies of scale and contributing to gaining market share (Pukall and Calabrò, 2014). Thus, research across the intersection of family firms and internationalization covering the internationalization outcomes of family firms (size, scope and performance) and the range of family firms' internationalization decisions and actions (entry modes, location choices,

internationalization processes and timing) forms a broad consensus on the internationalization behaviors of family firms (De Massis et al., 2018; Pukall and Calabrò, 2014; Verbeke, 2013). That is, the distinct governance characteristics of family businesses shape their internationalization behaviour (Arregle et al., 2021).

Concretely, the internationalization behaviour of family firms has been interpreted in two different perspectives i.e. restrictive and facilitative views. On the one hand, some scholars debate that family involvement limits internationalization and prefers conservative and localized business models (Arregle et al., 2017). This view explains that the fear of losing control of the business, risk aversion and conservatism of family owners, as well as the urge to control the family's social status (SEW), results in family firms having limited access to human resource management and competences, and a reluctance to embrace the knowledge of non-family managers (Fernández and Nieto, 2006; Gómez-Mejía et al., 2010; Sciascia et al., 2012; Verbeke and Kano, 2012). As a result, family firms are reluctant to introduce foreign capital into their international operations and to have non-family members as key managers of their international operations, as this may be perceived as a threat to the family's control over the firm (Fernández and Nieto, 2005; Fernández and Nieto, 2006). This further leads to a lack of knowledge of international market information and poor international market operations among family managers (e.g. family firms lack specific knowledge of different consumer tastes, internationalization, and specialized management (e.g. distribution policies, production and logistics) (Gómez-Mejía et al., 2010; Graves and Thomas, 2006). On the other hand, the complexity of international business often requires companies to decentralize in ways that reduce control (Alessandri et al., 2018). To preserve family control over the company, family members oppose equity dilution and increase family control over equity. That is, highly centralized equity control structures make family firms more risk-averse preferring to localize their operations (Gómez-Mejía et al., 2010) or focusing on countries that are geographically and culturally closer (Anderson and Reeb, 2004),

and therefore family owners are less inclined to internationalize. In short, these deficiencies and inherent behavioral tendencies of family firms contribute to the negative impact of family control on internationalization (Fernández and Nieto, 2005).

The opposite view suggests that family firms have a number of unique competitive advantages over non-family firms, including strong ties among family members and between family members and the firm (Hennart et al., 2019), the long-term orientation of family firms (Banalieva and Eddleston, 2011), lower agency costs (Singla et al., 2014), and rich family social capital (Calabrò and Mussolino, 2011; Segaro, 2012; Zahra, 2003) that strongly contribute to the international expansionary behaviour of family firms, and make family firms active participants in its creation. The strong sense of identification that family owners and managers have with the firm serves as a powerful motivation for them to actively involved in managerial behaviors and seek internationalization opportunities, even when faced with challenges (Miller et al., 2008). At the same time, consistent communication, long-lasting relationships, and robust social capital within a family contribute to the sharing of experiences and knowledge reinforce a comprehensive comprehension of the company's mission, and cultivating relationships based on mutual trust, thus contributing to the creation of an organizational culture that fosters independence, adaptability, and risk-taking, shifting towards strategic actions with long-term payoffs, such as internationalization (Arregle et al., 2007). A high level of trust between family members creates a favourable corporate culture that facilitates the development of a long-term strategic orientation with a high degree of autonomy and flexibility, allowing family firms to have a strong internationalization strategy (Banalieva and Eddleston, 2011; Claver et al., 2008).

In addition to this, family businesses offer distinct context for studying export performance in regard to the role of unique objectives that are family-specific and family-centred, as opposed to traditional firm-oriented objectives (Aparicio et al.,

2017). When family owners prioritize family-centred economic goals, internationalization may be more appropriate for their risk appetite, as family owners are keen on growing their family's financial wealth and might actively seek growth prospects outside their own country (Debellis et al., 2021). When making decisions related to internationalization, the appealing possibility of prospective advantages from exporting may override family owners' concerns about the associated challenges (Reuber, 2016). At the same time the flexibility of family firms' decisions is particularly favourable to cope with different demands due to environmental heterogeneity thus having a potentially positive impact on export performance (Arregle et al., 2017).

2.4.6. Competition

Hayek (1940) defines competition as a process of discovering information. The timely exchanges between economic agents—public authorities, banks, and other financial intermediaries, as well as firms and clients—provide this information. In a dynamic environment where companies are constantly innovating, this interaction is highly complex and involves multiple vertically related markets (Cantner et al., 2009). Existing literature suggests that intense product market competition leads to higher firm performance (Januszewski et al., 2002; Singla and Singh, 2019). As competition in the market develops a greater reputation, it provides a competitive advantage which is the result of increased firm value (Gupta et al., 2017). Given that the primary goal of a company is to attain greater financial returns, it is essential to acquire a durable competitive edge (Dunk, 2007). Competitive scenarios create a favorable profile for firms in a competitive marketplace and provide a competitive advantage (Carlin et al., 2004) thus enabling firms to acquire higher firm value through offering high-quality products and services.

In product competition markets, competitive advantages of family businesses include having higher customer service and being more trustworthy compared to non-family

businesses (Tokarczyk et al., 2007). As family business owners often take a more active role in the operation of the business, this may contribute to the business being perceived more as an individual or person than as a business, which allows for trust bonds to form more quickly and for more customized customer-oriented services such as customer loyalty (Memili et al., 2018). Such personalized service, by targeting customers on a one-to-one basis, can go a long way in helping family businesses to build customer trust, satisfaction and loyalty based on personality and process, thus creating a unique competitive advantage (Orth and Green, 2009). Family firms may have comparative advantages with regards to customer satisfaction, competitor orientation and inter-functional coordination (Intihar and Pollack, 2012). Specifically, on the one hand, family firms have greater flexibility in their ability to rectify problems with customers, which allows customers to forgive family firms and strengthens trust between family firms and customers (Craig et al., 2008). On the flip side, trust may also be because family firms have better customer relationships stemming from the implicit knowledge that family firms are able to amass and pass on between generations (Belkhodja, 2022). In addition, family business owners and managers may also be face-to-face with their customers more frequently, thus collecting and experiencing first-hand information that cannot be collected and analyzed by expensive and complex systems, all of which may increase market intelligence related to customers and enhance understanding of customers' needs for the market as a whole (Kohli and Jaworski, 1990; p.4).

According to the literature, product market competition can effectively resolve agency conflicts between owners and managers in family firms, reducing managerial slack, and increasing firm value (Mnasri and Ellouze, 2015; Yeh and Liao, 2020). Compared to managers in concentrated businesses, managers in competitive industries are more vulnerable to bankruptcy. Because they fear losing control of the family firm, managers are compelled to make the greatest choices (Abbas et al. 2020; Leenders and Waarts, 2003). Family businesses typically privilege dynastic succession and

family legacy by retaining family involvement in the business (Berrone et al., 2012). This emphasis can exacerbate worries regarding SEW loss instead of low economic returns if the firm is unable to withstand competitive threats. Thus, family firms facing high competitive threats are relatively more inclined to adopt new technologies than non-family firms in the same situation if investments in new technologies increase the prospect of the firm's survival, regardless of the anticipated economic return on these investments is low (Souder et al., 2017).

This argument is supported by existing research on the role of product market competition in promoting innovation in family firms. Arrow (1962) claims that growing rivalry in product marketplaces encourages firms to innovate. In a monopolistic environment, firms generally delay innovation in order to maximize the benefits of prior innovations, whilst company managers become lazy (Aghion and Howitt, 1990; Hicks, 1935). Increased competition in the product market serves as a catalyst for managers to exert greater effort and deliver product innovations or process innovations into the market (Karuna, 2007; Raith, 2003). However, owners and managers may react differently to growing competition in the product marketplace based on their objectives, particularly when it comes to long-term, strategic investments like R&D investment (Chakraborty et al., 2024). For example, firms with large family spans will focus on the SEW and inter-generational transmission of the firm rather than product market competition (Arif Khan et al., 2020). Chrisman and Patel (2012) argue that family firms typically invest less in R&D than non-family firms, unless a compelling competitive environment causes family firms to accelerate R&D investments. Similarly, Gómez-Mejía et al. (2010) find that family businesses may be hesitant to adopt new products due to concerns about external capital and potential restructuring threaten their SEW, and only choose to do so if they believe that not doing so poses a greater threat to their survival. Singh and Chakraborty (2024) found that product market competition is a very important moderator in interacting with family ownership/control to have a positive effect on R&D investment. As

competition increases, firms with concentrated family ownership/control may become more concerned with firm survival and continuity (Chen and Steinwender, 2020). As a result, intensifying rivalry may stimulate family firms to invest more in R&D to sustain their market dominance over time (Chrisman and Patel, 2012). In other words, when family firms are threatened by increased competition, their managerial behavior becomes more salient (Lim et al., 2010). Unlikely family firms, shareholders and managers of non-family firms may not be significantly influenced by SEW loss and concerns about the long-term sustainability of the firm.

2.4.7 Human Resource Management Practices

Human capital, being one of an organization's most precious assets, contributes significantly to its competitiveness, wealth, and success (Khatri, 1999). In this regard, employee performance, which is related to employee behavior and decision making, is further enhanced by employees applying their knowledge, skills, experience and competencies to respond to organizational needs in a high quality and efficient manner (Hee and Jing, 2018). This means that organizations must attract, retain, and develop high-value employees in order to maintain a competitive edge and thrive in a competitive environment (Hatch and Dyer, 2004). To achieve this, the organization must possess a well-established human resource management practice system (Pankaj Tiwari, 2012).

Schuler and MacMillan (1984) define Human Resource Management (HRM) practices as a set of activities designed to manage the pool of human resources and to ensure that these resources are used effectively to improve organizational performance and success. Researchers have identified different types of management practices. Initially, Pfeffer (1994) identified 16 comprehensive management practice activities including employment security, recruitment selectivity, information sharing,

participation and empowerment, training and skills development, closing the status gap, motivation, high wages, and promotion. Redman and Matthews (1998) further identified and developed six key management practice strategies: 1) Careful recruitment and selection, e.g. 'Total Quality Recruitment', 'Zero Defect Recruitment' 2) Extensive remuneration systems, e.g. providing additional rewards for staff who have developed multiple skills during their time in the job 3) Flexible job design 4) Training and learning, e.g. providing training that improves the interpersonal and social skills of frontline staff, in addition to providing training in the skills that are essential to the jobs that the employees hold 5) Employee involvement , e.g. regularly informing employees of significant achievements and changes in the organization 6) Performance appraisals linked to a contingent reward system, e.g. collecting feedback from customers to recognize work done by employees beyond the call of duty, which in turn has the potential to lead to bonuses for employees. Subsequently, studies have built on Redman and Matthews' (1998) typology of HRM practices to further take career planning, and position orientation strategies into consideration (Smeenk et al., 2006, Malik et al., 2010).

Typically, HRM practices improve employee performance by helping firms to improve organizational behavior in terms of employee commitment, competence and flexibility, thereby improving employee performance (Al-Qudah et al., 2014). For example, optimal recruitment and selection selects and identifies the candidates that best match the organization’ s needs by analyzing the job positions available, enabling the organization to acquire high quality skills and thus maximize the likelihood of achieving organizational goals (Santos et al., 2020). Simultaneously, including training as a supplementary measure to recruiting not only enhances employee proficiency, but also guarantees that employee conduct is in accordance with the organization's culture, thereby enabling the recruited personnel to do their tasks accurately (Ibrahim et al., 2017). In addition to this, the pay and reward system provides the compensation and incentives expected by the employees concerned to

motivate them to work harder and strive to improve individual performance, which in turn enhances and improves the overall performance of the organization (Nyberg et al., 2016). Performance appraisal linked to reward system enables the organization to achieve its performance goals by motivating employees to learn for themselves so that they can effectively achieve their performance goals (Baird et al., 2020). Flexible working arrangements enable employees to modify their work schedules either permanently or temporarily, in order to effectively accommodate and excel in their personal lives outside of work (Kattenbach et al., 2010). The implementation of this adaptable work structure improves employee contentment and fosters a sense of allegiance to the organization, resulting in increased motivation and production (Wheatley, 2017). Employee involvement fosters the development of competence, ownership, and responsibility among employees, hence enhancing their motivation to be more productive (Tian and Zhai, 2019).

2.4.7.1 Differences Between Family Firms Versus Non-Family Firms in Human Resource Management Practices

Human resource management practices in family firms have proven to be more intricate than in non-family firms (Ward, 1987). This is due to the fact that the relationship between owners, managers, employees and the family in a family business is ambiguous in terms of authority and responsibility (Cruz et al., 2011). Put simply, the connection between business management and the family introduces additional intricacies in organizational and managerial matters. This is because the CEO's and other family members' commitment to the long-term goals and maintenance of the SEW purpose necessitates both a balance in managerial responsibilities and a balance in ownership (Reid and Adams, 2001). The distinctive nature of this relationship has resulted in a precarious scenario within family-owned businesses when it comes to executing activities such as employee recruitment, incentivizing salary, and providing training (Lansberg, 1983). Specifically, in order to maintain consistency in family values, family firms exhibit particular preferences and

attitudes toward informal management practices (Kotey and Sheridan, 2004). For example, as family firms attempt to maintain owner SEW when the owner and manager belong to the same family, the family firm's SEW retention purposes will influence their business decisions in some way, such as appointing an inexperienced family member as a manager due to nepotism, even if it means that a financial benefit or competitive advantage will be lost (D'Cruz et al., 2014). However, in non-family firms, firms prefer to implement formal HR practices, such as recruiting employees with the skills required for the position and ensuring that individual interests are aligned with those of the organization (Gomez-Mejia et al., 2001).

Combs et al. (2010) emphasize that the remuneration practices and family involvement in strategic control usually result in lower remuneration packages, even for CEOs and top managers in family firms. Nonetheless, family managers are compensated better than other managers, making performance appraisal and motivation in family firms more difficult and costly (Chua et al., 2009). More formalized remuneration systems tend to be used in non-family firms to ensure fairer treatment of employees and to motivate them to keep pursuing their development goals by adopting fairer performance appraisal procedures (Daily and Dollinger, 1993). The intention of implementing training and development strategies in family businesses is to deepen understanding of the intricacy of internal relationships and the interaction between family and business objectives, which frequently result in conflict (Kopriva and Bernik, 2009). For non-family managers in particular, developing these cultural skills promotes identity (i.e., psychological ownership) as well as personal integrity (i.e., ethical behavior), which can conquer a variety of problems regarding the family and the firm (Erdem and Atsan, 2015, Bernhard and O'Driscoll, 2011). Non-family firms are more inclined to provide more formalized, structured training by delegating to in-house and external experts oriented to prepare employees for more senior positions in developing firms (Mabey and Thomson, 2000).

2.4.7.2 Human Resource Management Practice & Family Firm Resilience

In the context of a crisis, HRM can provide two important contributions to organizations: (i) operational capabilities to manage the crisis; and (ii) interventions that promote collective and individual organizational performance to mitigate the impact of the crisis on the organization (Hillyard, 2000; Wang et al., 2009). Prior studies such as Teague and Roche (2014) have proposed the use of "soft" HRM practices during a crisis including practices that promote employee motivation, support, psychological rewards, and commitment to mitigate the impact of an organizational response to a crisis. Although HRM practices in family firms are more informal in nature during times of stability with a focus on maintaining family SEW and family retention, Holten and Crouch (2014) argue that such informal management practices become a flexible method of coping with higher levels of environmental uncertainty. Indeed, informal HRM practices promote interpersonal relationships and reinforce family values and trust between family and non-family members (Van der Heyden et al., 2005). Thus, it helps to foster emotional attachment, identification and involvement (affective commitment), a sense of teamwork and strong social relationships among employees in the organization (Marlow and Patton, 2002). It is the emotional commitment and unique organizational climate fostered during periods of stability that facilitates keeping control over emotions, psychological risks and employee satisfaction while on disruptive occurrences, such as pandemics, becoming a main element contributing to the resilience advantage of family firms (Tabor et al., 2018, Bartik et al., 2020). In addition to this, the family-oriented workplace environment that family businesses enhances employee resilience by providing more flexible work arrangements, such as remote or adaptive scheduling, which acts as a buffer against anxiety and burnout in times of crises (Schwaiger et al., 2022). This employee adaptability enables employees to maintain job satisfaction thus contributing to workplace resilience and acting as a significant driver of the resilience edge of family businesses to successfully cope with turbulent environments (Marshall and Schrank, 2020).

Overall, this section systematically reviews the theoretical framework of the family business research area covered by this research. Specifically, starting from the definition of family business, it distinguishes the three key elements that make family firms heterogeneous (familiness, family ownership, and family governance) as well as the key theories applied in this study including the Resource-Based View (RBV), Socio emotional Wealth (SEW), Sustainable Family Business Theory (SFBT), and Agency Theory in family firms. In addition to this, the manifestations of familiness such as resilience, innovation, exporting behaviour are reviewed. Finally, product market competition and the human resources management practices are also discussed in this section.

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Chapter 3: Research and Innovation and The Role of Competition in Family Owned and Managed Firms

3.1 Introduction

Innovation is crucial to the survival of enterprises in competitive markets (Caves, 1998). It enables companies to explore new markets, increase market share and establish a good reputation (Ireland *et al*., 2002; Knight and Cavusgil, 2004; Baker and Sinkula, 2005; Pisano, 2015). This is also the case for family firms where innovation is needed for survival and growth (Kellermanns *et al.,* 2010). However, traditionally, family firms have been characterized as conservative, reluctant to change, and risk averse, which has led researchers to hypothesize that they will engage in lower levels of research and innovation, relative to non-family firms (Chen and Hsu, 2009; Nieto *et al.,* 2015). If true, this could have pessimistic implications for global economic development. In 2014 it was estimated that about 65%-80% of global enterprises are owned or operated by families, accounting for 70%-90% of global GDP (Family Firm Institute, 2014; Guo *et al.*, 2021) and 50-80% of jobs in most countries around the world (Alon *et al.,* 2020).

Family firms usually serve the dual objectives of economic efficiency whilst simultaneously preserving family social interests. This duality induces more complexity into the decision-making process around innovative behaviors for family firms (Astrachan and Jaskiewicz, 2008). Specifically, family firms not only pursue

financial and market success, but also attempt to retain intrafamily relatedness through the engagement of family members in business management (Gomez-Mejia *et al.*, 2007).

This paper adds to the body of knowledge on family firm innovation in three ways. The first contribution stems from the breadth of research and innovation indicators examined within this paper which provides a more comprehensive picture of family firm innovation. In previous studies, most scholars adopt a single index to measure the innovative behavior of family firms. Nieto *et al.* (2015), Lopez-Fernandez *et al.* (2016) and Schäfer *et al.* (2017), for example, measure innovation decisions or intensity of R&D investment and patents. Other scholars use external technology acquisition and product innovation to measure innovation inputs and outputs respectively (Classen *et al.*, 2012; Ashwin *et al.*, 2015; Minetti *et al.,* 2015; Mazzelli *et al.,* 2018). A number of papers (De Massis *et al.,* 2015a; Hernandez-Perlines *et al.* 2020; Calabro *et al.,* 2019 and Westhead and Howorth, 2006) encourage future scholars to consider the heterogeneity of innovation activities in the context of family firms, with De Massis (2015a: 6-7) highlighting that "the role of family involvement has only scarcely been understood" and Hernandez-Perlines *et al.* (2020: 3) highlighting "contradictory evidence" in the literature on the role of innovation for family firms. This study directly addresses this call for further research by considering the impact of family ownership on six different indicators of family firms' innovation behavior. These indicators include; (i) internal R&D expenditures, (ii) external

R&D expenditures, (iii) external knowledge acquisition, (iv) new to firm (NtF) product innovation, (v) new to market (NtM) product innovation and (vi) process innovation. This allows us to build on existing literature by providing a more thorough examination of the degree to which family firms engage in a diverse range of innovation activities relative to non-family firms.

The second contribution focuses on the internal governance in family firms. Specifically, the share of family members to non-family members in senior management positions and how that might affect the innovation outcomes of family firms. Under the framework of internal governance, family participation in senior management teams provides family members with greater freedom, enhancing their ability to influence the orientation of innovative activities in the family business (Kraiczy *et al.,* 2014). The bulk of existing literature focuses on the direct link between family management and innovation input or output (Manzaneque *et al.,* 2017; Cucculelli *et al.,* 2016; Manzaneque *et al.,* 2018). However, the proportion of family members in senior management positions and its impact on innovation outcomes has been largely ignored (Calabro *et al.,* 2018). Furthermore, the exploration of internal governance, particularly studies examining the family management-innovation nexus, have previously focused on a narrow scope of innovation activities in family firms (i.e. only product innovation) (Migliori *et al.,* 2020). Dieguez-Soto and Martinez-Romero (2019) suggest that future research should not only examine the implications of whether the degree of management positions

comprising family members (versus non-family members) matters for innovation, but also consider if it matters across a wider array of innovation activities. This paper addresses this call as it investigates the relationship between the percentage of family members in key managerial positions and its impact on different research and innovation activities of family firms.

The third contribution specifically focuses on the influence of external stimuli in driving family firm innovation. It does so by triangulating literature from the fields of competition, innovation, and family firms. Since most SMEs operate in a competitive environment, another way for businesses to innovate in the marketplace is by competing with their external rivals (Dutz *et al.,* 2011). Many previous studies have identified the impact of external forces on firm innovation and performance (Aghion *et al.,* 2005; Tingvall and Karpaty, 2011; Crowley and Jordan, 2017). However, Park *et al*., (2019:5) highlight that "there is a paucity of empirical studies on the nature of the high-velocity environment or on how family firms respond to changes in the economic environment and whether such changes drive innovation in family firms". This research aims to provide light on this matter by examining what role competition plays in driving innovation outcomes for family firms, relative to non-family firms.

This paper incorporates a cross-country and cross-continent analysis using World Bank Enterprise Survey data from 20,995 family and non-family businesses in 38

countries in Eastern and Central Europe and East Asia, covering the years 2019 to 2020. This allows us to extend existing literature by providing a cross-country, cross-continent contribution. A series of probit models are estimated, which allows us to identify the differences in innovation behavior between family firms and non-family firms, as well as the impact of family management and competition on innovation.

The remainder of this paper is structured as follows. Section 3.2 reviews the existing literature and outlines the hypotheses to be examined. Section 3.3 provides an overview of the data as well as detailing the empirical methodology utilized. The empirical findings are discussed in Section 3.4. Section 3.5 includes a discussion of the results while Section 3.6 concludes the paper.

3.2. Literature Review

3.2.1 The Role of Familiness for Family Firm Research and Innovation

In the resource-based view (RBV) (Wernerfelt, 1984) an enterprise is regarded as a pool of resources which includes both tangible and intangible resources. The success of a company largely depends on the resources it owns and controls (Galbreath, 2005). Only unique, rare, inimitable, and irreplaceably intangible resources can generate and preserve competitive advantages, and thus superior firm performance (Michalisin *et al.,* 1997). The RBV of the firm predicts that enterprises can generate specific competitive advantages through innovation (Barney, 1991; Greve, 2009). The

knowledge-based perspective, as a branch of RBV, regards the ability to collect and distribute the knowledge of a company as the origin of innovation (Zahra *et al.,* 2007). Due to the systematic interaction between family members and the firm, familiness are believed to be a collection of resources that exist in family firms (Habbershon and Williams, 1999). According to the RBV, a major factor which determines the knowledge base and strategic capabilities of family firms is their internal and external social capital (De Massis *et al.,* 2015c; Hoffman *et al*., 2015).

Individual and group ties within a collective, particularly relationships that contribute to cohesion and promote collective activity, are the focus of internal social capital (Acquaah, 2011; Adler and Kwon, 2002). In family firms, the deep and persistent links between most family members, as well as shared collective goals, foster an ideal setting in which more optimal social capital conditions can be generated (Coleman, 1988; Acquaah, 2011). This social capital acts as a channeling mechanism for knowledge flow and exchange, promoting the development of existing knowledge (Alguezaui and Filieri, 2010). Thus, social capital within family firms constitutes strategic resources available for innovation when exchanging and sharing knowledge (Acquaah, 2011).

External social capital includes intra-industry and extra-industry relationships, which allow enterprises to acquire new and diversified knowledge from the external environment providing a platform for knowledge sharing among companies (Ortiz *et*

al., 2018). Enterprises seeking new ideas externally may engage with universities, research centers and suppliers with necessary knowledge, which will promote the combination of heterogeneous knowledge and cultivate the innovation ability of enterprises (Moran, 2005; Corral de Zubielqui *et al.*, 2015; Singh, *et al.,* 2019). A firm's exposure to the external environment determines its ability to use external social capital to acquire knowledge (Simao and Franco, 2018). However, in family firms, especially those with a high proportion of family members, the ability to acquire knowledge can be weak (Donckels *et al.,* 1991). The reason for this is that family firms place a larger premium on creating good internal relationships to protect social emotional wealth (SEW), such as focusing on identity, family influence, and the continuation of the family dynasty (Gomez-Mejia *et al.,* 2011). Knowledge spillovers and loss of control over strategic decisions through acquisition of external knowledge may lead to the tendency of family business owners to reduce their level of external cooperation which in turn affects their ability to acquire knowledge (De Massis *et al.*, 2015a).

In general, family firms are frequently thought of as enterprises with a high level of intensive social interaction, and the innovation strategies they develop are likely to depend on the specificity of the resources they possess (Salvato and Melin, 2008). Unlike the profit-focused strategic objectives of non-family firms, through a complex combination of social interaction, network ties, company values, culture, and heritage of family enterprises, families have an impact on firms and innovative activities as

they seek to protect family social interests (Kansikas and Nemilentsev, 2010; Cassia *et al.,* 2011). It is the existence of heterogeneity of innovation phenomena between family firms and non-family firms (Hu and Hughes, 2020) that makes it necessary to understand the particularity of various kinds of innovation activities in family firms in more detail.

3.2.2 R&D Investment and Knowledge Sourcing in Family Firms

3.2.2.1 *R&D and Family Firms*

According to agency theory, the unification of ownership and management in family business leads to innovative activities and risk preferences related to the firm's ownership and governance (Sciascia *et al.,* 2015). Family owners and family members invest most of their wealth in their companies, so their wealth is related to enterprise value (Hoffmann *et al*., 2015). When an investment fails, they bear all the financial risk of a failed investment, and consequently family firms are more conservative than non-family firms and tend to avoid risk-related decisions, such as investing resources in R&D (Schulze *et al.,* 2002). R&D investments are characterized by a high probability of failure and unpredictable returns and family firms will not support such investments that do not guarantee financial success (Luo *et al*., 2021). The existing evidence shows that family firms prefer to invest in real assets rather than high-risk research and development projects based on the sample of 2000 largest companies in the United States covers the period from 2003 through 2007 (Anderson *et al.,* 2012). Base on a set panel data of 503 observations obtained from the publicly traded firms

in the Japanese pharmaceutical industry from 1995 to 2007, Asaba and Wada (2019) find that to preserve SEW, family firms invest less in R&D than other firms. Min (2021) applied samples includes all manufacturing firms listed in Taiwan between 2002 and 2015 provides evidence of the same. This leads to the first hypothesis:

H1. Family firms are less likely to undertake R&D relative to non-family firms.

3.2.2.2 *External Knowledge and Family Firms*

In the process of innovation, besides relying on internal procurement, external sources of knowledge can also be explored through outsourcing, corporate acquisition, or technical cooperation (Cockburn and Henderson, 1998; Cassiman and Veugelers, 1999; Rigby and Zook, 2002). The decision of a company to participate in external knowledge acquisition is influenced by the decision-makers' behavioral characteristics (Classen *et al.,* 2012). Decision makers in family firms are primarily concerned with the non-economic objective of protecting the family by controlling the business and thus maintaining family nepotism (Arregle *et al.*, 2015; Gometh-Mejia *et a*l., 2007). Internal innovation has the benefit of limiting information and knowledge leakage while also lowering coordination issues (Oxley and Sampson, 2004). Even though family firms need to invest more resources to maintain control over internal innovation activities, decision makers' desire for corporate control leads to their unwillingness to focus on external innovation activities (Gallo, 2004; Zellweger, 2017). Because of the risk of knowledge spillovers, family firms may view external procurement as a potential threat to competitive advantage, thus preventing them from

choosing external collaboration for innovative decisions (Serrano-Bedia *et al.*, 2016). Zhao *et al.* (2020) suggests that external collaboration based on partial relinquishment of control and adjustment of organizational practices will undoubtedly cause a huge loss of SEW for family enterprises that prioritize family control and influence.

The empirical evidence indicates that family firms are less likely to use external sources of knowledge. Nieto *et al*. (2015) report using Spanish data, that family firms are less likely to rely on external resources, especially technical cooperation, and contract mechanisms. Similarly, family SMEs employ fewer diversified partners in getting innovation-related resources, according to data from SMEs in Belgium and the Netherlands (Classen *et al.,* 2012). Finally, other studies such as Kotlar et al (2013) conducted with longitudinal data on 1540 private Spanish manufacturing firms over the period 2000 – 2006 show that compared with non-family enterprises, family firms are less likely to acquire external technologies. Based on the above discussion, this leads us to propose the second hypothesis:

H2. Family firms are less likely to use external sources of knowledge relative to non-family firms.

3.2.3 Family Firm Innovation Outputs

Existing literature highlights that family ownership also impacts firms' innovation output behavior (Carney, 2005; Carnes and Ireland 2013; Chrisman *et al.,* 2015b). However, despite the theoretical view and current empirical evidence indicating that

family firms (relative to non-family firms) are less likely to have innovation inputs, the same cannot be said in the case of innovation outputs. Existing research shows that, despite investing less in innovation, family firms have a greater productive capacity to do more (innovation outputs) with less (innovation inputs) (Duran *et al.,* 2016). This is apparent across other studies where family firms are more innovative than non-family firms (Gudmundson *et al.,* 2003; Llach and Nordquist, 2010).

Relative to non-family firms, family firms have special organizational flexibility, which makes it easier to communicate and make decisions faster (Lubatkin *et al.,* 2007; Hatum and Pettigrew, 2004). They will adopt a more flexible attitude to focus on the non-economic and long-term goals of the firm when they think the innovation decisions are in their long-term interests (De Massis *et al.,* 2015b). This special organizational flexibility of family firms allows "employees" to switch between innovative business and normal business at will, compared to non-family firms (Chrisman *et al.,* 2015a). This "employee" switching further enables family firms to achieve significant cost savings and allowing them to tailor their innovation processes to the characteristics of the firm (De Massis *et al.,* 2016).

Matzler *et al.* (2015) used data set of large German publicly traded firms between 2000 and 2009 finds that family firms launched more new products than non-family firms. Similarly, Classen *et al.* (2014), employing data from German SMEs, argues that family firms performed better in realizing product innovation than non-family

enterprises. A study based on a sample of 2,604 firms in the Flanders Community Survey, confirm that flexible internal and external organization of family firms created more successful process innovation (Broekaert *et al.,* 2016). Németh and Dory (2019) report that family firms showed higher performance in service process innovation than non-family enterprises in their study in Hungary. Thus, the third hypothesis is as follows:

H3. Family firms are more likely to engage in product and process innovation relative to non-family firms.

However, the degree of radicalness of innovation activities in family firms is questionable. Family firms have been found to invest less in innovation and to choose incremental innovation strategies over radical ones (De Massis *et al.,* 2015b). This is reinforced by Nieto et al. (2015) who theorized that the production of radical innovations is hindered by family involvement based on the sample firms in manufacturing industry obtained from Spanish Business Strategies Survey (SBSS) for the period from 1998 to 2007. This is because the unique characteristics of family businesses, such as a conservative attitude, make them more attentive to the stable and continuous operation of the enterprise by maintaining the status quo, rather than introducing disruptive innovations which may be beyond their control (Chrisman *et al*., 2015a). This leads to the following hypotheses:

H4. Family firms are more likely to engage in incremental innovation (new to firm) and less likely to engage in radical innovation (new to market) relative to non-family

firms.

3.2.4 Internal Governance, External Stimuli and Innovation in Family Firms

3.2.4.1 Family Management and Innovation

The internal governance of family-owned firms and the degree of family involvement in management can also impact the firm's likelihood of innovation (Purkayastha *et al.,* 2019). Family ownership is the extent to which family members, or their foundations/trusts hold equity or voting rights in a business, while family management control is the degree to which family members have influence over managerial positions (Frank *et al.,* 2019). The main implication under the family management scenario is that the main resources in the firm are controlled by family members and thus actions aimed at family continuity can occur, such as appointing family members to lead the company, rather than hiring outside professional managers (Holt *et al.,* 2017). Family-owned but professionally managed firms more strictly follow the economic goal of achieving higher profits (Nason, 2019). To date, most literature focuses on the relationship between family ownership and innovation performance, while much less attention has been paid to the role of internal governance, particularly the role of family management on innovation outcomes (Matzler *et al.,* 2015; Diéguez-Soto *et al.,* 2018).

As a form of internal governance, family members' involvement in top management teams (TMT) will have an impact on the company's innovation orientation as well as

the intention of TMT members to participate in innovative activities (Talke *et al.,* 2011). Agency theory indicates that family members want to keep control of the business, so they pay special attention to the internal financial situation of the business (Sharma, 2004). This is because their assets overlap with the value of the company, and the greater the overlap, the more family management restricts the use of financial resources, especially for risky innovative strategic investments (Astrachan and Jaskiewicz, 2008; Filser *et al.,* 2016). The greater the amount of family members in the TMT, the more the TMT's orientation has a detrimental impact on innovative activities (Kraiczy *et al.,* 2014). The reason is a TMT with a large proportion of family members may lead to a lack of knowledge and social resources due to a lack of external non-family members. Therefore, it can lead to a lack of diversity and poor innovation decision-making (Sirmon and Hitt, 2003).

With 2005 – 2007 data covering technological family-controlled firms listed on the SME board of Shenzhen Stock Exchange, Liang *et al.* (2013) show that family involvement in the management team inhibited the positive relationship between R&D investment and innovation performance. Using a sample of large German listed companies from 2000 to 2009, Matzler *et al.* (2015) finds that family members' participation in the board of directors and management team had a negative impact on enterprise R&D investment. Similarly, Migliori *et al.* (2020), based on data from 1,093 Italian family SMEs in Italy, finds that family management has a negative impact on the innovation tendency of family enterprises. Therefore, based on the

discussion of the above literature, the fifth hypothesis is:

H5: Firms with a higher degree of family management will lead to lower levels of research and innovation activities.

3.2.4.2 The Impact of External Stimuli (Competition) on Innovation in Family Firms

Schumpeter's (1942) view of market power and innovation suggests that the external environment and the degree of competition has a strong influence on innovation outcomes. The debate on the relationship between competition and innovation originated from Schumpeter's view of market forces and innovation, where a certain degree of competition is conducive to innovation (Schumpeter *et al.,* 1934). In other words, competition forces enterprises to innovate to survive (Ahn, 2002; Park *et al.,* 2019). Aghion *et al.* (1999) believe that to prevent losing control due to bankruptcy, external rivalry in product marketplaces may compel managers to accelerate the adoption of new technology. Based on the theory of population ecology, a family or non-family firm's existence and growth are tied to its legitimacy and capacity to execute its mission under external stimuli (Hannan and Carroll*,* 1992; Hannan and Freeman*,* 1988).

The interdependency between competition and innovation continues to be a topic of discussion in the literature. Earlier studies find a positive linear effect between competition and innovation (Mukhopadhyay, 1985; Nickell, 1996; Blundell *et al.,* 1999). However, more recent studies have identified a non-linear relationship between

competition and innovation such as an inverted U-shape relationship (Aghion *et al.,* 2005). Aghion *et al.* (2005: 719) believe that competition can increase incremental profits from innovation in what they refer to as "neck and neck" industries (i.e. oligopolistic experiencing similar production costs), thus encouraging R&D investment, to evade competitive effects. Tingvall *et al.* (2011), using panel data to study firms in the Swedish service industry, report that there was an inverted U-shaped relationship between service competition and R&D, but non-export enterprises did not have such a relationship. Similarly, Crowley and Jordan (2017) provide evidence of a 'tipping point' effect in domestically focused firms with some low or moderate levels of competition promoting innovation at the business level, while fierce competition has been linked to less innovation.

External rivalry is hypothesized to be an important learning system for family firm innovation (Park *et al.,* 2019). However, empirical analysis on the competition-innovation nexus in family firms is extremely limited (Westhead and Howorth, 2006; Park *et al.,* 2019). Chen *et al.* (2017) discovered that family managers who focus too much on family goals feel insecure, especially when operating in a highly competitive industry. Family businesses must abandon defensive characteristics and negative perceptions of the external environment to pursue economic goals that are in the interests of the company (Chen *et al.,* 2017). In this case, the inhibiting effect of family control on enterprise innovation activities is elevated (Classen *et al.,* 2012; Classen *et al.,* 2014). Empirically, Jiang (2017)

indicates that when family enterprises face fierce industrial competition, enterprises that have higher levels of family management involvement experience lower returns from R&D activities. Thus, the following hypothesis is proposed:

H6. The research and innovation activities of family owned and managed firms are more likely to be impacted negatively by increased competition relative to non-family firms.

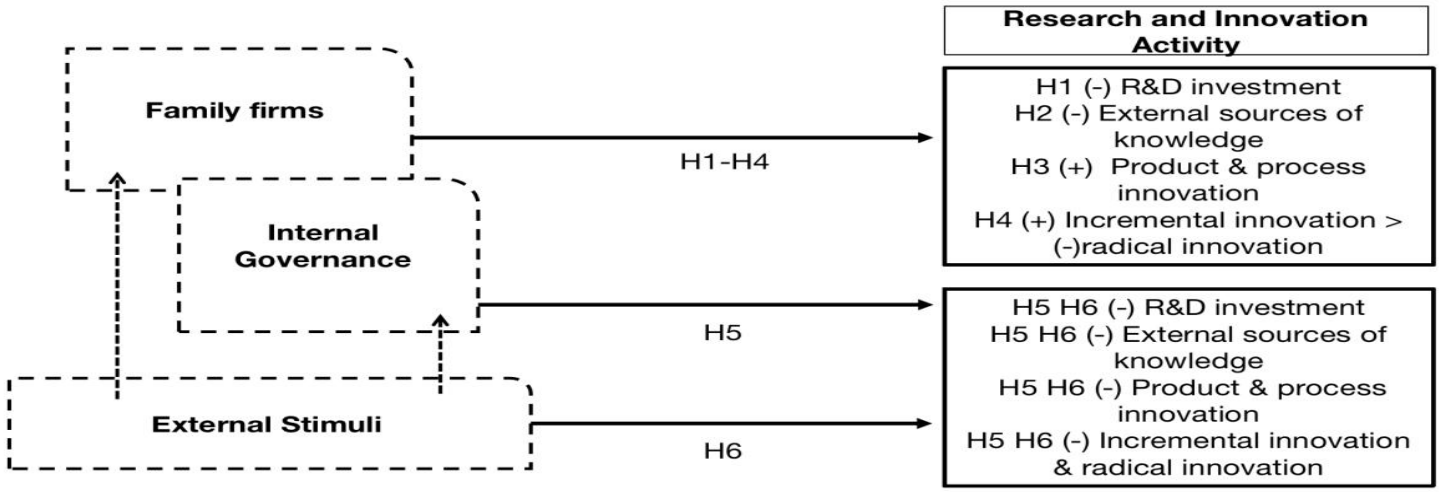
3.2.5 A Summary of The Research Model and Hypotheses

We conclude from the literature review that family firms are characterized as having higher levels of SEW. Consequently, they are prone to relatively conservative, risk averse and reluctant to change behaviors. For Hypotheses 1 and 2, we hypothesize that these characteristics impede family firms to invest in R&D and to choose external sources of knowledge respectively, relative to their non-family-owned counterparts. In contrast, the literature indicates that family firms are more efficient in converting innovative inputs into more innovative outputs. Consequently, we hypothesize in hypothesis 3 that family firms will be more likely to engage in product and process innovation. However, the conservative attitude of family firms makes them more concerned with the stability and continued operation of the firm rather than introducing disruptive innovations. Thus, we also hypothesis that family firms are more likely to engage in incremental innovation (new to firm), and less likely to engage in radical innovation (new to market), relative to non-family firms.

