Family Involvement, Capabilities and Innovation: Evidence from Spain

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Abstract

Previous scholarly research argues about the presence of "the ability and willingness paradox" in family firm innovation. That is, family firms, despite having an ability to innovate, show lower willingness to engage in technological innovation. Utilizing a sample of Spanish manufacturing firms for years from 1991 to 2011, we test how family involvement impacts on family firm's capabilities and innovation. Our results reveal that higher family involvement significantly diminishes the positive impact of the superior capability to transfer and adopt knowledge (measured by its relative proportion of engineers and graduates over the total personnel of the company) on family firm product innovation. But we find a contrary effect of family involvement on the superior technological capability and product innovation, as well as, on the superior capability to facilitate technical equipment and process innovation. In both cases, family involvement strengthens the family firm's probability to innovate. Hence, we argue that the source of family firm's unwillingness to innovate in products lies in the challenges related to delegating some strategic decisive power to the non-family employees. Even if those employees are highly qualified and can help a family firm to succeed in its product innovations.

Keywords

Family involvement; Socioemotional wealth, Capabilities; Innovation

1. Introduction

Previous scholarly research theorized that family firms have the ability yet lower willingness to engage in technological innovation (Carney, 2005; Chrisman, Chua, De Massis, Frattini, & Wright, 2015). More specifically, Chrisman et al. (2015) claim that family firms have the "discretion" but not a "disposition to act" innovatively. One traditional explanation is that family firms favor strategic actions that preserve the families' control over economic profits, and all this, at the expense of promising innovations (Kotlar, De Massis, Frattini, Bianchi, & Fang, 2013). Family firms, despite having relevant resources, tend not to allocate those resources in innovative projects. In this line, Chrisman et al. (2015) argue that contrary to what some management theories would have predicted, the ability is not always accompanied by the willingness in family firms (Chrisman et al., 2015; Chrisman & Patel, 2012). Family business literature has attempted to tackle this unwillingness by providing explanations like the risk aversion, the hiring of family members over skilled professionals, or the reluctance to share control with outsiders (Fang, Memili, Chrisman, & Penney, 2016; Minichilli, Corbetta, & MacMillan, 2010). Nevertheless, the organizational goals pursued within family firms like long-run investment horizon, or firm reputation, have been shown as important determinants of innovation (Berrone, Cruz, & Gomez-Mejia, 2012; De Massis, Kotlar, Frattini, Chrisman, & Nordqvist, 2016). In addition, the resource-based view perceives family firm advantages as specific to a given family and its organizational processes (Barney, 2001; Habbershon & Williams, 1999).

Family firms constitute a large portion of firms within an economy (Nordqvist & Melin, 2010). They show higher commitment to traditional product lines, and tend to treat their products as a reflection of the family brand and quality. Therefore, product innovation that allows for a continuous improvement of the brand, and which may also increase product quality or decrease its production costs, or both, can be expected to play an important role as a strategic tool to sustain competitive advantage. In addition, process innovation serves to produce new or improved products or to increase the production efficiency of existing products by using non-conventional production methods. In this context, expanding our knowledge about how a specific family firm moderates its ability and willingness to innovate, becomes relevant for the development of individual firms, and also for the economy as a whole (Hatak, Kautonen, Fink, & Kansikas, 2016). A question arises as to how does family involvement impact on those firm's capabilities,[1] which play a role in enhancing its product and process innovation?

To answer this question, we utilize the capabilities framework developed by Teece, Pisano and Shuen (1997), which has been further examined by Pisano (2016). More precisely, Pisano (2016) claimed that firms possess a continuum of capabilities that span from a highly general-purpose to highly market-specific, and both types can become either complements or substitutes. Hence, family firms possess a continuum of capabilities that can help enhance their product and process innovation. Miller and Le Breton-Miller (2006) provide some examples of the positive governance choices in family firms in terms of their commitment to build and sustain capabilities. Precisely, they pointed out on the importance of factors like the long-term tenures, learning and farsighted investment in the family firm innovation. In addition, Lee and Kelley (2008) supported a view that the prominent capability that an organization can maintain for innovation is "the ability to learn and improvise". Following this approach, we have constructed some measures of family firm's capabilities that can explain their product and process innovation. These measures are the following: (1) the capability to transfer

[1] Abilities tend to come in degrees, whereas capabilities tend to be either-or propositions; in this study we test how family involvement impacts on a firm's superior capabilities to innovate, which corresponds to family firm's higher degree abilities.

and adopt knowledge; (2) the technological capability; (3) the capability to facilitate technical equipment. Complying with a common practice in measuring those superior capabilities, we use their relative measures (as compared to a specific industry average) (García, Avella, & Fernández, 2012).

In sum, our study extends prior literature by examining the moderating effect of family involvement on the relationship between firm's superior capabilities and the firm-level product and process innovation, while controlling for family firm-specific unobservable factors. Family firm-specific governance and organizational processes affect firm's capabilities and technological innovation (Kotlar et al., 2013). Scholars theorized that they do it in a way that family firms despite having an ability to innovate, may not achieve higher innovative outcomes. For this reason, to identify those crucial capabilities that impact on family firm technological innovation, family owners and managers should attempt to take better informed strategic decisions. We aim to support family business practitioners in this process, and we offer an investigation on the impact of family involvement on family firm's capabilities and technological innovation. For this purpose, we use a sample of Spanish manufacturing firms for the period from 1991 to 2011 collected within the Survey on Business Strategies (Encuesta sobre Estrategias Empresariales) conducted by the National Bureau of Industrial Activity Foundation (Fundación SEPI) and with the support of the Spanish Ministry of Industry. Our findings show statistically significant support for our argument concerning the impact of family involvement on the relationship between firm's capability to transfer and adopt knowledge and product innovation. That is, with an increasing family involvement, family firms exhibit a decline in the usage of their superior capability to transfer and adopt knowledge to enhance product innovation. But in terms of family firm's technological capability and product innovation, and also the capability to facilitate technical equipment and process innovation, we find that both capabilities are allocated appropriately to enhance firms' technological innovation even at the higher levels of family involvement.

The remainder of the paper is structured as follows. Section 2 develops a theoretical framework of analysis. Section 3 describes the data and section 4 presents the empirical model. Section 5 shows the results. Section 6 discusses the findings, and section 7 offers conclusions.

2. Literature Review

2.1. Family Involvement and Technological Innovation

Family firms are exposed to complex governance challenges. On one hand, family involvement may minimize the agency problems present in an organization (Schulze, Lubatkin, & Dino, 2003) but, on the other hand, it may also jeopardize a family firm by contributing to the entitlement of family employees, double moral hazard, and power fights in the succession process (Meier & Schier, 2016; Schulze et al., 2003). More precisely, a family principal typically shows a long-term orientation, and has a great incentive to increase firm's value (Anderson, Mansi, & Reeb, 2003; Peng & Jiang, 2010). In addition, familiness as an important part of family firm's resource portfolio (Hatak, Kautonen, Fink, & Kansikas, 2016) determines the strategic behavior of family firms (Chrisman et al., 2015; Habbershon & Williams, 1999), and also their attitude towards innovation (Carney, 2005). Nevertheless, the presence of familiness may also bring some negative consequences to the firm as we have mentioned earlier. As a result, the benefits gained by the family involvement may be offset by family members' free riding, entitlement to use firm's resources for private benefits, or parents' inability to monitor and discipline employed offspring (Meier & Schier, 2016; Schulze et al., 2003). Despite the fact that kinship can urge family members employed in a family firm to pursue first-best actions for the whole family, some personal conflicts between different family members can be transferred on the whole firm, and cause a divergence of interests and, as a consequence, the presence of a double moral hazard problem.

