

**FIRM PERFORMANCE IN FAMILY SMES: THE INFLUENCE OF FAMILY
MANAGEMENT AND THE MEDIATING EFFECTS OF MANAGEMENT CONTROL
SYSTEMS AND TECHNOLOGICAL INNOVATION**

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“Workshop 3. Buen gobierno corporativo: estructura, diversidad y otros aspectos”

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Abstract

This article aims to study the influence of family management on firm performance in family SMEs. We find empirical support for a positive mediating influence of MCS and TI on the relation between family management and firm performance. Hence, the higher is the use of MCS and the greater the creation of TI, the more likely it is that family-managed firms perform better.

Keywords

Family Management, Firm Performance, Management Control Systems, Technological Innovation, PLS-SEM

1. Introduction

Literature has found contradictory results regarding the influence of family involvement on firm performance (Dyer, 2006, among others). The findings have not been enough consistent when the particular impact of family management on firm performance has been tested (Westhead & Howorth, 2006; Sciascia & Mazzola, 2008). These inconclusive results suggest that the explanation of the former relationship is intricate and might be moderated or mediated by variables not taken into account in former empirical research. Thus, recent research has started to utilize moderators and mediators in acceptance of the heterogeneity of family firms (Chua, Chrisman, Steier & Rau, 2012) and some authors have claimed that studies should be more focused on the mediators and moderators of family involvement effect's and firm performance (Chrisman Chua, Pearson & Barnett, 2012).

This study concentrates on Management Control Systems (MCS) and Technological Innovation (TI) as mediator factors in the relationship between family management and firm performance of family-owned SMEs, following calls for going beyond input–output models and the lack of studies on private SMEs (Bammens, Voordeckers & van Gils, 2011).

We initially explain in two steps how family management impacts on firm performance through the use of MCS: firstly justifying how family management influences the use of MCS and secondly arguing regarding how MCS impacts on firm performance. MCS become key tools that managers should take for planning, budgeting, analysing, measuring and evaluating useful information for a proper decision making process (Dávila and Foster, 2005) and are considered a sustainable competitive advantage, when they are correctly developed and structured (Barney, 1991). However, previous literature reveals MCS have not been sufficiently

considered in family firms research (Helsen, Lybaert, Steijvers, Orens, & Dekker, 2016) and the scarce previous studies confirmed family firms use MCS to a lesser extent compared to non-family firms (Chua, Chrisman and Steier, 2003).

Secondly, we propose that family management can impact on TI through the utilization of MCS. Once demonstrated the effect of family management on MCS, now we focus on the effect of family management on the TI through the utilization of MCS. TI has been usually conceptualized as the set of activities through which a firm conceives, designs, manufactures, and introduces a new product, service, or technique (Freeman, 1976). It has been also defined as all change in the things (products/service) which an organization offers (product innovation) and all change in the way in which they are created and delivered (process innovation) (Souitaris, 2003). Prior literature has pointed out mixed results regarding the influence of family management on TI (Classen, Carree, Van Gils, & Peters, 2014; Matzler, Veider, Hautz, & Stadler, 2015). In order to clarify the former varied findings, some recent studies have opted for focusing on the impact of family management on the relationship between TI inputs and outputs (Duran, Kammerlander, Van Essen and Zelweger, 2016; Diéguez-Soto, Manzaneque and Rojo-Ramírez, 2016), but this influence continues being an open question. Differently, we choose discussing the mediating effect of MCS on the connection between family management and TI as a mean to shed light on this unclear association.

Finally, we consider the mediating role of both MCS and TI in the relationship between family management and firm performance because, firstly, there is an emerging stream of research showing how MCS can play an important role in the management of innovation (Bedford, 2015). Secondly, prior research has confirmed that the obtaining of TI makes firms outperforming (Geroski, Machin, & Van Reenen,

1993) and it is an essential factor to achieve a continued better performance (Blundell, Griffiths, & Van Reenen, 1999). Therefore, an understanding of the influence of family management on the obtaining of technological innovation is a crucial requisite to really understand the performance of family-managed firms and their performance differences with regard to other family firms and non-family firms.

We tested our hypotheses using a sample of 617 family-owned, private, small and medium-size enterprises, while former literature has focused attention in public firms primarily. We analysed this specific group because prior research suggests that large and SME family businesses may differ from each other (Hamelin 2011; Romano, Tanewski and Smyrnios, 2001), most businesses are private, SMEs, and they contribute significantly to the economies worldwide.

We contribute to the former research by demonstrating how decisions made by family managers regarding the use of MCS and the achievement of TI may influence firm performance in family SMEs. With this approach, we overcome the excessive traditional dependence on basic input-output models. In particular, our findings suggest that the utilization of MCS and the obtaining of TI mediate the relationship between family management and firm performance. We highlight that the utilization of MCS can assist to reduce specific agency costs in family-managed firms and to find the right balance between economic and non-economic goals, improving the obtaining of TI outputs and firm performance. Moreover, we recognize that is crucial to consider heterogeneity in family firms. Specifically, family management becomes an important attribute that may condition the use of MCS and the occurrence of TI, influencing in firm performance eventually. In short, this study contributes to the debate on the antecedents of performance in family firms, highlighting that firm performance is not dependent only in their decision to hire family or non-family

managers but it is exhibiting that the utilization of MCS and the achievement of TI are essential to illuminate performance deviation between family-managed and non-family managed firms and even among family-managed firm group.

After this introductory section, section 2 analyses the main theoretical aspects of family management and firm performance, as well as the role of the use of MCS and TI in this relationship. Section 3 offers the research design and methodology. Section 4 presents the results of the analysis. Finally, Section 5 provides the concluding remarks, the primary implication for future research, and the limitations of this study.

2. Theoretical background and hypotheses development

2.1. Family management and firm performance

In the context of family business, the involvement and the role of family members in the firm's management has been proved to have a great influence on firm performance and a handful of arguments have been used to explain its incidence on it. Thus, literature has produced mixed and contradicting results regarding the sense of this impact. The active presence of family CEOs and top managers has been considered an advantage because it can easily align both the family and the firm interests (Anderson & Reeb, 2003) avoiding agency costs of non-family managed firms. Additionally, family-managed firms possess competitive advantages because of own family-business subsystem generating a bundle of unique resources and capabilities (Habberson, Williams, & MacMillan, 2003). Thus, family management enhances monitoring and top managerial incentives due to they may have a profound knowledge regarding the business (Miller & Le Breton-Miller, 2005). Moreover, they have positive features related to social capital, protecting family name and reputation, which includes better customer service or long-term relationships with stakeholders (Dyer, 2006), and as a consequence, a higher firm performance.