These hypotheses are summarized in the conceptualization presented in Figure 1 below. The overlap of the two dashed boxes reflects that in the internal governance of family firms, increased family involvement leads to an increase in conservative behaviors of family firms. The higher the proportion of family members in a TMT, the greater the negative impact of TMT positioning on innovative activity. In H5, we hypothesis that firms with high levels of family management inhibits research and innovation activities. The dashed black arrows capture the indirect effects of external

stimuli on firm's research and innovation activity. They indicate the mitigating effect of external stimuli on the relationship between family firms and internal governance and innovation activity. In H6, we hypothesize that external stimuli (measured by competition effects) exert a stronger effect on family firms relatively to non-family firms.

Figure 3.1: A graphic representation of this research model and the hypotheses under analysis.



3.3. Data and Methods

3.3.1 Data Sources

The data used in this paper stems from the Enterprise Survey (ES), also known as the Business Environment and Enterprise Performance Survey (BEEPS). This survey is conducted jointly by the World Bank Group, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB) and the European

Commission (EC) in European and Central Asian countries. The ES is a firm-level survey which captures a representative sample of the private sector of the economy considered. The ES focuses on the manufacturing and services sectors and uses a stratified random sampling method.[1]

As secondary data, the ES data set contains a wide range of business environment topics and information particularly on firm characteristics, firm management, competition, innovation, and technology indicators. This allows this study to model the innovative behavior of family firms versus non-family firms and the impact of family management and competition on innovation in good detail. ES data contain innovation variables that are similarly defined with the well-known Community Innovation Survey (CIS). It goes beyond the CIS by incorporating information on family ownership and governance. In addition, the quality of the ES data is a key asset, as this World Bank's firm-level survey began in the 1990s and therefore provides not only an up-to-date global overview but also 20 years of data on firm activity in 176 world economies.

3.3.2 Dependent Variables

The ES data provides a comprehensive set of indicators for the innovative behavior of businesses. Information is collected on six distinct types of innovation activities covering aspects of innovation inputs and innovation outputs. There is a high degree of concordance between the ES definitions of innovation activity and those in the

Oslo Manual developed by the OECD and Eurostat for the measurement of innovation activity (OECD/Eurostat, 2018). However, while the Oslo Manual identifies four types of innovation outputs in companies (product, process, marketing, and organization innovation) the ES dataset is focused on product and process innovation outputs.

To measure incremental product innovation, referred to as new to firm (NtF) innovation, the ES asks companies:

- "Has a new product or service been introduced or improved in the last three years?".

To identify radical product innovation, referred to as new to market (NtM) innovation, companies are asked:

- "Were any of the new or improved products or services also new for the establishment's main market?".

To capture process innovation companies are asked:

- "During the last three years, has this establishment introduced any new or improved process? These include: methods of manufacturing products or offering services; logistics, delivery, or distribution methods for inputs, products, or services; or supporting activities for processes.

These innovations are coded separately as three dichotomous variables which take a value of 1 if the firm introduces the relevant innovation, and 0 otherwise. This definition of NtF, NtM and process innovation are broadly consistent with existing

literature (Estrada *et al.,* 2016; Chen and Chang, 2019; Na and Kang, 2019)

In addition to this, the ES data set also provides data on firm R&D expenditure, which is extensively used by many studies to measure the company's investment in innovation (Mateut, 2018; Adegboye and Iweriebor, 2018; Kim *et al.,* 2019). Internal R&D expenditure is an indicator of a firm's efforts to create and absorb new knowledge (Vega-Jurado *et al.,* 2009). In the ES survey, companies were asked:

- "Over the last three years, did this establishment spend on research and development activities within the establishment?".

This is again coded as a dichotomous variable taking a value of 1 if the firm engaged in R&D and 0 otherwise. This definition of R&D expenditure is consistent with Menike (2015), and Hussen and Çokgezen (2021).

This study also accounts for strategies of external knowledge acquisition. To capture external knowledge acquisition firms were asked:

- “Over the last three years, did this establishment spend on the acquisition of external knowledge? This includes the purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other businesses or organizations”.

Finally, to capture companies’ acquisition of external R&D they were asked:

- "Over the last three years, did this establishment spend on research and development activities contracted with other companies?”

Both these variables are measured as binary indicators taking a value of 1 if the company engaged in the relevant activity and 0 otherwise. The definition of external

knowledge acquisition and external R&D are consistent with that of similar definitions used by Cassiman *et al.* (2009), Cainelli *et al.* (2015), and Mardones and Zapata (2019).

3.3.3 Independent Variables

A common way of distinguishing between family and non-family firms within existing literature is to use the shareholding ratio of family members to non-family members (Dyer, 2006; Kellermanns *et al.,* 2010). Consistent with this literature, this study defines a firm as family owned, if at least 50% of the firm is owned by the family (Chrisman *et al.,* 2005; Classen *et al.,* 2014; Memili *et al.,* 2018). This definition provides a dichotomous variable that takes a value of 1 for family-owned firms and 0 otherwise.

Further, to capture the strength of family management we consider the percentage of family members in key management positions and this is allocated into four dummy categories, of 0-24%, 25-49%, 50-74% and 75-100%. This not only reflects the weight of family members in decision-making process, but also reflects the degree of family control over the company (Classen *et al.,* 2012). This approach to capturing family participation in management is consistent with previous studies (Manzaneque *et al.,* 2018; Muñoz-Bullón *et al.,* 2020).

To measure the degree of competition faced by firms the ES asks firms "For the main

market in which this establishment sold its main product, how many competitors did this establishment's main product face?". In line with existing literature, such as Crowley and Jordan (2017), Mendi and Costamagna (2017), and Crowley and Jordan (2021), the natural log of the number of competitors in the main product market is used as a measure of competition. A higher number of competitors in product market is expected to mean higher competition.

3.3.4 Control Variables

The analysis also includes common controls which may impact firms' research and innovation performance. This paper controls for firm size by including the natural log of the number of full-time employees of the firm. Existing literature highlights the importance of controlling for firm size as, for example, smaller firms, may be more efficient in their innovation efforts due to their more flexible management structure and ability to respond quickly to changing competitive markets (Aiello *et al.,* 2019; Perez-Alaniz *et al.,* 2022). The models also control for the natural log of the age of the firm (Coad *et al.,* 2016), measured as the number of years since the firm was founded. Export orientation and internationalization have also been identified as important determinants of innovation activity (Nieto *et al.,* 2013). Therefore, export intensity is included in the analysis and is calculated as the ratio of the firm's sales in foreign markets to total sales (Galende and De La Fuente, 2003). Similarly, we control for relationship between foreign ownership and innovation (Dachs and Peters, 2014) by using the percentage of the firm owned by foreign individuals, companies or

organizations. Finally, we control for the size of the city the firm is located in as larger agglomerations have been identified as hotbeds of innovation where new and dynamic industries are likely to develop (Breau *et al.,* 2014; Lee and Rodriquez-Pose, 2014). A summary of variable definitions and their associated means are provided in Table 3.1.

Table 3.1: Definition of variables

Variable Name	Variable Definition	Mean	Std. Dev.
Innovation Performance			
Product innovation (new to firm)	1=During the last three years, this establishment introduced new or improved product or services 0= otherwise	.24	.427
Product innovation (new to market):	1=if the firm introduced a new or significantly improved goods that were new to the establishments main market in the previous three years, 0= otherwise	.165	.371
Process innovation	1=During the last three years, this establishment introduced any new or improved process, 0=otherwise	.135	.342
Internal R&D expenditure	1= Over the last three years, this establishment spend on research and development activities within the establishment, 0= otherwise	.175	.38
External R&D	1= Over the last three years, this establishment spend on research and development activities contracted with other companies, 0=otherwise	.082	.275
External knowledge acquisition	1=Over the last three years, this establishment spend on the acquisition of external knowledge (This includes the purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other businesses or organizations); 0=otherwise	.111	.314
Family firms			
Family ownership:	1=at least 50% of the company is owned by the same family (or the family with the largest ownership if there is more than one family),0=otherwise.	.458	.498
Family management:	The percent of the key management positions of this firm are occupied by members of the same family.	36.67	45.158
Control variables			
Local market	1=main product sold mostly in same municipality where establishment is located ,0=otherwise	.445	.497
National market	1=main product sold mostly across the country where establishment is located,0=otherwise	.442	.497
International market	1=main products are sold overseas, 0=otherwise	.114	.317
Level of competition	Log of number of competitors of the establishment's main product faced in their main market.	3.3	1.572
Location in capital or city with pop > 1 m	1= if the firm is located in a city with a of pop > 1 million, 0 =otherwise	.267	.443
Location in city with pop. 250 k–1 m	1 =if the firm is located in a city with a pop of 250 k–1 m, 0 otherwise	.214	.41
Location in city with pop. 50–250 k	1 =if the firm is located in a city with a pop of 50–250 k, 0 otherwise	.212	.409
Location in city with Pop < 50 k	1= if the firm is located in a city with pop under 50 k, 0	.28	.449

	otherwise		
Firm size	Logarithm of full-time employees	3.254	1.336
Firm age	2020- Year of establishment, in logarithm	2.802	.698
Internationalization	The ratio of the firm's sales in foreign markets to total sales	9.508	23.801
Foreign involvement(foreign)	Percentage owned by foreign individuals, companies, or organizations	5.642	21.379

3.3.5 Descriptive Statistics

Table 3.2 shows the descriptive statistics of the variables used in this study. The sample is mainly concentrated in developing countries, with approximately a third of companies in emerging economies and a fifth of companies in developed countries. More than half of the sample companies are in the manufacturing industry, and about a quarter of the companies are in the service industry. Also, about one in six companies are in the retail, only 1.5% companies are in the construction. Regarding firms' research activities Table 3.2 shows that approximately 17.5% of companies have internal R&D expenditures and approximately 11% of companies have engaged in external collaboration, 8% of companies have undertaken external R&D expenditure. From the perspective of the company's innovation output, about a quarter of the companies have carried out product innovations, about 13.5% have carried out process innovations, and 16.5% have introduced new product or process innovations in major product markets.

Nearly one-half of these companies are family businesses. On average, family members account for about 38% of the senior management team across sampled firms. However, the large standard deviation indicates that the internal control rights

family/non-family members varies considerably by firm. About one-third of the companies are located outside the capital or in cities with a population of more than 1 million, about one-fifth of the companies are in second-tier or less populated cities, and more than a quarter of the companies reside in cities with a population of less than 50,000. Most of the sample companies are domestic companies and the main market of most companies is the local market or the domestic market (each accounting for about 44%), while only 11% of the companies' main market is the overseas market. At the same time, the companies in the sample only export products that account for an average of 10% of their sales. Nearly half of the companies face more than 100 competitors on their main products.

Table 3.2: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Developing country	21885	.49	.5	0	1
Emerging country	21885	.32	.467	0	1
Advanced country	21885	.19	.392	0	1
Product innovation	21885	.24	.427	0	1
New to market	21885	.165	.371	0	1
Process innovation	21885	.135	.342	0	1
Internal R& D spending	21885	.175	.38	0	1
External R&D	21885	.082	.275	0	1
External knowledge	21885	.111	.314	0	1
Manufacture	21885	.55	.498	0	1
Service	21885	.238	.426	0	1
Construction	21885	.015	.121	0	1
Retail	21885	.163	.369	0	1
Family firm	21885	.458	.498	0	1
Family management	21885	36.67	45.158	0	100
International	21885	.114	.317	0	1
National	21885	.442	.497	0	1
Local	21885	.445	.497	0	1

Competition	20996	3.3	1.572	0	9.21
Log firm age	21885	2.802	.698	0	5.328
Log firm size	21884	3.254	1.336	0	11.067
Internationalizatio n	21885	9.508	23.801	0	100
Location in capital or city with pop > 1 m	21885	.267	.443	0	1
Location in city with pop. 250 k – 1 m	21885	.214	.41	0	1
Location in city with pop. 50 – 250 k	21885	.212	.409	0	1
Location in city with pop. <50 k	21885	.28	.449	0	1
Foreign involvement	21885	5.642	21.379	0	100

3.3.5.1 Sub-sample Analysis

As shown in Table 3.3, the empirical analysis in Chapter 3 covers a total of 21,885 observations, of which 45.8% are family businesses and 54% are non-family businesses. Almost half of the family businesses in the sample are located in developing countries, followed by one-third in developed countries and one-fifth in emerging countries. Almost the same proportion of non-family businesses are located in developing and developed countries, respectively.

The average age of family businesses is 21 years, and the average size of the company is 60 employees. The average age of non-family businesses is 19, and the average size of the business is 101 employees.

About 28% of family businesses in the sample have product innovations, and about

one-fifth have new-to-market product innovations. Only 8.6% of family businesses have external RD investment activities. About one-fifth of non-family businesses apply product innovations, 16.7% implement internal RD investment activities, and only about 8% have external RD investment activities.

Table 3.3: Sample breakdown by sub-sectors

Sub - Sectors	Obs(%)	Developing Country(%)	Advanced Country (%)	Emerging Country (%)	Firm Age	Firm Size	Product Innovation (%)	New to Market Product Innovation (%)	Process Innovation (%)	Internal R&D Investment (%)	External R&D (%)	External Knowledge Acquisition (%)
Family Firms	45.83	46.1	31.5	22.3	21.9	60	27.8	19	15.7	18.2	8.6	11.9
Non Family Firms	54.17	51.4	40.2	8	19.6	101	20.7	14.2	11.7	16.9	7.9	10.3

3.4 Methods

We apply an innovation production function framework to model the relationship between family ownership, family management, competition and innovation activities (Geroski, 1990; Griliches, 1992; Crépon *et al.,* 1998; Crescenzi and Gagliardi, 2018; Audretsch and Belitski, 2020). We specify six individual models for different innovation outcomes, each with a dependent variable representing an innovation activity, including internal R&D expenditure, external knowledge acquisition, external R&D expenditure, NtF product innovation, NtM product innovation and process innovation. This approach is consistent with that of Roper *et al.* (2008) and Perez-Alaniz *et al.* (2022) among others.

The empirical modelling is divided into two stages. In the first stage, Equation (1) tests whether family businesses are more innovative than non-family businesses. At the same time, the impact of the level of competition by firm type on the innovation activities of firms is examined. The specification of the empirical model is as follows:

$$IO_{ih}=\beta_0+\beta_1 FF_i + \beta_2 LC_i+\beta_3 (FF_i \times LC_i) +\beta_4 Co_i+\varepsilon_i \qquad (1)$$

Where IO_{ih} indicates that the company is engaged in a type of innovation activities or not, and h refers to innovation type. β represents the coefficients, FF_i is a binary indicator of whether firm *i* is a family business or not, LC_i is the degree of competition company *i* faces measured as the number of competitors in the main product market, $FF_i \times LC_i$ is the interaction term used to verify how the inhibiting

effect of family ownership on firms' innovation activities is affected by different levels of competition in the industry. Co_i is a series of control variables that may affect company *i*'s innovative behavior.

The second stage is to estimate Equation (2) to examine the impact of family management on the innovation activities of family firms. Equation two is as follows:

$$IO_{ih}=\beta_0 + \beta_1 FM_{di}+\beta_2 LC_i+\beta_3 IA2_{ei}+\beta_4 Co_i+\varepsilon_i \qquad (2)$$

Where, FM_{di} represents the four dummy variables measuring the proportion of family members in top management positions. $IA2_{ei}$ represents the four interaction terms (family_management dummies*competition) used to verify how the inhibiting effect of family management on firms' innovation activities is affected by different levels of competition in the industry. $\beta_2 LC_i$ and $\beta_4 Co_i$ are as defined in equation 1. As IO_{ih}, the dependent variables, are binary in nature estimation using either a probit or logit model would be appropriate. Both models are widely applied in the field of innovation (Gatignon and Robertson, 1989; Ur Rehman, 2016; Abdu and Jibir, 2018; Akinwale *et al.,* 2018; Seclen-Luna and Regalado, 2020; Hoang *et al.,* 2021). Gujarati (2011: 163) indicates that "in practice, there is no compelling reason to choose one [model] over the other. Many researchers choose the logit over the probit because of its comparative mathematical simplicity". For comprehensiveness, we provide the results of logit model in the supplementary documents （APPENDIX A1). As can be identified from this table, the significance of the coefficients and their sign and

relative magnitude are consistent across both the probit and logit estimations. Furthermore, a correlation (APPENDIX A2) and VIF tests indicate no multicollinearity concerns. All the models control for robust standard errors. Estimations controlled for country dummies.

3.4.1. Empirical Results

Table 3.4 presents the marginal effects of the estimation in equation (1). Family firms are significantly positively correlated with internal and external R&D contradicting the expectations of H1. The results also show a significant and positive relationship between family firms and external knowledge procurement. Therefore, H2 is also rejected. For product innovation and process innovation, again family firms are significantly and positively related to these innovation types, relative to non-family firms, supporting the acceptance of H3. That is, the probability of family firms engaging in product innovation and process innovation is greater than non-family-firms respectively. This result simultaneously provides support for the expectation outlined in H4 that family firms have a greater potential for incremental innovation (NtF). However, an unexpected result emerges for radical innovation, where family firms are also more likely to introduce NtM innovations, relative to non-family firms. H4 is therefore only partially supported.

Table 3.4: Results of Equation (1) Innovation and Family and Non-Family firms

	Internal R&D	External R&D	External knowledge	New to Firm Product (NtF)	Process innovation	New to market Product (NtM)
Family firm	0.0120**	0.00896***	0.0143***	0.0415***	0.0193***	0.0350***
	(0.00528)	(0.00351)	(0.00427)	(0.00624)	(0.00461)	(0.00523)
Level of competition	-0.0143***	-0.00550***	-0.00978***	-0.0251***	-0.0138***	-0.0205***
	(0.00211)	(0.00139)	(0.00172)	(0.00254)	(0.00188)	(0.00211)
Competition*family firms	0.000127	-0.000352	0.00501**	-0.00867**	0.00143	-0.00385
	(0.00308)	(0.00202)	(0.00246)	(0.00361)	(0.00265)	(0.00300)
National market	0.0955***	0.0419***	0.0457***	0.0728***	0.0442***	0.0591***
	(0.00582)	(0.00403)	(0.00469)	(0.00660)	(0.00500)	(0.00557)
International market	0.130***	0.0734***	0.0856***	0.0510***	0.0608***	0.0392***
	(0.0155)	(0.0117)	(0.0132)	(0.0153)	(0.0126)	(0.0131)
Internationalization	0.000582***	0.000106	5.20e-05	0.000762***	0.000306**	0.000371**
	(0.000141)	(8.95e-05)	(0.000115)	(0.000177)	(0.000124)	(0.000146)
Foreign involvement(*foreign*)	-0.000122	8.00e-06	0.000274***	0.000327**	0.000131	0.000291***
	(0.000108)	(6.71e-05)	(8.29e-05)	(0.000132)	(9.26e-05)	(0.000107)
Firm size	0.0389***	0.0258***	0.0240***	0.0220***	0.0190***	0.0180***
	(0.00199)	(0.00128)	(0.00158)	(0.00240)	(0.00175)	(0.00198)
Firm age	-0.00517	-0.00564**	-0.00841***	-0.00236	-0.00472	0.00288
	(0.00372)	(0.00245)	(0.00300)	(0.00438)	(0.00324)	(0.00366)
Manufacture	0.106***	0.0316***	0.0412***	0.1775***	0.0114***	0.0105***
	(0.0177)	(0.0115)	(0.0147)	(0.02290)	(0.0221)	(0.0191)
Service	0.108***	0.0400***	0.0947***	0.172***	0.123***	0.0949***
	(0.0237)	(0.0154)	(0.0211)	(0.02993)	(0.0327)	(0.0251)
Retail	0.0681***	0.0370**	0.0779***	0.1799***	0.1322***	0.103***
	(0.0236)	(0.0164)	(0.0218)	(0.0318)	(0.0358)	(0.0271)
Observations	20995	20995	20995	20,995	20995	20995
LR chi2 (18)	2271.11	1257.63	1234.35	2366.52	1616.06	1636.17
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.1174	0.1061	0.0849	0.1029	0.0977	0.0880
Log likelihood	-8536.3355	-5297.8981	-6652.7896	-10320.769	-7463.578	-8475.212

Notes:

(1) The model controls for location, size effects and country dummies but they are not reported due to space constraints.

(2) Marginal effects are reported in the table. ***significant at 1%; **significant at 5%; *significant at 10%.

(3) The sector reference category is construction

Table 3.5 contains the marginal effect estimates of equation (2) that examines the impact different concentrations of family management in top management positions

have on research and innovation activities in the sample of family firms. The ratio of family management to non-family management is split into four quintiles (with the reference category being 'less than 25% of family members in top management positions'), as seen in Table 3.5. Firms containing higher concentrations (greater than 50%) of family involvement in firm governance invest less in internal R&D and NtF product innovations. When the proportion of family members in key management positions is between 50%-74%, there is also a negative relationship between family management and NTM product innovation and external knowledge. Finally, firms with over 75% of family members in key management positions conduct less process innovations. Consequently, H5 is partially confirmed, dependent on the aspect of innovation activities referred to. However, broadly more family management involvement has negative consequences for innovation activities.

Hypothesis 6 was tested in two ways, first by estimating how the level of industrial competition affects the level of research and innovation activities of family firms as a whole, relative to non-family firms, and second by estimating the interaction terms of industry competition with family management involvement. In Table 3.4, we note that on average higher levels of competition is negatively associated with the level of research and innovation activities among all firms in the sample, irrespective of being a family or non-family firm. Controlling for this general trend, we find a significant and positive relationship between competition and external knowledge seeking activities and a significant but negative relationship between competition and new to

firm product innovation among family firms, while the interaction terms of competition with other types of research and innovation activities remain insignificant. However, Norton *et al.* (2004) highlight that computing the marginal effect of a change in two variables needs care in nonlinear models. Consequently, the authors follow the INTEFF command as written by Norton *et al.* (2004) to estimate the correct marginal effect and its associated significance level. This analysis is outlined in APPENDIX (A3) of the supplemental documentation which shows that the evidence of a significant effect in the interaction effects in Table 3.4 are absent for most observations providing limited support for the contention that competition has an asymmetric effect on family firms, relative to their non-family counterparts. Consequently, H6 is rejected. However, there are more nuances to how market competition may have an impact on the family firms' innovation, which is considered next.

The authors further analyse the interaction of family management involvement with competition among only family firms. In most cases, the identified patterns are most relevant to firms with a higher level of family management involvement (with more than 50%), as firms with more than 50% of family involvement in management are significantly more likely to invest in R&D and seek external knowledge due to increased competition. Firms with heavy family involvement (greater than 75%) are also more likely to introduce NtF and process innovation, relative to firms in the 0-25% category. On this occasion, when the INTEFF check is conducted there is

evidence of a significant effect in the interactions effects present for most observations supporting the claim that competition impacts innovation activities of family firms with high proportions of family members in management positions (APPENDIX A4). Therefore, H6 is rejected in terms of there being no competition effect differences between family and non-family firms. But we can conclude that competition has an impact within the family firm sample and the extent of its impact is conditioned by the degree of family management involvement.

To control for the potential likelihood of firm's decisions to engage in innovation activities to be jointly determined; a multivariate Probit (MVP) model was estimated as a robustness test (see APPENDIX A5 in the supplementary section). The results mirror the results presented in Table 3.4 and Table 3.5 using independent Probit models.

Table 3.5: Results of Equation (2) Family Management

	Internal R&D	External R&D	External knowledge	New to Firm Product (NtF)	Process innovation	New to market Product (NtM)
Family management	0.0150	0.00285	-0.0493*	-0.0694	-0.0321	-0.0398
dummy(25%-49%)	(0.0476)	(0.0296)	(0.0256)	(0.0500)	(0.0352)	(0.0410)
Family management	-0.0643***	-0.0348***	-0.0435**	-0.0822**	-0.0263	-0.0492*
dummy(50%-74%)	(0.0224)	(0.0128)	(0.0191)	(0.0320)	(0.0243)	(0.0264)
Family management dummy	-0.0671***	-0.0274*	-0.0133	-0.0739**	-0.0844***	-0.0287
(75%-100%)	(0.0252)	(0.0164)	(0.0198)	(0.0304)	(0.0243)	(0.0248)
National market	0.113***	0.0504***	0.0537***	0.0691***	0.0513***	0.0544***
	(0.00913)	(0.00647)	(0.00760)	(0.0105)	(0.00837)	(0.00905)
International market	0.127***	0.0965***	0.114***	0.0577**	0.115***	0.0494**
	(0.0215)	(0.0179)	(0.0201)	(0.0228)	(0.0208)	(0.0200)
Level of competition	-0.0301***	-0.0156***	-0.0114**	-0.0545***	-0.0291***	-0.0347***
	(0.00614)	(0.00404)	(0.00516)	(0.00782)	(0.00575)	(0.00657)
Internationalization	0.000776***	0.000146	-0.000107	0.000681**	-0.000112	0.000153
	(0.000204)	(0.000131)	(0.000175)	(0.000276)	(0.000199)	(0.000231)
Foreign involvement(foreign)	-0.000207	-0.000166	0.000211	0.000237	0.000178	0.000196
	(0.000184)	(0.000117)	(0.000149)	(0.000241)	(0.000172)	(0.000197)
Firm size	0.0411***	0.0271***	0.0258***	0.0244***	0.0225***	0.0198***
	(0.00319)	(0.00206)	(0.00267)	(0.00408)	(0.00307)	(0.00344)
Firm age	0.00280	-0.00419	-0.00109	-0.0100	-0.00841	-0.00390
	(0.00583)	(0.00385)	(0.00489)	(0.00714)	(0.00550)	(0.00606)
Manufacture	0.0670*	0.0191	0.0531	0.241***	0.233***	0.206***
	(0.0354)	(0.0234)	(0.0325)	(0.0507)	(0.0705)	(0.0498)

Service	0.0522	0.0237	0.114**	0.237***	0.274**	0.212***
	(0.0406)	(0.0275)	(0.0452)	(0.0626)	(0.109)	(0.0683)
Retail	0.0164	0.0251	0.0907**	0.239***	0.271**	0.214***
	(0.0386)	(0.0286)	(0.0450)	(0.0643)	(0.114)	(0.0713)
competition*family	0.00112	-0.000515	0.0183	0.0274	0.0162	0.0212
management dummy	(0.0136)	(0.00918)	(0.0117)	(0.0174)	(0.0126)	(0.0143)
(25%-49%)						
competition*family	0.0242***	0.0164***	0.0153**	0.0166	-0.00151	0.00982
management dummy	(0.00861)	(0.00564)	(0.00734)	(0.0111)	(0.00841)	(0.00935)
(50%-74%)						
competition*family	0.0171**	0.00965**	0.00477	0.0166*	0.0189***	0.00473
management dummy	(0.00674)	(0.00445)	(0.00566)	(0.00852)	(0.00632)	(0.00717)
(75%-100%)						
Observations	9633	9633	9633	9633	9633	9633
LR chi2 (22)	1111.59	623.85	499.56	904.24	647.09	614.31
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R2	0.1219	0.1104	0.0707	0.0796	0.0773	0.0659
Log likelihood	-4001.8652	-2513.6477	-3282.8967	-5229.0808	-3859.5463	-4352.948

Notes:

(1) The model controls for location size effects and country dummies but they are not reported.

(2) Marginal effects are reported in the table. ***significant at 1%; **significant at 5%; *significant at 10%.

(3) Reference category is construction

(4) Reference category is family management dummy (0-24%)

3.5. Discussion of The Hypotheses

In contrast with previous research (Hoffmann *et al.,* 2015; Asaba and Wada, 2019), the results presented here indicate that family firms are more likely to implement both internal and external R&D, relative to non-family firms. Whilst this is a surprising result in the context of the empirical literature, Chrisman and Patel (2012) previously argued that if the family's long-term goals around organizational continuity and strong intergenerational control are given sufficient importance, they will invest more in R&D to achieve this goal.

The findings of this paper provide evidence to support the view that family firms are more likely to have greater external R&D and external knowledge acquisition than non-family firms which aligns with findings from Aiello *et al.* (2020). But again, the

Aiello (2020) findings are at odds with the results of previous studies (Classen *et al.,* 2012; Nieto *et al.,* 2015), that found family firms overall engage less in these types of activities, relative to their non-family counterparts. In all, this paper's findings in relation to innovation investment suggest family firms may not be as conservative as originally thought and may not fear knowledge leakage when they engage in both external R&D and knowledge acquisition. This coincides with the often-argued view that the rich social capital inherent in family firms enables them to acquire more contacts and increase their knowledge absorption capacity, thus becoming a vital component in translating external knowledge into innovation performance (Arregle *et al.,* 2007; Carney, 2005).

It has been argued previously that the organization of a firm's innovation management is typically determined by its size and ownership structure (Werner *et al.,* 2018). The unification of ownership and management in family firms often leads to better organizational flexibility than in non-family firms, facilitating improved internal governance structures that foster innovation (Lubatkin *et al.,* 2007; Hatum and Pettigrew, 2004). Consistent with existing research (Dong *et al.,* 2019), family-owned firms are more likely to implement NtF and process innovation, compared to non-family firms (Table 3.4). However, in stark contrast, family firms with higher proportions of family in top management positions are less likely to invest in NtF product and process innovations (Table 3.5). Such a finding suggests that a lack of diversity in top management positions may impact networking opportunities and

translate to poor internal decision making. The much-argued characteristics of conservatism, risk aversion and the inherent risk of family appropriation of resources translating through management decision making may impede the innovation ambitions of family firms.

Finally, this paper set out to analyze the impact of external stimuli through examining the competitive environment on innovative activities of family firms, which has not received much attention in existing literature. The results indicate that competition has a negative impact on the innovation activities of both family and non-family firms with no discernible moderating competition-innovation differences between the two categories of firms as indicated in the interaction term analysis (Table 3.4). However, whilst family firms with a high degree of family involvement in the management of the firm do less innovation activities, external rivalry spurs these firms to engage in more innovation activities (Table 3.5). This implies that family firms appear to be more sensitive to market signals lending support to a previous proposition by Park *et al*., (2019) that market competition creates a learning environment for family firm innovation to develop.

3.6. Conclusion

This study examines the heterogeneity of innovation in family versus non-family firms. It does so by exploring how the propensity of six research and innovation activities differ by family and non-family ownership. This study also investigates the

role of internal family governance and the impact of external stimuli (proxied by competition) on the innovation activities of family firms.

New insights discovered here contribute to ongoing debates in the family firm innovation literature. Prevailing literature suggests that family firm ownership is negatively correlated with R&D investment, external knowledge acquisition and new to market innovation. However, the analysis implies the opposite, indicating that family firms may not be as conservative and rigid as previously thought (Schulze *et al.,* 2002; Chrisman *et al*., 2015a) and in the context of such a proposition, it is particularly noteworthy that they are even more likely to introduce radical NtM innovations. This study supports previous findings on the positive influence of family firm ownership on NtF and process innovation (Duran *et al.,* 2016; De Massis *et al.,* 2016; Németh and Dory, 2019). The unique advantages inherent in family firms to change their internal organizational structure and external environment (Broekaert *et al.,* 2016) may be key drivers underlying these patterns.

The second key insight of the paper is that too much family involvement in the management of firms inhibits innovation which aligns with this paper's expectations and with much of the literature (Astrachan and Jaskiewicz, 2008; Filser *et al.*, 2016; Kraiczy *et al.,* 2014; Migliori *et al.,* 2020). Nevertheless, given that much of the literature points to family owned firms being less likely to invest in innovation or to introduce radical NtM innovations, it is noteworthy that in the results presented here

the configuration of top management, consisting of a higher proportion of family involvement, inhibits the likelihood of firms engaging in activities such as R&D and external knowledge sourcing. Hence, the results provide contrasting stories where family firm ownership is positive for innovation, but too much family involvement at management level may hamper innovation. This presents interesting implications for family owners and managers of family firms. Critically, whilst family-owned firms do not appear to suffer from the conservative, risk averse and reluctant to change characteristics often attributed to them; these features may in fact manifest instead through firm level management structures resulting in adverse consequences for their innovation activities.

Finally, in contrast to previous studies by Chen *et al.* (2017) and Jiang (2017), the findings of this paper place this study in a somewhat unique position, being one of the few papers to explore the impact of competition on innovation in family firms. Whilst, competition does not have an asymmetric impact by firm type, when the sample of family firms are considered in isolation, competition is identified as critical for spurring family firms with high levels of family management involvement to invest in R&D, NtF product innovation and process innovation. This suggests that market competition works as stimuli for family firms to engage in investing in innovation, improve process innovation positively impacting their level of innovation. However, it has limits. It plays little role in pushing out radical innovation, i.e. NtM product innovation. Again, these findings produce some interesting implications for the

literature and for policymakers, family business owners and managers which are discussed next.

3.6.1 The Paper's Contribution

This study makes three important contributions to the family firm innovation literature. First, this study enriches existing knowledge on the relationship between innovation and family firm ownership and management dynamics. Previous studies have mostly identified a negative impact of family involvement and ownership on innovation decisions (e.g. R&D investments) (Matzler *et al.,* 2015; Broekaert *et al.,* 2016; Luo *et al.,* 2021). This study presents evidence contrasting these findings and provides significant evidence on the positive capacity of family-owned firms to engage in a diverse range of research and innovation activities. This study shows that, *ceteris paribus*, family firms are more innovative than non-family firms. The results provide empirical support for the application of resource-based theory to the study of different innovative activities in family firms. The familial nature of family firms means that the common language and experience among family members may enable them to combine individual and team knowledge more easily, as well as to communicate and share information more efficiently (Daspit *et al.,* 2019). Thus, the shared vision between family members and their competence to co-construct knowledge allows them to share and reconfigure complex knowledge systems, thus strengthening the knowledge transformation capabilities of such enterprises (Patel and Fiet, 2011).

Family firms can translate new knowledge for strategic reasons (e.g., development of new product) when it is adapted to fit within the firm (Volberda *et al.,* 2010). Therefore, any notion of underlying conservatism, rigidity and nepotism that may hinder research and innovation activities in family-owned firms do not seem to be supported by the evidence in this paper. Although, it should be noted that the mechanisms underlying this dynamic are purely speculative and uncovering the exact mechanisms are avenues for future research.

Secondly, this study critically identifies that the previous findings in the literature identifying family firms to invest less in innovation most likely manifests through the dynamics and composition of management in the firm. The agency theory perspective suggests that greater family member involvement in TMT can lead to destructive altruism to the extent that it can counteract any positive innovation strategy (Madison *et al.,* 2016). It has previously been identified that non-family managers can offer more managerial expertise and more diverse external knowledge (Veider and Matzler, 2016). A TMT heavily concentrated with family members may inhibit the diversity of knowledge and act as a barrier to successful radical innovation.

Finally, this study extends the ongoing debate on the innovative behaviour of family firms to an under-explored but noteworthy aspect - the impact of external stimuli via market competition processes. Given the extensive work that has been undertaken in

previous studies to address the relationship between competition and SME innovation (Aghion *et al., 2018;* Cabanelas *et al.,* 2019; Lee *et al.,* 2020), it is surprising this is not more developed in the family firm literature. This study responds to Park et al.'s (2019) call to complement knowledge gaps at the intersection of the external environment and family business research fields by exploring the role of market competition in inhibiting or facilitating innovative activity in family businesses. The findings presented here indicate that family firms are not more (or less) sensitive to competition effects, relative to their non-family firm counterparts. This finding provides a useful mirror for understanding the behavior of family firms versus non-family firms in today's highly competitive industry environment, but can also seek to reassure policymakers that a one size fits all competition policy will unlikely have an asymmetric impact on family firms, relative to their non-family counterparts.

3.6.2 Implications of The Research

This study has several implications for family business managers and policy makers. Firstly, managers must be aware of the negative impact on innovation of excessive family involvement in the internal governing structures. Specifically, this study sheds light on the negative effects for innovation of firms having a high concentration of family members in key management positions. Family business managers should be cautious regarding the excessive inclusion of family members in the TMT; this study identified negative innovation performance implications when more than 50% of TMT are family members for many innovation indicators. Therefore, appointing

non-family CEOs or employing a certain proportion of non-family managers is an important governance measure to overcome possible nepotism, which can boost the family firms innovation potential (Ceipek *et al.,* 2020). Non-family members can make an important contribution as they can expand the knowledge base of the family business through introducing new viewpoints that are not ruled by family experience and convergent thinking tendencies, in turn expanding the cognitive diversity of the family business, assisting in conflict resolution, and enhancing management expertise (Sonfield and Lussier, 2009). Previous research has confirmed that family firms managed by professional and independent non-family managers are more focused on disruptive technologies and radical innovations enhancing the innovativeness of the firm (Lazzarotti and Pellegrini, 2015).

Secondly, this research can help policy makers to recognize the key role that family firms play in creating innovation. As innovation is one of the key factors for family firms to gain competitive advantage, there is a need to understand the innovative behaviour of family firms and to develop policies to support family firms to improve their innovative performance. Specifically, given the importance of family businesses to economic development, policies should ensure that family businesses are included, represented, and informed by all available research and innovation support. On the one hand, any support that might strengthen the links between family firms and external institutions to enable family firms to leverage knowledge from universities and research institutions could improve innovation performance without

compromising family goals (Aiello *et al.,* 2021). On the other hand, given that family firms are more likely to acquire knowledge from external sources, further policies that provide family firms with external advisors are another way to access external knowledge while retaining the benefits of the family to a large extent.

Lastly, the findings suggest that external competitive forces do not impact the innovative behaviour of family firms any differently to that of non-family firms. We identify higher levels of competition to inhibit innovation outcomes in both types of firms. Thus, contrary to popular policy narratives, efforts to maximize competition may not be productive in achieving greater innovation outcomes. A possibly better route is to look for win-win opportunities with competitors, while averting reciprocally subversive competition to acquire some advantages (i.e. knowledge of partners' strategic initiatives and access to complementary resources) (Quintana-García and Benavides-Velasco, 2004). Policies should therefore consider balancing competition and cooperation acts that can enhance firms' innovation performance (Park *et al.,* 2014).