Previous scholarly research had assumed that family firms bring fewer product innovations to market (Hatak et al., 2016) and made little investment in new technologies (Block & Jaskiewicz, 2007; Chrisman & Patel, 2012; Kotlar et al., 2013). In other words, the traditional view is that family firms behave rather conservatively and show unwillingness to allocate resources outside of known patterns (König, Kammerlander, & Enders, 2013), hence innovate. In particular, the socioemotional wealth (SEW) approach provides some explanations to this "ability and willingness paradox" in family firm innovation. It argues that "family owners frame problems in terms of assessing how actions will affect socioemotional endowment" (Berrone et al., 2012). These authors reason that "any threat to SEW means that the family is in a "loss mode" and, therefore, will make strategic choices that will avoid these potential SEW losses" (Berrone et al., 2012). Therefore, the innovation's role as a strategic tool to achieve a competitive advantage may not be unitary viewed by family owners and managers. As innovation entails significant risk, requires a strong commitment of resources, and takes time to produce tangible outcomes, then some family firms, as a result, may view it as a threat to their SEW endowment. However, as we have mentioned above, familiness equips a firm with a unique bundle of complex, intangible and non-substitutable resources (Barney, 2001) that may help family firms to deal with those negatives that an innovation brings with itself. In sum, we argue that in spite that some family firms to preserve their own SEW, may undertake decisions that can harm their product and process innovation, other family firms characterized by strong brands or operating in traditional industries may view innovation as an opportunity to achieve competitive advantage. Taking into account all this, we theorize that the advantages grounded in familiness can effectively balance out the family SEW concerns, finally also positively affecting on family firm technological innovation. Hence, we propose to test:

H1. Family involvement positively impacts on a family firm's technological innovation.

2.2. Family Involvement, Capabilities and Technological Innovation

Family business scholars attempt to better understand how family firms can utilize the advantages of family involvement and create multigenerational success (Habbershon & Williams, 1999). The resource based view (RBV) provides an established theoretical model to analyze the relationships among firm-level processes, assets, strategy, performance, and sustainable competitive advantage for the family firm (Barney, 2001). Furthermore, Teece et al. (1997) have developed the dynamic capabilities framework providing some guidelines to tackle the issue of the firm-level capability differences. Following this approach, a firm capability has been defined as "a collection of routines that enable an organization to perform some activity on a consistent (repeatable) basis" (Winter, 2003). The evidence in the field of product development and operational performance shows that some organizations pioneer in terms of creating and maintaining those capabilities that lead to a sustained competitive advantage (Pisano, 2016). In addition, this line of work has shown that beyond the capabilities' formation some firms are more capable to renew their skills and competences.

The dynamic capabilities framework has conjectured that firm level differences in capabilities are rooted in three factors: "asset positions", "processes" and "paths" (Teece, Pisano, & Shuen, 1997). More precisely, the term "assets" broadly defines the legacy resources (knowledge, technical skills, organizational competences, etc.) that shape the firm's options for future capability expansion. The "processes" describe firm's ability to "reconfigure" their asset positions by investments and other managerial interventions.

Nevertheless, a firm's capacity to "reconfigure" is not unlimited, and it depends on a set of 'higher-order' routines (like governance structures, resource allocation processes, management systems, etc.) that shape organizational adaptability. Finally, "paths" are defined as the firm's commitment over time through a series of coordinated investments to develop necessary capabilities in order to attain a competitive advantage. Pisano (2016) argues that "paths" stand in the center of the dynamic capabilities formation, as they are a result of cumulative actions taken in firms and cannot be formed in discrete projects.

In the context of a family firm, we argue that the controlling family discretion in the selection of paths - along with the constraints imposed by pre-existing asset positions within the family firm and the processes for reconfiguration driven by the family involvement - can lead to significant differences in their capabilities, and in turn to the heterogeneity in family firms' technological innovation. As a result, this study provides guidelines as to how family firms should select their "paths" to achieve a competitive advantage, particularly while engaging in product and process innovation.

The capability identification, selection, and formation are important strategic decisions (Teece et al., 1997). In previous research works, some authors could explain firm's innovation through firm's ability to transfer and adopt knowledge, their choice related to investment in R&D, and the firm's ability to facilitate technical equipment that allows for an interrupted and efficient use of firm's resources (Chen & Hsu, 2009; De Massis, Frattini, & Lichtenthaler, 2012; Haas & Hansen, 2005). More precisely, the evidence shows that organizations often lack expertise in the management of knowledge transfer and fail to realize its potential (Szulanski, Ringov, & Jensen, 2016). Recent evidence suggests that knowledge transfer remains poorly managed as organizations continue to make inefficient knowledge transfer investments and often fail to transfer valuable practices and capabilities (Szulanski et al., 2016). In sum, the challenge of knowledge adoption and transfer remains complex. It resides in organizational members, tools, tasks, and their subnetworks and much knowledge in organizations is tacit or hard to articulate. Having a superior capability to transfer and adopt knowledge positions a firm (and also a family firm) at the frontier of the cutting edge innovative firms. Hence, to measure a firm's superior capability to transfer and adopt knowledge, we use a proxy that captures its relative proportion of engineers and graduates over the total firm personnel.

In relation to firm's superior technological capability, R&D investments have been used to proxy for firms' technological and intangible capabilities (García et al., 2012). In fact, some knowledge may only be acquired by engaging in active research in that specific field (Freeman, 1982). Thus, one's own R&D investments facilitate the understanding of others' discoveries and play a key role in the assimilation and absorption of new technologies. In other words, R&D investments improve a firm's ability to assimilate, combine and use existing and new knowledge (Cassiman & Veugelers, 2006, Cohen & Levinthal, 1989). In this study, to measure firm's superior technological capability, we use a proxy that captures its firm's relative R&D expenditures over firm's sales.

Finally, our proposition includes a measure of firm's superior capability to facilitate technical equipment. Previous scholarly research provides a support for a positive correlation between the total productive maintenance and business performance (Brah & Chong, 2004). Hence, there exist various maintenance functions in an organization and a number of factors that breed complexity in maintaining operations. Firms (and also family firms) need to develop their own strategic, tactical and operational aspects of maintenance and structures to help complete the tasks at each of the organizational levels efficiently. Proper maintenance helps to keep the life cycle cost down and ensures proper operations and smooth internal logistics (Waeyenbergh & Pintelon 2002). More and more organizations are seeking proactive tools to effectively facilitate their technical equipment in order to enhance their competitive position. Hence, the superior capability to facilitate technical equipment can help a firm to maintain a competitive advantage (McKonea, Schroeder & Cuab, 2001). In this study, we measure firm's superior capability to facilitate technical equipment by using a proxy that captures the relative proportion that the purchases and large repairs on equipment (for information processing, industrial machinery, tools and technical facilities, rolling stock and furniture, office equipment and other tangible fixed assets) represent on added value.

In sum, the three types of capabilities, as presented above, play a crucial role to help a firm sustain its competitive advantage. The capability to transfer and adopt knowledge has been proved as an important "asset position" that a firm should possess "to shape its options for future capability expansion". Hence, highly skilled professionals like engineers and graduates due to a track record of their ability to absorb and utilize complex knowledge can become the core element of this type of capability for any firm. Furthermore, we view that the technological capability and the capability to facilitate technical equipment become the "processes" part within a firm, as both capture firm's ability to "reconfigure" their asset positions by investments. Those investments as a result of resource allocation processes and management systems within firms. We argue that they uniquely capture the firm's superior capabilities that facilitate technological innovation, and are complements. More precisely, higher expenditures on R&D over firm's sales indicate firm's engagement in acquiring knowledge to sustain their technological innovation. However, that engagement condition on the maintenance of technical equipment and tools necessary to successfully assimilate the acquired technology into organizational routines and processes. We find important to differentiate between those three capabilities to determine the variety of firm's "asset positions", "processes" and "paths" required to achieve technological innovation.