However, specific costs for family-managed firms, far from traditional agency costs, can arise having a negative impact on the firm performance (Gomez-Mejia, Haynes, Nunez-Nickel, Jacobson & Moyano-Fuentes, 2001; Schulze, Lubatkin & Dino, 2002). Owner-control relationship of family firms engenders other agency problems because the effectiveness of external control mechanisms can be compromised. Hence, family management may imply a lack of executive talent, conservatism, nepotism and/or altruism (Bertrand & Schoar, 2006), which is detrimental for firm performance. The active involvement of family members may also limit human capital (Burkart, Pannunzi & Shleifer, 2003), and discretion and latitude of non-family managers (Zahra, 2005) and even might increase family conflicts (Kellermanns & Eddleston, 2004). Furthermore, family-managed firms may erode performance, making business decisions based on enhancing socioemotional wealth at the expense of economic objectives (Berrone, Cruz, Gomez-Mejia, & Larraza-Kintana, 2010).

The vast majority of prior studies regarding the effect of family influence on firm performance have mainly used data collected from public firms and have explored the direct effect of family management on firm performance. Moreover, previous empirical research focused on private firms has not provided a uniform answer as to whether family-managed firms outperform non-family-managed firms, being the results mixed. While some studies did not find significant differences regarding performance between family and non-family managed firms (Westhead and Howorth, 2006; Blanco-Mazagatos, de Quevedo-Puente, and Castrillo, 2007), other research observed a negative relationship between the active involvement of family members in management and firm performance (Sciascia and Mazzola, 2008). Despite recognizing the relevant contribution of these studies to literature on family firm performance, we observe an overreliance on input-output models and they are

focused mainly in public firms. As a consequence, we believe that taking into account the mediating role of the utilization of MCS and the obtaining of TI may imply a significant advance in our understanding of the role of family management and its implications for firm performance.

Based on the above arguments and given that the results achieved in previous literature showed the positive and negative effects of family management on firm performance, being ambiguous the net effect, we set the following hypotheses:

H1a: Family management is positively associated with firm performance

H1b: Family management is negatively associated with firm performance.

2.2. The mediating role of MCS on the relationship between family management and firm performance

2.2.1. Family management and the use of MCS

Previous literature has shown that the use of MCS is not widespread enough in family businesses. A variety of empirical studies have found that there are differences in the implementation of the MCS between family and non-family businesses that need further research (Kotey, 2005). In fact, family influence is an important and distinct factor that has not been sufficiently considered by most MCS studies, being relatively few studies on MCS making the distinction between family and non-family firms (Senftlechner, Martin, and Hiebl, 2015; Helsen et al., 2016). The scarce previous studies have found that family firms are characterized by using MCS to a lesser extent compared to non-family businesses, giving them a different use (Perren, Berry and Partridge, 1999; Chua et al., 2003; Kotey, 2005).

In that sense, Jorissen, Laveren, Martens and Reheul (2005) suggested that family firms use MCS to a lesser extent for several reasons: first, because of the overlap of the owner-manager relationship and centralized decision-making; secondly, due to

the individual authority of the owner, and thirdly, owing to the interaction between the family and the company. Furthermore, Hopper, Tsamenyi, Uddin, and Wickramasinghe (2009) have shown that family firms consider the use of informal and subjective management controls as the prevalent system of MCS. Informal and family-based controls usually remain well-established throughout the organization's operations (Ansari & Bell, 1991) and MCS are often used only for internal interests (family members) (Uddin, 2009). In addition, the likely involvement in management of family members, and the consequent trust within the management team (informal organization), the family firm long-term orientation and the emphasis on non-financial goals, may influence on the choice of MCS (Senftlechner et al., 2015).

Since, previous evidence indicates less use of MCS, because family firms developed more informal management control systems, it is essential to face the dynamic process of transitioning from an informal management system to the development of a well-established MCS. Due to, MCS becomes a critical factor to the success of organizations (Dávila and Foster, 2005), particularly, when small family firms (owner-manager) move from informal methods in the decision-making process to more formal according to the business life cycle (Perren et al., 1999). Therefore, business growth seems to be another factor that determines the change towards a more formalized and transparent control system. At the same time, MCS may also be used to transmit and strengthen the culture of family businesses through the organization and strategically for decision-making (Flamholtz, 1983).

2.2.2. MCS and firm performance

It is unquestionable that any kind of organization needs to implement MCS according to its strategies and objectives. Nevertheless, the development of MCS is not enough, the next step consist of considering a formal performance measurement

system, in order to use a mechanism to make explicit the set of means-end relationships that the company has followed to achieve its strategic intent (Otley, 1999). According to Otley (1999), any performance measurement system should be capable of dealing with five dimensions referred to objectives, strategies and plans, targets, rewards and feedback.

In that sense, Chenhall (2003) suggested behavioural and organizational outcomes related to the usefulness of MCS. This is because of when MCS are useful, for the members of the organization providing enhanced information, then the decision-making process reach improved decisions achieving better organizational goals. Furthermore, according to Chenhall (2003), the link between improved organizational performance and MCS may depend on the suitability of the design of MCS in the specific context of the organization.

Previous empirical research confirmed the positive relationship between the implementation of MCS and performance measures in the context of business organizations. In that respect, McMahon and Davies (1994) stated a positive correlation between amplitude and frequency of accounting information elaborated by the company and the net profit per employee. Chenhall and Langfield-Smith (1998) also found evidence on the positive relation between the use of MCS and the company performance. Similarly, Piercy, Cravens & Morgan (1999) showed that the greater the extent of behaviour-based management control, the higher is the outcome performance of employees concerned.