3.6.3 Limitations of The Paper

There are several limitations to this study. Firstly, the cross-sectional data used in this study makes it difficult to disentangle the endogeneity of innovation inputs and outputs, where it is not possible to decipher if firms that engage in more R&D have more innovation outcomes and vice a versa. Secondly, this study identified that

competition has a negative impact on innovation outcomes for both family and non-family firms. However, this is through the lens of a static analysis rather than a dynamic one. Hence, the adoption of panel data may provide more nuanced insights into the competition-innovation nexus in family firms. Thirdly, whilst family firms are more likely to innovate, it is not possible given the data here to decipher the exact underlying mechanisms (i.e. social capital, resource based familiness) driving this pattern. Hence, future research should attempt to undercover this black box. Finally, this study has focused on the relationship between family firms and innovation inputs and innovations outputs. But of course, innovation is not an end and future research could explore whether family firms are better at translating innovation into profits and growth.

Note

1.Please find https://www.enterprisesurveys.org/en/methodology for more detailed discussion on the ES survey methodology.

2.Sample countries that were removed included: Zambia, Haiti, Rwanda, South Africa, and Gauteng.

3.Sample countries that were removed included: Belgium, Ireland, Luxembourg, Netherlands.

4.Please find Ha, J., Kose, M. A. and Ohnsorge, F. (Eds.). (2019), "Inflation in emerging and developing economies: evolution, drivers, and policies", World Bank Publications, p. 473. for the discussion on the country classification. Also, further IMF discussions on emerging economies: https://www.imf.org/external/pubs/ft/fandd/2021/06/the-future-of-emerging-markets-duttagupta-and-pazarbasioglu.htm

5. Please find the list of countries in APPENDIX A6.

6. In this study, we will adopt the definition of family business as defined by Sageder *et al.* (2016), that is, in a company owned or managed by a family, the family ownership is more than 50%.

7. This study used the winsor2 method to remove outliers at 1% and 99%. The results of this study include outliers as they did not have an impact on the final results.

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Chapter 4: Exporting Behaviour in Family Firms and The Mediating Role of Innovation

4.1 Introduction

Internationalization is a significant driver of firm performance (Debellis *et al.*, 2021; Fernández and Nieto, 2005). Specifically, internationalization enables businesses to benefit from economies of scale, reduced labor and material costs, increased access to higher qualified less expensive human resources, and experience in foreign industrial clusters (Eddleston *et al.*, 2019; Geringer *et al.*, 1989; Paul and Sánchez‐Morcilio, 2019; Rugman and Verbeke, 2001). Internationalization is generally acknowledged as a significant driver of the sustainable competitive success of family firms in the global economy (De Massis *et al.*, 2018). The internationalization process of firms involves different stages, covering the development from the beginning of testing foreign markets through exporting activities to making foreign direct investments (Cassiman and Golovko, 2010). Compared to FDI, exporting limits firms' risk exposure to foreign markets and does not require dealing with the complexities of setting up foreign production facilities/subsidiaries (Conconi et al., 2016). Therefore, many firms prefer exporting as a mode of entry into foreign markets (Aeberhardt et al., 2014).

Family business researchers offer significant theoretical differences on the factors that encourage or restrict exports (Arregle *et al.*, 2017; Casprini *et al.*, 2020; Kontinen and

Ojala, 2010). For example, on the one hand, the conservative, risk-averse attitudes of family firms drive them to focus more on domestic markets than on international markets (Berrone *et al.*, 2010; Gómez-Mejía *et al.*, 2007; Sciascia *et al.*, 2012). However, the advantages of long-term focus, organizational flexibility and quick decision-making may help family firms to enter foreign markets (Metsola *et al.*, 2020; Sciascia *et al.*, 2012; Zahra, 2003).

Innovation has been recognized as a key facilitator of exporting (Espeche *et al.*, 2023; Siedschlag and Zhang, 2015). Moreover, innovation-related activities have long been acknowledged as an essential component of competitive advantage, expansion, and profitability for businesses (Madrid‐Guijarro *et al.*, 2013; Slater *et al.*, 2014). Innovation results in better products or more efficient processes, which boosts a company's competitive edge (Golovko and Valentini, 2014). Due to this vital position in improving the competitive advantage of family firms, innovation is also considered crucial for successful exporting (Ratten and Tajeddini, 2017). However, scholars have long recognized that the attributes of family and non-family firms are qualitatively different and consequently these differences may impact family firm engagement in innovative activities and internationalization (Sharma *et al.*, 1997, Herrera-Echeverri et al., 2016).

The objectives of our paper are twofold. Firstly, we want to determine if family firms and non-family firms differ in their levels of exporting, specifically export propensity

and intensity. Our second goal is to investigate whether innovation can mediate the internationalization of family-owned vs non-family-owned businesses. To achieve these objectives, this study examines 9589 family and non-family firms across 38 countries in Eastern Europe, Central Europe, and East Asia 2019-2020 and applies PSM, Probit and Tobit techniques to extend existing research on the exporting of family firms, and whether innovation mediates their exporting behaviour, relative to their non-family counterparts. Much of the previous literature focused on the exporting performance of family firms using a single economy or developing countries (Herrera-Echeverri et al., 2016; Pukall & Calabrò, 2014; Yang *et al.*, 2020), which leads to the possibility that the generality across countries of the research results is limited (Piva *et al.*, 2013). Our study extends the analysis in a more detailed and comprehensive cross-country context.

Our research makes three substantial contributions to the literature. First, there is significant disagreement within existing literature on the extent of internationalization evident in family firms versus non-family firms. One branch of the literature emphasizes the flexibility and the efficiency of decision-making in family firms as positive attributes providing them with a comparative advantage in exporting activities (Arregle *et al.*, 2017; Claver *et al.*, 2009), while others highlight the inherent limitations of 'familiness', meaning the conservativeness, nepotism, conflict, transparency, lack of professional management and lack of clear borders between family and firm in family firms, making them less likely to internationalize

successfully (Alessandri *et al.*, 2018; Gomez‐Mejia *et al.*, 2010; Kontinen and Ojala, 2010). The lack of consistent and substantial findings between the level of internationalization of family firms and non-family firms is highlighted by Arregle *et al.* (2017). Furthermore, Haddoud *et al.* (2021) highlight that existing studies rarely isolate family firms as the unit of analysis focusing on export intensity as an outcome. This research addresses this shortcoming.

The second contribution is to consider the mediating role of innovation activities on the exporting behaviour of family firms. There is growing scholarly interest in the role of innovation in the internationalization performance of family enterprises (Casprini *et al.*, 2020; Zahra, 2020) because of Basile's emphasis on innovation as a key competitive component that causes variability in firms' export behavior (Basile, 2001). While there is a significant body of evidence exploring the impact of innovation on firm export performance (see Wu *et al.* (2021) for a comprehensive overview), less explored is the role of innovation in family firms, specifically the impact of innovation activities on family firm internationalization (Alayo *et al.*, 2021; Casprini *et al.*, 2020). Existing research investigates the moderating role of R&D investment on family firm internationalization (Fang *et al.*, 2018; Lin and Wang, 2021; Purkayastha *et al.*, 2018) but this measure fails to account more appropriate innovation indicators that capture the commercialization success of innovations (Espeche *et al.*, 2023), which would naturally offer key insights into the internationalization prospects of family firms. Rugman *et al.* (2016) argue that there is

an urgent need to comprehend how innovation in family firms can help firms take steps towards internationalization and build global competitiveness. Zahra (2020) and Lin and Wang (2021) call for future studies to explore more closely what types of innovations are effective in enhancing the internationalization of family firms. The failure of research to date to do this, and instead primarily focus on the impact of R&D investment, has led to limited understanding about whether internationalization via exporting is driven by family firms' efforts to leverage innovation-linked resources (Espeche *et al.*, 2023). While there have been some attempts made to rectify this shortcoming in the family firm literature the focus has been on family firms in a single country (Costa and Barbosa, 2024; Espeche *et al.*, 2023; Haddoud *et al.*, 2021) or a cohort of family firms, such as SMEs, in a single country (Alayo *et al.*, 2022; Merino *et al.*, 2015). This study moves beyond this limitation by using a multi-country study that examines the impact of innovation, namely product and process innovation, on the exporting behaviour of family firms. In doing so, we answer the call by Debellis *et al.* (2021) for future studies on family firm internationalization to consider the role of innovation.

The paper's third contribution centres around the methodological approach employed to tackle ongoing issues of endogeneity in family firm research (Arregle *et al.*, 2021). Propensity Score Matching (PSM) is used to accurately compare the differences across similar family firms and non-family firms and their internationalization activities. Family firms are not evenly distributed across sectors and countries which

may lead to potential endogeneity and sample bias distortions that may bias the results (Demsetz and Lehn, 1985; Heugens *et al.*, 2009). This implies that endogeneity could be possible if the variables explaining the family status of a firm also affect its internationalization (Hennart *et al.*, 2019). Arregle *et al.* (2021) argue that future research needs to go further in this direction as the literature addressing the issue of endogeneity is still very limited so far. Our study therefore addresses this research gap by firstly applying PSM to eliminate possible endogeneity problems arising from sample selection, and secondly by using Probit and Tobit techniques to test our hypotheses.

This study examines 9589 family and non-family firms across 38 countries in Eastern Europe, Central Europe, and East Asia 2019-2020 and applies PSM, Probit and Tobit techniques. The remaining sections of the paper are organized as follows. Section 4.2 looks back on the existing literature and sets out the hypotheses to be examined. Section 4.3 describes the sample as well as details of the empirical methodology utilized. Section 4.4 presents the empirical findings . Section 4.5 presents a discussion of the results. Section 6 finishes the paper by discussing the study's key managerial and public policy implications, as well as providing prospects for further research.

4.2 Literature Review

4.2.1. Family Firms and Exporting Behaviour

According to the resource-based theory, heterogeneous resource endowments contribute to a firm's performance (Penrose, 1959). The resource-based view of the firm (RBV) argues that differences in firm performance can be explained by the heterogeneous distribution of resources among firms (Wernerfelt, 1984). Firms with more, and arguably superior, resources are likely to gain a competitive advantage (Barney, 1991). To sustain competitive advantage requires resources that are rare, valuable, non-substitutable and inimitable (Barney, 1991). According to Pascucci *et al.* (2022) ownership type relates to a firm's resource endowment and subsequently internationalization given that export growth is a resource intensive strategy. Ratten and Tajeddini (2017) assert that the main types of resources held by family firms are social, human, and financial capital. These resources, and their implications for family firm exporting behaviour, are discussed in turn here.

The social capital of family firms as an entrenched, implicit, and hard to replicate resource is a basis of competitive advantage for family firms which also influences their level of exports (Dess and Shaw, 2001; Kidwell *et al.*, 2020). Family social capital such as commitment, generosity, solidarity, and strong social connection among family members will influence the organizational social capital of family firms (Arregle *et al.*, 2007; Bourdieu, 1994). Further, this social capital of the family firm

reduces monitoring costs, minimizes relationship risks, and enables the family firm to build efficient informal mechanisms, thus reducing its governance costs (Mustakallio *et al.*, 2002). It is the external linkages of family firms' social capital that facilitate knowledge sharing, expand relational capital at the firm level (Arregle *et al.*, 2021; Kano *et al.*, 2021) and boost the decision-making speed (Gallo and Pont, 1996), facilitating family firms' utilization of international expertise and host country networks (Basly, 2007; Cheong *et al.*, 2015).

A firm's social capital is additionally important to its legality and reputation (Lounsbury and Glynn, 2001). The reputation of the family in a family business enhances the firm's relations with its stakeholders compared to non-family firms (Habbershon and Williams, 1999). Levie and Lerner (2009) demonstrate that family firms are capable of using reciprocal altruism to effectively collaborate, create solid relationships with stakeholders, and maintain or foster a long range reputation for their business. It is these long-term and trust-based relationships that are a valuable resource for accelerating the internationalization of family firms (Debellis *et al.*, 2021; Kontinen and Ojala, 2011). Thus, family firms' social capital endowments have a positive impact on the international scale of family firms relative to non-family firms.

Human capital, that is individuals within the organization having knowledge and expertise, is an intangible resource (Ratten and Tajeddini, 2017). Human capital is critically important as a resource for internationalization (Cerrato and Piva, 2012) as it is considered a critical element in recognizing and exploiting international business

opportunities (Kidwell *et al.*, 2020). Family firms have unique human capital as a result of their reputation and close business relationships (De Massis *et al.*, 2015). Kontinen and Ojala (2010) highlight the positive attributes of human capital in family firms including extraordinary commitment, intimate relationships and deep firm-specific tacit knowledge. However, there is a downside to family firm human capital too as the nature of family firms may lead to family members experiencing favouritism in their selection for roles within the firm at the expense of more knowledgeable and experienced non-family members (Ratten and Tajeddini, 2017; Miller *et al.*, 2008). Furthermore, family firm human capital is complicated by the duality of the relationships between family members as they participate in both business and family relationships simultaneously (Sirmon and Hitt, 2003).

The final resource considered is financial capital. According to Danes *et al.* (2009) family firm financial capital comprises both monetary and physical assets owned by family members, individually or collectively. Ratten and Tajeddini (2017) postulate that family firms differ from non-family firms due to the focus on business longevity and future inter-generational succession. This is compounded by the desire to maintain familial independence and control may also affect the financial decisions of family firms (Fernández and Nieto, 2006). This may impact their financial decision making which is exhibited in a reluctance to include non-family investors (Sirmon and Hitt, 2003). As a result, family firms may be conflicted as their desire to grow via exporting is at odds with the personal interests of family members (Costa and Barbosa,

2024). However, Zahra (2003) argues that family firms are willing to take risks if it increases the family's future wealth including the risks inherent in exporting.

Arregle *et al.* (2021) highlight that there is a broad consensus in the literature that family firms possess unique features and resource reservoirs. This echoes the concept of 'familiness' developed by Habbershon and Williams (1999). Grounded in the resource-based view, they define familiness as "the bundle of idiosyncratic internal resources that exist due to the involvement of the family in the firm" (Habbershon and Williams, 1999; p.1). This suggests that the family and their involvement in the firm is a resource distinctive to family firms that creates synergistic effects with the firms' other resources. Merino *et al.* (2015) further highlight qualitative resources unique to family firms, such as trust and commitment, which positively impacts relationships within the firm including those linked to the internationalization process. Furthermore, Scholes *et al.* (2016) argue that the long-term view of family firms leads to increased investment in resources and capabilities which promote internationalization.

Consequently, due to the theoretically implied unique 'familiness' resources present in family firms, the following hypothesis is proposed:

Hypothesis 1: Family firms will export more than non-family firms

4.2.2. Innovation as A Mechanism for Increased Exporting Behaviour

According to the resource-based view, resources can be categorized as tangible or

intangible with the latter being the most significant strategically as they are the resources likely to generate sustainable competitive advantage (Rodríguez and Rodríguez, 2005). Innovation, captured in technological resources such as product and process innovation, is one such intangible resource (Rodríguez and Rodríguez, 2005). Innovation has long been regarded as a fundamental source of competitive advantage in international markets (Azar and Ciabuschi, 2017) and is thus considered one of the most important resources for internationalization (Espeche *et al.*, 2023). Due to its intangible nature, it assists companies maintain their competitive advantage through outputs that are hard to replicate and irreplaceable (Hitt *et al.*, 2001; Hitt *et al.*, 2006). By continuously updating their products and adapting to new market environments, innovative firms are more inclined to break into and maintain their participation in international markets thus increasing their level of internationalization (Monreal-Pérez *et al.*, 2012). It is widely recognized that productivity improvements by firms, through the development of new products and processes, can contribute to their export activities (Almodóvar *et al.*, 2016; Caldera, 2010; Classen *et al.*, 2014; Edeh *et al.*, 2020; Rodríguez and Rodríguez, 2005; Tavassoli, 2018).

There is a need to consider ownership type when considering the impact of innovation on firm exporting behaviour as the organizational specificity of family firms suggests that they will be more efficient in their decision making than non-family firms (Duran *et al.*, 2016; Hatum and Pettigrew, 2004; Lubatkin *et al.*, 2007). As a result, the acquisition and transfer of external knowledge across hierarchical and

interdepartmental levels may be enhanced by tacit knowledge, high dedication, and alignment of interests among family members, encouraging innovative activities in the firm (Bammens *et al.*, 2015). Furthermore, consistent with the resource-based view of the firm, the unique bundle of resources in family firms becomes an advantageous source of fostering innovation relative to non-family firms (Zahra, 2003; Zellweger, 2007). Chrisman *et al.* (2015) summarize family governance characteristics and their link to innovation demonstrating that the unique social capital within family firms contributes to family firms being more innovative compared to other firms (Acquaah, 2011; Classen *et al.*, 2014; Duran *et al.*, 2016). On the one hand, the deep and enduring ties between family members in family firms constitute greater family control, strong networks, in-depth knowledge of the business and strong monitoring capabilities, which provide important channels for knowledge flow and exchange to ensure that their investment in innovation leads to tangible results (Alguezaui and Filieri, 2010). In contrast to non-family enterprises, family firms seek long-term sustainability along with performance advantages, and this organizational duality drives them to continuously improve their original capabilities and innovations through development and to ensure the creation of financial value and competitive sustainability over a long period by exploring more or less radical strategic innovations (Sharma and Salvato, 2011). The additional experience and tacit knowledge accumulated by family firms in terms of products and markets may facilitate the reorganization of existing and new knowledge, all of which constitute a hotbed of innovation in family firms (Freixanet *et al.*, 2021). Consequently, more

innovative family firms are likely to hold specific advantages over their less innovative non-family counterparts leading to greater internationalization (Espeche *et al.*, 2023).

Given the literature highlighting the innovativeness of family firms relative to non-family firms, and the importance of innovation as an intangible resource for internationalization, the expectation is:

Hypothesis 2: Family firms that innovate more export more relative to non-family firms.

4.2.3 A Summary of The Research Model and Hypotheses

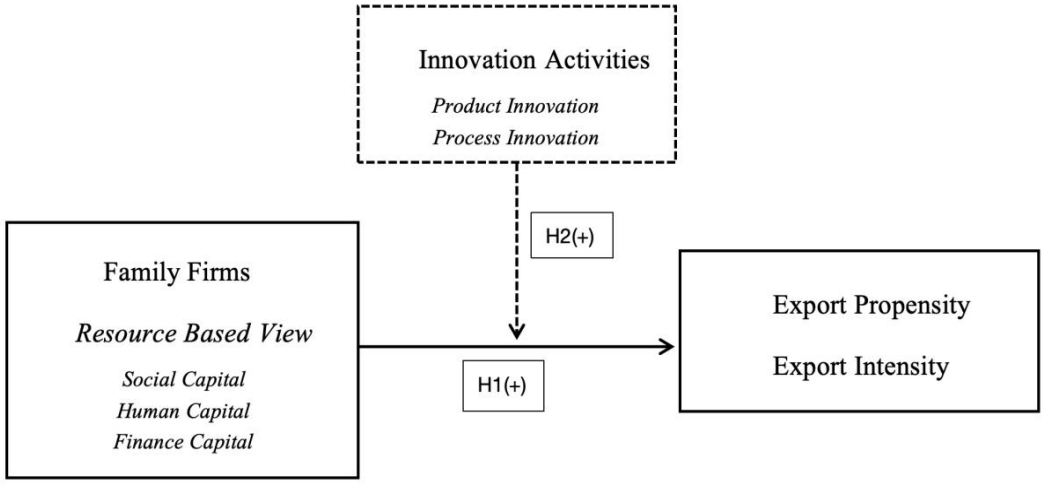
Overall, the following figure 4.1 reflected the hypothesis proposed based on the literature. Specifically, family firms possess unique resources such as strong social ties, deep firm-specific knowledge, and financial flexibility, which enhance their export potential. Their tendency to innovate further strengthens their ability to compete internationally, making them more likely to export than non-family firms.

The broad consensus from the literature reflects that the family and its involvement in the firm is a unique resource for family firms, capable of generating synergies with other firm resources. Specifically, family firms' unique social capital such as strong social ties among family members, human capital (deep firm-specific tacit knowledge) and financial capital (financial flexibility) motivate them to export more than

non-family firms (H1).

Second, by continuously updating their products and adapting to new market conditions, innovative firms are more inclined to penetrate and maintain their participation in international markets, thus increasing their propensity to export (Monreal-Pérez et al., 2012). It has been recognized in previous research that family firms are more innovative (Yin et al., 2023), so given the literature's emphasis on the innovativeness of family firms relative to non-family firms and the importance of innovation as an intangible resource for exporting, it can be expected that family firms that innovate more export more relative to non-family firms (H2).

Figure 4.1: A graphic representation of this research model and the hypotheses under analysis.



4.3 Data and Method

4.3.1 Data

The data employed in this research are from the Enterprise Survey (ES) 2019-2020, which was undertaken in European and Central Asian countries by the World Bank Group, the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and the European Commission (EC). To distinguish family firms from other firms, we determine a firm to be family owned if the family owns more than 50% of the firm's shares which is a common indicator of family firm ownership used in the literature (Arregle *et al.*, 2021; Classen *et al.*, 2014; Haddoud *et al.*, 2021; Umans *et al.*, 2020; Yin *et al.*, 2023). The first measure of internationalization captures firms' decisions about whether to export. It is captured through export propensity (Cerrato and Piva, 2012; Costa and Barbosa, 2024; Fernández and Nieto, 2005; Piva *et al.*, 2013). In the survey, firms were asked "Coming back to fiscal year, what percentage of this establishment's sales were direct exports?" We utilize a binary variable indicating whether the firm exported or not, which takes a value of 1 when the percentage of export sales to total sales is greater than 0, and 0 otherwise. According to Yang *et al.* (2020) while export propensity represents the first hurdle in the internationalization process it does not capture the scope of firms' internationalization efforts. Thus, there is a need to incorporate a further measure of internationalization: export intensity. To measure export intensity, we follow previous studies and use the ratio of export sales to total sales (Arregle *et*

al., 2007; Bausch and Krist, 2007; Haddoud *et al.*, 2021; Sánchez-Bueno and Usero, 2014; Yeoh, 2014; Zhou *et al.*, 2019).

Consistent with previous research, innovation is measured here as the introduction of new products and processes (Cieślik and Michałek, 2017; Higón and Stoneman, 2011; Rogers, 2004; Saridakis *et al.*, 2019). In the ES survey, companies were asked in relation to product innovation: "Has a new product or service been introduced or improved in the last three years?" To capture process innovation firms were asked: "During the last three years, has this establishment introduced any new or improved process?" New or improved processes may include: (i) methods of manufacturing products or offering services; (ii) logistics, delivery, or distribution methods for inputs, products, or services; (iii) or supporting activities for processes. These definitions of innovation activities are consistent with the OECD and Eurostat measures of innovation activities in the Oslo Manual (OECD/Eurostat, 2018). These innovation activities are coded as two dichotomous variables that have a value of 1 if the firm introduced the innovation in question and 0 otherwise.

This study also considers control variables that have been identified in previous studies as determinants of firm internationalization including those related to firm characteristics such as firm age, size and foreign ownership (Yang *et al.*, 2020; Classen *et al.*, 2014; Alayo *et al.*, 2022). Costa and Barbosa (2024) say that firm age and size are widely used as they gauge the impact of experience, knowledge, and

resources on internationalization. Existing literature emphasizes that older firms are better able to engage in internationalization after gathering information about international business in the local market and establishing an internationalization infrastructure, thus, we control for the age of the firm measured as the natural logarithm of the number of years the firm has been in existence (Nadkarni and Perez, 2007; Yang *et al.*, 2020; Zhou *et al.*, 2019).

Similarly, the literature identifies firm size as a determinant affecting internationalization (Andersson *et al.*, 2004; Lin, 2012; Zhou *et al.*, 2019). Larger firms have greater financial and non-financial resources for facilitating internationalization, which means that they have more different modes of entry into internationalization compared to smaller firms (Santulli *et al.*, 2019; Tihanyi *et al.*, 2003). Firm size is measured as a continuous variable based on the natural logarithm of the number of employees in the firm (Alayo *et al.*, 2022; Zhou *et al.*, 2019). Finally, foreign ownership may help the firm enter international markets leveraging knowledge of business opportunities or export experience in foreign markets or alliances (Rodríguez and Rodríguez, 2005). Foreign ownership signifies a deeper understanding of the international environment and may also indicate a broader view of the market (Cerrato and Piva, 2012; Fernández and Nieto, 2006). By measuring the percentage of the firm owned by foreign individuals, firms, or organizations, we control for the relationship between foreign ownership and internationalization (Damijan *et al.*, 2017).

We also control for the education levels of firm employees capturing the proportion of full-time employees with a university degree. According to Almodóvar *et al.* (2016), firms with highly educated employees are associated with good export performance. We include a variable that captures the proportion of highly educated full-time employees where highly educated means they possess a university degree. Companies depend heavily on their environment to access resources, and a larger population cluster surrounding the firms operating environment facilitates a higher degree of supply firm supports and availability of infrastructure for exporters (Pfeffer, 1987; Sridhar and Wan, 2010). Consequently, this study also includes controls for city size-level variables. Furthermore, we also included industry dummy variables (manufacturing and services) to control for industry effects (Ray *et al.*, 2018). A summary of variable names, and definitions are provided in Table 4.1.

Table 4.1: Variable Definitions

Variable Name	Variable Definition
Exporting Behaviour	
Export intensity (exports sales)	The ratio of export sales to total sales
Exports propensity	1= when the percentage of export sales to total sales is greater than 0, 0= otherwise
Family ownership	1=at least 50% of the company is owned by the same family (or the family with the largest ownership if there is more than one family), 0=otherwise.
Innovation	
Product innovation	1=During the last three years, this establishment introduced new or improved product or services 0= otherwise
Process innovation	1=During the last three years, this establishment introduced any new or improved process, 0=otherwise
Control variables	
Location in capital or city with pop > 1 m	1= if the firm is located in a city with a of pop > 1 million, 0 =otherwise

Location in city with pop. 250 k – 1 m	1 =if the firm is located in a city with a pop of 250 k–1 m, 0 otherwise
Location in city with pop. 50 – 250 k	1 =if the firm is located in a city with a pop of 50–250 k, 0 otherwise
Location in city with Pop < 50 k	1= if the firm is located in a city with pop under 50 k, 0 otherwise
Firm size	Logarithm of full-time employees
Firm age	2020- Year of establishment, in logarithm
Foreign involvement(*foreign*)	Percentage owned by foreign individuals, companies, or organizations
Production workers	Logarithm of the number of production workers
Highly educated full time employees	The proportion of highly educated full-time employees to total employees

4.3.2 Descriptive statistic

Tables 4.2 presents the descriptive statistics and the correlations between variables. Focusing on firms' export activities, the mean values of the export intensity and export propensity variables indicate that less than a third of them are exporters, and they export slightly more than 11% of their goods on average to foreign markets. More than half of the firms in the sample are family-owned. Nearly a third of the firms innovate in terms of products and about 15% in terms of processes. About a third of the companies are located outside the capital or in cities with a population of more than 1 million, about a quarter are in second-tier cities with a population of over 250.000 to 1 million and about a fifth are located in third-tier cities with a smaller population or in cities with less than 50,000 inhabitants. On average, foreign ownership in the sample is around 5%.

Table 4.2: Descriptive statistic

Variable	Obs	Mean	Std.Dev.	Min	Max
Product innovation	9589	.26	.439	0	1
Process innovation	9589	.143	.351	0	1
Manufacture	9589	.538	.499	0	1
Service	9589	.249	.432	0	1
Construction	9589	.005	.07	0	1
Retail	9589	.185	.388	0	1
Family firm	9589	.685	.465	0	1
Firm age	9589	21.788	15.545	1	203
Log firm age	9589	2.862	.688	0	5.313
Firm size	9589	66.177	155.68	1	3900
Log firm size	9589	3.253	1.254	0	8.269
International market	9589	11.742	26.268	0	100
Location in capital or city with pop>1 m	9589	.326	.469	0	1
Location in city with pop. 250 k – 1 m	9589	.255	.436	0	1
Location in city with pop. 50 – 250 k	9589	.207	.405	0	1
Location in city with pop. <50 k	9589	.183	.387	0	1
Foreign involvement(*foreign*)	9589	5.373	21.246	0	100
Exports intensity	9589	11.742	26.268	0	100
Production workers	9589	33.182	104.523	0	2500
Log product	9589	1.743	1.859	0	7.824

works					
Educated workers	9589	13.411	23.644	.005	100
Export propensity	6565	10.929	25.606	0	100

4.3.2.1 Sub-sample Analysis

As presented in table 4.3, the empirical analysis in this chapter covers a total of 9,589 observations, with family businesses accounting for 68.5% of the sample and non-family businesses accounting for about 32.5%. 72% of the family businesses in the sample are located in developing countries, about one-fifth are located in emerging countries, and only about 5% are located in developed countries. Nearly 76% of non-family businesses are located in developing countries and nearly one-fifth are located in developed countries.

The average age of family businesses is 23, and the average size of family businesses is 66. The average age of non-family businesses is 22, and the average size of non-family businesses is 98.

On average, the export sales ratio of family firms is around 12.8%. On average, 28.2% of the family firms export. On average, the export sales ratio of non family firms is around 10%. 22.9% of the Non family firms have an export propensity.

Table 4.3: Sample breakdown by sub-sectors

Sub - Sectors	Obs (%)	Export Propensity (%)	Export Intensity (Export Sales %)	Firm Age	Firm Size	Product Innovation (%)	Process Innovation (%)	Developing Country(%)	Advanced Country (%)	Emerging Country(%)

Family Firms	68.5	28.8	12.8	23	66	27.2	15.1	72	5.1	22
Non Family Firms	32.5	22.9	10.28	22	98	22.5	11.9	76	5.4	18.1

4.3.2 Method

To achieve our research objectives, we designed a three-step process. Firstly, there may be fundamental differences in the characteristics of family and non-family firms and to control for this a Probit model was estimated regressing family firm as the treatment group against firm characteristics and fixed effects (country and industry). Second, propensity score matching (PSM) was used to locate, match, and analyze a control group that was similar to the main 'treatment group' in order to efficiently mitigate endogenous confounding from bias in sample selection and to eliminate confounding bias in the survey of variables caused by control variables (Liao *et al.*, 2021).

We follow Mulligan *et al.* (2022) to construct a control group using the following equation (1):

$$FF_i = \beta_0 + \beta_2 Co_i + \varepsilon_i \quad (1)$$

Where FF_i represents whether the firm is a family firm or not. Co_i is a series of control variables representing firm characteristics. The benefit of employing an appropriately matched sample is that family and non-family firms have similar firm characteristics in the Probit model, allowing us to separate out the effect of family firm affiliation on internationalization (Attig *et al.*, 2016). The process of applying the

PSM（presented in detail in APPENDIX A8）involved caliper matching and nearest neighbor matching, and after removing the firms that could not be matched, the final sample for analysis is 9589 observations.

Third, given the characteristics of the dependent variable, export propensity, which is a binary (0/1) dependent variable, and export intensity (percentage of export sales), which is simultaneously a left-censored and right-censored dependent variable (i.e no export intensity value is below zero or above 100), we apply a Probit model to estimate the former and a Tobit model to estimate the latter model in line with existing literature (Costa and Barbosa, 2024; Fernández and Nieto, 2005; Merino *et al.*, 2015; Yang *et al.*, 2020). Thus, the equations used to estimate the effects of family firms and innovation and the mediating effect of innovation (through the interaction multiplier term) on export propensity are as follows:

$$E_i=\beta_0+\beta_1 FF_i+\beta_2 PD_i+\beta_3 PC_i+\beta_4(FF_i\times PD_i)+\beta_5(FF_i\times PC_i)+\beta_6 Co_i+\varepsilon_i \quad (1)$$

Where E_i indicates whether the company has the tendency to export. β represents the coefficients, FF_i is a binary indicator of whether firm i is a family business or not. PD_i indicates that firm i is engaged in product innovation or not. PC_i indicates that firm i is engaged in process innovation or not. $FF_i \times PD_i$ is an interaction term used to verify the impact of product innovation on stimulating the export tendency of family ownership. $FF_i \times PC_i$ is used to verify the impact of process innovation on

stimulating the export tendency of family firms. Co_i is a series of control variables that may affect company i's exporting.

For the export intensity, we propose a model identical to the previous one, except that the dependent variable (percentage of export sales) is modified and the equation is shown below:

$$ES_i=\beta_0+\beta_1 FF_i + \beta_2 PD_i+\beta_3 PC_i + \beta_4 (FF_i \times PD_i) +\beta_5 (FF_i \times PC_i) + \beta_6 Co_i+\varepsilon_i \quad (2)$$

where ES_i represents the export propensity measuring the proportion of export sales to total sales. $\beta, PD_i, PC_i, FF_i \times PD_i, FF_i \times PC_i$, Co_i are as defined in Equation (2). Estimations controlled for country dummies.

4.4. Empirical Results

Table 4.4 shows the results of the analysis of family firms' propensity to export (Probit) and export intensity (Tobit) respectively. The models are statistically significant. The results show that family firms are more likely to engage in exporting behaviour, measured by export propensity and export intensity, relative to non-family firms. This supports hypothesis 1. To explore the mediating role of innovation, namely product and process innovation, in family firm exporting behaviour, we created separate Family firm*product innovation and Family firm*process innovation interaction terms. By running the models with interaction effects, Table 4.5 gives the coefficients for the re-estimated Probit and Tobit estimates. The results show that innovation does not have a mediating effect on export propensity or export intensity

for family firms relative to non-family firms, implying that innovation is equally important in explaining the exporting behaviour of family and non-family firms. Consequently, we do not find support for H2. We also use the "INTEFF" command as instructed by Norton et al. (2004) to determine the correct marginal impact and its related significance level. The results of this analysis, which is outlined in a supplementary document in APPENDIX A10, also show that there is no significant effect of this interaction term.

Table 4.4: Export propensity and intensity of family business

	Probit	Tobit
	Exporting	Exports sales
Family firm	0.13***	5.80***
	(0.04)	(1.91)
Product innovation	0.19***	5.11***
	(0.04)	(1.98)
Process innovation	0.19***	6.38***
	(0.05)	(2.35)
Location in capital or city with pop > 1 m	-0.63	-41.30*
	(0.41)	(23.34)
Location in city with pop. 250 k – 1 m	-0.64	-41.35*
	(0.41)	(23.33)
Location in city with pop. 50 – 250 k	-0.68*	-48.04**
	(0.41)	(23.36)
Location in city with pop. 50 – 250 k	-0.66	-47.05**
	(0.40)	(23.13)
Foreign involvement(*foreign*)	0.01***	0.48***
	(0.00)	(0.03)
Log firm size	0.13***	6.89***
	(0.02)	(0.94)
Log firm age	0.07***	1.18
	(0.03)	(1.39)
Manufacture	0.32***	19.21***
	(0.06)	(3.31)
Service	0.30***	20.02***
	(0.05)	(3.00)
Log product workers	0.24***	13.79***
	(0.02)	(0.85)
Educated workers	0.00	-0.01
	(0.00)	(0.04)

_cons	-1.43*** (0.43)	-49.27** (24.47)
N	9589	9589
Wald chi2(45)	1938.00	LR chi2(45) = 3067.99
Prob > chi2	0.0000	0.0000
Log pseudolikelihood	-4087.3512	-15174.903
Pseudo R2	0.2612	Pseudo R2 = 0.0918

Notes:***significant at 1%; **significant at 5%; *significant at 10%.

The model controls for country dummies but they are not reported.

Table 4.5: The mediating effect of innovation on the export of family firms

	Probit	Tobit
	Exporting	Exports sales
Family firm	0.12*** (0.04)	5.89** (2.31)
Product innovation	0.17** (0.07)	4.73 (3.70)
Process innovation	0.19** (0.09)	7.38* (4.48)
Family firm#product innovation	0.02 (0.08)	0.51 (4.29)
Family firm#process innovation	-0.00 (0.10)	-1.35 (5.17)
Location in capital or city with pop > 1 m	-0.63 (0.41)	-41.33* (23.35)
Location in city with pop. 250 k–1 m	-0.64 (0.41)	-41.37* (23.34)
Location in city with pop. 50–250 k	-0.68* (0.41)	-48.07** (23.36)
Location in city with pop. 50–250 k	-0.66 (0.40)	-47.06** (23.13)
Foreign involvement(foreign)	0.01*** (0.00)	0.48*** (0.03)
Log firm size	0.13*** (0.02)	6.89*** (0.94)
Log firm age	0.07*** (0.03)	1.19 (1.40)
Manufacture	0.32*** (0.06)	19.21*** (3.31)
Service	0.30*** (0.05)	20.01*** (3.00)

Log product workers	0.24*** (0.02)	13.79*** (0.85)
Educated workers	0.00 (0.00)	-0.01 (0.04)
_cons	-1.43*** (0.43)	-49.33** (24.50)
N	9589	9589
Wald chi2(47)	1941.26	LR chi2(47) = 3068.06
Prob > chi2	0.0000	0.0000
Log pseudolikelihood	-4087.32	-15174.868
Pseudo R2	0.2612	0.0918

Notes: ***significant at 1%; **significant at 5%; *significant at 10%.
The model controls for country dummies but they are not reported.

4.5. Discussion of The Hypotheses

This study examines the exporting behaviour of family firms and the mediating role of innovation in explaining export propensity and intensity. Our results reveal that family firms are more internationalized, via exporting activity, than non-family firms which supports existing literature (Carr and Bateman, 2009; Piva *et al.*, 2013; Singh and Kota, 2017; Zahra, 2003; Zhou *et al.*, 2019) . Zahra (2003) explains that family owners or managers act as good family firm stewards and pursue internationalization as a strategy to protect the organization, enhance legitimacy and make it more profitable for future generations. Because of this, family firms are more motivated to use their personal business networks to facilitate internationalization (Cesinger *et al.*, 2016). These long-term, trust-based relationships constitute an essential resource in promoting family firms' internationalization (Ratten and Tajeddini, 2017). Thus, the results support the facilitative view of family ownership on internationalization (De Massis *et al.*, 2018) whereby family ownership has a positive effect on

internationalization including long-term commitment and trust among members. It also suggests that the unique 'familiness' inherent in family firms provides them with resource advantages (Habbershon and Williams, 1999), relative to non-family firms, that promote internationalization.