Nevertheless, we argue that family firms despite possessing those superior capabilities mentioned above, due to their paradoxical behavior, do not seem to be willing to engage in technological innovation. Some scholars have argued that a family firm innovation paradox is partially a function of situational factors (Chrisman et al., 2015). A specific combination of factors like the relative importance of control, survival, profitability, intra-family succession, identity (and reputation), emotional attachment, and social ties (Berrone et al., 2012) may lead to different amounts and types of innovation activities within family firms. In addition, Chrisman et al. (2012) show that although family owners have the power and legitimacy to commit a superior level of resources to R&D in comparison with nonfamily firms, most do not do so and whether they do that or not depends on their willingness (Chrisman & Patel, 2012). In fact, they find that a concern for current control and performance that exceeds aspirations result in lower investments for family firms compared with nonfamily firms. Furthermore, we argue that the higher family involvement in a family firm the stronger those negative effects of the SEW. Thus, a presence of a myopic loss aversion within a family firm (Chrisman & Patel, 2012) can also extensively diminish their technological innovation. Thus, we hypothesize:

H2a. There is a negative interaction effect between family involvement and the capability to transfer and adopt knowledge. That is, the higher involvement of family owners and managers in a family firm, the lower the probability (willingness) that this family firm engage in technological innovations.

H2b. There is a negative interaction effect between family involvement and the technological capability. That is, the higher involvement of family owners and *managers in a family firm, the lower the probability (willingness) that this family firm engage in technological innovations.*

H2c. There is a negative interaction effect between family involvement and the capability to facilitate technical equipment. That is, the higher involvement of family owners and managers in a family firm, the lower the probability (willingness) that this family firm engage in technological innovations.

Insert Figure 1 about here

3. Data

To test our hypotheses, we use the data from the Survey on Business Strategies (Encuesta sobre Estrategias Empresariales - the ESEE data), which contains primary data from a yearly survey conducted by the National Bureau of Industrial Activity Foundation (Fundación SEPI) supported by the Spanish Ministry of Industry. The survey was designed to gather data from a representative sample (by size and industry) of the population of manufacturing firms in Spain. We were able to gather data from 1991 to 2011. Throughout these 20 years some firms have quitted participating in the survey for various reasons. However, a representative sample of newly created firms in Spain from 1991 onwards has been included in the ESEE on a yearly basis. As a result, our initial sample consists of an unbalanced panel of 5,304 firms from 1991 to 2011. However, we have lost some data for several firms given the restrictions imposed by our statistical method and due to missing data for some variables. Therefore, our final unbalanced sample is reduced to 3,266 firms and 31,674 firm-year observations. Table 1 presents the industry breakdown and some descriptive statistics for the firms in our final sample.

Insert Table 1 about here

Dependent variables

This study focuses on family firm's ability and willingness to innovate. Scholars argued that "the anatomy of the product innovation process differs between family and nonfamily firms" (De Massis, Frattini, Pizzurno, & Cassia, 2015). To measure family firm's product innovation we utilize two different measures in our models. First, we use a binary variable which indicates whether the company has achieved product innovations during the financial year. Second, we apply a dependent variable that measures a number of product innovations achieved at time *t*. This variable is a count with a minimum value of 0 and the maximum value of 950 product innovations. Finally, we also use a binary dependent variable that indicates whether a firm has achieved process innovations during the financial year.

Independent variables

The founding family plays a distinguished role within a family firm by defining a firm's vision, imposing a control mechanism over the firm, and by the creation of unique resources and capabilities (Chua, Chrisman, & Sharma, 1999; Sharma, 2004). The ESEE database, however, does not include a direct measure of family vision and goals. The prior research had assumed that family vision and goals are highly correlated to the extent of family involvement in the firm (Gomez-Mejia, Makri, & Larraza-Kintana, 2010). This assumption has also received some empirical validation (Chrisman & Patel, 2012; Kotlar et al., 2013). We adopt this view and to measure the family vision and goals utilize a measure which provides information about a number of the owners and owner's relatives who occupy top managerial positions in family firms. Furthermore, to validate robustness of our result we use this variable interchangeably with a measure of family involvement in our sample that beyond those family owners and managers includes a number of other relatives who work on lower rank positions in family firms in time *t*. In fact, the variable number of family owners and managers and the working relatives captures the higher degree of family involvement in firms from our sample.

Furthermore, we also include a categorical variable to indicate whether the family firm is diversified or not, and in the latter case, whether the diversification is related or not. This variable may take three categories, based on the CNAE-09 classification. It takes the value 0 if a company is not diversified (only defines one product at 3 figures), or value 1 if a company has a related diversification (defines more than one product at 3 figures and these are in the same sector at 2 figures), and finally, a value 2 if a company has a non-related diversification (defines more than one product at 3 figures and some of them are in a different sector at 2 figures). The family firm's ability to implement innovation strategies and its willingness to engage in different types of innovation had been shown to depend on different governance configurations in terms of, for example, board composition, family involvement in management, and business groups, combined with different types and amounts of diversification and internationalization (Chrisman et al., 2015). Hence, family firms are found to be more willing to diversify as business risk increases (Gomez-Mejia et al., 2010). Berrone et al. (2012) argue that diversification reduces the family's SEW by appointing non-family members to various business units, reducing family influence over the units, decreasing centralization of decision making, and the like. As a result, it also explains family firm innovation.

Finally, we also include some measures of firm capabilities in our estimation models. In particular we consider: (1) the capability to transfer and adopt knowledge (measured by the relative proportion of engineers and graduates over the total personnel of the company); (2) the technological capability (measured by its relative R&D expenditures); (3) the capability to facilitate technical equipment (measured by the relative proportion of the purchases and large repairs on equipment for information processing, industrial machinery, tools and technical facilities, rolling stock and furniture, office equipment and other tangible fixed assets, over the total added value). To distinguish between more capable firms and less ones, we rely on the relative capabilities measures as compared to a specific industry average. That is, we compare the focal firm's capabilities as measured by its relative proportion of engineers and graduates, R&D expenditures and its proportion which the purchases and large repairs on their tangibles represent the on added value, to the average of all firms in its industry. Finally, we build three new dummy variables to compare a given capabilities intensity to its industry average; we subtract the average of each capability for industry *j* at time *t* from the specific capability of firm *i* from industry *j* at time *t*. This relative measures serve as indicators of the firm's standing compared to the average firm within the same industry in Spain. Consistent with our previous arguments, positive (or zero) values of those variables indicate that the firm is a pioneer in its industry, whereas negative values indicate that the firm is a laggard in such industry.

Control variables

We control for other factors that could systematically affect technological innovation in family firms. First, we introduce the variable R&D intensity. As it is a common practice in the literature, we define R&D intensity as the R&D expenditures of firm *i* at time *t*, divided by its sales at time *t*. Second, we know that firms that engage in export activities innovate with a higher probability. Therefore, we include a variable that captures firms' export intensity, defined as the percentage which the exports made by the company represent of total sales. Third, the firm size has an impact on firm's innovation. A variable that captures the firm size in our sample represents the number of total personnel employed at the company at time *t*. Both variables "export intensity" and "number of employees" due to their skewed distribution enter our estimation models in a log-linear form. Forth, we include variables like “market dynamism” and “competition” to control for specific environmental determinants of the Spanish market. The variable “market dynamism” is categorical and classifies the company according to the value of the Markets’ Dynamism Index during the year (i.e., category 1 stands for a recessive market; category 2 for a stable market; and 3 for an expansive market). The variable “competition” indicates the number of competitors of the company in the main market for its products. It takes the value of 1 if the number of competitors is less than 10; 2 if it is between 11 and 25; 3 for more than 25 competitors; and 4 if the market is atomized. Finally, dummies for each year and industry based on the sum of the 3-figures CNAE-09 codes are included in our estimations to control for temporal effects.