In the same sense, Dávila (2000) positively related MCS with performance, through a qualitative research, with 10 case studies in Europe and US, designed to evaluate a diversity of product development projects and MCS. Adler Everett & Waldron (2000) showed, after analysing 165 industrial companies of New Zealand, that MCS

positively influences product performance. Eventually, Kennedy and Affleck-Graves (2001) indicated how the implementation of ABC cost control systems had a positive effect on performance. Besides, Sandino (2007) used a survey and face-to-face interviews with a sample of 131 CEOs of US based retailers in early-stage firms with the intention of exploring the kind of MCS implemented during the initial stage that better fits with their strategy. The result obtained demonstrates that the right fit of initial MCS are very useful for manager and more likely to increase performance.

Recently, Bedford (2015) developed an empirical research collecting a survey addressed to top managers of 400 Australian firms and the author' findings showed that the patterns of use and interdependencies among control levers associated with superior performance differ depending on the mode of innovation (exploitation versus exploration).

The above arguments are formally stated in the following hypothesis:

H2: The use of MCS mediates the relationship between family management and firm performance

2.3. The mediating role of MCS on the relationship between family management and technological innovation

2.3.1. Family management and technological innovation

The analysis of both ability and willingness can be utilized to explain whether family governance has an overall positive or negative effect on innovation performance (Chrisman, Chua, De Massis, Frattini, & Wright, 2015). Literature is divided as to the answer of the former question (Chin, Chen Kleinman & Lee, 2009; Sciascia, Nordqvist, Mazzola, & De Massis, 2015).

Some studies argue that family managers are common source of socioemotional wealth for a family (Block, Miller, Jaskiewicz & Spiegel, 2013) and have as an

essential and vital objective, to protect the family affective endowment (Gomez-Mejia, Haynes, Nuñez-Nickel, Jacobson, & Moyano-Fuentes, 2007). Consequently, family-managed firms opt for making lower investments in R&D (Classen, Carree, Van Gils & Peters, 2014) to limit the requirements of external financing, given non-family capital might endanger the control of the firm and the latitude and discretion of family management (Classen, Van Gils, Bammens, & Carree, 2012). Therefore, family-managed firms may have lower willingness to innovate due to risk-aversion, disinclination to share control and socioemotional issues. As a consequence, and given family managed firms often will prefer to restrict R&D expenses, the likelihood of obtaining TI will be obviously more reduced. Moreover, the family firm's ability to innovate may be influenced by the combination of certain negative aspects usually associated with family management. Family-managed firms may encourage the hiring and entrenchment of unmerited managers and workers, succumb to altruism and/or nepotism or even intensify the disputes inside the family and the firm (Bertrand & Schoar, 2006; Kellermanns & Eddleston, 2004).

However, other research has maintained that the presence of a family CEO results in higher innovation because the innovation process that obtains innovation outputs from innovation inputs is more impacted by firm's resource orchestration and less affected by resource allocation preferences (Duran, Kammerlander, van Essen & Zellweger, 2016). Family CEO increases the willingness and ability to monitor the innovation process (Anderson and Reeb, 2003) and the establishment of long and trusted relationships with stakeholders, accessing to external knowledge (Phelps, 2010) and so generating greater innovation output. Furthermore, family management provides higher tacit knowledge (Von Krogh, Ichijo, & Nonaka, 2000), which produces higher innovation outcomes (Carnes & Ireland, 2013).

Thus, we expect that family management influences on TI. Nevertheless, previous reasoning on literature is inconclusive regarding the expect sign of the relationship.

2.3.2. MCS and Technological Innovation

According to Bedford (2015), an emerging stream of research has discovered how MCS can play an important role in the management of innovation, when formal control systems are efficiently implemented. In that sense, Simsek (2009) and Smith and Tushman (2005) showed that the use of MCS (developing a levers of control framework) by top management is necessary, due to they have a pivotal role for successful innovation and the learning process within the business organizations. In that respect, Hall (2010) affirmed that the interactive use of formal information systems assists the exchange of tacit knowledge and promote the development of new technologies.

Furthermore, the essence of MCS is to manage the inherent organizational tension between creative innovation and predictable goal achievement (Henri, 2006). In this sense, Chapman (1997) argues that innovation requires adequate use of MCS. Additionally, Dávila (2000) positively related MCS with innovation and performance because of they are necessary to ensure innovation effectiveness (Simons, 1995). Bright et al. (1992) found a relationship between the development of new cost techniques and the improvement of product performance. In this sense, Bisbe and Otley (2004) showed that the greater the use of MCS, the greater is the effect of innovation on SME's performance.

Similarly, in the specific case of TI through new products development, the experiment of Hertenstein and Platt (2000), with 75 industrial design managers, confirmed that MCS play an important role in TI process. The authors focused on three specific MCS: positioning innovation in products within organizational structure,

the product development process and performance measurement. Ylinen and Gullkvist (2014) developed an empirical research, in Finland with 119 project managers, testing the effects of organic and mechanistic control in exploratory (radical) and exploitative (incremental) innovations. They found that control mechanism systems have effect on both type of innovation, enhancing the performance of the innovation projects.

Nevertheless, according to Bedford (2015) remains unclear if same MCS are similarly effective across distinct types of innovation, as well as how MCS run when implementing multiple and potentially conflicting innovation modes.

Based on the previous reasoning, we propose the following hypothesis:

H3: The relationship between family management and TI is mediated by the use of MCS.

2.4. The mediating role of technological innovation on the relationship between family management and firm performance

Innovating technologically is an indispensable requisite to explore new opportunities (Rauch, Wiklund, Lumpkin & Frese, 2009), enter into competition superbly (Ireland, Hitt, Camp & Sexton, 2001) and become a competent contender in the global market (Subramaniam & Venkatraman, 1999). Previous literature has confirmed that firms engaged in TI generate growth, create value and outperform (Amit & Zott, 2001) and that it is an imperative driving of firm's competitive advantage (Ernst, 2002) and national development (Tidd, Bessant & Pavitt, 2001).

Prior researchers have found that achieving TI contributes decisively to generate more performance (Irwin, Hoffman & Lamont, 1998). Specifically, strategy and product innovation (Strecker, 2009) and process innovation (Klomp & van Leeuwen, 2001) have been showed to have also a positive impact on firm performance.