Previous studies have drawn attention to the significance of innovation strategies adopted by exporting firms (Becker and Egger, 2013; Filipescu *et al.*, 2009; Pla-Barber and Alegre, 2007; Wu *et al.*, 2021). Less explored is the role of innovation in the internationalization of family firms (Espeche *et al.*, 2023) and specifically studies focusing on export propensity as the outcome of firms' internationalization efforts (Haddoud *et al.*, 2021). We did not find any differences in our investigation of the mediating role of innovation on the export behaviour of family firms and non-family firms supporting previous findings by Costa (2022). This is the case for both product and process innovation. This contrasts with existing studies showing that the introduction of process innovation by family firms was more likely to increase export intensity than product innovation (Haddoud *et al.*, 2021) or those reporting the importance of product innovation relative to process innovation (Espeche *et al.*, 2023). Overall, these results are contrary to previous literature that finds the unique resources of family firms can be instrumental in their ability to develop unique innovative capabilities that have a beneficial impact on firm internationalization (Forcadell *et al.*, 2018; Miller and Le Breton-Miller, 2005).

4.6. Conclusions

The objective of this paper is to examine the export propensity and intensity of family and non-family firms and to analyse the mediating effect of innovation (product and process innovation) on their exporting behaviour. In doing so, we address several of the shortcomings in existing studies. We move beyond the focus on single country studies (Haddoud *et al.*, 2021; Merino *et al.*, 2015; Monreal-Pérez *et al.*, 2012) or a cohort of family firms such as SMEs (Alayo *et al.*, 2022; Pascucci *et al.*, 2022; Yang *et al.*, 2020). This study utilizes data from a broad cohort of family firms located in 38 countries across the world. Furthermore, we address the call in existing research for future studies on family firm internationalization to consider the role of innovation (Debellis *et al.*, 2021), specifically innovation indicators such as product and process innovation rather than R&D (Espeche *et al.*, 2023). Our study examines whether innovation, namely product and process innovation, play a mediating role in the internationalization of family firms, captured by export propensity and intensity. In doing so, we highlight that while the broader literature highlights the importance of innovation for internationalization, this is not supported when examining the family versus non-family firm dichotomy.

Our study helps to further reconcile the previous mixed findings in the literature on the internationalization behaviour of family firms. First, while some existing studies found that family firms do not tend to have different internationalization outcomes relative to their non-family counterparts (Gomez-Mejia et al., 2010; Alessandri et al.

2017; Arregle et al., 2017) our study contests this and reports that family firms internationalize more than non-family firms, other things being equal. The findings provide empirical evidence for the resource-based theory in the growing literature on internationalization in family firms. The different internationalization outcomes may be due to their 'familiness' traits, as family firms benefit from enduring shared meanings, including values, norms, and convictions, which help establish and mold social capital advantages distinguishing them from other firms (Rau et al., 2019; Erdogan et al., 2020; Sirmon and Hitt, 2003). Therefore, the social capital of family firms is considered as a potential lever for their internationalization success (Rondi et al., 2020).

Second, a large body of prior research has highlighted innovation as an important component of internationalization strategies (Pla-Barber and Alegre, 2007; Becker and Egger, 2009; Halpern and Murakozy, 2011; Dohsea and Niebuhrbc, 2018). However, less explored is the role of innovation in the internationalization via exporting strategies of family firms (Espeche *et al.*, 2023). Thus, this study contributes to extending the theoretical literature utilizing the resource-based view of the firm as well as the empirical work in the under-explored areas of family business, innovation, and internationalization. The results of this study suggest that the mediating effect of innovation on the internationalization of family firms is not significant, implying that innovation is equally important for the internationalization behaviour of family firms and non-family firms. This is important to highlight

because, whilst we identify here that innovation is important in explaining internationalization outcomes and since family firms have previously been identified as innovating more than their non-family counterparts (Yin *et al.*, 2023), non-family firms do not need to look at innovation to explain why they are lagging their family firm counterparts. Rather this provides further evidence that it may be unique familiness characteristics of family firms that is driving the differences between the two firm types with respect to their exporting behaviour.

This study has several implications for policy makers. First, given the greater export activity of family firms, policymakers should establish a sound institutional environment to ensure that family firms are supported in their exporting endeavors. For example, providing family firms with more effective property and patent protection, and safeguarding intellectual property rights and contractual performance required for outsourcing are key internationalization enablers (Zhou et al., 2019). Second, policies are needed to aid family firms so they can further develop their 'familiness' advantages (Scholes *et al.*, 2016). Specifically, regulatory policies that provide insurance for family business exports can be used to mitigate disadvantages that may negatively affect the internationalization of family businesses. Given that this study finds that innovation is equally important to family and non-family firms, asymmetric policies related to innovation are not required. Better use of public funds to realize a range of export programmes, specifically, investments to support companies in product innovation, process innovation and R&D design such as

innovation vouchers and Smart Awards and Knowledge Transfer Partnerships have been proven support levers (Halima and Stephen, 2022).

The present study is not without limitations; however, these limitations also represent opportunities for future research. Firstly, our study relies on cross-sectional data, so our ability to draw any strong conclusions about temporal stability and dynamism is limited. Therefore, we believe that further longitudinal research is needed to examine the links between family firms, innovation, and internationalization. Secondly, although our study finds that family firms are more likely to internationalize, our data (which is usual for these types of studies) limits the path we can take to explore the underlying mechanisms related to specific 'familiness' endowments. Thus, future work should attempt to further explore how family firms initiate internationalization strategies and leverage upon family management dimensions, family network ties and so forth. This is a critical data gap is most family firm studies. Thirdly, this paper only examines the role of a proxy for risk-taking behaviour and unique endowments (innovation) in mediating the internationalization behaviour of family firms. Other factors, such as competition or business environment, could also be considered in future studies.

Notes:

1. For more detailed discussion on the ES survey methodology, please see https://www.enterprisesurveys.org/en/methodology .

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Chapter 5: Family Firm Resilience During The COVID-19 Pandemic - The Moderating Roles of Innovation, Management Practices and Family Governance

5.1. Introduction

The World Health Organization declared COVID-19 a pandemic in March 2020, with the new coronavirus spreading rapidly across the globe (WHO, 2020). The 'social distancing' restrictions and lockdowns adopted by governments to slow the spread of the pandemic included the widespread closure of the economy in sectors such as catering, aviation, and tourism, including the suspension of public events and the closure of educational venues in most countries, which had a significant systemic impact on local and national economies (Demirguc-Kunt et al., 2020). The production disruptions, material shortages, disrupted supply chains and reduced demand for goods and services that accompanied these measures posed an unprecedented threat to business survival (Leffler et al., 2020, del Rio-Chanona et al., 2020). Therefore, analyzing the response of the business sector to this shock is crucial for understanding the determinants of business adaptability and to prepare for any future exogenous shocks (Clemente-Almendros et al., 2021).

Family businesses have drawn a lot of scholarly attention because they are an

important part of the global economy and because of their traditional blend of entwined ownership and management with inward-focused distinguishing qualities (Kotlar and De Massis, 2013, Boubaker et al., 2016, De Massis and Rondi, 2020). Previous research has identified that family businesses are more robust than other types of organizations to adversity including extreme events (such as financial crises), which may account for their success as a commercial organization (Chrisman and Patel, 2012, Minichilli et al., 2016, Amato et al., 2020). However, the COVID-19 pandemic introduced a novel kind of disruption for businesses, impacting the operations of family-owned companies and often posing a threat of failure. The disruption put their owners in a precarious situation, which was unprecedented since the two World Wars (Pieper et al., 2020). It is crucial that scholars and decision-makers comprehend how family businesses adapted to this challenging period (Richardson et al., 2020). This paper addresses that challenge by examining the following research questions: (1) How well have family firms adapted to the Covid-19 pandemic compared to non-family firms? (2) Do innovation activities, management practices and family governance moderate the adaptability of family firms in response to shocks?

This paper proposes that it is critical to consider the role of innovation, management practices, and family governance as vital mechanisms which may enable family businesses to be resilient in the face of challenging circumstances. Firstly, the implementation of innovative activities can help firms to gain a competitive

advantage by changing existing products or processes and thus bring a survival premium (Galanakis et al., 2021). This positive relationship between innovation and firm survival has been shown to remain valid in crises (Nah and Siau, 2020). Knowledge sourcing offers companies access to various types of knowledge in tandem with value chain and ample learning opportunities, making it an important driver of firm innovation (van Beers and Zand, 2014). Secondly, good management practices can help firms to better deploy their internal resources and skills in times of crisis to adapt to the changing external environment (Lalonde, 2007, Teece et al., 1997). Specifically, good management practices ensure that the business runs efficiently and can respond to any unforeseen circumstances such as the COVID-19 pandemic through performance monitoring, goal setting and selection, and the development of performance-focused rewards for people management (Farooq and Bakhadirov, 2022). Thirdly, it is argued that top management can perceive changes in the environment when a firm's survival is threatened and to find alternatives and make strategic decisions related to different levels of risk-taking (McClelland et al., 2012). Specifically, the 'improvisation' of top management during a crisis, such as quick decision-making, efficient allocation of resources, and actions to put themselves and the company in a position to weather the crisis are critical features associated with good governance (Cesinger et al., 2023). However, the literature is very scant on the importance of these moderating resilience characteristics for family firms.

This study makes four key contributions to the family firm literature. First, it

contributes to the literature on how family ownership contributes to business responses when faced with extreme shocks. It does so by providing a conceptual and empirical discussion of the underlying mechanisms driving business resilience in times of crisis. In doing so, it helps to unlock the 'black box' of family business resilience in the COVID-19 context. Previous research is well established on the resilience of family firms in response to crises such as political revolutions (Mzid et al., 2019), financial crises (Aldamen et al., 2020, Amato et al., 2020, Garel and Petit-Romec, 2021), and earthquakes (Salvato et al., 2020). While research on the resilience of family firms in a pandemic context has led to the emergence of an exciting new field, scholars have also lamented that explanations of family firms' resilience in response to COVID-19 have not been clearly conceptualized and empirically tested (Kraus et al., 2020). The only literature that has explored family firm resilience to the COVID-19 pandemic is limited to qualitative methods and at the level of family managers' psychological capital (e.g., emotional, cognitive, self-efficacy) (Corrêa et al., 2022, Mchiri, 2022). Rovelli et al. (2022) highlight that since economies are currently experiencing a historic moment, more empirical research should focus on whether the unique characteristics of family firms, compared to non-family firms, affect their adaptability in a pandemic. This paper directly addresses this call for more research by providing a conceptual framework which provides insights into the mechanisms driving resilience in family businesses and also providing the first empirical test of this conceptualization. The results of this research, which are the first of their kind in the literature, are applicable across different

contexts and can offer valuable insights for both family business owners, managers, and policy makers.

Second, this study promotes a deeper understanding of the role of innovation in determining the resilience of family firms in crisis periods. A promising area of research in the current family firm innovation literature focuses on the relationship between crisis and family firms' innovative behavior (De Massis et al., 2015; Wenzel et al., 2020; Calabrò et al., 2021; Rondi et al., 2021). However, scholars lament that the literature has a very limited understanding of whether innovation impacts family firms differently during crises (Hu and Hughes, 2020, Erdogan et al., 2020, Leppäaho and Ritala, 2022). A striking research gap is how innovation, and in particular "the unique innovation dynamics of family firms due to the internationalization and reinterpretation of knowledge" (Soluk et al., 2021:365), affects the adaptability of family firms to exogenous shocks (Erdogan et al., 2020). De Massis and Rondi (2020) and Leppäaho and Ritala (2022) argue that a more nuanced understanding of what types of innovations family firms introduce is required. Doing so may provide a fuller understanding of family firm resilience and innovation in turbulent environments. This paper responds to these calls and examines the impact of innovation activities introduced before the pandemic and innovation activities implemented during the pandemic on family firm resilience. Furthermore, a more nuanced analysis of innovation types is explored. Firstly, the paper employs three separate sources of knowledge: internal innovation investment, external innovation investment and

external knowledge acquisition. Secondly, the paper distinguishes between process innovation and incremental and radical product/service innovation. This research consequently offers in-depth insights into what types of innovation better explain family firm resilience and perspectives on their adversity to risk and their unique social capital endowments.

Third, a growing body of literature highlights the role of management practices in family firms during periods of stability and uses it as a key factor in differentiating performance differences between family and non-family firms (Bloom and Van Reenen, 2010, Duréndez and Madrid-Guijarro, 2018, Lemos and Scur, 2019, Hoon et al., 2019). Specifically, family firms can exert their unique human capital endowments on the firm through their approach to management practice implementation. Structured management practices in the areas of performance monitoring, goal setting, and people management do significantly increase productivity and profits (Bloom et al., 2014, Lemos and Scur, 2019, Li et al., 2020). However, the body of knowledge on family business crisis management has a very limited understanding of the management practices deployed to foster organizational resilience (Ngoc Su et al., 2021, El Baz and Ruel, 2021). Tsoutsoura (2021) calls on future scholars to explore whether the deployment of management practices can be a force for achieving resilience in family firms during crises. Thus, this study adds further insights to the link between management practices and family resilience by measuring the mediating effects of management practices on family ownership and

adaptive resilience.

The fourth contribution extends the family management literature by examining the impact of family governance on family firm adaptability in the face of exogenous shocks. Previous literature has highlighted the characteristics of family management and ownership as a double-edged sword providing unique insights into the reallocation of resources for business survival (Backman and Palmberg, 2015, Stenholm et al., 2016, McGuinness, 2018). Typically, scholars draw on a 'mixed gambling' approach to interpret the behavioral outcomes of the decision-making dilemma between the unique decision-making paradigm of family firms' top management team (TMT) and the potential gains and losses resulting from the protection of Social Emotional Wealth (hereafter SEW) (Hussinger and Issah, 2019, Bauweraerts et al., 2020, Martínez-Romero et al., 2023). Some prior evidence has demonstrated a positive or negative relationship between excessive family member involvement in management and firm performance such as financial performance, internationalization, and investment in R&D (Gallucci et al., 2015, Diéguez-Soto et al., 2018, Ruiz-Palomo et al., 2019, Ramírez et al., 2021). However, it is unclear to what extent family involvement in management affects resilience, i.e. the trade-off between SEW gains and financial loss targets ('mixed gambles') for family firm during external shocks (Amore et al., 2022). Scholars have highlighted the need to understand the role of family senior groups in influencing family firm resilience in times of shock (Ranucci and Wang, 2024). This study therefore contributes to the

understanding of the wider impact of a pandemic on family firms by determining the degree to which the unique human capital involvement of family members in top management can have on family firm resilience.

The data set for this study is a combination of the standard World Bank Enterprise Survey (WBES) (2019-2020) and the COVID-19 Impact Follow-up Surveys (CEFS) rounds 1, 2 and 3. A unique attribute of the CEFS is that it is based on a sample of companies that have previously participated in WBES interviews. Consequently, it is purposely designed to investigate the impact of COVID-19 on the private sector across a wide range of topics including sales, production, labor, policy, and expectations. This paper presents a cross-country analysis of 18,140 family and non-family firms across 21 countries in Eastern Europe, Central Europe, and East Asia. Propensity score matching and a series of econometric models are estimated to examine the relationship between innovation, management practices, family governance and family firm resilience.

Section 5.2 presents the conceptual framework used and the hypotheses derived. The data and methodology section describes the data used in this study, the variables included in the model and the empirical methods used. Section 5.4 explains the results obtained. A discussion of the hypotheses is presented in Section 5.5. Section 5.6 discusses both the theoretical and managerial implications of the research. Finally, the limitations and future research directions are explored in Section 5.7.

5.2. Literature Review

5.2.1 Exogenous Shocks, Family Firms and Adaptability

A great deal of research has been produced in different fields around the impact of external shocks such as wars, natural disasters, financial crises, terrorist attacks and epidemics on businesses (Chow and Dunkelberg, 2011, Park et al., 2013, Shepherd and Williams, 2014, Landini et al., 2020). A formal definition of exogenous shocks is "a prolonged and widespread period of crisis during which participants struggle to reconstruct aspects of social life" (Fligstein and McAdam, 2011:8). This contrasts to the generic term of ‘crisis’, which refers to 'the stress that a shock exerts on a particular business ecosystem' (Miklian and Hoelscher, 2022). Exogenous shocks emphasize a sudden event that is acute, beyond the control of the authorities, and can even put businesses in a state of 'adverse shock' (IMF, 2003:4). They are typically characterized by potentially disruptive threats to organizational functioning and performance such as loss of resources, operational inefficiencies, reduced financial returns and credit losses (McKinley et al., 2014, del Rio-Chanona et al., 2020, Kuckertz et al., 2020). Since the outbreak of the COVID-19 pandemic in 2019, supply chain disruptions, labor shortages, and restricted product and service operations caused by the pandemic, have had a significant impact on businesses across many different sectors as governments imposed closure and isolation restrictions (Amankwah-Amoah, 2020, Kraus et al., 2020). Therefore, COVID-19 is considered an exogenous shock (Wenzel et al., 2020, Kuckertz et al., 2020).

Studies examining the impact of external shocks on firm performance have previously concentrated on an enduring feature at the level of the firm called resilience (Bogodistov and Wohlgemuth, 2017, Giustiniano et al., 2018). A broad conceptualization of resilience is the ability of firms to quickly adapt their strategic responses in the face of disruptions or catastrophic events (Danes et al., 2009, Rahi, 2018). A more detailed definition is provided by Ambulkar et al. (2015) who classify resilience according to particular time dimensions; the resilience of the firm to be alert before a disaster, the resilience to adapt when an event occurs and the ability to respond quickly to changes brought about by disruptions after an event. Adaptive resilience emphasizes the ability of firms to respond to disruptions with the resources they already have or to adjust to changes in the economic environment with new solutions (Tong, 2021).

The primary area of interest in this paper is the resilience of family firms in the face of the COVID-19 pandemic, where a family firm's resilience to adverse events is rooted in the Resource Based View (RBV) theory of the firm and Sustainable Family Business Theory (SFBT). The RBV identifies fixed, inimitable and invisible resources that are unique to the firm as a source of competitive advantage and superior performance (Barney, 1991). These resources have been linked to three overlapping but related subsystems in family businesses, namely the business itself, its ownership, and the family (Habbershon et al., 2003). 'Familiness' refers to the combination of resources and competencies that arises from the interplay of the family, its members,

and the firm (Habbershon and Williams, 1999, Glyptis et al., 2021). SFBT (Stafford et al., 1999) views the combination of family and business success as a function of transactions between the family and the business, emphasizing the sustainability of the family business. According to SFBT, the family environment and its members provide the family business with resources such as their distinct human capital, social capital, and financial capital, and these resources enable the family business to transition between the family and the business system during challenging times (Danes and Brewton, 2012, McDonald and Marshall, 2018).

Human capital belongs to individuals and comprises factors such as experience, education, value, and skills (Brewton et al., 2010). In family businesses, the positive characteristics of family human capital embrace strong commitment and close relationships and working towards a long-term common goal - the continuation of the family in the business (Miller and Le Breton-Miller, 2005, Salvato and Moores, 2010). In other words, family relationships furnish family firms with the advantage of constructing knowledge structures and systematic search processes through the special interpersonal skills and networks developed through shared values-based interactions (Chirico and Salvato, 2016). It is the existence of this hard-to-replicate knowledge structure in family firms that helps them to identify opportunities and survive crises in the face of external shocks (Stafford et al., 2013). In addition, family human capital also creates additional financial support for firms in the face of shocks (Tengblad, 2018). For example, when faced with employee absenteeism during the

COVID-19 pandemic, the immediate decision-making endowment that characterizes family firms for continuity enables family members to respond quickly to shortages in the form of unpaid labor and pay cuts in times of hardship, compared to non-family firms (Le Breton-Miller and Miller, 2020).

Second, family social capital emphasizes how the structure of relationships and networks between family members and external stakeholders influence resource flows and promote continuity (Danes et al., 2009, Brewton et al., 2010). During a pandemic, the ability of family firms to demonstrate strong management of relational networks becomes key to adapting to shocks better than other firms and maintaining business prosperity (Brunelli et al., 2023). This managerial capacity reallocates resources in the form of developing new network relationships and reactivating old relationships (Hadjielias et al., 2022). Family firms, compared to non-family firms, are more able to increase their capacity for adaptation in the face of unanticipated disruptions by making use of the private social networks and collections of resources that have been amassed over time by their family generations based on trust to share information, work with shareholders, and access resources (Herrero, 2018, Herrero and Hughes, 2019). Good interactions for example with the government in the family's interpersonal network gives family firms increased access to a variety of resources when facing disruptions (Mzid et al., 2019). For instance, family businesses that are close to the public sector will have a better opportunity than other businesses to access and gain from financial support in governmental rebuilding initiatives during

economic shocks (Salvato et al., 2020).

Third, family financial capital benefits from conservative financial policies during a pandemic (Molly et al., 2019). The reason for this is that the financial position of the family is closely linked to the business, which means that the welfare of a given family cannot be achieved without the security and prosperity of the business (Danes and Brewton, 2012). As a result, family businesses are more inclined to build up large financial reserves than non-family businesses (Dreux, 1990). The conservative financial model of family firms and their financial accumulation allow them to be more flexible in adapting to shocks and maintain solvency (Conz and Magnani, 2020). At the same time, given that family firms maintain unique SEW endowment targets, families are forced to mobilize private assets and external financial resources to provide survival capital for the firm in response to shocks (Nordqvist et al., 2014, Alonso-Dos-Santos and Llanos-Contreras, 2019).

There are also empirical analyses that serve as evidence that family firms are more adaptive than other firms in coping with shocks. Brewton et al. (2010) surveyed a sample of 311 family firms distributed across urban and rural areas in the US that were collected in 1997 and were still in operation in 2000. The results showed that their human capital and networks helped them improve their resilience in the face of disruptions, compared to non-family firms. Zhou et al. (2017) used data from the US S&P 500 to examine the ability of family firms to recover during financial crises

(2008-2010). The results confirm that the financial support of family firms, through family networks and monetary loans, contributed to the greater resilience of family firms during and after the economic crisis compared to non-family firms. Salvato et al. (2020) studied which types of firms are more resilient in the face of exogenous shocks (earthquakes) based on a longitudinal data set spans from 2004-2012 covered by a sample of 180 industrial firms in Italy. The results of the study show that family members mobilize private assets and external financial resources through the family network to provide capital for the firm's survival, thus enabling family firms to have a better coping capacity than non-family firms. Żukowska et al. (2021) using data from a sample of private family firms surveyed during local lockdowns in Poland in March 2020, found that family firms mobilize private resources more quickly to support business survival in the face of pandemic shocks than non-family firms. This study acknowledges that the 'family effect', caused by the unique characteristics of family firms, has contributed to the better resilience of family firms in dealing with the negative effects of COVID-19.

In summary, based on the RBV and SFBT, the human, social and financial capital that characterizes ‘familiness’ in family businesses has the ability to improve the adaptability of family firms when exogenous shocks occur. Thus, the following hypothesis is proposed:

Hypothesis 1: Family firms (relative to non-family firms) are more adaptable in response to the COVID-19 pandemic.

5.2.2 Innovation and The Adaptability of Family Businesses to Crises

In the previous section the role of human, social and financial resources that are unique to the family make family businesses more resilient when faced with exogenous shocks were acknowledged. But there are also other aspects that can help family firms to adapt successfully to such disruptions. These can include innovation, family governance and management practices as the mechanism of how human, social and financial advantages of family firms translate into improved adaptability.

Adaptive resilience, based on dynamic capabilities, emphasizes an “ability to adapt to changing circumstances with new and innovative solutions and/or to adapt the tools it already has to new and unforeseen circumstances” (Karman, 2020:886). Thus, the ability to rapidly adapt to changing circumstances through the implementation of innovative activities becomes an essential characteristic of adaptive resilience (Erdogan et al., 2020). This fundamental characteristic coincides with Schumpeter's (1934) 'creative destruction' argument, which states that innovation is a great driving force behind a firm's ability to gain competitive advantage in the marketplace, especially in turbulent environments (Schumpeter and Swedberg, 2021). This means that innovation constitutes a resource and a competency, and that firms that innovate in products and processes have an innovation premium on survival and lead to better adaptation to uncertainty (Cefis and Marsili, 2005, Cefis et al., 2020). Specifically, product innovation is a way to continuously meet consumer needs and increase the value of the firm, which can give the firm a competitive advantage and be a

prerequisite to ensure that the firm becomes a market leader (Schreiber et al., 2016). Thus, in the context of uncertainty, such as a pandemic, product innovation can lead companies to respond to changing competitive environments and customer needs and provide market stability by modifying the delivery channels of products and services (Tapas and Pillai, 2022). Often product innovation and process innovation are complementary (Polder et al., 2010) which can provide a culminating 'escape route' for firms during a pandemic (Van Auken et al., 2021).

In addition to this, Research & Development (henceforth R&D) is the activity that leads to greater utility of knowledge-based resources in a dynamic rather than stable environment, which includes internal R&D efforts or knowledge absorption through external R&D (Heeley et al., 2006, Lome et al., 2016). Creating knowledge and facilitating the integration of old and new information is necessary to respond to changing service development needs and rapid delivery requirements during a pandemic (Amara et al., 2016, Garcia Martinez et al., 2019). On the one hand, internal R&D as the primary source of internal knowledge helps firms learn from continuous process improvement (Geroski et al., 2010). This knowledge contributes to a firm's ability to identify, assimilate and leverage external resources, providing internal resources to better adapt to turbulent environments (Thornhill and Amit, 2003). Furthermore, investing in internal R&D activities is reflected in the form of organizing employee education and training and can help companies build and improve their internal knowledge base, which constitutes the tacit knowledge of the

company (Svetina and Prodan, 2008). This tacit knowledge can also be continuously increased through feedback from design, production, marketing and distribution (Senker, 1995). This knowledge can therefore be used to meet the adaptive needs of a company in pandemic times, enabling the firm to solve production bottlenecks or develop improvements for new products and processes (Krammer, 2022).

The external knowledge acquired by external R&D investments is derived from interactive learning between firms and suppliers, customers, private institutions, schools and research institutes (Gunasekara, 2006). Previous work has argued for the value of external knowledge as a complementary resource to internal knowledge in enhancing internal R&D efforts during periods of stability (Laursen and Salter, 2006). This is achieved through wider and deeper collaborations that provide companies with new ideas and resources (Chiang and Hung, 2010). However, it is worth emphasizing that firms that relied on external knowledge for innovation did not successfully adapt to 'social distance' public health measures during the COVID-19 pandemic (Kraus et al., 2020). For firms that rely on external channels for innovation, this means that they incur additory costs, time and effort in mastering how to use new technologies (Kessler et al., 2000, Bridoux et al., 2013). However, the closure of non-essential operations, the shortage of financial resources or even imminent bankruptcy resulting from COVID-19 makes it less likely that firms will adapt using external knowledge strategies (Baldwin and Di Mauro, 2020).

There is also some literature that provides empirical debate on the role of R&D and innovation activities on firm resilience and survival in turbulent times. Zouaghi et al. (2018) studied the impact of R&D intensity on firms during economic downturns using a sample of 21016 for the period 2008 -2012 from the Spanish Technological Innovation Panel (PITEC) and found that investment in product innovation improved the resilience and survival of high-tech firms to the turbulent environment. Monsson (2017) in their study of Danish firms, investigates the impact of the timing of innovation on firms' resilience in the period following the recession of 2009 and empirically finds that firms that undertake radical innovation before disruptions are better able to survive and even prosper during turbulence. Firms that adopt incremental innovations before disruptions, however, may affect the firm's resilience during disruptions. Using a data set combining World Bank's COVID Survey in the period May – June 2020 with the latest wave of Enterprise Surveys from either 2018 or 2019 from 28 countries covering both developed and developing countries, Krammer (2022) finds that firms that rely on internal sources of knowledge acquired through internal R&D investments during a pandemic were able to adapt more successfully to the COVID-19 pandemic.

Previous researchers have claimed that family firms are more attracted to innovation strategies than non-family firms and make innovation a key requirement for their legacy and leadership (Dana and Smyrnios, 2010, Chrisman et al., 2015). In other words, family firms are not as conservative as traditionally conceived, they are risk

takers (Schulze and Gedajlovic, 2010, Chrisman and Patel, 2012). Yin et al. (2023) highlights that family firms are more innovative than non-family firms in terms of product innovation, process innovation and R&D investment, refuting the view that family firms are conservative, unwilling to change and risk averse to innovation activities. The external shocks triggered by the COVID-19 pandemic led family firms to alter their focus on financial, human and social capital, and a range of resource conservation, resource restructuring and social boundary resource actions were activated. This adaptive resource allocation behaviour in turn promotes the advance of process innovation, product innovation and thus makes family firms more flexible and resilient in times of crisis (Soluk et al., 2021). That is, resources specific to the family can help family firms find solutions to challenges in a short period of time to support them to adapt quickly to environmental changes and become more resilient (Haynes et al., 2019).

Limited evidence finds that family firms survive by offering new products or adapting existing products to help them better adapt to pandemic shocks (Kraus et al., 2020, Marja ń ski and Sułkowski, 2021, Dettori and Floris, 2023). Dettori and Floris (2023), based on data from a sample of 570 Italian companies, found that family businesses that reorganized their operations and introduced new ideas for their products were able to respond positively to the pandemic crisis and stimulate their resilience.

Based on the above discussion, it appears that family firms are not risk-averse

"conservatives" when it comes to innovation activities. Instead, the innovative qualities of family firms can be reinforced in times of crisis and trigger a 'heterogeneous response' compared to non-family firms, thus stimulating an understanding of the adaptability of family firms. This leads to the following hypothesis:

Hypothesis 2: Family Firms that engage in innovation activities are more adaptable in response to the COVID-19 pandemic.

5.2.3 Family Management and Resilience to Pandemics within Family Firms

Agency-based theory suggests that the organizational dynamics of family firms may be influenced by individual self-interest (Eisenhardt, 1989, Discua Cruz, 2020). When more family members in an organization are involved in management, although this reduces agency costs, their considerations regarding the non-economic goals of management decisions become increasingly important, especially in turbulent times such as pandemics (Zellweger and Dehlen, 2012, Kotlar et al., 2018).

On the one hand, when more family members are in the top management team (TMT), as their wealth is tied to the company's assets, it represents a possible preference for family-centered self-interested behavior rather than management and business initiative (Le Breton-Miller and Miller, 2009, Filser et al., 2016). Such behaviors include hiring inept family members, squeezing resources for family purposes, and avoiding taking business risks in order to maintain family fortune (Lubatkin et al.,

2007). Thus, when faced with a pandemic/shock such as COVID-19, firms with a high proportion of family members in the TMT may support conservative and stable strategic decisions rather than implement risk-related innovation decisions (Gómez-Mejía et al., 2007, Chirico et al., 2019). Additionally, much family involvement in management decisions can impede innovative behaviors (Yin et al., 2023). Family firms with a higher proportion of family members with 'conservative characteristics' in the TMT are less likely to adapt to the COVID-19 pandemic due to the strategic importance of innovation as a factor for firms to become more adaptive and increase their competitive advantage during extreme downturns (Caloghirou et al., 2021). On the same time, having more family members involved in management means that family firms lack external managers with professional management experience and competence (Dyer, 1989). Experienced external managers often have expertise from other companies and industries that family members do not have access to, leading to information asymmetries (Gomez-Mejia et al., 2011). Therefore, due to the lack of formalization of the management team in family firms, this may lead to a reduced potential for family firms to directly improve crisis resilience based on external knowledge and external experience (Faghfouri et al., 2015).

The empirical results on the impact of more family members involved in the management of family firms during crisis periods is inconsistent. Faghfouri et al. (2015) use data from German SMEs and find that family firms with a higher proportion of family members in the TMT have a lower degree of formalization in

response to crises and have lower crisis resilience. Chirico and Bau (2014), based on data from a sample of Swiss family firms, confirm the existence of an inverted U-shaped relationship between TMT and family firm performance during a crisis. Sahut et al. (2023) analyzed the performance of family and non-family firms during the COVID-19 epidemic based on a dataset of 466 including both family and non-family firms, which was conducted in August and September 2020 from Cameroonian firms. This study found that the performance of family firms with a high proportion of family members involved in management, weakened during the COVID-19 epidemic.

Based on the above discussion the following hypothesis is formulated:

Hypothesis 3: Family firms with more family members involved in top management positions are less adaptable in response to the COVID-19 pandemic.

5.2.4 Management Practices and The Adaptability of Family Firms to The Pandemic

Bloom and Van Reenen (2010) explain that firm performance largely reflects differences in management practices. Management practices are significantly correlated with productivity, profitability, increase in sales and the rate of survival and are a vital source of competitive advantage (Armbruster et al., 2008). Specifically, a good training system in a firm leads to employees having more valuable skills and knowledge including tacit knowledge that is not easily replicated by competitors and therefore helps the firm to generate more profits, competitive advantage and develop

good resilience during crises (Zollo and Winter, 2002, Zhou et al., 2011). A clear system of incentives leads to more learning and experimentation within the organization, while increasing the stock of knowledge within the firm (McGuirk et al., 2015). This knowledge accumulation helps companies to identify specific business opportunities to respond to technological change and adapt faster to changing environments (Caloghirou et al., 2021). In summary, any form of management practice that meets the needs of the company such as recruitment, performance evaluation, and employee training increases the breadth and depth of the company's knowledge exploration, thus increasing the company's potential to adapt to shocks (Krammer, 2022). Good management practices are often associated with managing human capital within the firm (Bloom and Van Reenen, 2007). Therefore, management practices act as a proxy of unique 'family' human capital associated with SFBT mechanisms in family firms.

Human resource management (HRM) based practices have always been a sensitive area for family businesses (Tsoutsoura, 2021). The reason for this is that the relationship between company management and the family increases the complexity of business management issues due to the overlap between family, business and ownership (Tagiuri and Davis, 1992). In detail, the recruitment, promotion and selection tools that work well for non-family firms, such as management training, compensation plans, written employee policies and employee reviews, become the most rejected processes in family firms (Bloom and Van Reenen, 2010, Bloom et al.,

2012). The precariousness of family firms in human resource management will be stimulated as their businesses grow and achieve changes in management practices (Bloom et al., 2012). As family businesses grow in size, they recognize the need for external managers with specialist knowledge to assist them in managing their growing workforce (Kim and Gao, 2014). As a result, a range of formal practices such as employee evaluations, incentive compensation strategies, training and career development initiatives will become more widely utilized in family businesses (Leon-Guerrero et al., 1998). It is also these formal and standardized HRM practices that can help family firms to better cope with the changes in working practices such as teleworking brought about by the COVID-19 pandemic and help family firms to further examine the effectiveness and continuity of teleworking (Kalogiannidis, 2021).

The empirical evidence on the impact of management practices on family firm resilience is limited. Faghfouri et al. (2015) based on data from a sample of 2000 German SMEs, find that the adoption of standardized human resource management practices, such as an independent supervisory board of experienced professionals, was able to "turn the state of the family business around" in response to the financial crisis". Issah et al. (2023) based on the Successful Transgenerational Entrepreneurship Practices (STEP) survey of a sample of 2,130 was collected on 2020 for companies in 69 countries worldwide found that family businesses that adopted good management practices during COVID-19 showed positive resilience.

The above discussion leads to the following hypothesis:

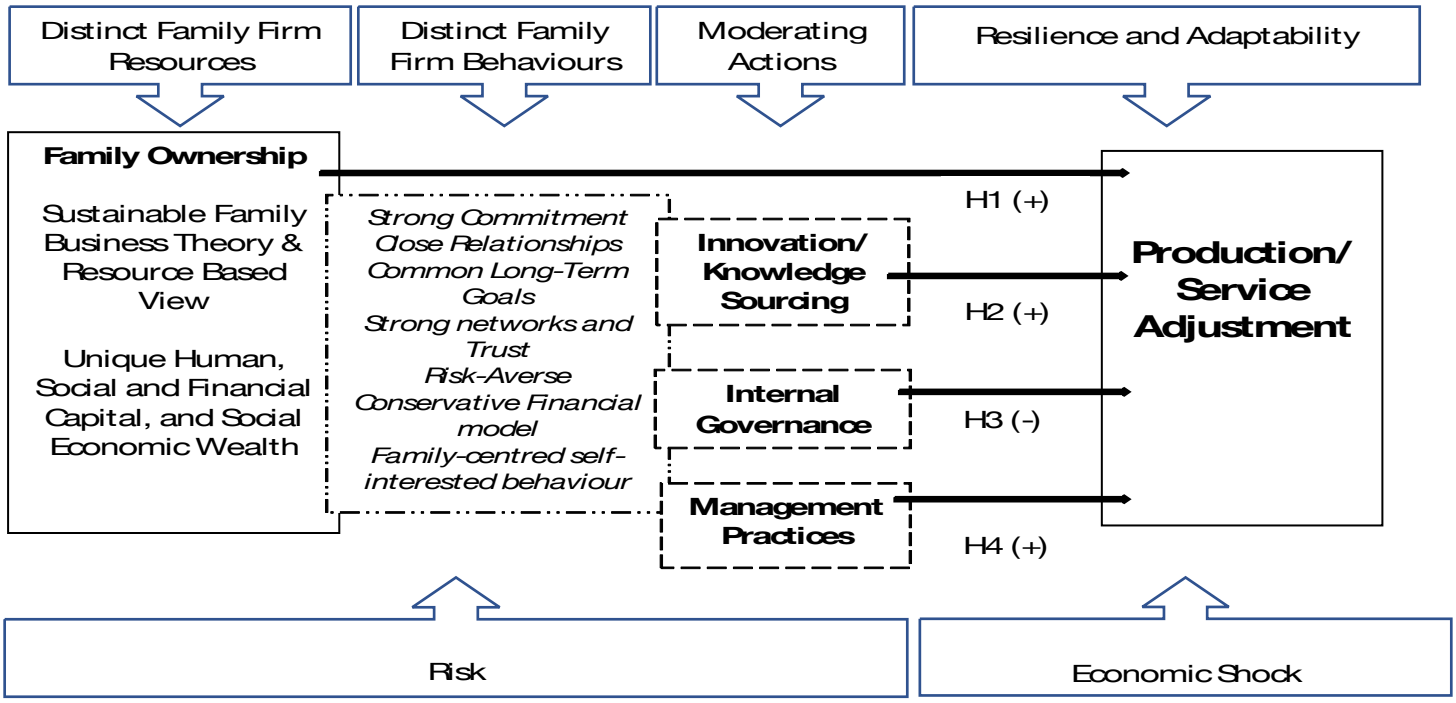
Hypothesis 4: Family Firms with well-defined HRM practices are more adaptable in response to the COVID-19 pandemic.

5.2.5 Theoretical Framework

The information derived from the literature review highlights that family firms, due to their unique human, social and financial capital, adapt better then non-family businesses to exogenous shocks. This is a result of their strong commitment, strong relationship networks, trust, and greater financial flexibility. Thus, in H1 a positive relationship between family ownership and resilience is hypothesized. However, there are several other behaviors that impact how family firms respond to exogenous shocks. First, existing literature suggests that innovation matters for adaptability. Family firms, by their nature, do not tend to be risk-averse, and consequently have high rates of innovation activities. Some literature has highlighted that family firms are even more innovative than their non-family counterparts (Yin et al., 2023). Additionally, the unique social capital traits of family firms enables access to wide network resources and knowledge sources. Thus, it is hypothesized that implementing innovative activities prior to and during the COVID-19 pandemic ensures better adaptability by family firms (H2). However, too many family members involved in the TMT may lead to a tendency for family firms to choose conservative innovation strategies. This will be clearly detrimental to the resilience of family firms when coping with crises. Therefore, it is hypothesized that too much family involvement in top management is

detrimental to family firm resilience (H3). Finally, family firms with formalized and better management practices may have better adaptive resilience in response to the COVID-19 pandemic (H4). Figure 5.1 provides an overview of the conceptual framework that forms the foundation of this study.