Moderation effects

In this study we are interested in determining how family involvement moderates the relationship between firm’s capabilities and technological innovation. To assess the moderating effect of family involvement on family firm’s capabilities and product innovation, we follow the methodology by Hoetker (2007). Thus, the explanatory variables in our estimation models have been mean-centered. We argue that a family firm in spite of having superior capabilities to innovate as compared to its counterparts in the same industry, will show unwillingness to allocate those capabilities in technological innovation.

4. Results

Due to the panel composition and binary nature of two dependent variables in our models, i.e., the product and process innovation, we estimate random-effects logit models. In relation to the dependent variable that measures the number of product innovations, we estimate a random-effects negative binomial regression since the dependent variable is a count.

Product innovation occurs on average in 22.37 percent of the firm-years, whereas the average number of product innovations implemented by the firms from our sample equals to 2.31. Process innovation seems to be a preferred type of innovation in the Spanish manufacturing firms. It occurs more frequently than product innovation, and on average in 32.40 percent of the firm-years. Spanish family firms show the average of 0.71 family owners and managers actively working in a family firm. Whereas the alternative measure of family involvement in our estimation models that serves the robustness check reports 0.9046 family related employees (it includes family owners, managers and also the other relatives working at lower ranks) in the firm. Table 2 presents the descriptive statistics and table 3 correlations for the variables used in our study.

Insert Table 2 about here

Insert Table 3 about here

Table 4 presents the results of the random-effects logistic regressions testing our hypotheses. Model 1 presents the results of the control variables. Model 2 adds the independent variables. Model 3 includes the interaction terms between family involvement and firm's capabilities. Models 4 and 5 present the results of our estimations testing for their robustness. That is, in those models the independent variable that represents the family involvement has been substituted by a continuous variable that counts the number of family owners and managers and other relatives employed in the firm. We follow the methodology by Hoetker (2007) to report and interpret the results of our logistic regression models. That is, for all of our significant independent variables, in addition to the coefficient, standard error, and level of significance, we also calculated the magnitude of the effect of a change in the variable (Hoetker, 2007) using values for each independent variable that were either one standard deviation below the mean and one standard deviation above the mean, or that were theoretically meaningful (Hoetker, 2007). We then calculated the average of the predicted value for changes in the independent variable for each observation in our model. For each model we report the change in the model fit using the change in the log-likelihood.

Hypothesis 1 predicts that family involvement would increase the likelihood of a firm's product innovation (*see tables 4-6, model 2*). In terms of family firm product innovation, the coefficient for family involvement equals 0.0722, and its marginal effect on the product innovation equals 5.85 percentage points. Similarly, testing the family involvement's impact on the number of product innovations, the coefficient equals 0.0386 with a margin of 3.29 percentage points. Finally, the result of estimation model testing the impact of family involvement on process innovation equals 0.0899, and its marginal effect on the process innovation equals 8.61 percentage points. All three coefficients are significant across models. Thus, we cannot reject hypothesis 1.

Hypotheses 2a, 2b and 2c predict that higher family involvement would moderate the firm's capabilities in such way that, finally, it diminishes the likelihood of family firm technological innovation (*see tables 4-6, model 3*). Testing for the likelihood of family firm product innovation, we found supporting evidence for the hypotheses 2a. Hence, we cannot reject hypothesis 2a. Our results, however, show the contrary to what we have theoretically predicted in relation to the hypotheses 2b and 2c. As a result, both are rejected.

More precisely, the coefficient for the interaction between family involvement and firm's capability to transfer and adopt knowledge on the firm's probability to innovate in products of -0.176 is significant at 0.01, and appears robust across models. As the family involvement within a firm moves from minus to plus one standard deviation, a firm's likelihood to innovate in products despite having a superior capability to transfer and adopt knowledge decreases from 2.84 percentage points down to -28.12 percentage points (i.e., a decrease of 25.28 percentage points). Whereas the coefficient for the interaction between family involvement and the technological capability on the firm's probability to innovate in products of 0.113 is significant at 0.05. As the family involvement within a firm moves from minus to plus one standard deviation, a firm's likelihood to innovate in products that have a superior technological capability increases from 17.70 up to 51.75 percentage points (i.e., an increase of 34.05 percentage points).

Insert Table 4 about here

In terms of the coefficient for the interaction between family involvement and firm's capability to transfer and adopt knowledge in terms of the number of product innovations of -0.0549 is significant at 0.05, and also appears robust across models. As the family involvement within a firm moves from minus to plus one standard deviation, a firm's likelihood to report a higher number of product innovations despite having a superior capability to transfer and adopt knowledge decreases from 11.10 percentage points down to -87.74 percentage points (i.e., a decrease of 76.64 percentage points).

Insert Table 5 about here

Finally, the coefficient for the interaction between family involvement and firm's capability to facilitate technical equipment on the process innovation of 0.168 is significant at 0.01, and robust across models. As the family involvement within a firm moves from minus to plus one standard deviation, a firm's likelihood to report a higher probability to innovate in their process while having a superior capability to facilitate technical equipment increases from 17.65 percentage points up to 55.60 percentage points (i.e., an increase of 37.95 percentage points).

Insert Table 6 about here

In order to present meaningful plots of the results, we calculated the predicted value for each observation in our sample at a number of meaningful levels of family involvement (from -3 s.d. to +3 s.d.) as well as either high or low capabilities. We then calculated the average of the predicted values at each level and plotted the results (Hoetker, 2007). Figures 2 to 5 graph all significant interactions. Figure 2 presents the results with respect to the likelihood of product innovation and the capability to adopt and transfer knowledge at lower and higher family involvement levels, whereas figure 3 corresponds to the likelihood of product innovation and the technological capability. Figure 4 shows the results of the interaction between the family involvement and the capability to adopt and transfer knowledge on the number of products innovations. Finally, figure 5 corresponds to the likelihood of process innovation and the capability to facilitate technical equipment at lower and higher family involvement levels.

The graphs of these interactions, in all cases mentioned above, suggest that the effects of family involvement on the firm's likelihood to innovate are moderated in different ways when there is a low and high proportion of family owners and managers employed in a family firm. Specifically, figures 2 and 4 show that in both instances the likelihood of engaging in product innovation (or multiple product innovations) decreases as family involvement increases. When a family firm owns a superior capability to transfer and adopt knowledge, the likelihood that a family firm has a higher willingness to innovate in products is not greater than when the firm has a lower capability to transfer and adopt knowledge, if the family involvement is high in those firms.

However, we find a contrary interdependency when plotting the impact of family involvement on the technological capability and product innovation, as well as, the impact of family involvement on the capability to facilitate technical equipment and process innovation. Figures 3 and 5 show that in both instances the likelihood of engaging in technological innovation increases as family involvement increases. More precisely, in those family firms with a superior technological capability, when more family owners and managers are actively working in the firm, we observe an increase in their probability to innovate in products. Similarly, in those family firms with a superior capability to facilitate technical equipment, when more family owners and managers are actively working in the firm, we observe an increase in their probability to innovate in processes. The SEW approach provides a possible interpretation for those results. Family firms are "not self-sacrificial and/or ignore financial issues" (Berrone et al., 2010). The main point of SEW is that when there is high family involvement, firms are more likely to bear the cost and uncertainty involved in pursuing certain actions, driven by a belief that the risks that such actions entail are counterbalanced by noneconomic benefits rather than potential financial gains. Hence, our results show that family owners and managers are unwilling to engage in product innovations when it dependents on firm's capability to adopt and transfer knowledge. It may be that family members do not trust their non-family employees to the extent that the economic benefits of product innovations do not counterbalanced the family SEW issues.