Whereas, other studies have highlighted the influence of product advantage on market performance (Li and Calantone, 1998) or the moderating role exerted by the business' operating environment in the relationship between technology strategy and performance (Zahra, 1996). Thus, we propose the following hypothesis:

H4: TI mediates the relationship between family management and Firm Performance

In view of the above mentioned theory and empirical evidence, family management will be related to the financial performance through, first of all, the use of MCS and, then, the TI. Integrating these two models with mediation generates a three-path mediation model (see Fig. 1) (Hayes, 2009; Taylor, MacKinnon & Tein, 2008). To sum up, we test whether the use of MCS and TI sequentially mediate the relationship between family management and financial performance. In other words, family management impacts on the use of MCS and this will influence the intensity of TI, which will improve the firm performance of the firm. Thus:

H5. The use of MCS and TI sequentially mediate the relationship between family management and firm performance.

3. Methodology

3.1. Data collection and representativeness

We collected data through a survey questionnaire addressed to 617 managers of family firms in Murcia (Spain) as a part of a long term research activity promoted by the "Observatorio Económico de la PYME," a Research Centre for SME's funded by the *Instituto de Fomento de la Region de Murcia* -public institution that belongs to the Spanish Industry, Firm and Innovation Office -. We defined the size of the firms following the European Commission's recommendation 2003/361/CE of 6th May 2003 (European Union, 2003).

A sample selection process was designed to characterize the structure of the region following the stratified sampling principles in finite populations. The population of firms was segmented by industry and size. The number of firms in each stratum was implemented according to the information contained in the Companies Registration Office following the criteria of the Spanish statistical Office. The final sample included two research groups: the first with 556 family companies managed by family members and the second with 61 family companies managed by professional external managers. The percentage of professionalized family firms of the sample was very similar to the proportion found by other academic works (Huybrechts, Voordeckers, & Lybaert, 2013). Sample distribution is very similar between family-managed and non-family managed family firms in terms of percentage of businesses belonging to manufacturing (51-56%), construction (10%-10%) and services (38%-34%) industries. In contrast, family-managed firms appear relatively smaller than non-family managed family firms. Thus, around 88% of family-managed firms are small businesses while only the 66% of non-family managed counterparts are small-sized firms. As far as business maturity is concerned, around 64% of family-managed firms are 25 years old or less in comparison to 56% of non-family managed family firms.

We replaced companies that chose not to participate in the project with similar (random selection) firms in the same industry and geographic area. We collected information through personal interviews with firm managers between April 2010 and July 2010 using a questionnaire addressed to the firms' CEOs. SME managers are the most important decision makers (Van Gils, 2005), and managerial perceptions influence to a significant degree the firm's strategic behavior (O'Regan & Sims, 2008).

3.2. Measurement variables

3.2.1. Firm Performance

Firm performance is measured building three indicators from the perception of managers regarding the competitive position of their own companies. With this purpose, we utilized three likert-scale questions concerning the growth in market share, improvements on profitability and improvements on productivity. We followed Quinn & Rohrbaugh (1983) “rational model” (see Van Auken, Madrid & García-Pérez de Lema, 2008). Faced with the alternative of using indicators from accounting information, this model is justified for different reasons: if we use accounting information, a number of intangibles, valuable and vital to the competitive success of companies assets are omitted (Kaplan and Norton, 1992 & 1993), and a time lag occurs between the date of the survey and obtaining accounting information, not officially available until the company publishes its annual accounts. Finally, competitive success is a relative term, thus the position of the company against the competition is established as one of the key indicators of success or failure.

3.2.2. Family management

The involvement of the family in business and in ownership defines a firm as a family firm (Chua, Chrisman, & Sharma, 1999). The former demand is a basic requirement, but an insufficient condition. The involvement of the family is a preliminary condition for a long-term shared conception of the business, which is transferred from one generation to another (Chrisman, Chua, and Sharma, 2005). Nevertheless, shared vision and goals are specially associated with the level of family involvement (Chrisman, Chua, Pearson, and Barnett, 2012). We use family management as a proxy of family influence on decision making since we have not a direct estimation of family vision and goals (Diéguez-Soto, López-Delgado, and Rojo-Ramírez, 2015).

Particularly, we use a dummy variable that takes value 1 whether the CEO of the family firm is a family member, and 0 when the family firm is managed by a professional manager, outside of the family. This variable has also been measured and used in previous studies in order to consider the influence of the family in the company through management positions (Schmidt, Achleitner, Ampenberger & Kaserer, 2014, among others).

3.2.3. Management Control Systems

To analyse the degree of implementation of MCS a measure of subjective perception of the company manager is required, similarly to Chenhall and Morris (1986), among others. To this end, the questionnaire included a section that applies a 1-5 Likert type scale on five items: The degree of implementation and use of: (1) Managerial Accounting; (2) Budget control; (3) Financial Statements Analysis; (4) Enterprise Resources Planning (ERP) or Balanced Score Cards (BSC); and (5) Internal Auditing.

3.2.4. Technological innovation

To measure the TI level of the firm, we used a subjective approach rooted on the firm's manager or owner's judgment regarding the innovative activity of the business. This option appears pertinent in samples composed mainly by SMEs since the objective approaches seem to minimize the innovative attempts of this particular type of firms (Hughes, 2001). In particular, we used three dimensions for TI, namely the importance of current products innovations, new products development, and innovations in processes, as well as other studies previously did (Diéguez-Soto, Duréndez, García-Pérez de Lema & Ruiz-Palomo, 2016). In consequence, we included six items in the questionnaire as follows: "a) Did your firm made any improvement in your existing products in the last year? [0/1] If yes, please indicate

the degree of importance of these changes for your company [from 1 to 5]”. “b) Did your firm developed new products in the last year? [0/1] If yes, please indicate the degree of importance of these changes for your company [from 1 to 5]”. “c) Did your firm made any improvement in your processes in the last year? [0/1] If yes, please indicate the degree of importance of these changes for your company [from 1 to 5]”. Therefore, we recoded them in three measures, likert type, from 0 to 5.

3.3. Statistical remedies for bias

To test for the validity of the survey, we analyzed two types of bias: nonresponse and common method bias. Firstly, to test for non-response bias we used late respondents as surrogates for non-respondents (Nwachukwu, Vitell, Gilbert, & Barnes, 1997). We contrasted responses from firms answering the first round of interviews (81% of the sample) with those responding to the follow-up (19% of the sample) interviews. Results show no significant differences between the two groups using t and χ^2 tests. Considering these outcomes, we found neither non-response nor industry bias. Secondly, we analysed this bias using several statistical remedies as suggested by Podsakoff, MacKenzie, Lee & Podsakoff (2012) and partial correlation procedure (Lindell & Whitney, 2001). Results suggest that the bias of the common method variance is not relevant in our study.