Figure 5.1: Family firms resources, behaviors, actions and adaptability



5.3. Data and methodology

5.3.1 Data

The data used for the empirical analysis in this study are derived from a combination of two datasets: the World Bank's Enterprise Surveys (WBES) and the COVID-19 Impact Follow-up Surveys (CEFS). The WBES (2019-2020 wave) is used in this

study as baseline data outlining firm measures prior to the COVID-19 pandemic. The dataset is a survey of formally registered private sector businesses in the manufacturing and service sectors in multiple countries around the world. A wide range of business environment topics are covered including infrastructure, competition, innovation, trade, bribery, access to finance and performance measurements. The sample frame for the dataset is based on a random sampling method stratified by company size, business sector and geographical region of the country to ensure data representation of the firm population in each country.

Given the economic disruptions caused by the COVID-19 pandemic, and its significant impact on the private business sector following lock down measures taken by many governments, the World Bank Corporate Analysis Department implemented a short follow-up module of the survey based on WBES data. These follow-up surveys were conducted in three rounds via telephone interviews from May 2020 to August 2021. In the CEFS, the topics covered included data on sales, employment, finance, policy, and changing firm expectations due to the pandemic. This novel dataset makes it possible to measure the external shock caused by the pandemic and how it affects private businesses. For the purposes of this study, the WBES standard (2019-2020) and follow-up CEFS (rounds 1, 2 and 3) data have been combined by using unique identifiers between the surveys. The sample size and country coverage are determined by the CEFS; after removing missing observations related to the main variables of the study, there is a sample of 12,959 firms for 21 countries (Appendix

A11 provides the results of the sample distribution by country).

The main objective of this study is to capture the resilience of family firms in a pandemic context. Adaptability serves as the inherent ability of organizations to change strategies, structures, and other processes in response to environmental changes (high-risk environments caused by COVID-19) (Mithani, 2020). To capture firms' resilience adaptability is measured using the following question in the CEFS "Has this establishment adjusted or converted, partially or fully, its production or the services it offers in response to the COVID-19 outbreak?". The use of this variable is consistent with recent research including (Eslami Andargoli et al., 2023) and (Aseinov et al., 2022).

To distinguish between family and non-family businesses the approach used in earlier studies is followed Minichilli et al. (2010, Classen et al. (2012), Brinkerink (2018), by creating a dummy variable to identify family businesses. Firms are classified as family firms if one family owns more than 50% of the company; otherwise, they are referred to as non-family firms. As a proxy for family management involvement, much of the literature uses family members' involvement in top management teams (TMT) as an indicator of the influence of family firms on decision making (Sirmon et al., 2008, Kotlar and De Massis, 2013, Kotlar et al., 2014, Yin et al., 2023). More family members in TMT increases the family's intention to maintain substantial control over the firm and reduces non-family managers' discretionary decisions

(Zahra, 2005, Kraiczy et al., 2014). Therefore, following Manzaneque et al. (2018), Migliori et al. (2020) and Muñoz-Bullón et al. (2020) this paper uses a continuous variable, expressed as a percentage, which captures the extent of family involvement in the top management team (FTMT).

Many studies have confirmed the critical role of innovation for business adaptability, with Chesbrough (2020) highlighting that "innovation will play an important role in the recovery from a pandemic". Innovation outputs require knowledge, which can be acquired and accumulated internally or from other companies through collaboration with other companies or institutions (Forés and Camisón, 2016). This paper follows Belderbos et al. (2006), Serrano-Bedia et al. (2016), Yin et al. (2023), and Perez-Alaniz et al. (2023) in using variables that represent the different sources of knowledge that firms use to carry out their innovation activities. Specifically, external knowledge acquisition is measured using the question "Over the last three years, did this establishment spend on the acquisition of external knowledge? Which includes the purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other businesses or organizations". External knowledge investment is measured using the question 'Over the last three years, did this establishment spend on research and development activities contracted with other companies?". To capture internal sources of knowledge, the following question is used: "Over the last three years, did this establishment spend on research and development activities within the establishment?".

The definition of innovation in the WBES and CEFS data coincides with the definition of innovation in the Oslo Manual (OECD/Eurostat, 2018). This allows the paper to use different proxies to measure innovation activities at the firm level. In this paper, the data structure is suitable to distinguish between family firms introducing innovative activities before the pandemic and family firms implementing innovative activities during the pandemic. Following previous studies (Børing et al., 2016, Seenaiah and Rath, 2018, Baccarella et al., 2022, Khan et al., 2022) and the Oslo Manual definition of innovation, a series of binary variables are used to measure innovation. In the WBES, to capture product innovation, firms are asked "Has a new product or service been introduced or improved in the last three years?" Similarly, to identify more radical innovation, firms are asked "Were any of the new or improved products or services also new for the establishment's main market?". To measure process innovation, the WBES asks "During the last three years, has this establishment introduced any new or improved process?". The dataset used covers all three rounds of the CEFS survey, which enables this study to uniquely measure innovation activity 'in the midst of an outbreak'. Firms are asked "Since round 2, did this establishment experience introduced new or improved products or services in response to the COVID-19 outbreak?".

In addition to innovation activities, good management practices enhance a company's ability to successfully adapt to a crisis (Eggers and Kaplan, 2009). This paper followed Krammer (2022) and utilizes five variables related to management practices

in the WBES. These variables are combined into a single index using Principal Component Analysis (PCA) to derive a composite indicator (please see Appendix A11 for more on this).

In addition to the key variables considered above, the models control for several indicators that are known to influence the resilience of a firm in a crisis. Foreign ownership means that firms have access to advanced technologies that are foreign owned and may lead to more innovation, thus increasing their chances of resilience in times of crisis (Baldwin and Yan, 2012). Also acknowledged in much of the empirical literature is that firms involved in exporting can achieve higher innovation intensity and productivity, thereby increasing their resilience potential over non-exporting firms (Ali et al., 2020, Mas-Verdú et al., 2015, Inui et al., 2017). It is thought that experienced managers are more likely than less experienced managers to have a strong introspective tendency to look for alternatives to the firm's adversities, thus helping the firm to have a better chance of adaptability in complex situations (Renko et al., 2021). Firms with financing obstacles are more likely to exit the market in a crisis, so this study measure whether firms faced financial obstacles by an inability to access loads before the pandemic (Khan et al., 2022). In addition, this study follow Crowley and Jordan (2017) in controlling for the strengths of firms operating in urbanized economies by creating four dummy variables with different population sizes (see Table 5.1 for definition details). Existing literature identifies the positive impact of competition on healthier organizational performance (Mubeen et al., 2016,

Sheikh, 2018, Javeed et al., 2020). Therefore, the degree of competition is expressed in natural logarithmic form using "number of competitors of the establishment's main product faced in their main market" which coincides with the same measurement employed by (Crowley and Jordan, 2017). Industry-level effects and the impact of policies adopted by different countries on firm resilience during the pandemic are also controlled for by including industry and country dummy variables (Mills and Rüttenauer, 2022). Finally, firm characteristics such as firm age and firm size are included as control variables (Garrido-Prada et al., 2021). This is because larger and/or older companies are likely to have more resources for innovation and will have more experience in dealing with crises (Leary and Roberts, 2005, Blazenko and Yeung, 2015, Buchheim et al., 2020).

The definitions and descriptive statistics of the variables are presented in Table 1. Family firms account for 88.6% of all firms in the sample. 29% of the firms implemented product innovations before the crisis, while almost 20% of the firms introduced process innovations before the crisis. Likewise, approximately 20% of the companies invested in internal innovation activities prior to the crisis.

Table 5.1: Definition of Variables

Variable Type	Variable Name	Variable Definition
Dependent variable	Adaptability	1=this establishment adjusted or converted, partially or fully, its production or the services it offers in response to the COVID-19 outbreak,0=otherwise
Independent variables	Family firms	Family ownership: 1=at least 50% of the company is owned by the same family (or the family with the largest ownership if there is more than one family), 0=otherwise.

	Family management	The proportion of family members in TMT.
	Innovation pre-crisis	Product innovation: 1=During the last three years, this establishment introduced new or improved product or services, 0= otherwise Product innovation (new to market): 1=if the firm introduced new or significantly improved goods that were new to the establishments main market in the previous three years, 0= otherwise Process innovation: 1=During the last three years, this establishment introduced any new or improved process, 0=otherwise Internal R&D expenditure： 1= Over the last three years, this establishment spent on research and development activities within the establishment, 0= otherwise External R&D: 1= Over the last three years, this establishment spent on research and development activities contracted with other companies, 0=otherwise External knowledge acquisition: 1=Over the last three years, this establishment spend on the acquisition of external knowledge (This includes the purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other businesses or organizations), 0=otherwise
	Innovation in crisis	1= Since round 2, this establishment introduced new or improved products or services in response to the COVID-19 outbreak, 0=otherwise
	Management practice	Composite indicator for best management practices (PCA)
Control variables	Level of competition	Log of number of competitors of the establishment's main product faced in their main market.
	Location in capital or city with pop > 1 m	1= if the firm is located in a city with a of pop > 1 million, 0 =otherwise
	Location in city with pop. 250 k–1 m	1 = if the firm is located in a city with a pop of 250 k–1 m, 0 otherwise
	Location in city with pop. 50–250 k	1 = if the firm is located in a city with a pop of 50–250 k, 0 otherwise
	Location in city with Pop < 50 k	1= if the firm is located in a city with pop under 50 k, 0 otherwise
	Firm size	The logarithm of full-time employees
	Firm age	Log of 2020- Year of establishment
	Exporting	1=The ratio of the firm's sales in foreign markets to total sales>0, 0=otherwise
	Foreign involvement	Percentage owned by foreign individuals, companies, or organizations (>50%)
	National market	1= if main product sold mostly across the country where establishment is located, 0=otherwise
	International market	1=if main products are sold overseas, 0=otherwise
	Manager experience	Number of years manager is in the industry
	Loan	1= the firm had access to loans before the COVID-19 pandemic, 0= otherwise

5.3.2 Descriptive statistic

As shown in the table 5.2, overall, the average age of the sample company is 23. Around 29.5% companies adjusted or converted, partially or fully, its production or the services it offers in response to the COVID-19 outbreak. 88.6% firms are family firms. 29.1% company choose to introduce product innovation before pandemic. 16.8% firms adapted process innovation before COVID-19. One in five companies implemented new to market product innovation before the pandemic. Only 3.2% of companies innovated during the pandemic. About 44% of the companies are located outside the capital or in cities with a population of more than 1 million, about 23% of firms are located in second-tier cities with a population of over 250.000 to 1 million and about one in ten firms are located in third-tier cities with a smaller population or in cities with less than 50,000 inhabitants.

Table 5.2: Descriptive Statistic

Variable	Obs	Mean	Std. Dev.	Min	Max
Adaptability	20,455	.2948912	.456005	0	1
Family firm	20,455	.8863359	.3174107	0	1
Family management	20,455	69.84943	40.33772	0	100
Product innovation	20,455	.291518	.4544726	0	1
Process innovation	20,455	.1680763	.3739431	0	1
New to market product innovation	20,455	.1923246	.3941363	0	1
Internal R&D	20,455	.185627	.3888149	0	1

expenditure					
External R&D	20,455	.0904424	.2868216	0	1
External knowledge acquisition	20,455	.1305304	.3368943	0	1
Innovation during crisis	20,455	.0320215	.1760615	0	1
International market	20,455	.1626986	.3690995	0	1
National market	20,455	.4664385	.4988846	0	1
Local market	20,455	.3708629	.4830476	0	1
Competition	20,455	3.015927	1.560217	0	9.21034
Firm age	20,455	23.19951	15.97823	1	203
Firm size	20,455	60.11523	155.9387	1	11382
Internationalization	20,455	12.46507	26.11394	0	100
Location in capital or city with pop > 1 m	20,455	.4425813	.4967043	0	1
Location in city with pop. 250 k–1 m	20,455	.2327548	.4225976	0	1
Location in city with pop. 50–250 k	20,455	.1705207	.3760988	0	1
Location in city with pop. <50k	20,455	.1126864	.3162168	0	1
Foreign investment involvement	20,455	5.103789	20.94193	0	100

5.3.2.1 Sub-sample analysis

The empirical analysis in this chapter covers a total of 20,445 observations, with family businesses accounting for 88.6% of the sample and non-family businesses accounting for about 11.3%. As shown in table 5.3, half of the family businesses in the sample are located in developed countries, around 37% in developing countries

and just 13% in emerging countries. Almost half of the non-family businesses are located in developing countries, almost a third in developed countries and more than a fifth in emerging countries.

In the sample, the average age of family businesses is 23 years, and the average company size is 57. The average age of non-family businesses is 22, and the average size of non-family businesses is 83.

On average, about 30% of family businesses implemented product innovation before the crisis, about one-fifth implemented New to Market Product Innovation, and only 3.2% had innovation activities during the crisis. Among non-family businesses, on average, 25.3% implemented product innovations, 16.5% of non-family businesses implemented New to Market Product Innovation, and about 20% of non-family businesses implemented Internal R&D Investment. On average, only 2.9% of non-family businesses implemented innovation activities during the crisis.

On average, family businesses were 23 years old and the firm size is 57. On average, non family businesses were 22 years old and the firm size is 83.

Table 5.3: Sample breakdown by sub-sectors

Sub - Sectors	Obs (%)	Developing Country (%)	Advanced Country (%)	Emerging Country (%)	Firm Age	Firm Size	Product Innovation (%)	New to Market Product Innovation (%)	Process Innovation (%)	Internal R&D Investment (%)	External R&D (%)	External Knowledge Acquisition (%)
Family Firms	88.6	36.6	50.3	13	23	57	29.6	19.6	17.1	18.5	9	13
Non Family Firms	11.3	50	27.5	21.7	22	83	25.3	16.5	14.2	19	8.9	12.7

Table 5.3: Sample breakdown by sub-sectors (continued)

Sub-Sectors	Innovation during crisis (%)	Adaptability (%)	Firm Age	Firm Size
Family Firms	3.2	29.6	23	57
Non Family Firms	2.9	28.3	22	83

5.3.3 Methodology

A two-step process is followed to test the hypotheses proposed in Section 5.2. First, Propensity Score Matching (PSM) is implemented to match family-owned and non-family-owned firms to eliminate possible bias in the results due to differences in their underlying characteristics. Second, a series of Probit regression models are estimated to determine the adaptability of family-owned firms and non-family firms in response to COVID-19, and to estimate the moderating role of family governance, innovation activity and firm level management practices on family firms adaptability.

The reason for testing the hypotheses based on a matched sample is that family-owned and non-family-owned firms may differ significantly in various firm-level characteristics (Chang and Shim, 2015, Rehman et al., 2023). The fact that

family ownership is not randomly selected leads to the possibility that it may be difficult to produce unbiased estimates in comparing the ability of family firms and non-family firms in coping with pandemics due to endogeneity issues. The PSM helps to create a near-controlled experimental setting (Rosenbaum and Rubin, 1983). Both large and small sample theories show that adjustment for the scalar propensity score is sufficient to remove bias due to all observed covariates" (Rosenbaum and Rubin, 1983:46).

The propensity matching scores are obtained from a Probit model with family firms as the dependent variable. The independent variables are a set of control variables including firm age, firm size, city size, foreign ownership, exports, international markets, domestic markets, and industry fixed effects. Proximity matching and caliper matching is then applied using the STATA "PSMATCH2" command (Leuven and Sianesi, 2018), and following the work of (Monreal-Pérez and Sánchez-Marín, 2017) family-owned and non-family-owned firms are matched. A series of balancing property tests are conducted to ensure that the matching groups were balanced (see Appendix A13 for more on this). Based on this matched sample it is possible to test hypotheses H1, H2 and H4 using a probit estimation of equation (1) below.

$$\text{Adaptability}_i = \beta_0 + \beta_1 FF_i + \beta_2 PD_i + \beta_3 PC_i + \beta_4 NTM_i + \beta_5 IRD_i + \beta_6 ERD_i + \beta_7 EK_i + \beta_8 (FF_i \times PD_i) + \beta_9 (FF_i \times PC_i) + \beta_{10} (FF_i \times NTM_i) + \beta_{11} (FF_i \times IRD_i) + \beta_{12} (FF_i \times ERD_i) + \beta_{13} (FF_i \times EK_i) + \beta_{14} Co_i + \varepsilon_i$$

(eq 1)

Where Adaptability_i indicates whether the company has adapted its production to COVID-19 challenges or not. β represents the coefficients, FF_i is a binary indicator of whether firm i is a family business or not. PD_i indicates whether firm i engaged in product innovation or not. PC_i indicates whether firm i engaged in process innovation or not. NTM_i indicates whether firm i engaged in new to market innovation or not, IRD_i indicates whether firm i engaged in internal RD or not, ERD_i indicates whether firm i engaged in external RD or not, EK_i indicates whether firm i engaged in external knowledge acquisition or not. $FF_i \times PD_i$ is an interaction term used to verify the impact of product innovation on stimulating the adaptability of family-owned firms. $FF_i \times PC$ is used to verify the impact of process innovation on stimulating the adaptability of family-owned firms. $FF_i \times NTM$ is used to verify the impact of new to market innovation in stimulating the adaptability of family firms, $FF_i \times IRD_i$ indicates the impact of internal R&D innovation on stimulating the adaptability of family firms, $FF_i \times EK_i$ denotes the impact of external knowledge innovation on stimulating the adaptability of family firms, and Co_i is a series of control variables that may affect company i's adaptability and were previously outlined in Section 3.3.

Equation (2) below allows for the analysis of the impact of family management on the adaptability of family businesses and informs the analysis of H3. Equation (2) is

estimated using only family businesses, as the percentage of family involvement in management is only available for family businesses, i.e. where $FF_i = 1$.

$$Adaptability_i = \beta_0 + \beta_1 FM_i + \beta_2 PD_i + \beta_3 PC_i + \beta_4 Ntm_i + \beta_5 IRD_i + \beta_6 ERD_i + \beta_7 EK_i + \beta_{14} Co_i + \varepsilon_i \quad (2)$$

In this equation FM_i is the percentage of family involvement in management. All other variables are defined as in equation (1). Estimations controlled for country dummies.

5.4. Results

5.4.1 Primary Results

In this section, the results of the analysis are presented. Table 5.4 presents mean marginal effects with probability values and an indication of their statistical significance. Column 2 reports the baseline regressions examining the adaptability of family firms, and column 3 reports the augmented regressions which include the interaction terms. This table is applicable for Hypotheses H1, H2 and H4.

The empirical results show that family firms are better able to adapt their production to the challenges of a pandemic than non-family firms, supporting the acceptance of H1. All firms, irrespective of family firm status or not, that introduced incremental or new to market product/service innovation and engage in internal R&D activities were

better able to adapt their production to the COIVD-19 shock. Unsurprisingly, both family and non-family firms that engage in external knowledge sourcing activities were less likely to adapt their production. The root cause of this problem is probably linked to the increased challenges in external engagement caused by social distancing and strict lockdown measures.

However, across the interactions results presented in column 3 of Table 5.4, family firms that introduced an incremental product or service innovation prior to or during the COVID-19 pandemic were less adaptable in terms of production than family firms that did not introduce a product or service innovation. In other words, while introducing an innovation generally has a positive effect on a firm's adaptability prior to and during the pandemic, this is problematic for family firms and has a disruptive effect on their adaptability, relative to family firms that did not introduce an incremental innovation. This may be because family firms face unique challenges such as family conflicts, lack of professional management, and resistance to change, which hinders their ability to translate innovation premiums, which in turn impedes their adaptability to external shocks like the COVID-19 pandemic. However, family firms that invested in internal R&D and introduced a radical innovation, were more adaptable in the crisis. Family firms that invested in R&D and implemented radical innovations before the crisis may have been more agile to begin with and gained a competitive edge over those that adopted incremental improvements in the market, generating a new revenue stream improving their adaptability during COVID-19.

Therefore, H2 is only partially rejected. This research did not uncover any evidence of a favorable impact of effective management practices on the resilience of family or non-family businesses. Therefore, H4 is rejected.

Table 5.4: Marginal effects for equation (1)

	Adaptability	Adaptability (including interaction items)
Family firm	0.0777***	0.0797***
	(0.0105)	(0.0132)
Product innovation	0.0783***	0.161***
	(0.0126)	(0.0423)
Process innovation	0.00882	0.0334
	(0.0106)	(0.0368)
New to market innovation	0.0311**	-0.0484
	(0.0142)	(0.0422)
Internal R&D spending	0.0664***	-0.0262
	(0.0153)	(0.0359)
External R&D	-0.129***	0.00533
	(0.0135)	(0.0498)
External knowledge	0.0215	-0.0193
	(0.0131)	(0.0390)
Family firm*Product innovation		-0.0814**
		(0.0374)
Family firm*Process innovation		-0.0268
		(0.0358)
Family firm*New to market innovation		0.0931*
		(0.0514)
Family firm*Internal R&D spending		0.116***
		(0.0450)
Family firm*External R&D		-0.152***
		(0.0364)
Family firm*External knowledge		0.0448
		(0.0446)
Innovation in crisis	0.744***	0.791***
	(0.00510)	(0.00305)
Family firm*Innovation in crisis		-0.327***
		(0.00422)

Management practice	-0.00105	-0.0116
	(0.00520)	(0.0129)
Family firm*Management practice		0.0115
		(0.0130)
Loan	0.0134*	0.0138*
	(0.00738)	(0.00743)
Manager experience	-0.000194	-0.000189
	(0.000241)	(0.000243)
Location in capital or city with pop > 1 m	0.279***	0.281***
	(0.0254)	(0.0255)
Location in city with pop. 250 k–1 m	0.273***	0.274***
	(0.0291)	(0.0292)
Location in city with pop. 50–250 k	0.284***	0.286***
	(0.0301)	(0.0302)
Location in city with pop. 50–250 k	0.417***	0.418***
	(0.0290)	(0.0290)
Foreign involvement	-0.000590***	-0.000606***
	(0.000190)	(0.000191)
Firm size	0.00279	0.00283
	(0.00412)	(0.00415)
Firm age	-0.0228***	-0.0231***
	(0.00602)	(0.00607)
Exporting	0.000430*	0.000425*
	(0.000222)	(0.000223)
Competition	0.00585**	0.00570**
	(0.00230)	0.00232
International market	-0.0294*	-0.0283*
	(0.0161)	0.0162
National market	-0.0108	-0.0111
	(0.00801)	(0.00806)
Observations	18,140	18,140
Log likelihood	-9646.0681	-9635.0934
LR chi2(25)	2217.94	2239.89
Prob > chi2	0.0000	0.0000

Note:

(1)Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

(2) All models include country and industry effect

(3) Reference category is construction.

Table 5.5 shows the statistical results of model (2) which were tested only in the family firm sample. According to the results in column 2 of Table 5.5 there is a

positive relationship between family members' involvement in management and firm adaptability. Hence, H3 is rejected. This result is surprising, it appears that the interaction between the two subsystems, 'business' and 'family', did not create a conflict in the face of the crisis, but rather they were surprisingly aligned and worked together to make the family business more resilient to the crisis. In other words, during the crisis, a high percentage of family members took part in the TMT and showed a strong sense of responsibility and were able to create a dynamic pattern of adaptive growth. The second column of results shows a further investigation of the relationship between the proportion of family members involved in management teams and adaptability. When the proportion of family members in key management positions is over 75%, relative to the reference category of 25% of family members in key management positions, there is a positive relationship between family management and adaptability.

Table 5.5: Marginal effects for equation (2)

	Adaptability	**Adaptability**
Family management	0.000255**	
	(0.000117)	
Family management dummy(25%-49%)		-0.00617
		(0.0239)
Family management dummy(50%-74%)		-0.00522
		(0.0151)
Family management dummy(75%-100%)		0.0196*
		(0.0114)
Product innovation	0.0718***	0.0716***
	(0.0133)	(0.0133)

Process innovation	0.00632	0.00627
	(0.0112)	(0.0112)
New to market innovation	0.0401***	0.0404***
	(0.0153)	(0.0153)
Internal R&D spending	0.0887***	0.0889***
	(0.0172)	(0.0172)
External R&D	-0.151***	-0.151***
	(0.0141)	(0.0141)
External knowledge	0.0256*	0.0252*
	(0.0142)	0.0716
Management practice	0.000957	0.000775
	(0.00559)	(0.00559)
Innovation in crisis	0.734***	0.734***
	(0.00554)	(0.00554)
Loan	0.0126	0.0127
	(0.00788)	(0.00788)
Manager experience	-0.000176	-0.000166
	(0.000357)	(0.000357)
Location in capital or city with pop > 1 m	0.269***	0.270***
	(0.0269)	(0.0269)
Location in city with pop. 250 k–1 m	0.254***	0.255***
	(0.0308)	(0.0308)
Location in city with pop. 50–250 k	0.272***	0.274***
	(0.0318)	(0.0317)
Location in city with pop. 50–250 k	0.399***	0.400***
	(0.0308)	(0.0308)
foreign_owner	-0.000557***	-0.000582***
	(0.000209)	(0.000209)
Firm size	0.00318	0.00338
	(0.00447)	(0.00448)
Firm age	-0.0184***	-0.0185***
	(0.00680)	(0.00680)
Exporting	0.000411*	0.000407*
	(0.000239)	(0.000239)
Competition	0.00535**	0.00531**
	(0.00247)	(0.00247)
International market	-0.0316*	-0.0314*
	(0.0172)	(0.0173)
National market	-0.0135	-0.0133
	(0.00857)	(0.00857)

Observations	16171	16171
Log likelihood	-8745.1645	-8744.675
LR chi2(25)	1947.46	1948.44
Prob > chi2	0.0000	0.0000

Note:

(1)Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

(2)All models include country and industry effect

(3)Reference category is family management dummy (0-24%)

5.4.2 Robust Checks

Refer to Krammer (2022), to evaluate the reliability of the hypotheses, numerous supplementary indicators for adaptation derived from the follow-up surveys are employed. These proxies examine if firms have adapted or improved their business activities in ways other than production (“Did this establishment experience any of the following changes in response to the COVID-19 outbreak? “) or moved to a more online presence (“Started or increased business activity online?”), adoption of delivery or carry-out (“Started or increased delivery or carry-out of goods or services?”) and adoption of remote work (“Started or increased remote work arrangement for its workforce?”). Robustness tests (see Appendix A14 of supplemental documentation), which measure three additional indicators (online business, delivery and teleworking), further confirm the conclusion that family firms are more resilient than non-family firms in the face of a coronavirus pandemic. Please see supplemental documentation for a presentation of these analyses.

5.5. Discussion of The Hypotheses

The results show that family firms are more resilient than non-family firms in the face

of exogenous shocks such as pandemics, which is in line with previous studies (Salvato et al., 2020, Żukowska et al., 2021). As has been highlighted by Salvato and Moores (2010) and Le Breton-Miller and Miller (2020), family firms are better able to absorb exogenous shocks through quick and decisive strategic decisions due to their greater focus on preserving the long-term goals of the firm and their desire for continuity. While not directly observed by the measures utilized here, the findings lend support to the contention of SFBT that the family's unique human, social and financial capital forms a resource bundle that creates a resilience between the business and trading patterns during periods of stability, allowing them to remain solvent during shutdowns and to provide the emotional support needed to cope with shocks (Le Breton-Miller and Miller, 2022). In short, it is the 'family effect' or the particular 'familiness' of family firms that is likely to make them distinctive in the event of disruption.

The arguments that the resilience of firms in turbulent times depends on innovative factors in the existing literature Erdogan et al. (2020), Cefis et al. (2020) are supported in this study (Table 5.4). This reasoning is supported by dynamic capability, which reflects the ability of organizations to purposefully create, extend and modify their existing resource base (Helfat, 2007). This capability allows for the introduction of new product lines or services to update the nature of resources and facilitate innovation to better accommodate disruptions (Park et al., 2019). The ability to engage in internal R&D and to undertake radical (new-to-market) innovation, prior to

the crisis, were key factors that distinguished firms in terms of their ability to adapt their production processes. Family firms that are strong in these endeavors are already conditioned to long term strategies and hence perhaps are predisposed to better adapt in crisis periods. In contrast, family firms that introduce incremental innovations and innovated during the crisis were less adaptable which may signal more fundamental concerns faced by these firms such as a lack of competitive advantage, intense competition and perhaps confusion around the firm's main markets. Whilst there is partial support that innovation is important for family firms that innovative (Table 5.4) during the COVID crisis, the findings presented here still provide caveats to the previous findings of Kraus et al. (2020) and Marja ń ski and Sułkowski (2021), who identified innovation as a key factor for family firms to survive drastic market changes such as COVID-19. While innovation may be useful for the adaptability of all types of firms, the type of innovations introduced may signal fundamental weaknesses in the firms long run capabilities impacting adaptability in crisis periods.

Family firms relying on internal rather than external sources of knowledge are more adaptive in the face of pandemics which is in line with previous research (Baldwin and Di Mauro, 2020, Krammer, 2022). Reliance on external knowledge for innovation might shift a firm's essential R&D resources away from its core business (Colombo and Piva, 2012). When faced with the scenario of social lockdown, closure of business premises and universities, family firms that rely on external sources of knowledge for innovation are likely to find it difficult to adapt in a pandemic because

they do not have access to cutting-edge technologies. Therefore, family firms relying on internal knowledge sources for innovation have a better chance of adapting to pandemics such as COVID-19.

This study also challenges previous literature on the negative impact of a high proportion of family members in TMT on firm resilience in times of crisis (e.g. Filser et al., 2016, Chirico et al., 2019, Caloghirou et al., 2021). This study shows that family firms are more resilient to pandemics when the proportion of family members in the management team exceeds 75%. This may be explained by the fact that a higher proportion of family members in the management team implies a high degree of consensus in the family management team, avoiding inconsistent voices in the face of shocks that require quick decisions for the family's well-being (Casillas and Moreno, 2010). More family members in the TMT therefore increase the opportunities for proactive exploration in adapting to turbulent environments (Chirico et al., 2019).

What is perhaps surprising is that good management practices did not matter for family firms in the COVID-19 period, which conflicts with previous literature (Nemlioglu and Mallick, 2017, Ngoc Su et al., 2021). Other factors play a bigger role in explaining production adaptation during COVID-19. For instance, independent of management approaches, being a younger firm, having increased competitive pressure, being in urban areas, and having increased dependence on local markets enabled greater firm resilience.

5.6. Conclusion and Implications

The global spread of the COVID-19 pandemic has had significant economic consequences for economies around the world, with businesses across different sectors affected to varying degrees, including family businesses (Shafeeq Nimr Al-Maliki et al., 2023). Some scholars have argued that the story of family firms in crisis is complex (Bertschi-Michel et al., 2023, Dettori and Floris, 2023). This study has chosen a unique perspective to analyze the resilience of family firms in response to the COVID-19 pandemic based on data from a sample of firms from 21 countries drawn from the WBES and CEFS datasets.

In this study, the direct relationship between family ownership and adaptability is examined. The moderating influence of innovation activities (pre-pandemic and during the pandemic), management practices and internal governance on family firms' adaptability in the face of the pandemic are also analyzed. The study's key findings are as follows. First, family firms are more adaptive in the face of a pandemic than non-family firms. Secondly, while implementing an innovation and using internal knowledge sources generally have a positive impact on a firm's ability to adapt both before and during the pandemic, this innovation premium is beneficial for family firms only in the case of internal R&D spending and radical new to market innovations. Thirdly, management practices play a less significant role in the adaptability of family firms. Finally, as the proportion of family members in the management team increases, family firms adapted better in the pandemic. Based on

these insights, this study provides the following theoretical and practical implications, respectively.

5.6.1 Theoretical Implications

This study first helps to enrich previous research on the adaptive resilience of family firms in the face of exogenous shocks. Most of the literature finds that family firms are indeed resilient, yet the analysis of dimensions of resilience such as adaptability remains an under-explored area (Minichilli et al., 2016, Arrondo-García et al., 2016, Mzid et al., 2019). This study focuses on the adaptive resilience of family firms by capturing the response of firms in terms of production during a pandemic and lends empirical support for SFBT theory. While this study is not directly able to measure the impact of specific resources set out in SFBT, the findings suggest that family firms may be better able to mobilize human, financial, and social capital specific to the family when they face shocks. For example, this can occur through unique innovation and governance approaches, thus supporting family firms to overcome the negative effects of shocks triggered by financial constraints, labor shortages, and resource shortages (Basco, 2017, McDonald and Marshall, 2018). Thus, aside from the proxies of innovation and internal governance, future research should focus on whether specific SFBT family resources serve as a source of support for family firms to adapt in turbulent times, helping family firms to be better resilient in the face of external shocks such as pandemics.

Furthermore, this paper contributes to the almost non-existent literature on how innovation affects family firms' resilience in a pandemic period. Specifically, the mediating role of innovation on the resilience of family firms is assessed more broadly by dividing innovation activities according to a time dimension (incremental and radical innovations and process innovations implemented before the COVID-19 pandemic and innovation activities implemented during the pandemic) and according to innovation-dependent knowledge source activities (internal innovation investments and external innovation investments). This study responds well to Leppäaho and Ritala (2022) call for future research to determine which types of innovation enabled family firms to survive the pandemic. The findings here show that the implementation of R&D activities and radical product/service innovations by family firms before the crisis led to better adaptability. According to Schumpeter (1942), habitual innovators who innovate before a crisis follow a set technological trajectory and develop the innovation into their routine, a process known as creative accumulation (Archibugi et al., 2013). Creative accumulation is independent of the business cycle and prevents the entry of newcomers in the market (Malerba and Orsenigo, 1995). Thus, despite the dramatic changes in market structure and customer demand caused by the pandemic, innovative family firms with long term innovation strategies may have the resilience to adapt to major environmental changes.

However, this study challenges the prevailing view that all types of innovation are a key strategy to help family firms adapt to crises (Bauweraerts and Colot, 2013,

Calabrò et al., 2021, Chaudhary et al., 2021). Family firms that introduced incremental innovations and attempted to innovate during the crisis were less successful in translating this innovation premium to adaptability gains. This is not to deny the role of innovation in family firms' adaptability in the face of a pandemic, but to reveal that the type of innovation matters and that there are perhaps more important factors outside of innovation activities, that influence family firms' adaptability in the face of exogenous shocks.

This study extends the current debate on the importance of interval versus external knowledge for family firm resilience in times of crisis. While most of the literature highlights that unique social capital traits and reliance on external sources of knowledge will help family firms to innovate effectively and improve resilience in times of crisis, this finding does not apply when family firms face a pandemic (Grigoriou and Rothaermel, 2017, Zouaghi et al., 2018, Garcia Martinez et al., 2019). The nature of the external shock (i.e., COVID-19) suggests that this finding is likely to be specific to this case, as the government-imposed lockdowns in response to the pandemic resulted in the closure of business premises, schools, and universities, as well as disruptions to global value and distribution chains.

The empirical findings respond to Dolz et al. (2019) call for more research on family management to improve our understanding of the positive relationship between family governance and firm resilience in crisis contexts. Previous research highlights the

positive impact of good management practices on firm performance and greater adaptability (Agostini and Filippini, 2019, Santoro et al., 2021). In family firms, the desire to retain family management is met by selecting managers from family members only through primogeniture, leaving family firms with a lack of diversity in ownership, resulting in their lack of knowledge of potential talent management (Bloom and Van Reenen, 2007). Whilst management practices were not a differentiating attribute impacting adaptability in this paper, the configuration of high proportions of family members in TMT is a pathway to adaptive excellence in family businesses. Based on agency theory, a high proportion of family members in the TMT increases "the collective expertise of the ownership coalition", thereby increasing monitoring capabilities and reducing agency costs, which leads to faster decision making and rapid adaptation when they face turbulent environments (Buchanan et al., 2023). In this study, more than 75% of family members in the TMT were found to increase the resilience of family firms in the face of crisis.

5.6.2 Managerial and Policy Implications

To begin with, family managers need to have faith in the advantages of long-term innovation planning, as the introduction of radical innovations results in a substantial premium in adaptability. Secondly, the findings may help family managers to identify where to focus their attention on acquiring sources of knowledge to better adapt to exogenous shocks. Specifically, family firms' increased investment in internal R&D to build up internal resources can be an insurance policy against future exogenous

shocks. Third, this research also suggests that it is beneficial for family firms to allow more than 75% of their family members to be on the management team when faced with exogenous shocks. For policy makers, initiatives that support innovation in family firms are worth pursuing. For example, government subsidies and tax breaks to stimulate innovation in family firms are likely to improve the resilience of family firms in the face of exogenous shocks.

5.7. Limitations and Future Research

This study suffers from several limitations. First, while the study has investigated the resilience of family firms, the direct features underlying their SFBT ability to adapt to pandemics such as COVID-19 are unclear, due to a lack of SFBT specific variables (i.e. the unique human, social and financial resources in family firms). Conducting research in the future to examine the internal mechanisms that activate family firm resilience specifically through the lens of SFBT would be valuable in expanding the current knowledge on family firm resilience, particularly in relation to external disruptions like the COVID-19 crisis. Second, this study only included family firm resilience at the onset of a pandemic. How the behavior of family firms may evolve after the pandemic which represents a promising direction for future research.

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Chapter 6: Conclusions

6.1 Introduction

This PhD examines the performance outcomes of family firms in the field of family business research. It highlights (i) the heterogeneity in innovation performance between family and non-family firms and subsequently analyses the role of innovation in terms of the (ii) internationalization of family firms and (iii) the resilience of family firms in the face of the COVID-19 pandemic. In terms of the heterogeneity of innovation performance, This PhD focus on the differences between family firms and non-family firms in their R&D investments and innovation outputs (measured as product and process innovation) to provide a fine-grained analysis of different innovative outcomes in family businesses. Next, I consider the impact of family firm innovation on internationalization behavior, thus helping to unravel the nature of the relationship between family firms and internationalization. Finally, my research turns its attention to the performance of family firms in terms of their resilience in the face of external shocks, in order to determine the ability of family firms to respond to and capitalize on disruptions caused by environmental change, providing constructive responses that are critical to the long-term sustainability of family firms. All of this is accomplished through the utilization of data from the World Bank Enterprise Survey (2019-2020) as well as the COVID Follow-up Survey (rounds 1-3). Throughout the PhD I apply advanced econometric techniques and analytical methodologies to explore the three main research questions presented in Chapters 3 through 5. Specifically, the methodologies employed consist of a series of Probit models, Tobit models, and Propensity Score Matching (PSM) estimations.