Insert Figure 2 about here

Insert Figure 3 about here

Insert Figure 4 about here

Insert Figure 5 about here

5. Discussion

The evidence suggests that managerial discretion can shape an organization's capabilities, however, such discretion is by no means unlimited (Pisano, 2016). In this study, we attempted to answer a question concerning the capability commitments, also called "paths", which family firms should deploy to enhance their technological innovation. Our results show that family firms do not always choose the strategy, which best exploit family firm's resources. In fact, family involvement negatively moderates the relationship between family firm's superior capability to transfer and adopt knowledge (measured by its relative proportion of engineers and graduates on the total personnel of the company) and product innovations. Family firms despite possessing the superior capability to transfer and adopt knowledge do not utilize it to increase their probability (and willingness) to innovate in products. In other words, family firms controlled by a larger number of family related owners and managers are unwilling to innovate in products, if the capability required to do so is dependent on firm's highly skilled personnel. On the other hand, we find that in terms of the technological capability and product innovation, as well as, the superior capability to facilitate technical equipment and process innovation, the family firm with higher family involvement in the workforce does experience an increase in the probability to innovate. Hence, this study uncovers the root causes of the unwillingness in family firm innovation. In fact, family owners and managers are hesitant to innovate in products and prefer to diminish firm's superior capability formed by its non-family highly skilled employees. It may be that family owners and managers are concerned about the shift of the family authority to the advantage of non-family workforce. They view non-family highly skilled employees as the competitors rather than effective collaborators. We argue that family firms, in order close the innovation gap with their non-family counterparts, should take more cautious decisions in the formation and allocation of their capabilities to transfer and adopt knowledge. One way that family firms could achieve it is by delegating some strategic decisions related to product innovation to their highly specialized employees. Szulanski et al. (2016) claimed that "investments in knowledge transfer capabilities rather than always increasing firm value may also be a cause of performance heterogeneity in firms that rely on complex, causally ambiguous knowledge for competitive advantage". Hence, product innovation is a rather knowledgeintense activity, and it requires a support of organizational processes like experimentation and creative methods (Hatak et al., 2016). Family firms implementing systematic efforts to create a more innovation-adept culture by delegating some decisive power to their non-family employees may outperform their non-family counterparts. Family firms have the ability to bring out the best in their workers (Moscetello, 1990). They can foster a greater employee care and loyalty utilizing their unique features (Ward, 1988), and inspire their workforce to become more innovatively proactive. Nevertheless, all this can only happen if family owners and managers have a willingness to (and can) take higher risks to delegating some strategic decisions related to innovation to their highly skilled non-family employees.

6. Conclusion

In this study we have attempted to increase family scholars' and business practitioners' understanding of how specific firm's capabilities are impacted by family involvement. We have analyzed "the ability and willingness paradox" through the lenses of the agency theory and the SEW approach, and we have sought to inform family firms about how to take better capability decisions and become more innovative. The dynamic capabilities framework argues that the choices about firm's capabilities are crucial to a firm's competitive advantage, and thus should be a focal point for any strategic analysis (Teece et al., 1997). Hence, we have demonstrated that family firms underperform in terms of allocating their superior capabilities to transfer and adopt knowledge to achieve product innovation. This study draws a recommendation that family businesses ought to take "paths" that can allow them to use their superior capabilities to adopt and transfer knowledge, and as a consequence, increase their "willingness" to innovate in products.

Furthermore, König, Kammerlander, and Enders (2013) claim that while family governance results in family firms adopting discontinuous technology later than nonfamily firms, when they do decide to adopt it, they implement this decision more rapidly. In this line, we argue that “breaking the ice” with innovation is one of the challenges that family firms can experience, and a better use of family firm’s capabilities ease the process. However, family firms should be aware of the fact that capabilities have an evolutionary character - they emerge from uncertain processes of search and experimentation - rather than a deterministic one (Lee & Kelley, 2008; Pisano, 2016).

We propose that additional research using sampling frames other than Spanish manufacturing firms is needed to extend the validity of our findings to firms outside Spain. A limitation of this study relies on the usage of secondary data sources. As a consequence, and similar to other studies, we have proxied the pursuance of family vision and goals by the number of family owners and managers (Chrisman & Patel, 2012; Gomez-Mejia et al., 2010). We encourage family business scholars to continue exploring “the ability and willingness paradox” of family firm innovation by taking a cross-country perspective on this phenomenon.

Figure 1: Research model

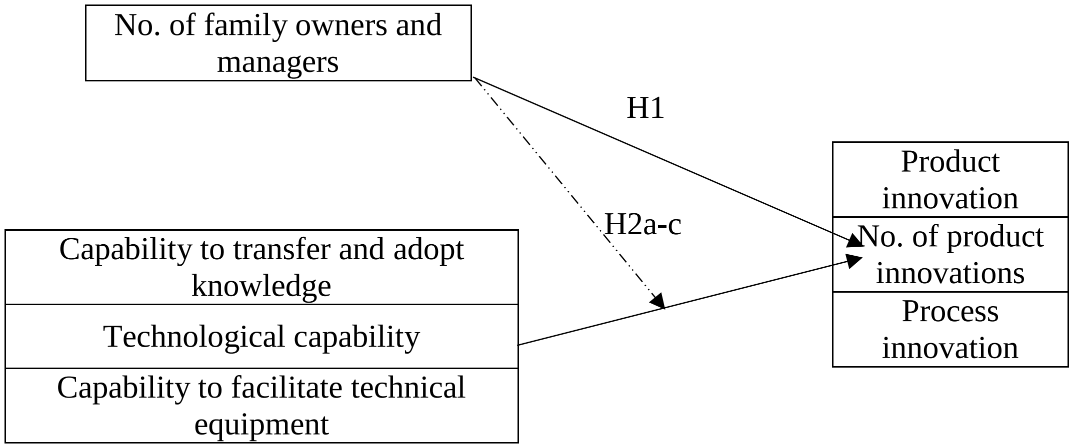

Figure 2: Family involvement on the capability to transfer and adopt knowledge and product innovation

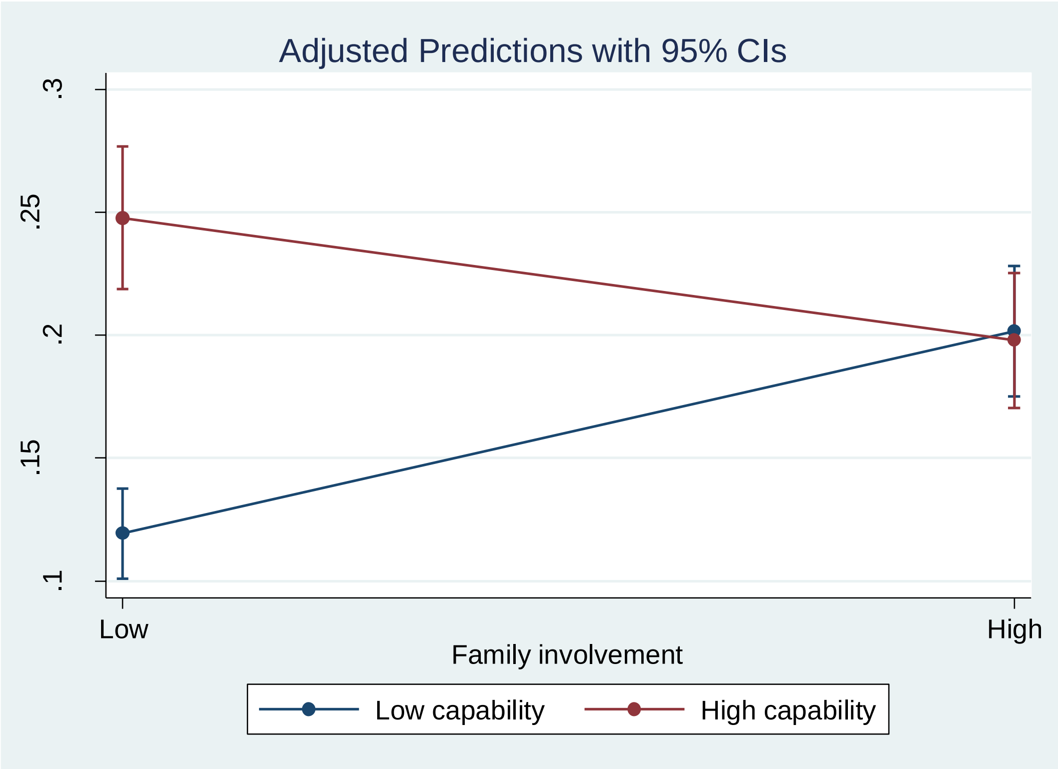

Figure 3: Family involvement on the technological capability and product innovation