3.4. Statistical procedure

3.4.1. Structural Equation Modelling selection.

We tested our model using Partial Least Squares (PLS), a variance-based Structural Equation Modelling (SEM) (Reinartz, Haenlein, & Henseler, 2009). SEM is particularly suitable to test the proposed theoretical model because it allows simultaneous estimation of multiple relationships between latent constructs involving mediation and accounts for measurement error in the constructs (Zattoni, Gnan &

Huse, 2016). Consequently, PLS-SEM is an appropriate technique to use in a theory development situation such as in this study (Chin, 2010). In addition, PLS-SEM analyses are more flexible than Covariance-Based SEM in order to model both reflective and formative latent factors at the same time (Roldán & Sánchez-Franco, 2012 among others). In this sense, we considered our three endogenous variables as composites, because it assumes a defining relationship between a construct and its indicators (Henseler et al. 2014, among others). We follow the recommendations of Rigdon (2016) in the estimates of composites, thus they were measured in a Mode A weighting scheme. This study uses SmartPLS 3.2.7 software (Ringle, Wende & Becker, 2015).

3.4.2. Mediation analyses

According to our research model, Fig. 1a describes the total effect of family management in firm performance, c . Fig. 1b represents H2-H5 mediation hypotheses, which posit how an independent variable (family management) affects a dependent variable (firm performance) through two sequential mediators (the use of MCS and TI) following a three-path mediation model (Hayes, 2009; Taylor et al., 2008), where the total effect of the family management on the firm performance can be expressed as the sum of the direct and indirect effects, the latter being estimated by the product of the path coefficients for each of the paths in the mediational chain (Alwin & Hauser, 1975). Thus, $c = c' + a_1b_1 + a_2b_2 + a_1a_3b_2$, with the latter three terms being specific indirect effects and their sum being the total indirect effect (Hayes, 2009), while c' is the direct effect of the family management on the financial performance, controlling for both mediators (the use of MCS and TI) (Taylor et al., 2008).

Insert figure 1 about here

The advantage of this approach is that it is able to isolate the indirect effect of both mediating variables, that is, the use of MCS (H2: a_1b_1) and TI (H4: a_2b_2) on performance, as well as the mediating role of MCS in the relationship between family management and TI (H3: a_1a_3). In addition, this approach allows the analysis of indirect effects passing through both of these mediators in a sequential series (H5: $a_1a_3b_2$) (Van Jaarsveld, Walker, & Skarlicki, 2010).

A traditional way of testing mediation hypotheses has been the Sobel (1982) test. It is commonly indicated for a formal test of mediation in multiple linear regressions. However, such a test cannot be applied with PLS because path coefficients are not independent when computed using PLS, and PLS does not provide raw unstandardized path coefficients (Sosik, Kahai, & Piovoso, 2009). In addition, Hayes (2009) indicates that Sobel test requires the assumption that the sampling distribution of the indirect effect is normal. As an alternative, we have applied the bootstrapping method for testing mediation, a nonparametric resampling procedure that does not impose the assumption of normality on the sampling distribution (Preacher & Hayes, 2008). MacKinnon, Cumbers, and Chapman (2002) and MacKinnon, Lockwood, and Williams (2004) suggest that the performance of bootstrapping is higher than the Sobel test.

3.4.3 Robustness Analyses

Alternative measures were applied to check the robustness of our constructions. In this sense, we dichotomized the measure of performance by segmenting the sample above the median (1) or not (0) of principal components factor in order to apply logit regressions to mediation modelling. Further, the command '*binary_mediation*' in Stata 14 (Peake and Watson, 2015) and causal mediation analysis (Imai, Keele and

Tingley, 2010), as well as sensitivity analysis were conducted. Results are consistent with our findings -not reported-.

4. Results

4.1. Model validation

Measure descriptive statistics and correlations are shown in table 1.

Insert table 1 about here

Each latent variable in the model was measured by multiple indicators and evaluated in terms of reliability, validity and composition weights (Henseler, 2017). All the reliability and discriminant validity criteria, such as Cronbach's alpha, Average Variance Extracted, Dijkstra–Henseler's rho (ρ_A) and Jöreskog's composite reliability (ρ_C) (Hair, Hult, Ringle & Sarstedt 2017) exceed their shortcuts values, as shown in table 2 (panel A). In addition, we estate the relevance and significance of measures by considering the value of outer loadings (over 0.7) and their bootstrap significance by using a 10,000 samples bias corrected procedure. Furthermore, we performed a confirmatory composite analysis test (Henseler et al. 2014) following a blindfolding procedure (omission distance of 9) in order to determine the overall predictive relevance of the model as a first step in the quality assessment, since the Q^2 values are above 0 (Henseler et al., 2009). In a second stage, we assess the discriminant validity according to Cross-Loadings (not reported), Fornell-Lacker and HTMT criteria (Henseler, Ringle, & Sarstedt, 2015) as shown in table 2 (panel B). In addition, constructs VIF ranged 1.00-1.12, suggesting that collinearity is not a problem (see table 3). Additionally, this study assesses quality by checking that the standardized root mean square residual (SRMR) does not exceed a value of 0.08 (Hu and Bentler, 1998). These results suggest a good of fit in model specifications. Finally, we checked that SRMR (Dijkstra and Henseler, 2015), as well as unweighted least

squares distance (d_{ULS}) and geodesic discrepancy (d_G) (Henseler, Hubona & Ray, 2016) are into their own bias-corrected 95% confidence interval, suggesting that our model is true and meaningful.

Insert table 2 about here

4.2. Structural results and hypotheses testing

Our results suggest that family involvement in managing the business had a negative and significant impact on the use of MCS (path = -0.16^{***}) and on TI (path = -0.10^{**}), whereas its impact on performance was negative but not significant. Path coefficients from the use of MCS to the importance of TI and performance were both positive and significant (paths = 0.28^{***} and 0.14^{**} respectively). Finally, the path coefficient from TI to performance was positive and significant (path = 0.17^{***}). These results are in concordance of mediation hypotheses. Path coefficients and their 10,000 resampling bootstrap significance levels are reported in Table 3 and Figure 2.