Chapter 2 of this PhD has presented as discussed of existing literature in the area of familiness, common theories applied to family business research, and manifestations of familiness in firms. Chapter 3 delves into the differences between family firms and

non-family firms in terms of innovation inputs and outputs, exploring the moderating role of market competition and family governance. Chapter 4 investigates the internationalization behavior of family firms and the mediating role of innovation in the internationalization of family firms. Chapter 5 investigates the resilience of family firms in the face of COVID-19 and further assesses the moderating role of innovation, management practices and family governance on family firm resilience. This final chapter, Chapter 6, describes the main research questions addressed in each empirical chapter and summarizes the main findings of this work. I then present recommendations for policy-making based on these findings. Finally, I discuss the limitations of this work and suggest directions for future research.

6.2 The Research Problem

Family firms, being the most ancient form of business organization, currently play a crucial role in generating wealth in both emerging and developed economies (Ingram and Głód, 2018; Ramadani *et al.*, 2020). Among firms, innovation is an essential source of competitive advantage and contributes to their ability to grow and survive (Crossan and Apaydin, 2010; Klette and Kortum, 2004; Leiponen and Helfat, 2010). Similarly, innovation is crucial for family firms (Cesaroni *et al.*, 2021), and its importance deepens with its ability to enhance the sustainability of the firm over successive generations (Ahmad *et al.*, 2021; Rondi *et al.*, 2019; Zellweger *et al.*, 2012b). In the field of family firms, many researchers have suggested that family involvement in management and ownership may affect firm innovation (Cucculelli and Peruzzi, 2020; Hughes *et al.*, 2018; Kellermanns *et al.*, 2012; Llach and Nordqvist, 2010; Scholes *et al.*, 2021). However, this influence, and how it occurs in conjunction with other drivers, has not been clearly defined in the literature, with studies returning mixed results (Calabrò *et al.*, 2019; De Massis *et al.*, 2013; Hu and Hughes, 2020). Röd (2016; p.198) even describes this familial influence as a "double-edged sword" that may create advantages and disadvantages for family firm innovation. Therefore, researchers should aim to unravel the black box of the "family

innovation dilemma", as discussed in this study, relates to the innovative activities of family firms and the impact that innovation has on internationalization and resilience in relation to other factors (e.g., competition, family governance, management practices).

Innovation has a crucial role in fostering competition and enhancing the efficiency of dynamic markets (Howitt, 2007). In the current dynamic global markets, companies that possess robust competitive advantages are more likely to endure and attain exceptional success (Edeh *et al.*, 2020). One of the most interesting paradoxes in family business research is innovativeness. Specifically, on the one hand, there is the traditional vision of family firms as less inclined to innovate as a result of their conservative organizational views and resistance to risk (Hu and Hughes, 2020). On the other hand, innovation decisions are consistent with family firms' survival instincts and typical concern for long-term continuity (Sirmon *et al.*, 2008). Given this dichotomy in how family agendas are likely to influence the innovative behavior of family firms, this study explores the innovative behavior of family firms in Chapter 3 and assesses the role of internal family governance as well as the impact of external stimuli (competition) on innovation.

Innovation and internationalization have been identified as critical strategies for the survival, growth and competitiveness of small and medium-sized enterprises (SMEs) (Freixanet *et al.*, 2021). While innovation and internationalization are closely connected strategic actions (Ipek and Bıçakcıoğlu-Peynirci, 2020), there have been limited studies that have examined these phenomena specifically in family businesses (Lin and Wang, 2021). Internationalization decisions present managerial challenges due to the high levels of unpredictability, risk, and the complexity of the activities associated with operating in foreign markets (Clercq *et al.*, 2005; Hsu *et al.*, 2013; Li *et al.*, 2018), and family SMEs have restricted financial and managerial resources to carry out worldwide activities (Merino *et al.*, 2015). Hence, engaging in innovative

activities can significantly contribute to the success of international operations by fostering organizational rejuvenation, enhancing competitiveness, and growth (Lisboa *et al.*, 2011). Also engaging in innovation can facilitate companies in developing innovative products or processes that aid in overcoming the obstacles of accessing overseas markets (Saridakis *et al.*, 2019). However, the literature does not provide conclusive evidence on the internationalization impact of innovation in family firms (Love and Roper, 2015). With this in mind, Chapter 4 examines the exporting behaviour of family firms and the role of innovation in mediating the internationalization of family firms.

Given the current global healthcare, political, and climate crises, family businesses are confronted with fresh obstacles that necessitate organizational resilience in order to recover from adversity and adapt to a new organizational landscape (Koronis and Ponis, 2018). Certain family-owned businesses have not only endured but even prospered throughout periods of crisis whereas others have experienced considerably less achievement (Bertrand and Schoar, 2006). This prompts the inquiry: for what reason? What factors contribute to the enhanced resilience of certain family businesses in dealing with adversity, stress, or unforeseen circumstances? First, the positive correlation between innovation, family firm performance and overall economic growth has long been known from a long-term growth perspective (Park *et al.*, 2019; Trinidad, 2018). However, whether innovation has an impact on family firm performance during recessions remains understudied. Given that recessions are characterized by a sudden and severe contraction in demand that leads to dramatic changes in market patterns, it is unclear whether the findings from normal times can be generalized to periods of adversity. Moreover, adequate studies cross-sectional investigations of HRM and non-family firms in the context of crisis (Edvardsson and Durst, 2021) emphasize the operational capabilities of HRM in helping to manage crisis in non-family firms. On the other hand, in response to the economic downturn, firms have generally adopted cost-cutting measures such as layoffs, salary reductions,

hiring freezes, training reductions, stringent performance management, or layoffs, which have improved their ability to cope with the crisis (Wang *et al.*, 2009). However, in family business research, due to family firms focusing more on social emotional wealth protection, relying more on social networks in human resource management practices, focusing more on informal training, and using more informal evaluation systems than formal annual assessment procedures this can lead to HRM becoming a sensitive area in family business research (Morgan and Gomez-Mejia, 2014). It is not yet clear what the impact of management practices on the resilience of family firms is when they experience adversity. Therefore, considering the above points, the resilience of family firms in coping with a specific shock, in this case the Covid-19 pandemic, is analyzed in Chapter 5. With a specific focus on the interaction of firms' innovation performance, management practices and family governance and how these stimulate resilience in family firms.

6.3 Key Findings of This PhD

6.3.1 Key Findings

An important theme running through this study is the role of family ownership in influencing the performance of family firms, especially innovation-related behaviors. The study first broadly examines the performance of family firms implementing different innovation activities, relative to non-family firms, such as R&D investments, product innovation, process innovation and knowledge acquisition. It also considers the moderating effects of competition and family governance on the adoption of innovation activities by family firms. Subsequently, the study also explores the impact of family ownership on the internationalization of family firms and how innovative activities stimulate the internationalization behavior of family firms. At the same time, this study investigates the impact of family ownership in terms of resilience when exposed to external shocks such as pandemics. Further research emphasizes the moderating role of innovation, management practices and family governance.

Chapter 3 investigates the role of family ownership in influencing the implementation of innovative activities in family firms and the role of market competition and family governance in moderating the implementation of innovative activities in family firms. The main findings of Chapter 3 are (i) family firms are more likely to implement innovation activities; (ii) family member involvement in top management positions reduces innovation; (iii) competition has a positive moderating effect on the innovation activities of family firms.

Chapter 4 examines the export propensity and intensity of family and non-family firms and to analyse the mediating effect of innovation (product and process innovation) on their exporting behaviour. This study finds that (i) family firms are more likely to internationalize than non-family firms, (ii) innovative firms are more likely to internationalize than non-innovative firms, and (iii) innovation is equally important for internationalization outcomes in both family and non-family firms.

Chapter 5 investigates the resilience of family firms in the face of the global challenge such as: COVID-19 pandemic, and to identify the moderating role of innovation, management practices and family governance in explaining their resilience. The study's findings demonstrate that family businesses were more able to adjust to the COVID-19 shock, than non-family businesses. Family firms that undertook internal R&D investment and implemented new to market product (radical) innovations before the COVID-19 outbreak exhibited greater resilience. Family firms that introduced new to firm product innovation (incremental) innovations, external R&D expenditure and attempted to innovate during the crisis were less successful in translating this innovation premium into adaptability gains. High family involvement in governance is a pathway to adaptive excellence in family firms.

6.3.2 Discussion

Given the key findings above, family firms outperform non-family firms in terms of innovation, internationalization and resilience, overturning the view highlighted in previous literature that family firms are conservative and rigid. On the one hand, Chrisman and Patel (2012) explained that if the family's long-term goals for organizational continuity and strong intergenerational control are given sufficient importance, they will positively introduce Risk-related innovation activities such as invest more in R&D or internationalization. Second, the social capital of family firms plays a powerful role in facilitating knowledge exchange and sharing, thus promoting innovation and internationalization（Arregle et al., 2007）. Specifically, The deep connections that individuals establish in family businesses with other members of close-knit communities, like families, are a source of internal or external social capital (Marsden and Campbell, 1984; Adler and Kwon, 2002). The rich social capital inherent in family businesses enables them to acquire more contacts and improve their knowledge absorption capacity (Carney, 2005). Thus, their social capital becomes an important part of translating external knowledge into innovative performance and facilitating family firms to tap into international expertise and host country networks (Basly, 2007; Cheong et al., 2015). Finally, when disaster strikes, familial ties activate critical supportive procedures that "enable the family system to come together in times of crisis, buffer stress, reduce the risk of dysfunction, and support optimal adaptation" (Walsh, 2003; p.3). It is also the active implementation of innovative activities, especially internal R&D investment and radical innovation, in the stable period of family enterprises, which become the conditions for family enterprises to have long-term strategies and successfully adapt to external shocks.

In the empirical study of Chapter 3 and Chapter 5, it is found that family governance plays a different role in the performance of family firms in the stable period and the turbulent period. Although too many family members are involved in the management team may stifle some innovation activities during periods of stability. But how to

manage external shocks in the face of turbulence in the external environment largely depends on the family that owns and/or manages the business (Lumpkin and Brigham, 2011). Because of the overlap of family wealth and firm’ s wealth, family wealth continuity has become the primary task of family business (Martin and Gomez-Mejia, 2016). Too many family members involved in management can provide a buffer for families and businesses in times of crisis by providing strategic flexibility, a less formal decision-making process, and the ability to react quickly (Danes et al., 2008).

6.4 Theoretical Implications

Chapter 3 makes three great contributions to family firms innovation literature. This study first enriches existing knowledge on the relationship between innovation and the ownership and management dynamics of family firms. By providing strong empirical evidence on the innovativeness of family firms, this study provides empirical support for the application of resource-based theory to the study of different innovative activities in family firms. Secondly, this study critically suggests that prior findings in the literature on the low investment in innovation in family firms are likely to manifest themselves through the dynamics and composition of firm management. Finally, this study responds to Park et al. ‘s (2019) call to fill the knowledge gap at the intersection of the external environment and family firm research fields by exploring the role of market competition in inhibiting or facilitating family firms’ innovative activities. The findings of this study contribute to understanding the behaviour of family firms and non-family firms in today's competitive industry environment.

Chapter 4 is conducive to further reconciling the contradictory conclusions in the previous literature on the exporting behavior of family businesses. The proactive export behavior of family enterprises may stem from their familiness characteristics. This is because family enterprises benefit from enduring common values, norms and beliefs, which help to establish and shape social capital advantages and distinguish

them from other enterprises. Secondly, this study is conducive to leveraging the theoretical literature based on resources and empirical research to expand the research on areas that have not been fully explored, such as family enterprises, innovation, and internationalization. The results of this study imply that innovation is equally important for the internationalization behaviors of both family enterprises and non-family enterprises. This further proves that the unique family characteristics of family enterprises may be the reason for the differences in export behaviors between the two types of enterprises.

The contribution of chapter 5 cross two perspectives. The findings provide empirical support for the SFBT theory. While this study cannot directly measure the impact of the specific resources proposed by SFBT, our findings suggest that family firms may be better able to mobilise family-specific human, financial and social capital in the face of shocks. This can be achieved, for example, through unique innovation and governance approaches that can help family firms overcome the negative impacts of financial constraints, labour shortages and resource scarcity (McDonald and Marshall, 2018).

The contribution of Chapter 5 goes beyond existing qualitative evidence by assessing the broader role of innovation as a driver of resilience in family firms, including the temporal dimension of innovation activity and activities that rely on innovative sources of knowledge (Cucino et al., 2023; Leppäaho and Ritala, 2022; Soluk et al.) . This study responds well to Leppäaho and Ritala's (2022) request for future research that identifies the types of innovations that enable family firms to survive the pandemic. This study challenges the prevailing view that all types of innovation are key strategies to help family firms adapt to the crisis (Calabrò et al., 2021; Chaudhary et al., 2021). The findings of this study suggests that the type of innovation matters and that there may be more important factors than innovation activity that influence the adaptive capacity of family firms in the face of external shocks.

6.5 Recommendations for Practitioners and Policy Makers

In light of the above discussion, this section provides a summary of key implementations of practice and policy based on the research in Chapter 3-5.

6.5.1 Implications of This Research for Practitioners

Chapter 3 demonstrates the role of family ownership in influencing family firms in implementing some specific innovative activities. The results of this study enable us to confirm that family firms are innovative, especially in terms of product innovation, process innovation and R&D investment. Therefore, family firm managers and owners should strongly support family firms in implementing such innovative activities that can become their unique differentiation advantage over non-family firms, thus helping family firms to become more competitive. Additionally, it is crucial for managers and owners to recognize the negative effects of excessive family involvement in the internal management structure of the firm on innovation. This study specifically highlights that a significant involvement of family members in key managerial roles might detrimentally affect the innovation of an organization. It is advisable for managers and owners of family firms to exercise caution when it comes to having too many family members in the management team. According to this study, keeping more than 50% of family members in the management team may result in a detrimental impact on many indicators of innovation. Hence, the implementation of a non-family CEO or the inclusion of a specific proportion of non-family managers is a crucial governance strategy to mitigate potential nepotism and consequently enhance the innovation capacity of family-owned businesses (Ceipek *et al.*, 2021). Non family members can significantly enhance the knowledge pool of the family business by introducing fresh perspectives derived from their non-family background. They can also change the thinking tendencies of the business and thus expand cognitive diversity, which will help to resolve conflicts and improve managerial expertise (Sonfield and Lussier, 2009). Previous study reveals that family enterprises led by

professional and independent non-family managers place a larger emphasis on disruptive technologies and radical breakthroughs, which enhances the firm's potential to innovate (Lazzarotti and Pellegrini, 2015).

From an internationalization perspective, Chapter 4 demonstrated that family ownership as an advantage contributes to family firms being more likely to internationalize than non-family firms. Therefore, family managers or owners need to understand that family influence can be positive in terms of internationalization. One thing to be careful of is that this positive effect disappears when family influence is too high (Calabrò *et al.*, 2009). For instance, previous study confirmed that after family ownership reaches a particular threshold, family businesses tend to exhibit risk aversion and stubbornness (Sirmon *et al.*, 2008) and that family ownership disadvantages prevail (Sciascia *et al.*, 2012). Therefore, considering that internationalization is a catalyst for growth and entrepreneurial conduct, family businesses with a growth-oriented mindset should establish a board of advisors (legally non-compulsory), comprising domain experts, who can contribute novel ideas to the company (Mitter *et al.*, 2014). In other words, 'outsiders' (i.e. external managers) may be a factor for the long and sustained success of a family business, and this knowledge needs to be disseminated within the family firms.

From a resilience perspective, Chapter 5 demonstrates the positive role of family ownership and resilience when exposed to external shocks. It also emphasizes the positive relationship between innovation (product innovation, internal R & D investment) and family governance with family resilience. This study therefore provides family business owners and managers with priorities on how to prepare for unexpected crises in order to better protect the continuity of the family business. Specifically, on the one hand, increased internal R&D investment by family firms to accumulate internal resources can serve as an insurance policy against future exogenous shocks. On the other hand, keeping up with continuing innovation creates

a supportive environment for firms to better cope with exogenous shocks, and therefore it is also crucial for managers to encourage their employees to think outside the box and thus contribute to the introduction of new products and services. In addition to this, theoretically, there are reasons for this study to believe that the internal resources of family firms are resilient and can provide a buffer for the family and the firm in times of crisis. Therefore, the family manager or owner can set up a centralized steering team consisting of members of the family with rich human, financial and social resources in the management team and activate it only when a crisis occurs. This ensures that in the event of a crisis, the family business has immediate access to any private resources that can be utilized to help the business better cope with the crisis and challenges posed by dynamic and adverse environmental developments.

6.5.2 Implications of This Research for Policymakers

Chapter 3 shows the key role that family firms play in innovation, especially in terms of external knowledge acquisition. Given that innovation is a crucial determinant of competitive advantage for family businesses, it is vital to comprehend the innovative behavior of these firms and devise strategies to assist them in enhancing their innovative performance. Given the significant role of family businesses in economic development, it is crucial for policies to guarantee the inclusion, representation, and provision of information to family businesses regarding all available research and innovation funding (Andersén, 2015). Hence, any assistance that may enhance the connections between family-owned businesses and external institutions, allowing them to utilize the knowledge from universities and research institutes, has the potential to enhance innovation performance without compromising the objectives of the family (Aiello *et al.*, 2021). Furthermore, given that family firms are more likely to acquire knowledge from external sources, implementing policies that offer family firms access to external consultants is an additional ways for them to effectively acquire external knowledge. Furthermore, the results indicate that the influence of

external competitive factors on the innovative behavior of family firms is similar to their impact on non-family firms. We identify that higher levels of competition hinder the achievement of innovative outcomes in both types of companies. Therefore, in contrast to popular policy narratives, efforts to maximize competition may not provide favorable results in terms of enhancing innovation outcomes. An alternative approach would be to acquire knowledge of partners' strategic initiatives and access to complementary resources (Quintana-García and Benavides-Velasco, 2004). Policies should therefore aim to strike a balance between promoting competition and fostering cooperation acts that can enhance firms' innovation performance (Park *et al.*, 2014).

Chapter 4 demonstrates that family firms have greater export potential. Therefore, any export-friendly, sound institutional environment in policy is effective (Lapeira *et al.*, 2024). For example, providing family firms with more effective property and patent protection, and safeguarding intellectual property rights and contractual performance required for outsourcing are key internationalization enablers (Zhou *et al.*, 2019). Second, policies are needed to address the pursuit of SEW by family firms so they can further develop their 'familiness' advantages (Scholes *et al.*, 2016). Specifically, instead of providing generic support based on the expertise of bureaucrats, policymakers should establish communication with export company executives to design new and innovative export promotion policies tailored to the characteristics of international markets (Sharma *et al.*, 2018). This study supports the recommendations raised by Seringhaus and Botschen (1991) that international entrepreneurs require more customized and targeted programs as well as involvement in the design process of export promotion policies. In addition, policymakers should provide different export promotion policies according to the needs of enterprises in different industries. Given that this study finds that innovation is equally important to family and non-family firms, asymmetric policies related to innovation are not required. Better use of public funds to realize a range of export programmes, in particular, investment in programs that support businesses in innovation-related activities such as Innovation

Vouchers and Smart Awards and Knowledge Transfer Partnerships have been proven support levers (Jibril and Roper, 2022).

Chapter 5 identifies that innovation has a positive effect on the resilience of family firms, therefore, initiatives that support innovation in family firms are worth pursuing as they should also boost resilience. For example, government subsidies and tax breaks to stimulate innovation in family firms are likely to improve the resilience of family firms in the face of exogenous shocks. Second, in terms of innovation from a long-term perspective, policymakers can establish contractual relationships for enterprises and facilitate resource exchange between enterprises and between enterprises and institutions (e.g., research institutes, universities) to achieve the sharing and reuse of common methods and technologies, as well as the exploration of new avenues for overcoming key technological problems. Therefore, through this interaction between enterprises, universities and research institutes, each business unit can easily access company-wide resources to promote the development of its own business, thereby maximizing the company's overall technical capabilities.

6.6 Towards A Future Research Agenda in Family Firms.

6.6.1 Limitation

Although this PhD provides valuable insights into family businesses in terms of innovation, internationalization and resilience, it must be acknowledged that this PhD still has some data limitations. First, due to the data insufficiency, this PhD is unable to take inter-generational analysis into account in the research. Previous studies have acknowledged that the degree of family influence on the firm changes with generational change, which further affects the strategic behavior and performance of family firms (Cruz and Nordqvist, 2012). As ownership shifts from the founding generation to the successor generation, family influence, family bonding and

identification with the firm will be weakened, which leads to the successor family managers weakening the consideration of SEW when making decisions (Le Breton-Miller and Miller, 2013). In other words, the family managers of the second generation will prioritize economic goals over non-economic goals when making strategic choices (Gomez-Mejia et al., 2010). This means that innovative activities with high risks but beneficial to the survival of the enterprise and the acquisition of more competitive advantages, and internationalization behaviors will be prioritized by the second generation of family enterprises (Fang et al., 2018). Meanwhile, Hillebrand (2019) emphasizes that the next generation of family businesses is more sensitive to changes in the external environment than the first generation of family businesses, and this environmental change has a stronger driving force for innovation in the next generation of family businesses than in the first generation. The participation of the next generation of managers often improves the family business's ability to analyze the competitive environment and identify opportunities for innovation (Woodfield and Husted, 2017).

The second critical but unaccounted data limitation is financial slack. Previous research has emphasized financial slack as an important resource that can help firms provide buffers and greater flexibility in adverse dynamic environments, mitigate resource constraints due to economic shocks, facilitate business transformation, and increase investments in R&D to promote innovation (Greve, 2003; Fang et al., 2008; Bradley et al., 2011; Chakrabarti, 2015). For family firms that value SEW preservation, it is more likely to build more financial redundancy, which helps family firms adapt to changes more successfully when encountering major shocks or global changes. Given that the fifth chapter of this PhD focuses on the research of family firms' resilience in the face of crises, this limitation will become particularly prominent.

Finally, as highlighted in previous family business literature on the role of the external environment, certain features of the national institutional environment, such as the level of regulation and the degree of market development, can have a powerful influence on family business behaviour and outcomes (Peng and Jiang, 2010; Mengoli et al., 2020). In particular, for those firms that have implemented internationalisation, the internationalisation mode is largely influenced by the home country environment parameters such as the strength of formal institutions (Marano et al., 2016). Meanwhile, the quality of governance at different levels affects the ability of enterprises to withstand external shocks such as COVID-19. For example, during the pandemic, the United States and China adopted different epidemic management models in the financial market, advanced financial intermediaries and financial markets can mitigate the impact of the pandemic and ease capital constraints (Hu and Zhang, 2021). Therefore, one data deficiency that must be acknowledged is the lack of data measuring a country's characteristics such as regulation (ie. business regulations, IP regulation) in the home country and the quality of governance index.

6.6.2 Future Research Agenda

Although, family enterprises are more inclined to engage in external R&D innovation and have greater possibilities in innovation output, we do not conduct in-depth analysis in this study on whether family enterprises achieve good innovation performance by absorbing external knowledge (such as establish R&D contracts with external research institutions or the purchase patents). Therefore, future research could further focus on the mediating role of external knowledge acquisition in family firms and innovation output. Additionally, due to the limitations of the dataset used in this thesis, in examining the impact of market competition on the innovative behavior of family firms, this study only chooses a single measure (the number of competitors in the same industry) to measure the moderating effect of market competition on the innovation of family firms. However, since our findings do not indicate a clear linear relationship between the two, this implies a complex relationship between

competition and innovation. Therefore, future research could measure the level of competition from different aspects such as the industry concentration index (Hoberg and Phillips, 2016) or the Lerner index (Aghion *et al.*, 2013) to obtain more detailed insights into this relationship.

In addition, this paper only examines the innovative behaviors of family firms and non-family firms from the perspective of the whole firm. Our study does not emphasize the internal mechanisms such as unique resources that drive the implementation of innovation activities in family firms, but this is still an open question, and we are interested in understanding how the internal mechanisms of family firms affect innovation inputs as well as outputs. For instance, a analysis conducted by Duran *et al.* (2016) found that family firms invested less in innovation than non-family firms, but had higher innovation outputs).

Although our study finds that family firms are more likely to internationalization, our data (which is common in this type of research) limits the path we can take to explore the underlying mechanisms associated with specific 'familiness' endowments. Therefore, more empirical work in the future should attempt to further explore how family firms initiate their internationalization strategies, using the lenses of SEW, family management dimensions, family network relationships, etc. Secondly, the four dimensions of SEW (family legacy maintenance, family control decisions, family relationship recovery, and affective decisions), family management dimensions, and family network relationships are not the only ones that are relevant to family firms' internationalization strategies. Future research could also describe more richly the specific nature of the interrelationships between SEW, networks, and innovation, revealing how non-economic/emotional and economic/rational decisions and goals manifest themselves in practice. Moreover, the literature raises questions regarding the correlation between specific family business traits and goals, and the successful strategies for de-internationalization and re-internationalization.

There is also a lack of studies investigating the location (host country) choice of family firms. However, scholars of SME internationalization have shown that firm-specific resources and institutional settings have an integrated impact on location selection decisions. For example, German SMEs show a preference for developed nations over developing countries when the level of knowledge intensity is high (Huett *et al.,* 2014). This preference is driven by their motivation of market-seeking and resource-seeking (Huett *et al.,* 2014). This is because there are fewer concerns related to knowledge exclusivity in developed economies with advanced institutions. However, their preferences change as international experience increases. Future scholars might utilize this research to investigate the decision-making process of family-owned SMEs when (a) selecting suitable foreign locations by exploring various "distances" (e.g., geographic, cultural, linguistic, and psychological) (Baronchelli *et al.*, 2016; Bettinelli *et al.*, 2019), and (b) considering resource, related, and psychological factors (Baronchelli *et al.*, 2016; Bettinelli *et al.*, 2019). and (c) entry mode choices (e.g., exporting, acquisitions, and strategic alliances) that take into account resources, associated costs, speed of entry, and partner characteristics.

In order to expand the study into how family firms internationalize, scholars in the field of family businesses (Berrone *et al.*, 2012; Kotlar and De Massis, 2013) have outlined a few goals that family firms can strive for. These include: financial family goals, non-financial family goals, financial non-family goals and non-financial non-family goals (Cabrera-Suárez et al., 2014; Debicki et al., 2016). Financial family objectives are associated with family control and family well-being, nevertheless non-financial family goals are associated with harmony within the family, reputation, and identity (Chrisman et al., 2012). Financial non-family objectives are tied to business expansion, longevity, and profitability, whereas non-financial non-family goals are related to internal peace and external relations (Farrington et al., 2011).

Future research could investigate which goals are emphasized by family firms when they decide to internationalize or re-internationalize.

Indeed, our findings are general, and there remain a number of pressing issues to be addressed. For example, what is the role of transnational networks involving multiple social ties (family, economic, social, organizational, religious and political ties across national boundaries) in the internationalization of family firms is still unknown. And how do environmental factors (domestic reforms, global economic and technological disruptions) and family factors (entrepreneurially oriented mindset of family influencers, family SEW, presence of network ties, divisive biases, and nationalism) in home and host countries affect the internationalization of family firms are also promising areas of research.

In research on family business resilience, although our study investigated the resilience of family firms, the direct characteristics behind the ability of family firms to adapt to epidemics such as COVID-19 are unclear due to the lack of family firm-specific variables (i.e., the unique human, social, and financial resources of family firms). Conducting future research, particularly through the lens of Sustainable Family Business Theory, to examine the internal mechanisms that activate family firm resilience would be valuable in expanding current knowledge on family firm resilience, particularly in relation to external disruptions such as the COVID-19 crisis (Czakon *et al.*, 2023). More precisely, when a family's capital assist a company in overcoming a crisis, that crisis can also serve as a catalyst for the growth of certain resources, particularly social capital (interactions with external players) (Mihotić *et al.*, 2023). Social capital includes both local and international connections, plays a significant role in providing emotional support to family enterprises during challenging periods. Additionally, it serves as a valuable resource for offering strategic opportunities locally (Mzid *et al.*, 2019). We expect future research will reveal further bonuses of international ties, such as enhanced access to global

prospects, enabling local businesses to counterbalance market downturns. Second, future research could compare family and non-family firms to examine whether there are differences in the benefits of their international linkages that contribute to their resilience (Fourné *et al.*, 2023).

Finally, strongly resilient family firms operating in dynamic and changing environments cannot exist without the guidance of an entrepreneur. In other words, it is reasonable to conjecture that good adaptive resilience depends not only on the nature of what makes a family business unique but also on the ability of the entrepreneur behind the family business to act resiliently and his/her ability to transmit this attitude to his/her employees (Amaral and Da Rocha, 2023). This means that future family business research should spend time studying the internal mental attitudes of family entrepreneurs, in which case the focus should be on studying the tendency of family entrepreneurs to increase the search for alternatives and creative solutions to overcome problems, and how the development of a strong ability to react in unfavourable conditions is worth considering (Amaral and Da Rocha, 2023).

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APPENDIX I: Research and Innovation and The Role of Competition in Family Owned and Managed Firms.

APPENDIX A1: Logit Model Results for Chapter 3

Table A1.1: Marginal effects (logit) of equation 1: Family firms and Non-Family Firms

	Internal R&D	External R&D	External knowledge	New to Firm Product (NtF)	Process innovation	New to market Product (NtM)
Family firm	0.0126**	0.0104***	0.0152***	0.0391***	0.0204***	0.0348***
	(0.00534)	(0.00397)	(0.00454)	(0.00603)	(0.00496)	(0.00535)
National market	0.0963***	0.0484***	0.0489***	0.0697***	0.0480***	0.0593***
	(0.00589)	(0.00468)	(0.00501)	(0.00628)	(0.00534)	(0.00564)
International market	0.111***	0.0651***	0.0736***	0.0477***	0.0577***	0.0376***
	(0.0109)	(0.00798)	(0.00936)	(0.0132)	(0.0102)	(0.0116)
Level of competition	-0.0147***	-0.00653***	-0.0107***	-0.0247***	-0.0150***	-0.0213***
	(0.00212)	(0.00158)	(0.00183)	(0.00245)	(0.00203)	(0.00217)
Competition*family firms	0.000750	0.000182	0.00585**	-0.00737**	0.00217	-0.00284
	(0.00309)	(0.00228)	(0.00262)	(0.00349)	(0.00283)	(0.00306)
Internationalization	0.000535***	9.06e-05	5.35e-05	0.000704***	0.000290**	0.000353**
	(0.000136)	(9.61e-05)	(0.000117)	(0.000167)	(0.000127)	(0.000145)
Foreign involvement(foreign)	-0.000140	2.56e-06	0.000270***	0.000299**	0.000128	0.000273***
	(0.000106)	(7.12e-05)	(8.23e-05)	(0.000124)	(9.42e-05)	(0.000105)
Firm size	0.0383***	0.0285***	0.0251***	0.0214***	0.0200***	0.0183***
	(0.00195)	(0.00146)	(0.00167)	(0.00230)	(0.00185)	(0.00200)
Firm age	-0.00457	-0.00573**	-0.00883***	-0.00253	-0.00498	0.00256
	(0.00378)	(0.00280)	(0.00320)	(0.00426)	(0.00347)	(0.00376)
Manufacture	0.128***	0.0427***	0.0571***	0.220***	0.172***	0.138***
	(0.0230)	(0.0159)	(0.0199)	(0.0319)	(0.0367)	(0.0268)
Service	0.115***	0.0463***	0.0974***	0.194***	0.156***	0.113***
	(0.0234)	(0.0163)	(0.0202)	(0.0324)	(0.0369)	(0.0273)
Retail	0.0794***	0.0425**	0.0820***	0.196***	0.158***	0.118***
	(0.0240)	(0.0166)	(0.0205)	(0.0327)	(0.0371)	(0.0275)
Observations	20,995	20,995	20,995	20,995	20,995	20,995
LR chi2(18)	2240.22	1238.65	1226.23	2358.00	1609.37	1620.88
Prob > chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Log likelihood	-8551.7761	-5307.3864	-6656.8483	-10325.031	-7466.9257	-8482.8601

Notes:

(1) The model controls for location size effects and country dummies but they are not reported.

(2) ***significant at 1%; **significant at 5%; *significant at 10%.

(3) Reference category is construction

Table A1.2: Logit model results for family management and innovation

	Internal R&D	External R&D	External knowledge	New to Firm Product (NtF)	Process innovation	New to market Product (NtM)
Family management dummy(25%-49%)	0.14	0.04	-0.08	0.03	0.09	0.12
	(0.16)	(0.21)	(0.19)	(0.14)	(0.16)	(0.15)
Family management dummy(50%-74%)	0.00	0.09	-0.03	-0.20**	-0.25**	-0.17*
	(0.10)	(0.13)	(0.12)	(0.09)	(0.11)	(0.10)
Family management dummy(75%-100%)	-0.10	0.01	0.01	-0.12*	-0.20**	-0.10
	(0.08)	(0.11)	(0.09)	(0.07)	(0.08)	(0.08)

National market	0.86***	0.79***	0.56***	0.35***	0.44***	0.37***
	(0.07)	(0.10)	(0.08)	(0.05)	(0.07)	(0.06)
International market	0.86***	1.14***	0.95***	0.29***	0.80***	0.30***
	(0.12)	(0.16)	(0.14)	(0.11)	(0.12)	(0.12)
Level of competition	-0.11***	-0.10***	-0.05***	-0.21***	-0.13***	-0.20***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Internationalization	0.01***	0.00	-0.00	0.00**	-0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Location in capital or city with pop > 1 m	-0.43**	-1.04***	-0.25	0.55***	0.83***	0.44**
	(0.17)	(0.20)	(0.20)	(0.17)	(0.24)	(0.20)
Location in city with pop. 250 k–1 m	-0.45***	-0.93***	-0.39*	0.30*	0.62***	0.34*
	(0.17)	(0.20)	(0.20)	(0.17)	(0.24)	(0.20)
Location in city with pop. 50–250 k	-0.54***	-0.95***	-0.10	0.38**	0.70***	0.36*
	(0.17)	(0.20)	(0.20)	(0.18)	(0.24)	(0.20)
Location in city with Pop < 50 k	-0.07	-0.54***	0.13	0.80***	0.63***	0.73***
	(0.17)	(0.20)	(0.20)	(0.18)	(0.24)	(0.20)
Foreign involvement(foreign)	-0.00	-0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Firm size	0.31***	0.41***	0.26***	0.13***	0.18***	0.14***
	(0.02)	(0.03)	(0.03)	(0.02)	(0.03)	(0.02)
Firm age	0.02	-0.07	-0.01	-0.06	-0.07	-0.03
	(0.04)	(0.06)	(0.05)	(0.04)	(0.05)	(0.04)
Manufacture	0.60*	0.39	0.68	1.63***	2.80***	1.83***
	(0.32)	(0.43)	(0.43)	(0.39)	(1.01)	(0.51)
Service	0.46	0.45	1.12***	1.47***	2.63***	1.63***
	(0.33)	(0.44)	(0.43)	(0.39)	(1.01)	(0.51)
Retail	0.20	0.44	0.93**	1.45***	2.53***	1.60***
	(0.33)	(0.44)	(0.43)	(0.39)	(1.01)	(0.52)
Emerging country	-1.13***	-0.83***	-0.90***	-1.10***	-0.99***	-1.04***
	(0.09)	(0.13)	(0.11)	(0.08)	(0.10)	(0.09)
Advanced country	-0.35***	-0.13	0.02	-0.08	-0.07	-0.26***
	(0.07)	(0.09)	(0.08)	(0.06)	(0.07)	(0.06)
_cons	-2.63***	-3.28***	-3.63***	-2.53***	-5.07***	-3.26***
	(0.40)	(0.52)	(0.51)	(0.45)	(1.05)	(0.57)
Observations	9633	9633	9633	9633	9633	9633
LR chi2	1084.74	602.88	490.18	898.65	627.93	609.82
Prob> chi2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Log likelihood	-4015.2921	-2524.1317	-3287.5869	-5231.8773	-3869.1243	-4355.1958

Notes:

(1) The model controls for location size effects and country dummies but they are not reported.

(2) ***significant at 1%; **significant at 5%; *significant at 10%.

(3) Reference category is construction

(4) Reference category is family management dummy (0-24%)

APPENDIX A2: Correlation Test of The Variables Used in Chapter 3

Table A2.1 and A2.2 show the correlation matrix for the variables included in our analysis.

Table A2.1: Correlation test of the variables used in this study

	New to Firm Product (NtF)	New to market Product (NtM)	process innovation	Internal R&D	External R&D	External knowledge	Family firm	Family management	Local market	National market	International market	Level of competition
New to Firm Product (NtF)	1											
New to market Product (NtM)	0.79	1										
process innovation	0.366	0.339	1									
Intern R&D	0.319	0.301	0.272	1								
External R&D	0.209	0.201	0.208	0.485	1							

External knowledge	0.272	0.253	0.273	0.376	0.33	1						
Family firm	0.083	0.064	0.059	0.018	0.014	0.026	1					
Family management	0.056	0.042	0.03	-0.007	-0.003	0.01	0.838	1				
Local market	-0.136	-0.121	-0.12	-0.195	-0.136	-0.12	-0.012	0.02	1			
National market	0.069	0.07	0.045	0.097	0.061	0.058	-0.032	-0.03	-0.796	1		
International market	0.105	0.077	0.117	0.154	0.117	0.097	0.069	16	-0.32	-0.318	1	
Level of competition	-0.169	-0.146	-0.119	-0.104	-0.069	-0.075	-0.076	-0.063	0.04	-0.02	-0.033	1
Internationalization	0.119	0.089	0.116	0.161	0.115	0.089	0.055	0.001	-0.302	-0.175	0.748	-0.061
Location in capital or city with pop > 1 m	0.101	0.061	0.089	0.037	0.009	0.018	0.165	0.155	-0.049	-0.033	0.127	-0.156
Location in city with pop. 250 k–1 m	-0.011	-0.002	0.007	-0.008	-0.07	-0.015**	0.041	0.027	0.019	-0.048	0.045	-0.028
Location in city with pop. 50–250 k	-0.023	-0.013	-0.003	-0.037	-0.020	0.004	0.003	0.004	0.041	-0.000	-0.065	0.032
Location in city with Pop < 50 k	-0.055	-0.036	-0.079	0.001	0.005	-0.005	-0.198	-0.174	0.001	0.064	-0.103	0.120
Foreign involvement(foreign)	0.076	0.067	0.074	0.073	0.070	0.086	-0.063	-0.111	-0.152	-0.002	0.241	-0.069
Firm size	0.121	0.113	0.128	0.209	0.189	0.148	-0.096	-0.142	-0.287	0.120	0.262	-0.107
Firm age	0.031	0.030	0.030	0.045	0.036	0.014	0.098	0.083	-0.123	0.068	0.087	-0.061
Manufacture	0.062	0.058	0.051	0.087	0.038	-0.020	-0.042	-0.048	-0.191	0.074	0.183	-0.048
Service	-0.013	-0.019	-0.010	-0.011	-0.004	0.050	0.021	0.015	0.058	-0.013	-0.070	0.011
Retail	-0.001	-0.005	-0.007	-0.055	-0.017	0.007	0.089	0.094	0.146	-0.067	-0.123	-0.024
Emerging country	-0.231	-0.181	-0.182	-0.159	-0.100	-0.137	-0.191	-0.143	0.086	-0.009	-0.121	0.173
Advanced country	0.101	0.049	0.093	0.033	0.031	0.048	0.295	0.257	-0.100	0.000	0.155	-0.174
Developing country	0.136	0.130	0.097	0.122	0.069	0.090	-0.053	-0.069	-0.002	0.008	-0.009	-0.026

Table A2.2: Correlation test of the variables used in this study

	Internationalization	Location in capital or city with pop > 1 m	Location in city with pop. 250 k–1 m	Location in city with pop. 50–250 k	Location in city with Pop < 50 k	Foreign involvement(foreign)	Firm size	Firm age	Manufacture	Service	Retail	Emerging country	Advanced country	Developing country
Internationalization	1													
Location in capital or city with pop > 1 m	0.139	1												
Location in city with pop. 250 k–1 m	0.018	-0.315	1											
Location in city with pop. 50–250 k	-0.064	-0.313	-0.271	1										
Location in city with Pop < 50 k	-0.096	-0.377	-0.326	-0.324	1									
Foreign involvement(foreign)	0.283	0.045	-0.003	-0.003	-0.036	1								
Firm size	0.302	0.016	-0.017	0.009	0.010	0.225	1							
Firm age	0.101	0.072	-0.001	-0.024	-0.037	-0.018	0.226	1						
Manufacture	0.203	0.033	-0.12	-0.023	-0.010	0.054	0.173	0.065	1					
Service	-0.090	-0.011	0.014	0.008	-0.024	-0.010	-0.092	-0.073	-0.618	1				
Retail	-0.128	0.043	0.003	0.021	-0.073	-0.038	-0.106	0.001	-0.487	-0.246	1			
Emerging country	-0.096	-0.186	-0.127	0.012	0.328	-0.078	-0.013	0.016	0.085	-0.125	-0.165	1		
Advanced country	0.140	0.286	0.002	-0.040	-0.219	0.072	0.016	0.158	-0.046	0.057	0.061	-0.332	1	
Developing country	-0.020	-0.051	0.117	0.020	-0.134	0.016	-0.001	-0.139	-0.043	0.072	0.105	-0.673	-0.474	1

APPENDIX A3: Interaction Effect of Model 1 (External Knowledge) in Chapter 3

As mentioned in equation 1 in the main text, this study uses interaction terms to verify the effect of market competition on the innovative behavior of family firms and non-family firms (H4). According to the results of the probit model (Table 2) and the coefficients of the interaction term, the competitive environment is related to the acquisition of external knowledge and for product innovation by family firms. relative to non-family member firms. However, Norton et al. (2004) highlighted that caution was required when computing marginal effects for interaction terms in non -linear models. To obtain correct estimates of the marginal effects of changes in the two interacting variables, this study ran the Stata code "INTEFF" developed by Norton et al. (2004).