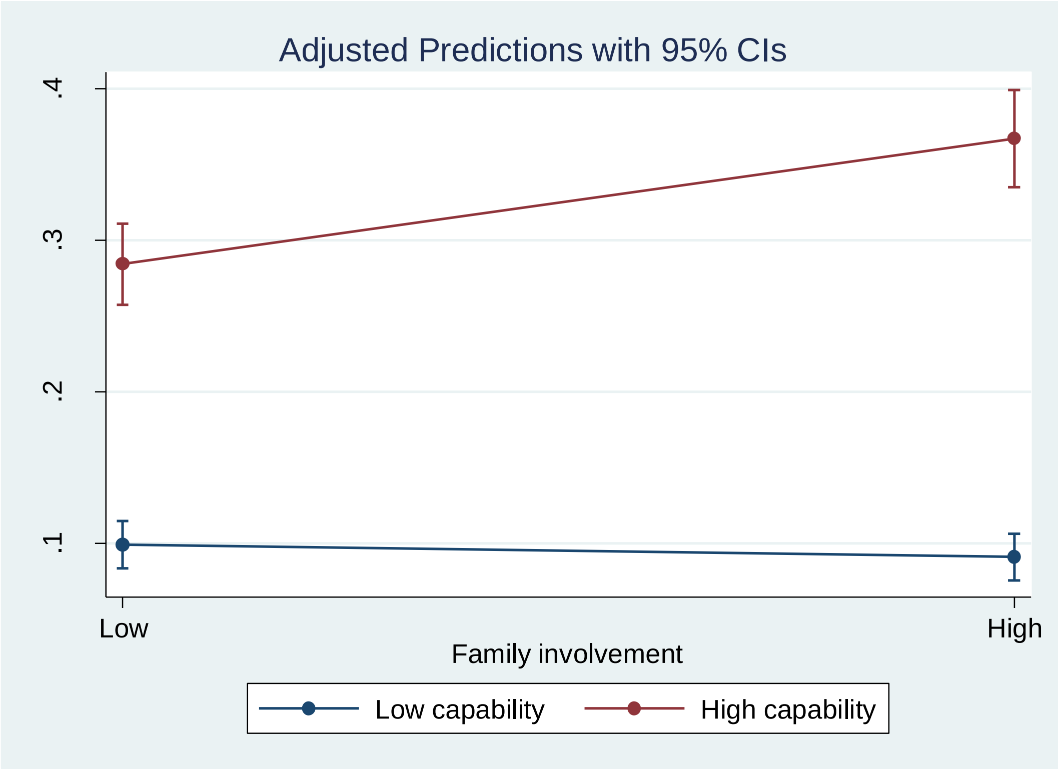

Figure 4: Family involvement on the capability to transfer and adopt knowledge and number of product innovations

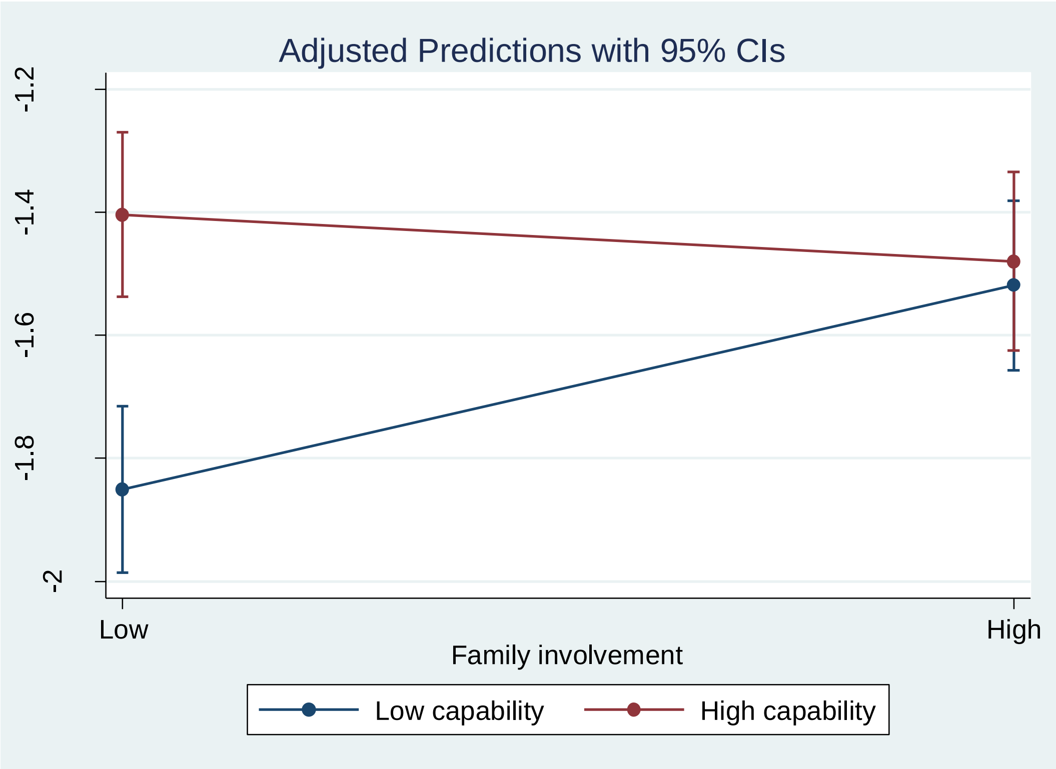

Figure 5: Family involvement on the capability to facilitate technical equipment and process innovation