Insert table 3 and figure 2 about here

We applied the analytical approach described by Preacher and Hayes (2008) and Taylor et al. (2008) to test our mediation hypotheses (H2–H5). The indirect effects are specified and contrasted with the mediators (i.e., the use of MCS and TI). We also examined the total (c) and direct (H1: c') effects of family management on firm performance. Following Chin' (2010) suggestions, we chose the bootstrapping procedure to test the indirect effects. This generates bias-corrected 95% and 99% bias-corrected confidence intervals (CI) for each individual indirect effect and sequential mediation (see table 3).

Total effect of family management over performance shows a significant influence (path c) while direct effects is not significant (path c'), suggesting that MCS and TI fully mediate on the relationship between Family Management and Performance

(Baron & Kenny, 1986). Hence, H1 is not supported. Additionally, we found that indirect effects of family management on performance through the use of MCS and TI are both negative and significant, supporting H2 and H3. In this sense, the indirect effect of family management on performance is about 52.1% of the total effect, distributed in a 25.3% through the use of MCS, a 18.2% through TI, and an additional 8.6% sequentially. These results support H2, H3 and H5 respectively. Moreover, we found that indirect effect of MCS on performance is positive and significant. Thus, TI mediates on the relationship between MCS and performance. In fact, these findings allow us to describe that the use of MCS enhances the mediating effect of TI on family management – performance relationship. Finally, the use of MCS partially mediates between family management and TI, supporting H4. The proportion mediated is a 32.1% of the total effect of Family Management on TI.

5. Discussion

Recent literature research has started to focus on the heterogeneity of family firms (Chua et al., 2012) by researching on the mediators and moderators of family involvement effect's and firm performance (Chrisman et al., 2012). In that sense, we analyse how the participation of family CEO may affect to the performance of family firms through a novel approach. Our analysis goes a step further because we examine the insights to explain this different behaviour according to two instrumental variables than can mediate the relationship between family involvement in management and the distinct performance of family firms. Particularly, we consider the mediating role of MCS and TI.

We contribute to filling a gap related to how mediator variables (MCS and TI) affect the relationship between family management and performance. In that sense, this article makes several contributions to the existing research on family business by

analysing the relationships between family involvement in management, MCS, TI and firm performance, and overcomes the excessive traditional dependence on basic input-output models.

First, the study sheds new light on the influence of family management on firm performance, investigating the mediating effect of MCS. Our results confirm that family management has a negative effect on the use of MCS (Jorissen, Laveren, Martens & Reheul, 2005) and, through it, family managers have a negative influence on firm performance. Second, recent literature opted for clarifying varied findings on the influence of family management on TI by exploring the family management efficiency of turning TI inputs into outputs, but these results were also mixed (Duran et al., 2016; Diéguez-Soto et al., 2016). However, we choose making enquiries on the mediating effect of MCS on the connection between family management and TI, finding out that the negative effect of family management on the utilization of MCS has, through it, a negative impact on the TI. Third, the lesser extent of TI in family-managed firms has a negative influence in firm performance. Finally, our study continues making an in-depth analysis on the effect of family involvement in management on firm performance, exploring the mediating effects of both MCS and TI simultaneously and sequentially. Our findings show that both the use of MCS and the obtaining of TI play a crucial mediating role in the understanding of the relationship between family management and firm performance. Collectively, these findings surfaced an important distinction between family-managed firms using MCS and achieving TI and the rest of family-managed firms: when family-managed firms utilize MCS and produce TI are much more likely to generate better performance whereas for the other family-managed firms, the opposite seems to be true. In other

words, the higher is the use of MCS and the greater the creation of TI, the more likely it is that family management performs better.

Our results have interesting implications for theory and practice. Our findings underline the importance of implementing MCS, especially in the case of family controlled firms (Arregle, Naldi, Nordqvist, & Hitt, 2012), such as those family firms managed by a family CEO. According to the agency theory, family directors (CEO) may have incentives to extract private benefits from other minority family members, and there is a higher tendency to support nepotism, hierarchies, family conflicts and entrenchment. The implementation of MCS helps to control opportunistic behaviour on the part of the family manager (CEO) and influences positively on the performance of family firms. Particularly, the utilization of MCS is appropriate in family firms characterized by informal and family-based controls that usually remain well-established throughout the organization's operations (Ansari & Bell, 1991) and where MCS are often used only for internal interests (family members) (Uddin, 2009). Likewise, our study highlights the relevance of using MCS to improve the obtaining of TIO. The use of formal MCS facilitates the exchange and promotion of specific tacit knowledge (Hall, 2010) and can be used as a control mechanism to reduce managerial entrenchment and mitigate family manager's shirking and opportunistic behaviour, enhancing the achievement of TI by family management.

Our findings also support that both MCS and TI fully mediate between family management and firm performance. In this sense, the mediated effect by MCS and TI of the influence of family management (CEO) on performance is nearly a 45.44% of the total effect. The use of MCS by family management has a double impact on firm performance, one direct and other through its impact on the obtaining of TI -see above theoretical explanations-. Our research also accentuates the significant role

played by TI in generating firm performance (Amit & Zott, 2001). The obtaining of TI may alleviate specific agency costs of family-managed firms. For instance, the achieving of TI requires executive talent and well-prepared human resources with reconigzed quality and expertise (Burkart et al., 2003) and makes family managers better positioned to balance economic and non-economic goals (Berrone et al., 2010).

The research also recognizes the heterogeneity of family firms (Chrisman & Patel, 2012). Chua et al. (2012) and Pazzaglia, Mengoli, and Sapienza (2013), among others, consider that this heterogeneity depends on generational stage, management team, CEO and the composition of the board of directors. Particularly, we observe the differences coming from the “governance-related heterogeneity” (Nordqvist, Sharma, & Chirico, 2014). Governance-related heterogeneity arises from family involvement being based on the difference between family-influenced firms and family-controlled firms (Arregle et al., 2012). This is the reason why we focus on the determinants of performance within family firms according to the heterogeneity of the management dimension. We confirm that in the particular case of private family-managed firms is very important, in order to mitigate particular agency problems and balance economic and non-economic objectives associated to family-business subsystem, taking into account the effects of MCS and TI when firm performance is evaluated.