Table A3.1 reports the corrected mean interaction effects, standard errors and t-statistics for the estimated partial effects for external knowledge. The results confirm that the average interaction effect is positive. Similarly, the plot of all interaction effects on the predicted probability of external knowledge acquisition (Figure A3.1) shows that the marginal effects are positive for all individuals. However, despite the interaction coefficient having the expected positive sign, Figure A3.2 shows that there is no significant effect for this interaction term: all observations are scattered on the zero line.

Table A3.1: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	20,995	.0046248	.0026727	.0001835	.0123673
Probit_se	20,995	.0132916	.0118772	.0006806	.0651535
Probit_z	20,995	.3943309	.0993053	.0436671	.5630172

Figure A3.1: Interaction effects after Probit

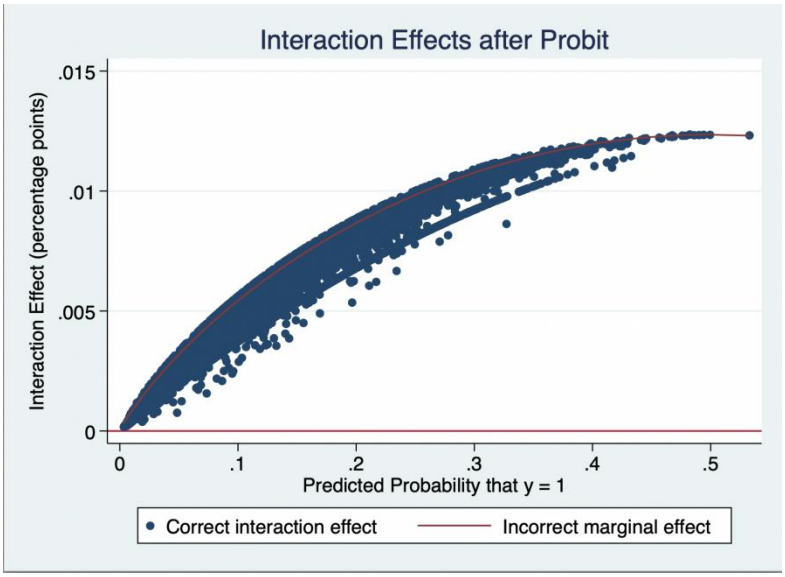
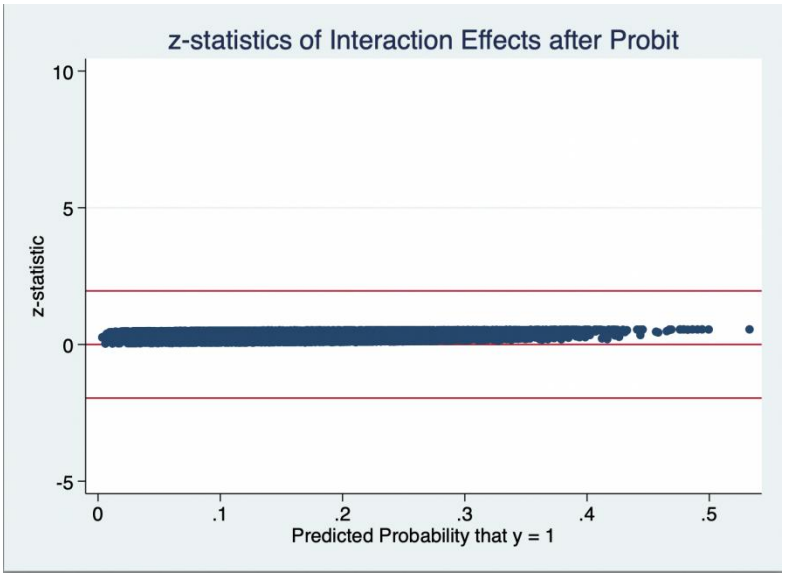


Figure A3.2: Z-statistics of interaction effects after Probit



We follow the same method for the NtF product innovation estimation. Table A3.2 reports the corrected mean interaction effects, standard errors and t-statistics for the estimated partial effects. The results confirm that the average interaction effect is negative (first row). Similarly, the plot of all interaction effects on the predicted probability of external knowledge acquisition indicates (Figure A3.3) that the corrected marginal effects are negative for all individuals. However, their statistical

significance is present only in rare cases as shown in Figure A3.4 producing negligible evidence in support of hypothesis 6.

Table A3.2: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	20,995	-.0108714	.0031777	-.0150935	-.0012754
Probit_se	20,995	.0155537	.0095491	.0008197	..0892343
Probit_z	20,995	-.8214748	.2234647	-3.233015	-.0740238

Figure A3.3: Interaction effects after Probit

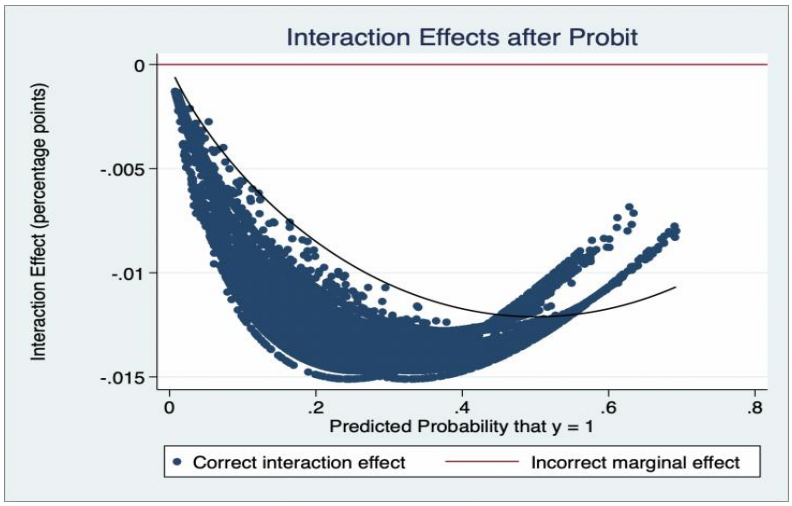
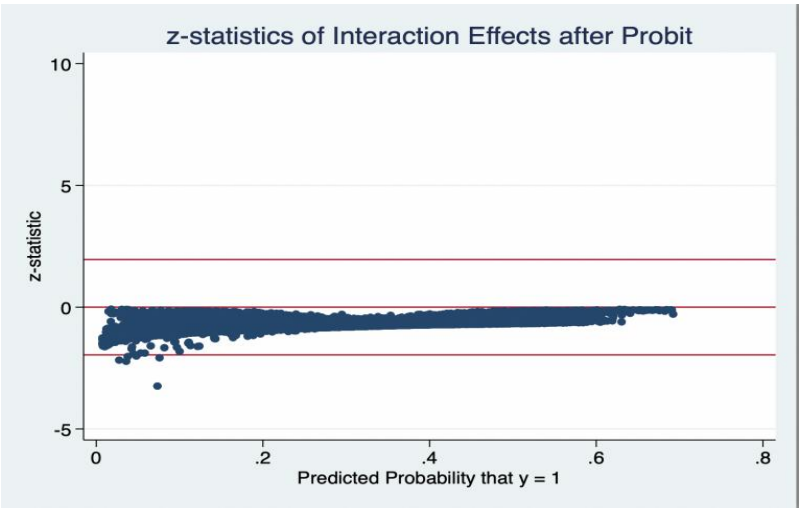


Figure A3.4: Z-statistics of interaction effects after Probit



APPENDIX A4: Interaction Effect of Model 2 in Chapter 3

This study also sets up other interaction items (interaction2=competition *family_management_dummy2,interaction3=competition*family_management_dum my3, interaction4= competition *family_management_dummy4). Hence, The impact of external stimuli on innovation activities under varying degrees of family management is further analyzed. As mentioned in the main text, when the proportion of family members in the management team is 50%-74%, competition promotes a greater likelihood of family firms to engage in internal RD, external rd, external knowledge. when the proportion of family members in the management team is 75%-100%, competition promotes a greater likelihood of family firms to when the proportion of family members in the management team is 75%-100%, competition promotes a greater likelihood of family firms to engage in internal RD, external RD, new to firm product innovation and process innovation. Therefore, the marginal effects of interaction terms are further estimated, as shown below. For the interaction terms in Model2, there is a significant coefficient appears for each model. Moreover, the plot of Z-statistics chart shows that nearly all interaction effects are statistically significant in each model.

Interaction effect in probit Model (New to firm product innovation).

Table A4.1: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,633	.0167507	.0051216	-.0009023	.0237144
Probit_se	9,633	.0079518	.00274	.0006514	.0117684
Probit_z	9,633	2.143124	.1674254	-.4706695	2.747003

Figure A4.1: Interaction effects after Probit

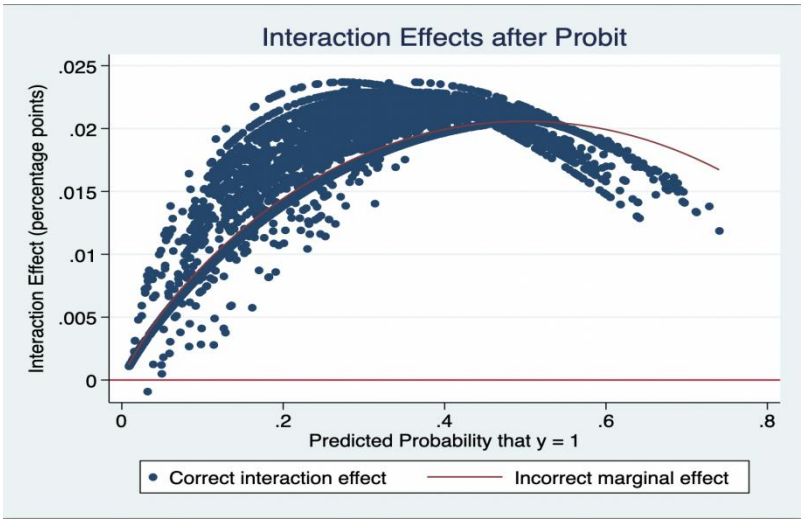
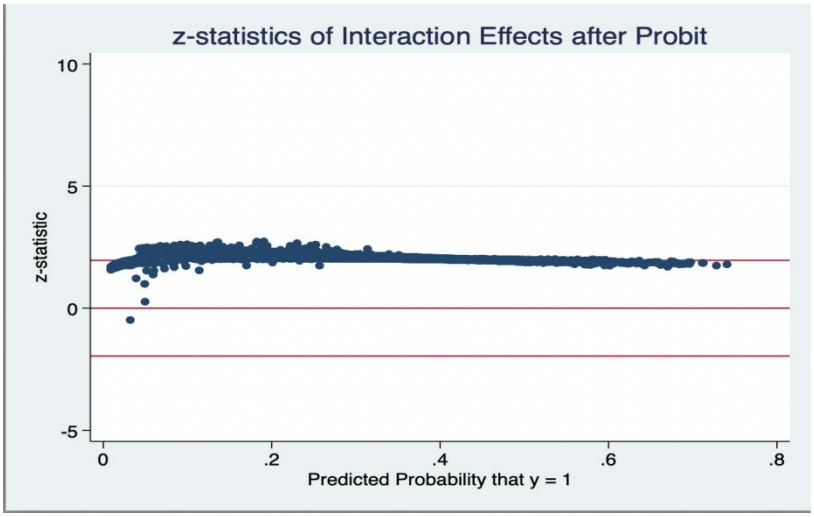


Figure A4.2: Z-statistics of interaction effects after Probit



Interaction effect in probit Model (Process innovation)

Table A4.2: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,633	.0213387	.0091695	.0001886	.0366699
Probit_se	9,633	.0068678	.0031222	.0002207	.0117684
Probit_z	9,633	3.115931	.435892	.8547512	2.747003

Figure A4.3: Interaction effects after Probit

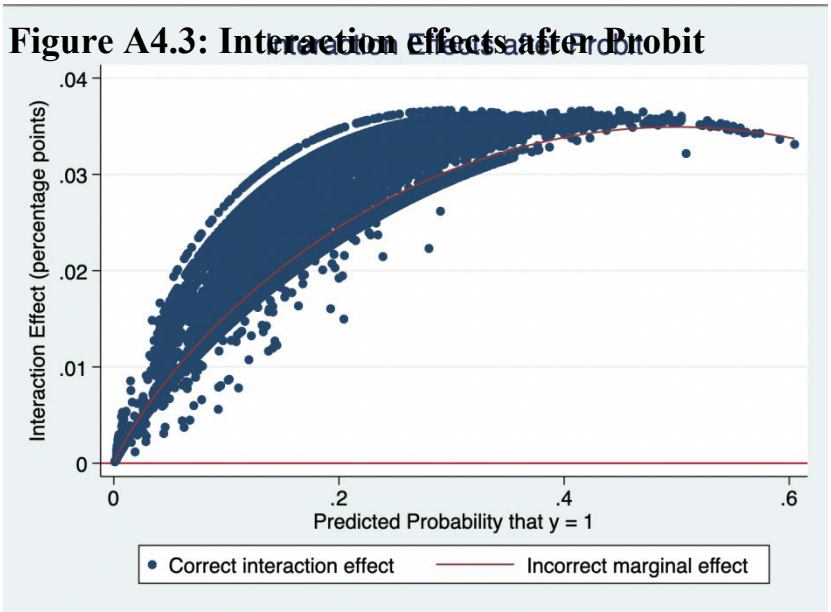
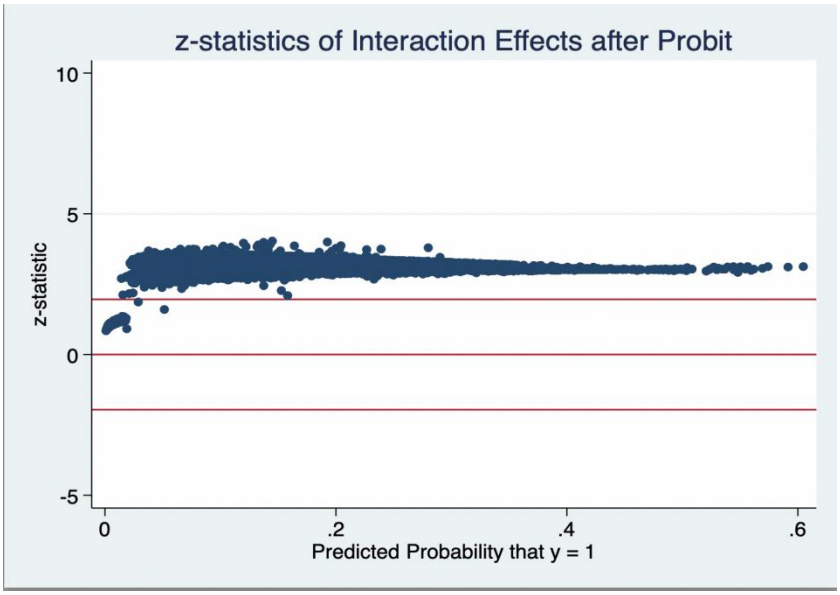


Figure A4.4: Z-statistics of interaction effects after Probit



Interaction effect in probit Model (Internal R&D spending)
competition*family management dummy(50%-74%)

Table A4.3: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,633	.0239716	.0115044	.0012537	.0423923
Probit_se	9,633	.0087463	.0039362	.0007536	.014906
Probit_z	9,633	2.68539	.270849	.5575991	3.281423

Figure A4.5: Interaction effects after Probit

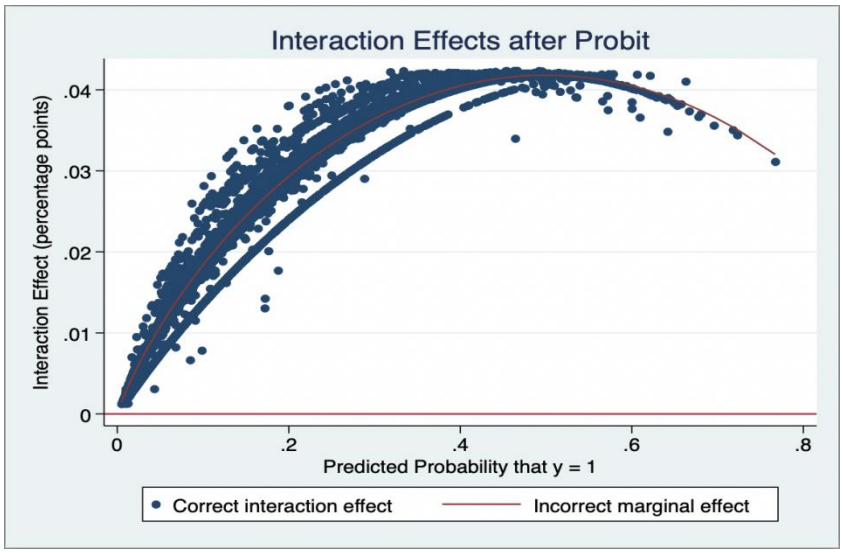
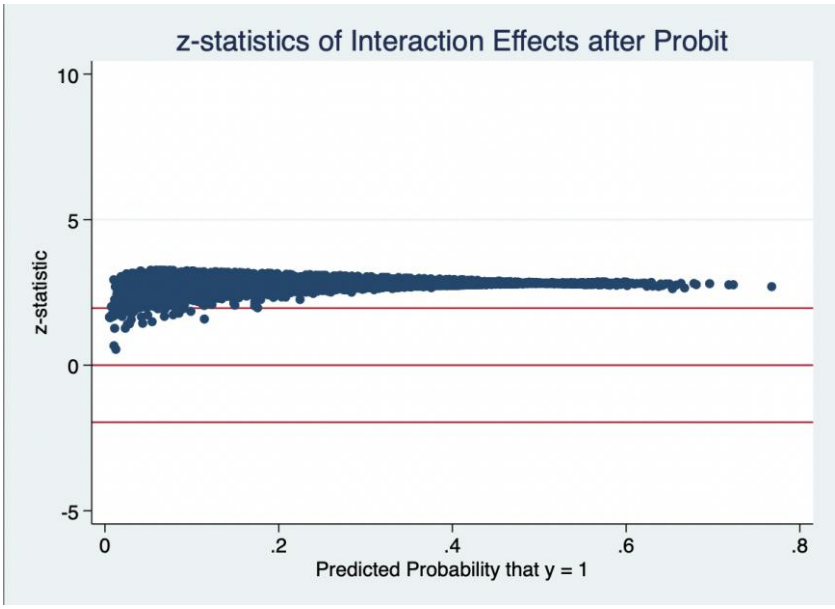


Figure A4.5: Z-statistics of interaction effects after Probit



competition*family management dummy(75%-100%)

Table A4.4: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,633	.0177768	.00841	.0000337	.0308674
Probit_se	9,633	.0068693	.0033291	.0003484	.0122023
Probit_z	9,633	2.608373	.193162	.0380984	3.211761

Figure A4.6: Interaction effects after Probit

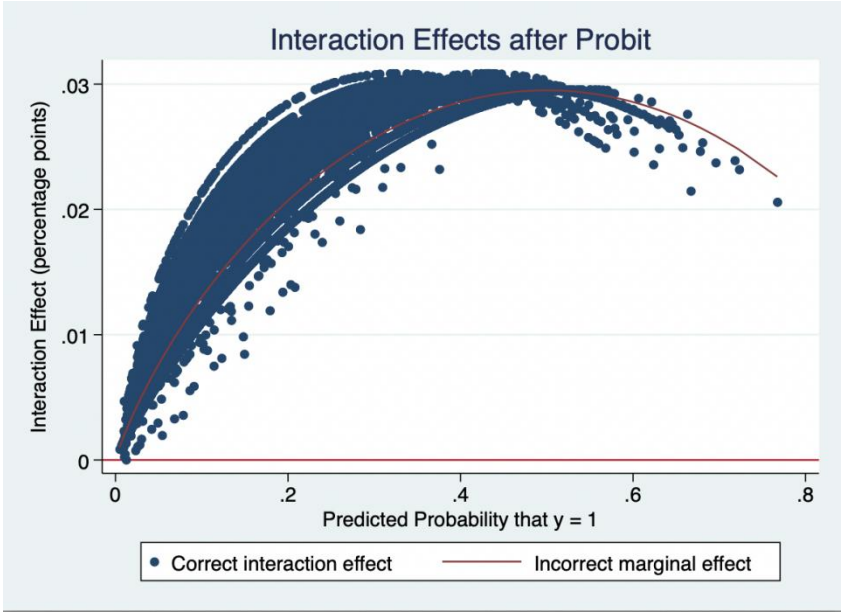
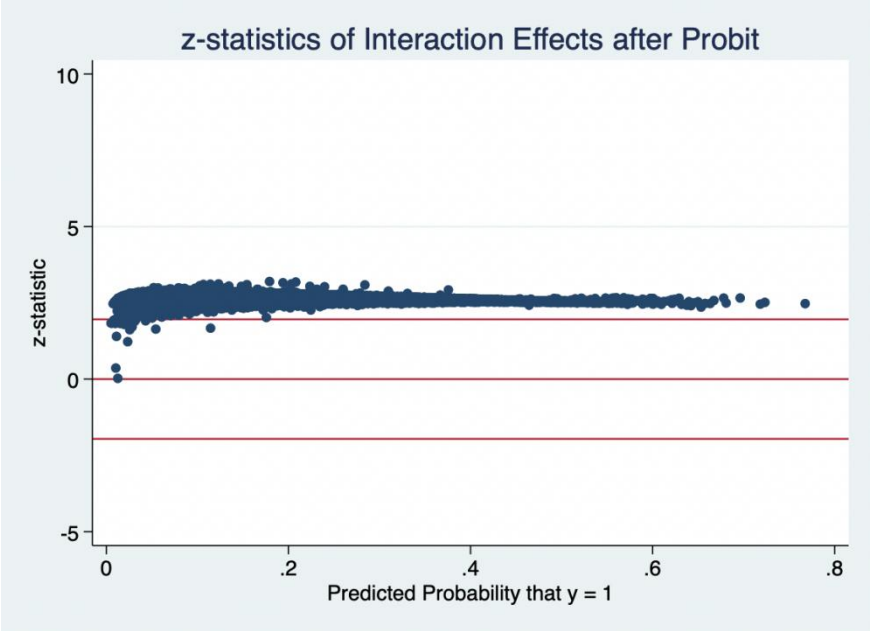


Figure A4.7: Z-statistics of interaction effects after Probit



Interaction effect in probit Model (external R&D)
competition*family management dummy(50%-74%)

Table A4.5: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,633	.0182588	.0117367	.0007713	.0522382
Probit_se	9,633	.0069592	.004032	.0005659	.0179812
Probit_z	9,633	2.535388	.4012689	.6360414	3.343109

Figure A4.8: Interaction effects after Probit

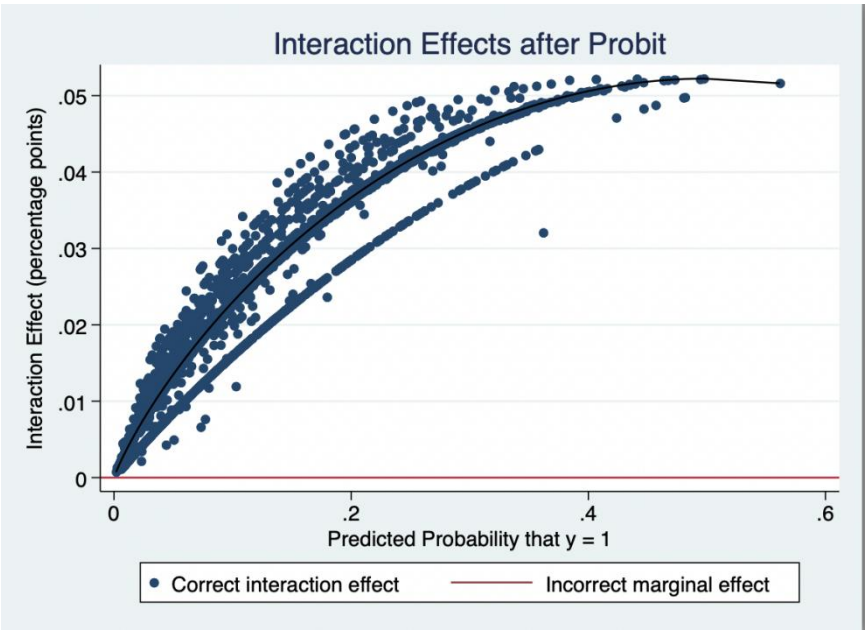
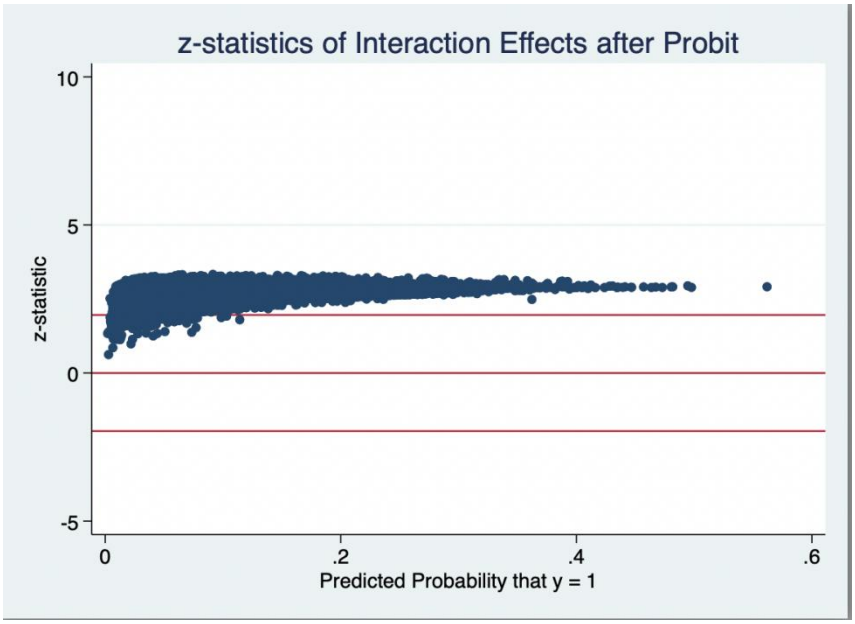


Figure A4.9: Z-statistics of interaction effects after Probit



competition*family management dummy(50%-74%)

Table A4.6: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,633	.0103546	.0074011	-.0003693	.0313545
Probit_se	9,633	.0051093	.0035437	.0002351	.0147233
Probit_z	9,633	1.988651	.1873794	-.9702636	2.440699

Figure A4.10: Interaction effects after Probit

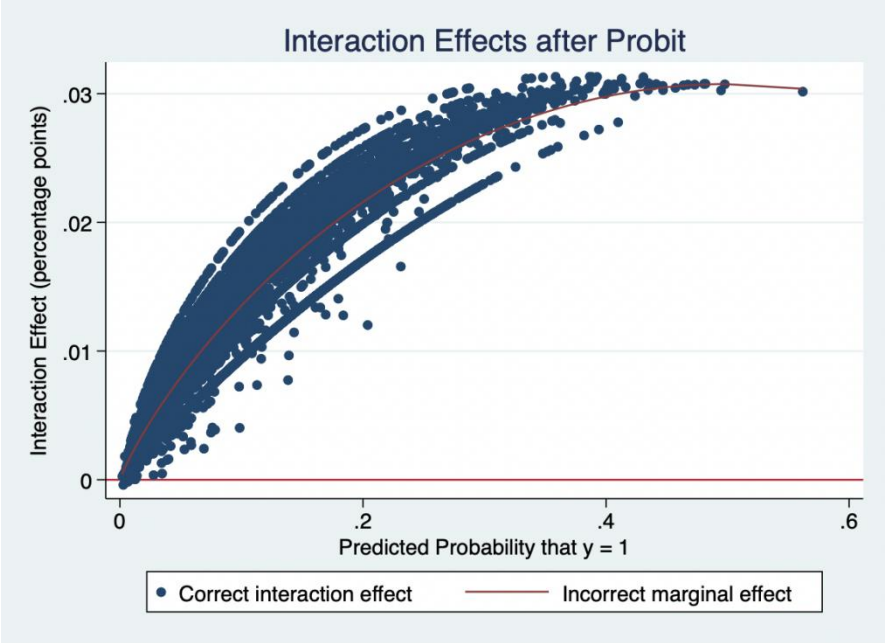
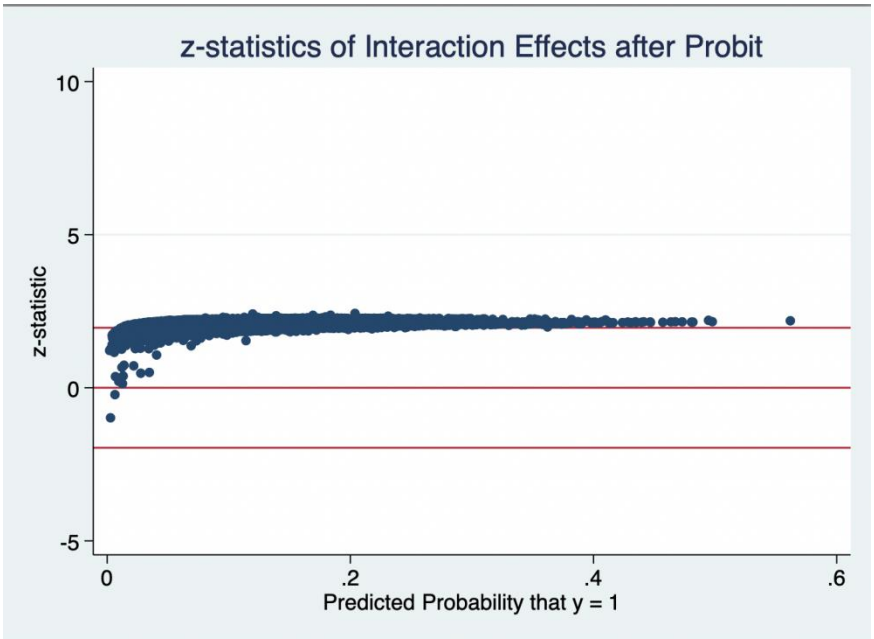


Figure A4.11: Z-statistics of interaction effects after Probit



Interaction effect in probit Model (external knowledge)

Table A4.7: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,633	.0159697	.0069974	.0012204	.0340732
Probit_se	9,633	.0078132	.0033008	.000847	.0161718
Probit_z	9,633	2.027095	.1706176	1.364043	2.416608

Figure A4.12: Interaction effects after Probit

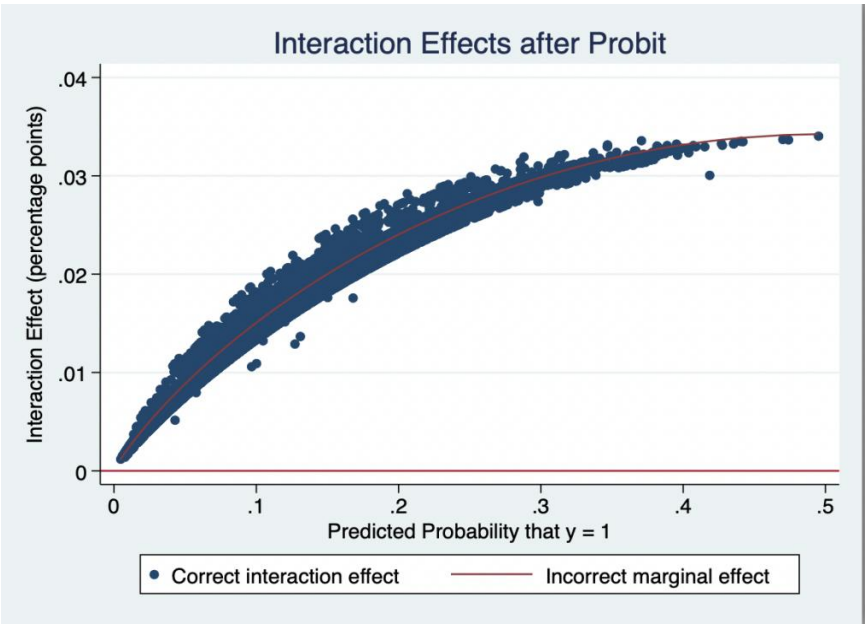
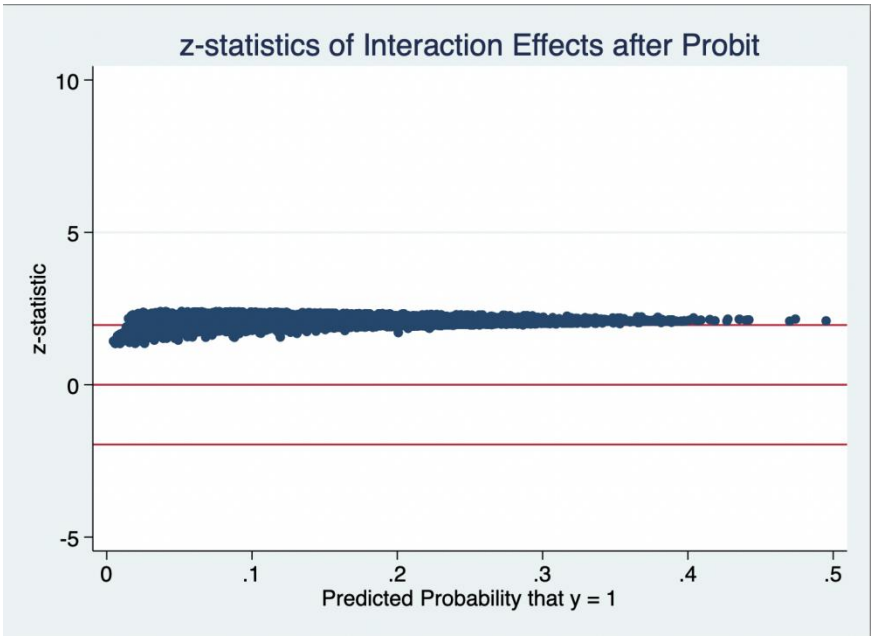


Figure A4.13: Z-statistics of interaction effects after Probit



APPENDIX A5: Robust Check For Equation 1 And Equation 2 In Chapter 3

A5.1: Robust check for equation 1

As a robustness check, we applied a multivariate probit model to examine for potential dependence across the error terms of equation one as unobserved firm characteristics may influence the adoption of each innovation decision simultaneously. This study uses the Mvprobit framework developed based on the Geweke-Hajivassiliour-Keane (GHK) algorithm (Cappellari and Jenkins, 2003). The results of these analyses are included in Table A5.1. The results suggest that controlling for this dependence matters as the Prob>chi = 0.000. However, the results are very similar to the results presented in the main paper, suggesting that controlling for unobserved firm characteristics in this case produces negligible differences in the results.

Table A5.1: Mvprobit estimator on innovation in family firms

	Internal R&D	External R&D	External knowledge	New to Firm Product (NtF)	Process innovation	New to market Product (NtM)
Family firm	0.05	0.08**	0.09**	0.15***	0.12**	0.16***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)
National market	0.41***	0.32***	0.27***	0.25***	0.24***	0.25***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)
International market	0.47***	0.43***	0.40***	0.17**	0.29***	0.16**
	(0.08)	(0.08)	(0.09)	(0.07)	(0.07)	(0.08)
Level of competition	-0.06***	-0.05***	-0.06***	-0.09***	-0.08***	-0.09***
	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Internationalization	0.00***	0.00	0.00	0.00***	0.00**	0.00**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Location in capital or city with pop>1 m	0.01	-0.33	0.16	0.58***	0.64***	0.49***
	(0.35)	(0.35)	(0.29)	(0.17)	(0.15)	(0.17)
Location in city with pop. 250 k – 1 m	-0.06	-0.31	0.09	0.39**	0.51***	0.37**
	(0.35)	(0.35)	(0.29)	(0.16)	(0.14)	(0.16)
Location in city with pop. 50 – 250 k	-0.08	-0.34	0.21	0.45***	0.54***	0.41**
	(0.35)	(0.36)	(0.29)	(0.17)	(0.15)	(0.17)
Location in city with Pop<50 k	0.17	-0.13	0.33	0.58***	0.49***	0.52***
	(0.35)	(0.35)	(0.30)	(0.16)	(0.15)	(0.16)
Foreign involvement(foreign)	-0.00	-0.00	0.00**	0.00*	0.00	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Firm size	0.17***	0.21***	0.15***	0.08***	0.10***	0.08***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Firm age	-0.02	-0.06**	-0.06**	-0.01	-0.03	0.01
	(0.03)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)
Manufacture	0.47***	0.23**	0.22*	0.64***	0.62***	0.50***
	(0.10)	(0.11)	(0.13)	(0.16)	(0.17)	(0.15)
Service	0.42***	0.26**	0.47***	0.56***	0.55***	0.39**
	(0.10)	(0.11)	(0.13)	(0.17)	(0.17)	(0.16)
Retail	0.27***	0.22*	0.37***	0.56***	0.56***	0.42***
	(0.10)	(0.12)	(0.14)	(0.17)	(0.17)	(0.16)
Emerging country	-0.60***	-0.45***	-0.52***	-0.73***	-0.67***	-0.66***
	(0.10)	(0.07)	(0.10)	(0.09)	(0.11)	(0.09)
Advanced country	-0.19**	-0.06	-0.03	-0.10	-0.04	-0.18**
	(0.09)	(0.08)	(0.09)	(0.11)	(0.12)	(0.09)
Competition*family firms	-0.00	-0.00	0.03*	-0.03	0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
_cons	-2.03***	-2.12***	-2.19***	-2.09***	-2.58***	-2.28***
	(0.36)	(0.38)	(0.30)	(0.22)	(0.22)	(0.22)

N=20995

chi2(15) = 17464.4

Prob > chi2 = 0.0000

Notes:

(1) The model controls for location size effects and country dummies but they are not reported.