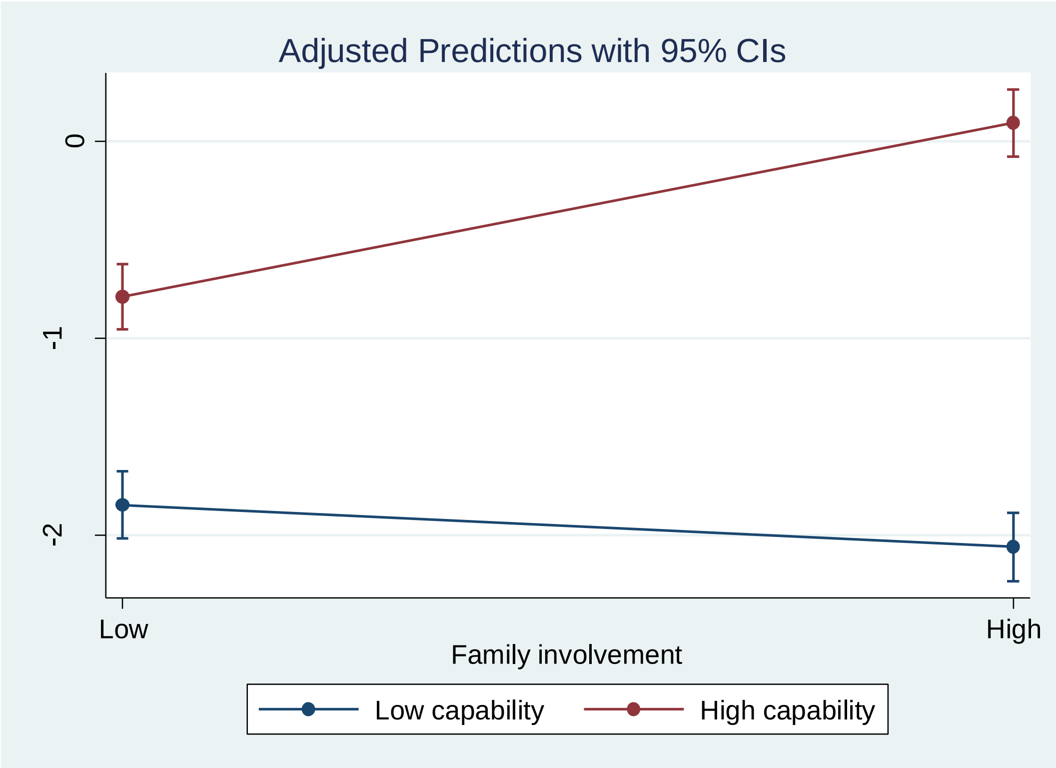

Table 1: Industry breakdown of the sample

Industry	Percentage of firms	Avg. employees	Avg. product innovation	Avg. number of product innovations	Avg. process innovation
1. Meat products	2.38	221.36	0.1797	0.9442	0.3058
2. Food and tobacco	8.85	209.44	0.2014	0.9511	0.3056
3. Beverage	2.19	288.82	0.2232	0.7263	0.3624
4. Textiles and clothing	8.93	129.62	0.1990	5.151	0.2209
5. Leather, fur and footwear	3.29	40.24	0.1807	6.0179	0.1618
6. Timber	3.29	89.11	0.0907	0.2046	0.2470
7. Paper	2.71	200.08	0.1818	1.1818	0.3708
8. Printing	4.89	132.62	0.0774	1.5222	0.2557
9. Chemicals and pharmaceuticals	6.30	296.97	0.3430	2.2846	0.4110
10. Plastic and rubber products	5.32	190.34	0.2417	2.4057	0.3654
11. Nonmetal mineral products	6.71	197.91	0.1588	1.3603	0.2591
12. Basic metal products	2.82	433.9	0.1962	3.2212	0.4374
13. Fabricated metal products	11.95	109.9	0.1289	1.1919	0.3148
14. Machinery and equipment	7.07	161.22	0.3321	2.192	0.3353
15. Computer products, electronics and optical	3.15	346.23	0.4840	4.4738	0.4072
16. Electric materials and accessories	5.40	326.14	0.3613	3.9774	0.4438
17. Vehicles and accessories	4.91	888.9	0.2985	2.0751	0.5058
18. Other transport equipment	2.00	667.24	0.3212	0.8828	0.3973
19. Furniture	5.18	84.29	0.2486	2.1924	0.2480
20. Other manufacturing	2.66	104.18	0.2433	4.549	0.2994
Full sample	100.00	255.93	0.2346	2.3753	0.3327

Table 2: Descriptive Statistics

Variable	Mean	Standard deviation			Min	Max
		Overall	Between	Within		
Product innovation	0.2237	0.4167	0.2977	0.3036	0	1
No. of product innovations	2.3113	18.1455	9.7483	15.1458	0	950
Process innovation	0.3240	0.4680	0.3051	0.3681	0	1
No. of family owners and managers	0.7064	0.9713	0.7700	0.6344	0	19
No. of family owners and managers and administration	0.9046	1.2671	1.0098	0.8500	0	55
Diversification	0.2277	0.5857	0.4643	0.3816	0	2
Capability to transfer and adopt knowledge	0.3546	0.4784	0.4006	0.2852	0	1
Technological capability	0.2052	0.4038	0.3173	0.2521	0	1
Capability to facilitate technical equipment	0.2269	0.4189	0.2342	0.3559	0	1
R&D intensity	0.0071	0.0225	0.0168	0.0147	0	0.9892
Export intensity[1]	17.9990	25.7929	23.2341	10.0479	0	395.70
Number of employees[2]	231.2092	706.7234	668.0722	194.3461	1	25363
Market dynamism	2.0175	0.7184	0.4360	0.6081	1	3
Competition	1.9106	1.1843	0.9400	0.7613	1	4

[1,2] Those variables enter our models in a log-linear form due to their skewed distribution

Table 3: Correlation raw data (overall variation)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Product innovation	1													
No. of product innovations	0.2373***	1												
Process innovation	0.3438***	0.0775***	1											
No. of family owners and managers	-0.0497***	0.0072	-0.0535***	1										
No. of family owners and managers and administration	-0.0542***	0.0084	-0.0613***	0.8535***	1									
Diversification	0.0572***	0.0021	0.0536***	-0.0110*	0.0037	1								
Capability to transfer and adopt knowledge	0.1131***	0.0175***	0.1019***	-0.0862***	-0.0936***	-0.0030	1							
Technological capability	0.3461***	0.1012***	0.2621***	-0.0863***	-0.0997***	0.0592***	0.2088***	1						
Capability to facilitate technical equipment	0.0630***	0.0280***	0.2054***	-0.0399***	-0.0352***	0.0218***	0.0279***	0.0783***	1					
R&D intensity	0.2259*	0.0670*	0.1470*	-0.0463*	-0.0543*	0.0268*	0.1388*	0.5447***	0.0420***	1				
Log(Export intensity)	0.2305***	0.0719***	0.2044***	-0.1811***	-0.1858***	0.0465***	0.2068***	0.3030***	0.1056***	0.1840***	1			
Log(Number of employees)	0.2593***	0.0642***	0.2940***	-0.2841***	-0.3010***	0.0658***	0.2246***	0.3482***	0.1176***	0.2023***	0.5233***	1		
Market dynamism	-0.0763***	-0.0163***	-0.1163***	0.0307***	0.0288***	-0.0111**	-0.0421***	-0.0621***	-0.0872***	-0.0406***	-0.0739***	-0.1158***	1	
Competitors	-0.1232***	-0.0177***	-0.1283***	0.1219***	0.1259***	-0.0490***	-0.1251***	-0.1347***	-0.0571***	-0.0700***	-0.1673***	-0.2986***	0.0661***	1
VIF	1.62	1.65	1.63	1.25	1.25	1.66	1.65	1.58	1.65	1.60	1.61	1.58	1.66	1.65

Table 4: Estimating Product Innovation (Logit model)