Finally, our study uses a sample of private family small and medium sized firms, while former literature has paid attention in public firms primarily. We focus in this specific group because most businesses are private, small and medium-size enterprises, and they contribute significantly to the economies worldwide and the

incidence of the use of MCS and the occurrence of TI may be more pronounced and more significant in SMEs.

From practical point of view, our results indicate that family management may have a great impact on the use of MCS and TI and, ultimately, firm performance. In particular, our results encourage family managers to use formal MCS because in that way they will contribute to obtaining better firm performance, direct and indirectly - through TI-. Therefore, our study support the view that firm performance is not dependent only on who occupies the CEO position (Morck, Shleifer & Vishny, 1988), but it is showing that the utilization of MCS is fundamental to explain why the variations in the behaviour and performance among family-managed firms may be as large as the variations between family-managed and non-family managed firms (Chua et al., 2012).

The research also offers limitations that provide avenues for future research. In particular, we control family involvement in management through a one-dimension variable (family managed vs non-family managed). In order to get a deeper knowledge, future research should consider a multidimensional approach to measure family involvement in the governance bodies, for example using theoretical or measurement approaches to heterogeneity within family firms, such as “familiness”, “socio-emotional wealth”, “social capital”, “F-Pec scale”. Therefore, extending this current study remains and important task for the next research lines. The study focuses in the case of private small and medium family firms, so it will be interesting to consider the particular behaviour of public family firms, which maintain different governance structures. Additionally, family firm heterogeneity can be studied considering other variables such as CEO family-connections (Miller, LeBreton-Miller & Lester, 2013), family and founder firms (Block et al., 2013), firms acquired by family

owners versus those created or inherited by family owners (Pazzaglia et al., 2013). We focus on the Spanish context characterized by being a code-law country. Due to the fact that the institutional setting would affect family-business relationship, further research in a different institutional setting is needed. Finally, the period of time when we developed the qualitative research, 2010, comprises a critical moment for Spanish small and medium family firms because of the strong economic and financial crisis. Therefore, family firms probably behaved more conservatively than they would in a normal period; this fact may have affected respondent's answers introducing some bias in the data collected through the survey.

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FIGURES AND TABLES

Figure 1. Model specifications

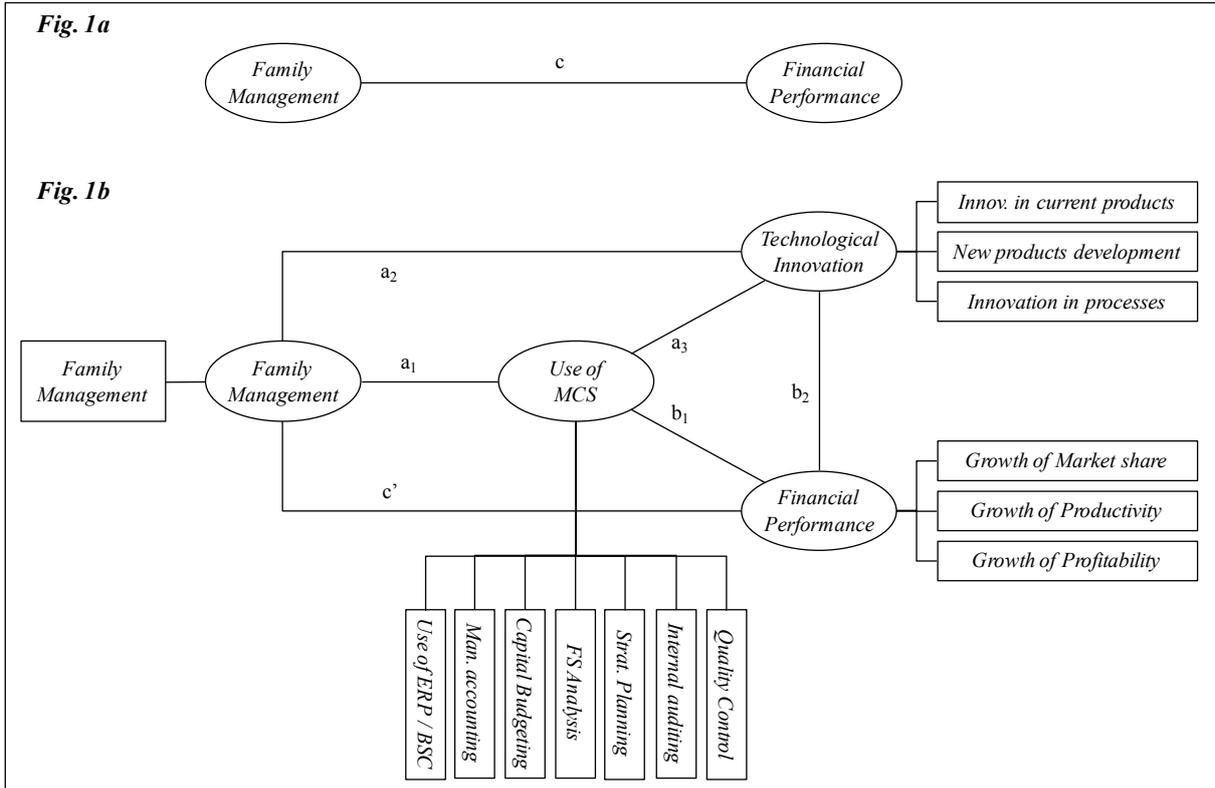
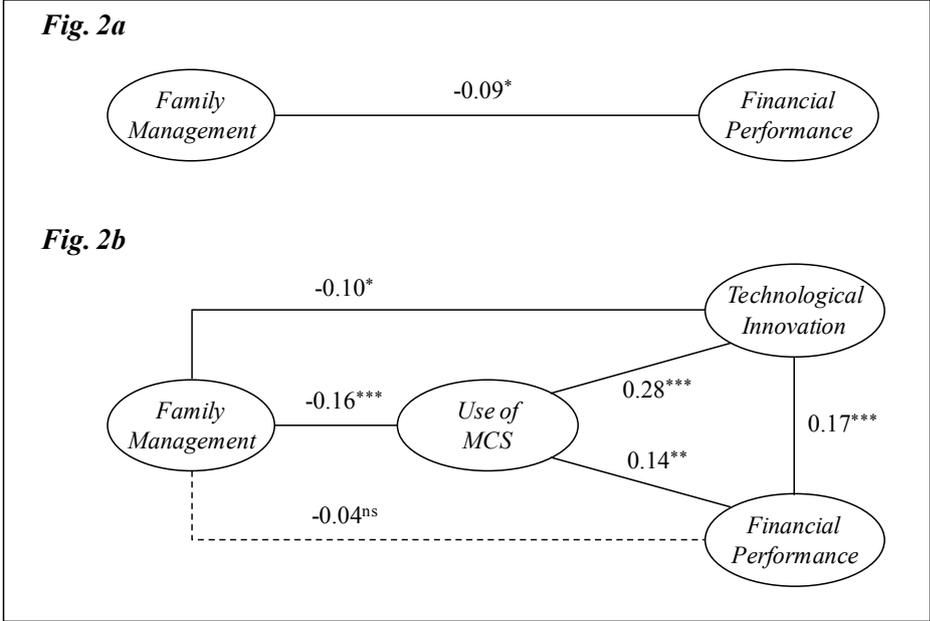