(2) Marginal effects are reported in the table. ***significant at 1%; **significant at 5%; *significant at 10%.

(3) Reference category is construction

A5.2: Robust check for equation 2

Following a similar procedure as to that outlined in Appendix A5.1, to obtain robust results and ensure the validity of the previous evidence on the impact of family management on innovation, an MVprobit model was also applied to equation (2) of the paper. The results of these analyses are listed in Table A5.2. Again the results suggest that controlling for unobserved factors that may impact the innovation decisions of family firms is necessary condition where Prob>chi2 =0 .000. However, the results are negligible when compared to the probit results in Table 3.3 of the paper.

Table A5.2: MVprobit estimator for family management on innovation

	Internal R&D	External R&D	External knowledge	New to Firm Product (NtF)	Process innovation	New to market Product (NtM)
Family management dummy(25%-40%)	0.06 (0.22)	-0.03 (0.26)	-0.38 (0.25)	-0.20 (0.18)	-0.14 (0.20)	-0.11 (0.20)
Family management dummy(50%-74%)	-0.29* (0.16)	-0.37** (0.18)	-0.28* (0.16)	-0.24* (0.13)	-0.10 (0.13)	-0.15 (0.13)
Family management dummy(75%-100%)	-0.26** (0.11)	-0.27** (0.13)	-0.09 (0.13)	-0.18* (0.11)	-0.35*** (0.09)	-0.02 (0.10)
National market	0.45*** (0.04)	0.36*** (0.05)	0.27*** (0.05)	0.21*** (0.05)	0.22*** (0.04)	0.19*** (0.05)
International market	0.45*** (0.11)	0.53*** (0.11)	0.47*** (0.11)	0.15 (0.09)	0.43*** (0.10)	0.14 (0.10)
Level of competition	-0.13*** (0.04)	-0.14*** (0.04)	-0.07** (0.03)	-0.16*** (0.03)	-0.14*** (0.03)	-0.12*** (0.03)
Internationalization	0.00*** (0.00)	0.00 (0.00)	-0.00 (0.00)	0.00** (0.00)	-0.00 (0.00)	0.00 (0.00)
Location in capital or city with pop > 1 m	-0.27 (0.28)	-0.56* (0.31)	-0.12 (0.28)	0.30* (0.18)	0.41*** (0.12)	0.25 (0.22)
Location in city with pop. 250 k–1 m	-0.27 (0.29)	-0.49 (0.32)	-0.18 (0.27)	0.16 (0.16)	0.31*** (0.12)	0.20 (0.21)
Location in city with pop. 50–250 k	-0.32 (0.29)	-0.49 (0.33)	-0.03 (0.28)	0.20 (0.17)	0.34*** (0.13)	0.22 (0.22)
Location in city with Pop < 50 k	-0.08 (0.29)	-0.31 (0.32)	0.07 (0.28)	0.43*** (0.16)	0.28** (0.13)	0.40** (0.20)
Foreign involvement(foreign)	-0.00 (0.00)	-0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Firm size	0.17*** (0.01)	0.21*** (0.02)	0.14*** (0.02)	0.08*** (0.02)	0.10*** (0.02)	0.08*** (0.02)
Firm age	0.01 (0.03)	-0.03 (0.03)	-0.00 (0.03)	-0.03 (0.03)	-0.03 (0.03)	0.00 (0.03)
Manufacture	0.22** (0.11)	0.09 (0.20)	0.26 (0.22)	0.74*** (0.17)	1.06** (0.42)	0.79*** (0.15)
Service	0.15 (0.12)	0.12 (0.20)	0.51** (0.23)	0.66*** (0.17)	0.97** (0.42)	0.69*** (0.15)

Retail	0.00	0.10	0.39*	0.65***	0.92**	0.67***
	(0.12)	(0.21)	(0.23)	(0.17)	(0.42)	(0.15)
Emerging country	-0.63***	-0.42***	-0.44***	-0.63***	-0.53***	-0.59***
	(0.10)	(0.09)	(0.11)	(0.11)	(0.12)	(0.10)
Advanced country	-0.19**	-0.05	0.03	-0.04	-0.04	-0.13
	(0.09)	(0.09)	(0.09)	(0.11)	(0.11)	(0.09)
Competition*family management dummy(25%-40%)	0.02	0.02	0.12	0.07	0.07	0.07
	(0.06)	(0.08)	(0.07)	(0.06)	(0.06)	(0.06)
Competition * family management dummy(50%-74%)	0.10**	0.14***	0.09*	0.04	-0.01	0.03
	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)
Competition*family management dummy(75%-100%)	0.07*	0.09**	0.03	0.04	0.09***	0.00
	(0.04)	(0.04)	(0.04)	(0.04)	(0.03)	(0.03)
_cons	-1.20***	-1.41***	-1.83***	-1.20***	-2.18***	-1.74***
	(0.35)	(0.42)	(0.35)	(0.27)	(0.45)	(0.29)

N= 9633

chi2(15) = 8384.62

Prob > chi2 = 0.0000

Notes:

(1) The model controls for location size effects and country dummies but they are not reported.

(2) ***significant at 1%; **significant at 5%; *significant at 10%.

(3) Reference category is construction

(4) Reference category is family management dummy (0-24%)

APPENDIX A6: Country List and Number of Observation by Country Used in Analysis in Chapter 3

Table A6.1: Country list and Observations

Developed Country	Emerging Country	Developing Country
Croatia (404)	Egypt (3075)	Albania (377)
Cyprus (240)	Hungary(805)	Armenia (546)
Czech Republic(502)	Poland (1369)	Azerbaijan (225)
Estonia (360)	Russia (1323)	Bosnia (362)
Italy (760)	Turkey(1663)	Bulgaria (772)
Latvia(359)		Georgia (581)
Lithuania(358)		Jordan (601)
Portugal(1062)		Kazakhstan(1446)
Slovakia(429)		Kosovo(271)
Slovenia (409)		Kyrgyz Republic (360)
		Lebanon(532)
		Moldova(360)
		Mongolia(360)
		Montenegro (150)
		Morocco(667)
		North Macedonia(360)
		Romania(814)
		Serbia(361)
		Tajikistan(352)
		Tunisia(615)
		Turkish Cypriot Community (120)
		Ukraine (1337)
		Uzbekinstan (1239)

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Norton, E. C., Wang, H. & Ai, C. 2004. Computing Interaction Effects and Standard Errors in Logit and Probit Models. *The Stata Journal*, SAGE Publications, 4, 154–167 doi: 10.1177%2F1536867X0400400206.

APPENDIX II: Exporting Behaviour in Family Firms and The Mediating Role of Innovation

APPENDIX A7 Analysis Prior to The Matching Technique for Chapter 4

Table A7.1: First-stage probit selection

	Coefficients	Standard Errors
Location in capital or city with pop>1 m	0.51	0.36
Location in city with pop. 250 k – 1 m	0.50	0.36
Location in city with pop. 50 – 250 k	0.42	0.36
Location in city with pop. 50 – 250 k	0.24	0.36
Foreign involvement(*foreign*)	-0.01***	0.00
Log firm size	-0.11***	0.01
Log firm age	0.06***	0.02
Manufacture	0.01	0.04
Service	-0.05	0.03
Log production workers	0.00	0.01
Educated workers	-0.00***	0.00
_cons	-0.37	0.37
N	15288	
LR chi2(42)	4121.54	
Prob > chi2	0.0000	
Pseudo R2	0.1973	

Note:* p < 0.1; ** p < 0.05; *** p < 0.01. Dummy variables for countries are included in the propensity score estimation, but the output is not displayed

APPENDIX A8: Details on PSM and Assessing The Quality of The Matching Process for Chapter 4

The average treatment effect (ATT) is measured in this study using nearest neighbor matching and caliper matching, as shown in Table A8.1, and T-stat (1.64) suggests a significant effect at the statistical threshold of 10%. According to PSM, family businesses are "treated," while non-family businesses are "untreated." The tolerance difference between matching firms in a "imperfect" match is measured by calipers. All matches that are not equal to or within 0.25 standard deviation of each covariable will be removed when the threshold is set to a level of 0.25 (Austin, 2011). The balancing test findings in Table (A8.2) show that after matching, the standard deviations of all explanatory variables are less than 10%. Furthermore, the majority of the t-test results are non-significant, indicating that there is no significant difference between the treatment and control groups in the main characteristic variables after matching, indicating that the matching effect is ideal and meets the assumption of balance. According to Rosenbaum and Rubin (1983), "if the difference between groups is less than 20%, the variable distribution of the two groups is very close." They believe it is a good match if Rubin. B is below 25 and Rubin.R is between 0.5 and 2. As seen in Table A8.3, our results satisfy all of the criteria, indicating that our matching technique is robust.

Table A8.1: The treatment effect of family business internationalization

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Exports sales	Unmatched	12.2255364	8.30010325	3.9254332	.396729195	9.89
	ATT	12.2367098	10.9294745	1.30723534	.798969528	1.64

Table A8.2: Comparison of standard bias reduction before and after matching

	Mean		Bias	t-test	
	Treated	Control	%	t-value	p-value
Location in capital or city with pop>1 m	.34745	.35506	-1.7	-0.91	0.361

Location in city with pop. 250 k – 1 m	.25545	.24966	1.4	0.76	0.445
Location in city with pop. 50 – 250 k	.20442	.20777	-0.8	-0.47	0.635
Location in city with pop. 50 – 250 k	.16314	.15842	1.1	0.74	0.461
Foreign involvement(*foreign*)	4.9468	5.2204	-1.2	-0.76	0.446
Log firm size	3.2267	3.2001	2.0	1.22	0.221
Log firm age	2.8869	2.8772	1.4	0.80	0.423
Manufacture	.53252	.52064	2.4	1.36	0.173
Service	.24966	.26017	-2.4	-1.38	0.167
Log production workers	1.7106	1.6742	1.9	1.13	0.259
Educated workers	12.206	12.783	-2.3	-1.46	0.145

Table A8.3: Balance test of matching quality

Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
0.001	17.00	1.000	0.8	0.6	7.2	1.10	40

APPENDIX A9 Correlation Matrix for Chapter 4

Table A9.1 shows the correlation matrix for the variables included in our analysis. Furthermore, it can be seen that most values of the correlation coefficient are below 0.56, which is the maximum recommended for testing for multicollinearity (Leiblein, Reuer and Dalsace 2002).

Table A9.1: Correlation matrix

	Exporting	Exports sales	Family firm	Product innovation	Process innovation	City size1	City size2	city size3	citysi~4	Foreign	Log firm size	Logfirm age	Manufacture	Service	country	Logproduct workers	new third level
Exporting	1																
exports sales	0.747***	1															
family firm	0.059***	0.028***	1														
product innovation	0.151***	0.096***	0.053***	1													
process innovation	0.147***	0.098***	0.032***	0.301***	1												
citysize1	0.160***	0.149***	0.067***	0.057***	0.063***	1											
citysize2	-0.00600	0.00500	0.00200	-0.038***	-0.00900	-0.407***	1										
citysize3	-0.077***	-0.079***	-0.0110	-0.024**	0.00100	-0.356***	-0.299***	1									
citysize4	-0.095***	-0.098***	-0.076***	0.0100	-0.058***	-0.329***	-0.277***	-0.242***	1								
foreign	0.215***	0.298***	-0.030***	0.064***	0.080***	0.055***	-0.023**	0.00700	-0.037***	1							
logfirmsize	0.333***	0.329***	-0.031***	0.112***	0.111***	0.091***	-0.018*	-0.0120	-0.053***	0.225***	1						
logfirmage	0.148***	0.097***	0.053***	-0.00400	0.00200	0.065***	-0.0120	-0.024**	-0.032***	-0.020*	0.247***	1					
manufacture	0.261***	0.244***	-0.017*	0.090***	0.078***	0.083***	0.027***	-0.071***	-0.033***	0.060***	0.190***	0.073***	1				
service	-0.124***	-0.119***	0.00300	-0.051***	-0.040***	-0.051***	-0.00300	0.030***	0.0100	-0.0110	-0.100***	-0.074***	-0.621***	1			
country n	-0.067***	-0.047***	0.0120	-0.032***	-0.0140	0.076***	0.00200	0.080***	-0.180***	-0.0130	0.00200	-0.033***	0.084***	-0.045***	1		
Logproduct workers	0.402***	0.402***	-0.025**	0.116***	0.105***	0.115***	0.0150	-0.069***	-0.060***	0.152***	0.533***	0.171***	0.739***	-0.485***	0.057***	1	
new third level	-0.046***	-0.044***	-0.075***	0.0170	-0.00900	-0.139***	-0.039***	0.049***	0.153***	0.021**	0.076***	-0.045***	-0.068***	0.058***	-0.00800	-0.046***	1

APPENDIX A10 Interaction Effect in Probit Model (Product Innovation And Process Innovation) for Chapter 4.

As described in H3, this study exploys interaction terms to determine the moderating effect of innovation on family firms and non-family firms pursuing internationalization. According to the results of the probit model (Table A8.3) and the coefficients of the interaction terms, the two interaction terms (family firms *product innovation and family firms *process innovation) are not significant. However, we still follow the hint of Norton et al. (2004) in order to maintain caution when calculating the marginal effects of the interaction terms in the non-linear model. In addition, the Stata code "INTEFF" built by Norton et al. (2004) was employed in this work to get accurate estimates of the marginal effects of changes in the two interacting variables.

Table A10.1 reports the estimated mean interaction effects, standard errors and t-statistics. The results show that the average interaction effect is negative (first row). Similarly, the plot of the effect of all interaction effects on the predicted probability of internationalization (Figure A10.1) shows that the marginal effect is negative for all individuals. However, Figure A10.2 shows that all observations are around the zero line indicating that there is no significant effect of this interaction term.

Table A10.1: Descriptive statistics of interaction effects, standard errors, and Z-statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Probit_ie	9,589	-.0045884	.0046802	-.0133654	.0005324
Probit_se	9,589	.0196246	.0087384	.0008893	.0313128
Probit_z	9,589	-.172734	.2045422	-.989255	.2606925

Figure A10.1: Interaction effects after Probit

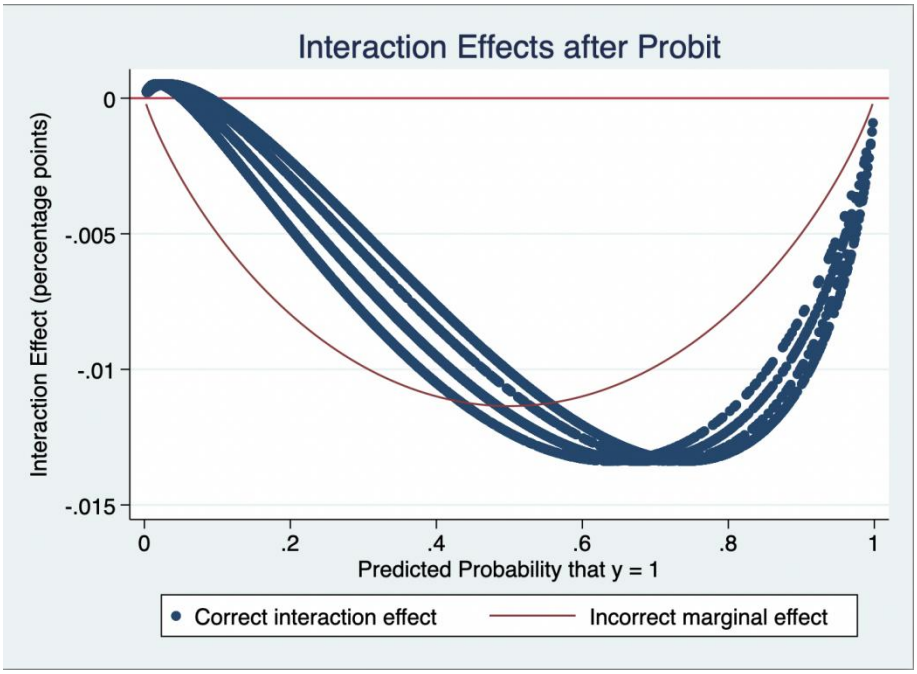
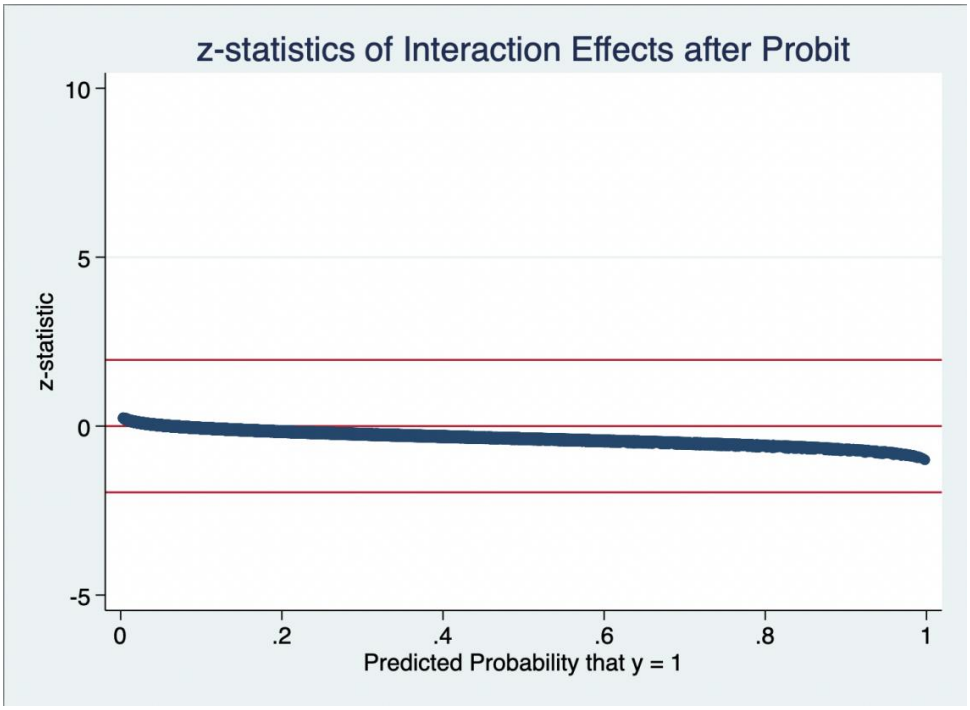


Figure A10.2: Z-statistics of interaction effects after Probit



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APPENDIX III: Family Firm Resilience During the COVID-19 Pandemic - The Moderating Roles of Innovation, Management Practices and Family Governance

APPENDIX A11 Breakdown of Data By Country for Chapter 5

Table A11.1: Breakdown of data by country

Country	Observations	Percent of total
Armenia	546	4.21
Bulgaria	772	5.96
Croatia	404	3.12
Cyprus	240	1.85
Czech Republic	502	3.87
Estonia	360	2.78
Georgia	581	4.48
Greece	600	4.63
Hungary	805	6.21
Italy	760	5.86
Jordan	601	4.64
Latvia	359	2.77
Lebanon	532	4.11
Lithuania	358	2.76
Moldova	360	2.78
Morocco	1,096	8.46
Poland	1,369	10.56
Portugal	1,062	8.20
Romania	814	6.28
Slovak Republic	429	3.31
Slovenia	409	3.16
All Countries	12959	100

APPENDIX A12 Principal Component Analysis For Chapter 5

Principal component analysis (PCA) is robust as a factor analysis method that assumes high correlation between all variables with high common variance and low unique variance (Hair et al., 2016). Five 'raw' variables relating to the management practice were transformed and ortho-normalized by a PCA. The five variables are:

(1) Performance Monitoring (the company was asked "Did This Establishment Monitor Any Production/Service Performance Indicators?". If the respondent answers "yes", the binary variable is set to 1, otherwise the value is set to 0.

(2) Provision Targets (The company is asked "Did This Establishment Have Production/Service Provision Targets?". The affirmative answer to this question is 1; otherwise, the value is 0.).

(3) Time Frame (The company is asked "What Best Describes The Time Frame of Production/Service Provision Targets?". Assign 1-3 values according to the length of the time frame. "Main focus was on short term, less than one year" is assigned as 1. "Main focus was on long term, one year or more" is assigned a value of 2, "Combination of short-term and long-term targets" is assigned a value of 3).

(4) Awareness (Company asked "Who Was Aware of The Production/Service Provision Targets At This Establishment?". "Only senior managers", "Most managers and some production workers", "Most managers and most production workers", "All managers and most production workers" are assigned values 1-4, respectively).

(5) The company is asked "How underperformers are dealt with". "Does not apply", "Non-managers are normally not promoted", "Based mainly on factors other than performance and ability (for example, tenure or family connections)", "Based partly on performance and ability, and partly on other factors (for example, tenure or family connections)", "Based solely on performance and ability" are assigned values 1-5, respectively).

Table A12.1: Principal component analysis rotated using orthogonal varimax method

Variables	Factor 1 (Management practices)
Performance Monitoring	0.8518
Provision Target	0.9594
Time Frame	0.9253
Awareness	0.9022
Promotion	0.8050
Eigen Value	3.96417

Appendix A13 Propensity Score Matching (PSM) for chapter 5

The independent variables are a set of control variables including firm age, firm size, city size, foreign ownership, exports, international markets, domestic markets, and industry fixed effects. Proximity matching and caliper matching is then applied using the STATA "PSMATCH2" command (Leuven and Sianesi, 2003), and following the work of Monreal-Pérez & Gregorio (2017) and Anderson et al. (2016) family-owned and non-family-owned firms are matched. A series of balancing property tests are conducted to ensure that the matching groups were balanced. Firms are matched using nearest neighbor matching.

As shown in Table A13.1, nearest neighbor matching and caliper matching are used in this study to measure the average treatment effect (ATT), and T-stat (1.66) implies a significant impact at the statistical level of 10%. In PSM, family firms are referred to as 'treated' and non-family firms as 'untreated'. Calipers measure the tolerance difference between matching firms in an "imperfect" match. Setting the threshold to a level of 0.25 means that all matches that are not equal to or within 0.25 standard deviation of each covariable will be deleted (Austin, 2011).

At the same time, this study also carried out the matching balance and common support test to ensure the reliability of the matching effect. The balance test results in

Table A13.2 show that the standard deviations of all explanatory variables after matching are less than 10%. Moreover, most of the results of t-test are not significant, which indicates that there is no significant difference between the treatment group and the control group in the main characteristic variables after matching, which shows that the matching effect is ideal and meets the assumption of balance. Rosenbaum and Rubin (1983) pointed out that "if the difference between groups is less than 20%, the variable distribution of the two groups is very close". In their thinking, if Rubin.B is less than 25 and Rubin. R is between 0.5 and 2, we think it's a good match. As show in the Table A12.3, the results satisfy all the criteria, so the matching process is robust.

Table A13.1: The treatment effect of family firms adaptability

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Adaptability	Unmatched	.296359625	.28344086	.012918765	.010045048	1.29
	ATT	.296359625	.275620518	.020739106	.012528407	1.66

Table A13.2: Comparison of standard bias reduction before and after matching

	Mean		Bias	t-test	
	Treated	Control	%	t-value	p-value
Location in capital or city with pop > 1 m	.45091	.44788	0.6	0.58	0.561
Location in city with pop. 250 k–1 m	.231	.23833	-1.7	-1.65	0.099
Location in city with pop. 50–250 k	.16994	.17093	-0.3	-0.25	0.802
Location in city with pop. 50–250 k	.10822	.10949	-0.4	-0.39	0.698
Foreign involvement(*foreign*)	4.3761	4.7224	-1.6	-1.62	0.105
Log firm size	3.1131	3.1152	-0.2	-0.15	0.881
Log firm age	2.9593	2.9439	2.3	2.25	0.024
Manufacture	.50248	.50055	0.4	0.37	0.713

Service	.27088	.27281	-0.4	-0.41	0.680
Exporting	12.453	12.372	0.3	0.29	0.768
Competition	3.001	2.9618	2.5	2.34	0.019
International	.1631	.16133	0.5	0.46	0.649
National	.46564	.46277	0.6	0.55	0.584

Table A13.3: Balance test of matching quality

Ps R2	LR chi2	p>chi2	Mean Bias	Med Bias	B	R	%Var
0.001	27.26	0.011	0.9	0.5	5.5	1.10	80

APPENDIX A14 Robust test for Chapter 5

Refere to Krammer (2022), to evaluate the reliability of the hypotheses, numerous supplementary indicators for adaptation derived from the follow-up surveys are employed. These proxies examine if firms have adapted or improved their business activities in ways other than production ("Did this establishment experience any of the following changes in response to the COVID-19 outbreak?") or moved to a more online presence ("Started or increased business activity online?"), adoption of delivery or carry-out ("Started or increased delivery or carry-out of goods or services?") and adoption of remote work ("Started or increased remote work arrangement for its workforce?"). Robustness tests (see Appendix D of supplemental documentation), which measure three additional indicators (online business, delivery and teleworking), further confirm the conclusion that family firms are more resilient than non-family firms in the face of a coronavirus pandemic. Please see supplemental documentation for a presentation of these analyses.

As a robustness check, multiple dependent variables were replaced to check for potential dependencies between the error terms of equations 1, 2. The results of these

analyses are included in Tables A14.1,A14.2, and A14.3. The results are very similar to those presented in the main paper, with family firms being more resilient than non-family firms in the face of a coronavirus pandemic. Similarly, family firms that chose innovative products prior to the pandemic were less resilient. Family firms that chose to innovate in new markets prior to the pandemic performed better than non-family firms in adapting to remote work. Surprisingly, the positive effect of internal innovation investment in the relationship between family ownership and adaptation is no longer evident. In addition to this, family management has a negative impact on adaptation for both online and teleworking indicators. Specifically, family firms adapt well to the teleworking indicator when the proportion of family members is between 50 and 74 per cent. However, when this percentage exceeds 75 per cent, family businesses are less well adapted. This is clearly in conflict with the findings of our main paper. The underlying reason may be that this measure dependent variables in different ways.

Table A14.1 Robust test: Marginal effects for equation (1)

	Business online	Adaption of delivery	Adaption of remote work
Family firm	0.0460***	0.0538***	0.0392***
	(0.00907)	(0.00953)	(0.0112)
Product innovation	0.0779**	0.0950***	0.135***
	(0.0327)	(0.0352)	(0.0361)
Process innovation	-0.0173	0.0215	-0.00589
	(0.0246)	(0.0293)	(0.0277)
New to market innovation	-0.00822	-0.00175	-0.0675**
	(0.0312)	(0.0339)	(0.0304)
Internal R&D spending	0.0450	0.00984	0.00838
	(0.0286)	(0.0287)	(0.0289)
External R&D	-0.0385	0.000308	0.0300
	(0.0283)	(0.0376)	(0.0397)
External knowledge	0.0706**	-0.00164	0.0570*
	(0.0333)	(0.0307)	(0.0341)
Family firm*Product innovation	-0.0302	-0.0658**	-0.0886***
	(0.0273)	(0.0266)	(0.0277)
Family firm*Process innovation	0.0280	-0.0305	0.0124
	(0.0300)	(0.0259)	(0.0303)
Family firm*New to market innovation	0.0477	0.0561	0.103**
	(0.0388)	(0.0415)	(0.0449)
Family firm*Internal R&D spending	-0.169***	-0.0598**	-0.0476*
	(0.00690)	(0.0237)	(0.0272)

Family firm*External R&D	0.215***	0.00577	-0.0121
	(0.0616)	(0.0414)	(0.0385)
Family firm*External knowledge	0.0231	0.0321	0.00472
	(0.0313)	(0.0360)	(0.0325)
Innovation in crisis	0.412***	0.376***	0.158**
	(0.0742)	(0.0744)	(0.0740)
Family firm*Innovation in crisis	-0.0394	-0.0346	0.0270
	(0.0357)	(0.0394)	(0.0623)
Management practice	-0.00443	-0.0239**	0.00244
	(0.00922)	(0.0101)	(0.0101)
Family firm*Management practice	0.0140	0.0274***	0.0140
	(0.00928)	(0.0101)	(0.0102)
Loan	0.00565	0.00962*	0.0109*
	(0.00551)	(0.00569)	(0.00630)
Manager experience	-0.000918***	-0.000336	0.000294
	(0.000253)	(0.000254)	(0.000191)
Location in capital or city with pop > 1 m	-0.143***	0.0552***	0.0485***
	(0.0116)	(0.0168)	(0.0184)
Location in city with pop. 250 k–1 m	-0.121***	0.0415**	0.0676***
	(0.00865)	(0.0183)	(0.0204)
Location in city with pop. 50–250 k	-0.0862***	0.0992***	0.102***
	(0.00911)	(0.0210)	(0.0221)
Location in city with pop. 50–250 k	-0.0540***	0.146***	0.119***
	(0.0105)	(0.0240)	(0.0240)
Foreign involvement	-5.40e-05	-0.000252*	0.000436***
	(0.000139)	(0.000152)	(0.000145)
Firm size	0.00688**	0.00802**	0.0322***
	(0.00304)	(0.00317)	(0.00340)
Firm age	0.00645	0.00922*	0.0198***
	(0.00471)	(0.00489)	(0.00517)
Exporting	-0.000381**	-0.000175	0.000220
	(0.000175)	(0.000184)	(0.000179)
Competition	-0.000137	0.00172	-0.0119***
	(0.00173)	(0.00178)	(0.00197)
International market	0.0168	-0.0586***	0.0869***
	(0.0136)	(0.0109)	(0.0159)
National market	0.0333***	-0.0175***	0.0720***
	(0.00601)	(0.00605)	(0.00715)
Observations	18140	18140	18140
Log likelihood	1313.29	767.29	-8686.3012
LR chi2(25)	-7318.3037	-7647.4518	1283.28
Prob > chi2	0.0000	0.0000	0.0000

Note:
(1)Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1
(2)All models include country and industry effect
(3)Reference category is construction.

Table A14.2 Robust test: Marginal effects for equation (2)

	Business online	Adaption of delivery	Adaption of remote work
Family management	-0.000198**	1.51e-05	-0.000643***
	(8.45e-05)	(9.00e-05)	(9.47e-05)
Product innovation	0.0429***	0.0169	0.0278**

	(0.0103)	(0.0104)	(0.0113)
Process innovation	0.00888	-0.0113	0.00473
	(0.00859)	(0.00849)	(0.00927)
New to market innovation	0.0388***	0.0547***	0.0224*
	(0.0121)	(0.0130)	(0.0129)
Internal R&D spending	-0.165***	-0.0532***	-0.0430***
	(0.00511)	(0.0108)	(0.0117)
External R&D	0.150***	0.00613	0.0166
	(0.0256)	(0.0160)	(0.0159)
External knowledge	0.0995***	0.0307***	0.0621***
	(0.0136)	(0.0117)	(0.0125)
Management practice	0.0102**	0.00365	0.0129***
	(0.00410)	(0.00430)	(0.00455)
Innovation in crisis	0.338***	0.317***	0.196***
	(0.0235)	(0.0229)	(0.0227)
Loan	0.00501	0.00970	0.0141**
	(0.00586)	(0.00609)	(0.00668)
Management experience	-0.000934***	-0.000195	0.000308
	(0.000270)	(0.000275)	(0.000302)
Location in capital or city with pop > 1 m	-0.147***	0.0486***	0.0494**
	(0.0128)	(0.0181)	(0.0196)
Location in city with pop. 250 k–1 m	-0.125***	0.0333*	0.0675***
	(0.00931)	(0.0194)	(0.0218)
Location in city with pop. 50–250 k	-0.0887***	0.0931***	0.105***
	(0.00984)	(0.0224)	(0.0236)
Location in city with pop. 50–250 k	-0.0565***	0.136***	0.120***
	(0.0113)	(0.0255)	(0.0256)
foreign_owner	-0.000106	-0.000194	0.000254
	(0.000153)	(0.000165)	(0.000159)
Firm size	0.00539	0.00818**	0.0313***
	(0.00329)	(0.00344)	(0.00366)
Firm age	0.00889*	0.0102*	0.0236***
	(0.00507)	(0.00530)	(0.00584)
Exporting	-0.000485**	-0.000224	0.000139
	(0.000188)	(0.000198)	(0.000191)
Competition	-0.000286	0.00197	-0.0131***
	(0.00185)	(0.00192)	(0.00211)
International market	0.0215	-0.0577***	0.0983***
	(0.0147)	(0.0118)	(0.0172)
National market	0.0324***	-0.0212***	0.0758***
	(0.00640)	(0.00649)	(0.00761)
Observations	16171	16171	16171
Log likelihood	-6583.4525	-6944.9357	-7752.6867
LR chi2(25)	1206.58	649.41	1212.16
Prob > chi2	0.0000	0.0000	0.0000

Note:

(1)Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1

(2)All models include country and industry effect

Table A14.3 Robust test: Marginal effects for equation (2)

	Business online	Adaption of delivery	Adaption of remote work
Family management dummy(25%-49%)	-0.00171	0.0201	0.00853
	(0.0175)	(0.0197)	(0.0194)
Family management dummy(50%-74%)	0.0102	0.0148	0.0310**
	(0.0113)	(0.0122)	(0.0128)
Family management dummy(75%-100%)	-0.0124	0.00695	-0.0439***
	(0.00896)	(0.00927)	(0.0103)
Product innovation	0.0430***	0.0171	0.0280**
	(0.0103)	(0.0104)	(0.0113)
Process innovation	0.00888	-0.0113	0.00512
	(0.00860)	(0.00849)	(0.00927)
New to market innovation	0.0388***	0.0544***	0.0223*
	(0.0121)	(0.0130)	(0.0129)
Internal R&D spending	-0.165***	-0.0530***	-0.0442***
	(0.00510)	(0.0108)	(0.0117)
External R&D	0.150***	0.00584	0.0154
	(0.0256)	(0.0160)	(0.0159)
External knowledge	0.0996***	0.0307***	0.0635***
	(0.0136)	(0.0117)	(0.0125)
Management practice	0.0105**	0.00370	0.0135***
	(0.00411)	(0.00430)	(0.00455)
Innovation in crisis	0.338***	0.317***	0.196***
	(0.0235)	(0.0229)	(0.0227)
Loan	0.00483	0.00960	0.0132**
	(0.00586)	(0.00610)	(0.00668)
Manager experience	-0.000938***	-0.000201	0.000283
	(0.000270)	(0.000275)	(0.000302)
Location in capital or city with pop > 1 m	-0.148***	0.0476***	0.0463**
	(0.0128)	(0.0181)	(0.0196)
Location in city with pop. 250 k–1 m	-0.126***	0.0318	0.0628***
	(0.00928)	(0.0194)	(0.0216)
Location in city with pop. 50–250 k	-0.0895***	0.0918***	0.102***
	(0.00981)	(0.0223)	(0.0235)
Location in city with pop. 50–250 k	-0.0577***	0.134***	0.116***
	(0.0113)	(0.0254)	(0.0255)
foreign_owner	-8.55e-05	-0.000176	0.000328**
	(0.000153)	(0.000166)	(0.000159)
Firm size	0.00513	0.00798**	0.0305***
	(0.00330)	(0.00345)	(0.00366)
Firm age	0.00908*	0.0103*	0.0240***
	(0.00507)	(0.00530)	(0.00584)
Exporting	-0.000473**	-0.000220	0.000163
	(0.000189)	(0.000198)	(0.000191)
Competition	-0.000174	0.00201	-0.0127***
	(0.00185)	(0.00192)	(0.00211)
International market	0.0208	-0.0581***	0.0965***
	(0.0147)	(0.0118)	(0.0171)
National market	0.0321***	-0.0214***	0.0747***
	(0.00640)	(0.00649)	(0.00761)
Observations	16171	16171	16171
Log likelihood	-6582.1202	-6943.8965	-7737.8977
LR chi2(25)	1209.25	651.49	1241.74
Prob > chi2	0.0000	0.0000	0.0000

Note:
(1)Standard errors in parentheses*** p<0.01, ** p<0.05, * p<0.1
(2)All models include country and industry effect
(3)Reference category is family management dummy (0-24%)

APPENDIX A15 Discussion of Control Variables for Chapter 5

In addition to the key variables considered above, the models control for several indicators that are known to influence the resilience of a firm in a crisis. Foreign ownership means that firms have access to advanced technologies that are foreign owned and may lead to more innovation, thus increasing their chances of resilience in times of crisis (Baldwin and Yan, 2012). Also acknowledged in much of the empirical literature is that firms involved in exporting can achieve higher innovation intensity and productivity, thereby increasing their resilience potential over non-exporting firms (ALI et al, 2020; Mas-Verdú et al., 2015; Inui et al., 2017). It is thought that experienced managers are more likely than less experienced managers to have a strong introspective tendency to look for alternatives to the firm's adversities, thus helping the firm to have a better chance of adaptability in complex situations (Renko et al., 2021). Firms with financing obstacles are more likely to exit the market in a crisis, so this study measure whether firms faced financial obstacles by an inability to access loads before the pandemic (Khan et al., 2022). In addition, this study follow Crowley and Jordan (2017) in controlling for the strengths of firms operating in urbanized economies by creating four dummy variables with different population sizes (see Table 5.1 for definition details). Existing literature identifies the positive impact of competition on healthier organizational performance (Mubeen et al.,2016; Sheikh, 2018; Javeed et al.,2020). Therefore, the degree of competition is expressed

in natural logarithmic form using "number of competitors of the establishment's main product faced in their main market" which coincides with the same measurement employed by Crowley and Jordan (2017). Industry-level effects and the impact of policies adopted by different countries on firm resilience during the pandemic are also controlled for by including industry and country dummy variables (Mills & Rüttenauer, 2022). Finally, firm characteristics such as firm age and firm size are included as control variables (Garrido-Prada et al., 2021). This is because larger and/or older companies are likely to have more resources for innovation and will have more experience in dealing with crises (Leary & Roberts, 2005; Blazenko & Yeung, 2015; Buchheim et al., 2020).

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