		Number of family owners and managers as a moderator		Robustness check: Number of family owners and managers and administration as a moderator	
	Model 1	Model 2	Model 3	Model 4	Model 5
Variables					
Family involvement		0.0722*** (0.0255)	0.0585** (0.0263)	0.0519*** (0.0189)	0.0386** (0.0194)
Diversification Related		0.373*** (0.0961)	0.374*** (0.0960)	0.371*** (0.0961)	0.366*** (0.0961)
Diversification Unrelated		0.123 (0.0850)	0.121 (0.0851)	0.123 (0.0850)	0.121 (0.0850)
Capability to transfer and adopt knowledge		0.341*** (0.0548)	0.325*** (0.0551)	0.341*** (0.0548)	0.329*** (0.0551)
Technological capability		1.347*** (0.0619)	1.356*** (0.0622)	1.349*** (0.0619)	1.370*** (0.0623)
Capability to facilitate technical equipment		0.153*** (0.0476)	0.157*** (0.0480)	0.151*** (0.0476)	0.154*** (0.0479)
Interaction terms					
Capability to transfer and adopt knowledge* Family involvement			-0.176*** (0.0476)		-0.114*** (0.0375)
Technological capability* Family involvement			0.113** (0.0491)		0.138*** (0.0396)
Capability to facilitate technical equipment* Family involvement			0.0201 (0.0484)		0.00772 (0.0372)
Controlling variables					
R&D intensity	17.41*** (1.167)	4.056*** (1.093)	4.020*** (1.090)	4.048*** (1.093)	3.983*** (1.088)
Log(Export intensity)	0.186*** (0.0223)	0.153*** (0.0222)	0.154*** (0.0222)	0.152*** (0.0222)	0.153*** (0.0222)
Log(Number of employees)	0.460*** (0.0305)	0.360*** (0.0304)	0.357*** (0.0304)	0.360*** (0.0304)	0.357*** (0.0304)
Market dynamism	-0.126*** (0.0293)	-0.111*** (0.0296)	-0.110*** (0.0296)	-0.111*** (0.0296)	-0.110*** (0.0296)
Competition	-0.125*** (0.0228)	-0.109*** (0.0229)	-0.108*** (0.0229)	-0.109*** (0.0229)	-0.109*** (0.0229)
Constant	-1.943*** (0.268)	-2.029*** (0.263)	-2.034*** (0.263)	-2.022*** (0.263)	-2.024*** (0.263)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	31,674	31,674	31,674	31,674	31,674
Number of firms	3,266	3,266	3,266	3,266	3,266
Log likelihood	-12083.42	-11803.843	-11794.896	-11804.157	-11794.686
X (test of rho = 0)	5190.55***	4539.31***	4531.90***	4538.51***	4516.26***
Change in fit		-279.577	-8.947	-279.263	-9.471

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Estimating the Number of Product Innovations (Negative binomial regression)

		Number of family owners and managers as a moderator		Robustness check: Number of family owners and managers and administration as a moderator	
	Model 1	Model 2	Model 3	Model 4	Model 5
Variables					
Family involvement		0.0386***	0.0329**	0.0396***	0.0271**
		(0.0140)	(0.0165)	(0.0112)	(0.0124)
Diversification Related		0.0955*	0.0957*	0.0900*	0.0881*
		(0.0508)	(0.0509)	(0.0509)	(0.0509)
Diversification Unrelated		0.103**	0.104**	0.102**	0.101**
		(0.0463)	(0.0463)	(0.0463)	(0.0463)
Capability to transfer and adopt knowledge		0.133***	0.127***	0.134***	0.128***
		(0.0305)	(0.0307)	(0.0305)	(0.0307)
Technological capability		0.839***	0.839***	0.840***	0.847***
		(0.0326)	(0.0328)	(0.0326)	(0.0328)
Capability to facilitate technical equipment		0.0746***	0.0703**	0.0740***	0.0698**
		(0.0285)	(0.0288)	(0.0285)	(0.0288)
Interaction terms					
Capability to transfer and adopt knowledge* Family involvement			-0.0549**		-0.0455**
			(0.0267)		(0.0214)
Technological capability* Family involvement			0.0173		0.0456**
			(0.0255)		(0.0204)
Capability to facilitate technical equipment* Family involvement			-0.0364		-0.0240
			(0.0274)		(0.0218)
Controlling variables					
R&D intensity	5.201***	1.645***	1.659***	1.643***	1.643***
	(0.355)	(0.419)	(0.420)	(0.420)	(0.422)
Log(Export intensity)	0.126***	0.0961***	0.0967***	0.0958***	0.0962***
	(0.0120)	(0.0120)	(0.0121)	(0.0120)	(0.0121)
Log(Number of employees)	0.205***	0.142***	0.139***	0.145***	0.142***
	(0.0140)	(0.0144)	(0.0145)	(0.0145)	(0.0145)
Market dynamism	-0.0854***	-0.0674***	-0.0678***	-0.0669***	-0.0666***
	(0.0178)	(0.0177)	(0.0177)	(0.0177)	(0.0177)
Competition	-0.0984***	-0.0811***	-0.0812***	-0.0818***	-0.0816***
	(0.0140)	(0.0139)	(0.0139)	(0.0139)	(0.0139)
Constant	-1.136***	-1.286***	-1.272***	-1.287***	-1.278***
	(0.133)	(0.133)	(0.133)	(0.133)	(0.133)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	31,674	31,674	31,674	31,674	31,674
Number of firms	3,266	3,266	3,266	3,266	3,266
Log likelihood	-30802.975	-30432.454	-30429.327	-30430.053	-30425.499
X (test of rho = 0)	8016.36***	7506.32***	7496.06***	7509.44***	7480.45***
Change in fit		-370.521	-3.127	-372.922	-4.554

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Estimating Process Innovation (Logit model)

		Number of family owners and managers as a moderator		Robustness check: Number of family owners and managers and administration as a moderator	
	Model 1	Model 2	Model 3	Model 4	Model 5
Variables					
Family involvement		0.0899***	0.0861***	0.0616***	0.0591***
		(0.0203)	(0.0205)	(0.0153)	(0.0157)
Diversification Related		0.305***	0.302***	0.304***	0.302***
		(0.0796)	(0.0796)	(0.0796)	(0.0797)
Diversification Unrelated		0.123*	0.120*	0.121*	0.121*
		(0.0695)	(0.0695)	(0.0695)	(0.0695)
Capability to transfer and adopt knowledge		0.156***	0.155***	0.157***	0.154***
		(0.0444)	(0.0445)	(0.0444)	(0.0445)
Technological capability		0.871***	0.875***	0.873***	0.880***
		(0.0538)	(0.0541)	(0.0538)	(0.0542)
Capability to facilitate technical equipment		0.952***	0.958***	0.950***	0.957***
		(0.0383)	(0.0384)	(0.0383)	(0.0384)
Interaction terms					
Capability to transfer and adopt knowledge* Family involvement			-0.0164		-0.0371
			(0.0382)		(0.0304)
Technological capability* Family involvement			0.0365		0.0497
			(0.0415)		(0.0341)
Capability to facilitate technical equipment* Family involvement			0.168***		0.143***
			(0.0383)		(0.0297)
Controlling variables					
R&D intensity	8.617***	0.123	0.112	0.117	0.114
	(0.951)	(0.907)	(0.906)	(0.907)	(0.906)
Log(Export intensity)	0.0853***	0.0596***	0.0614***	0.0590***	0.0614***
	(0.0174)	(0.0173)	(0.0174)	(0.0174)	(0.0174)
Log(Number of employees)	0.473***	0.398***	0.398***	0.398***	0.397***
	(0.0236)	(0.0235)	(0.0235)	(0.0235)	(0.0235)
Market dynamism	-0.249***	-0.237***	-0.236***	-0.237***	-0.236***
	(0.0243)	(0.0246)	(0.0246)	(0.0246)	(0.0246)
Competition	-0.0891***	-0.0753***	-0.0747***	-0.0755***	-0.0750***
	(0.0177)	(0.0178)	(0.0178)	(0.0178)	(0.0178)
Constant	-0.792***	-0.854***	-0.850***	-0.847***	-0.845***
	(0.201)	(0.196)	(0.196)	(0.196)	(0.196)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	31,674	31,674	31,674	31,674	31,674
Number of firms	3,266	3,266	3,266	3,266	3,266
Log likelihood	-16167.343	-15695.45	-15685.34	-15697.267	-15683.993
X (test of rho = 0)	3710.36***	3143.40***	3132.15***	3153.22***	3135.58***
Change in fit		-471.893	-10.11	-470.076	-13.274

*** p<0.01, ** p<0.05, * p<0.1

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