Figure 2. Results



^{ns} $p > 0.05$ (not significant); * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 1. Descriptive statistics and correlations of measures

	Mean	sd	min	max	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Family managed	0.90	0.30	0	1	1													
2 ERP/BSC systems	2.48	1.43	1	5	-0.15	1												
3 Managerial accounting	2.94	1.34	1	5	-0.13	0.50	1											
4 Capital budgeting	3.18	1.24	1	5	-0.07	0.32	0.61	1										
5 Financial statement analysis	3.36	1.20	1	5	-0.12	0.39	0.55	0.64	1									
6 Strategical planning	2.96	1.23	1	5	-0.13	0.42	0.47	0.55	0.60	1								
7 Internal auditing	2.78	1.42	1	5	-0.11	0.35	0.38	0.38	0.47	0.52	1							
8 Quality control systems	3.16	1.40	1	5	-0.12	0.27	0.33	0.39	0.41	0.44	0.52	1						
9 Current products innovation	1.70	1.92	0	5	-0.13	0.19	0.17	0.18	0.20	0.18	0.13	0.22	1					
10 New products development	1.33	1.84	0	5	-0.12	0.13	0.10	0.18	0.19	0.23	0.11	0.21	0.57	1				
11 Innovation in processes	1.70	1.96	0	5	-0.12	0.23	0.14	0.16	0.19	0.21	0.15	0.23	0.56	0.48	1			
12 market share growth	2.92	1.03	1	5	-0.05	0.11	0.13	0.16	0.17	0.12	0.11	0.08	0.13	0.11	0.21	1		
13 productivity	2.97	1.06	1	5	-0.12	0.09	0.15	0.14	0.16	0.11	0.15	0.13	0.15	0.14	0.25	0.64	1	
14 profitability	2.68	1.03	1	5	-0.05	0.12	0.12	0.12	0.14	0.08	0.12	0.10	0.09	0.07	0.18	0.69	0.73	1

Empirical correlations of indicators. Means, population standard deviations, min and max values of empirical original matrix. Major heterotrait correlation: 0.25; minor monotrait correlation: 0.27.

Table 2. Outer model validation, confirmatory composite analysis and Discriminant validity

Panel A. Outer model validation and confirmatory composite analysis									
Construct	Indicator	Loading	sd	CVR		α	ρ_A	ρ_C	AVE
				Q ²	Q ²				
Use of MCS				0.01	0.37	0.852	0.854	0.88	0.53
				3	7				
	ERP/BSC systems	0.638 ***	0.03	0.01	0.23				
				3	8				
	Managerial accounting	0.744 ***	0.02	0.01	0.41				
				6	2				
	Capital budgeting	0.758 ***	0.02	0.00	0.42				
				6	9				
Financial statement analysis	0.803 ***	0.01	0.01	0.48					
			9	3					
Strategical planning	0.788 ***	0.02	0.01	0.46					
			1	2					
Internal auditing	0.695 ***	0.02	0.01	0.34					
			7	9					
Quality control systems	0.666 ***	0.03	0.01	0.26					
			0	5					
Tech. Innovation				0.06	0.36	0.775	0.789	0.86	0.68
				4	5				
	Current products innovation	0.845 ***	0.01	0.06	0.41				
				9	5				
	New products development	0.793 ***	0.02	0.05	0.34				
			6	2					
Innovation in processes	0.849 ***	0.01	0.06	0.33					
			9	9					
Performance				0.04	0.52	0.869	0.889	0.91	0.79
				5	4				
	market share growth	0.869 ***	0.01	0.04	0.47				
				7	8				
	productivity	0.905 ***	0.01	0.05	0.50				
			3	7					
profitability	0.893 ***	0.01	0.03	0.58					
			5	8					

Panel B. Discriminant validity

		I	II	III	IV
I	Family managed	1	<i>0.18</i>	<i>0.16</i>	<i>0.09</i>
II	Use of MCS	-0.16	0.73	<i>0.36</i>	<i>0.22</i>
III	Tech. Innovation	-0.14	0.30	0.83	<i>0.24</i>
IV	Performance	-0.09	0.19	0.21	0.89

Panel A. Original sample loadings reported. Significance and standard deviations performed by 10,000 rep. Bootstrapping procedure. CVR Q²: cross-validated redundancies Q², and CVC Q²: cross-validated communalities Q², performed by a 9 Distance-Blindfolding procedure. α : Chronbach's Alpha; ρ_A : Dijkstra–Henseler's rho; ρ_C : Jöreskog's composite reliability; AVE: Average Variance Extracted.

Panel B. HTMT ratio over the diagonal (cursive). Fornell-Lacker criterion: squared-root of AVE in diagonal (bold) and construct correlations below diagonal.

Table 3. Structural model and hypotheses testing

	Path	sd	lo99	hi99	lo95	hi95	
Direct effects							VIF
Family managed → Use of MCS	-0.164 ***	0.03 ₉	-0.259	-0.059	-0.235	-0.080	1.000
Family managed → Tech. Innovation	-0.098 *	0.04 ₂	-0.206	0.006	-0.178	-0.017	1.028
Family managed → Performance	-0.043 ns	0.04 ₀	-0.145	0.066	-0.122	0.041	1.038
Use of MCS → Tech. Innovation	0.282 ***	0.03 ₇	0.179	0.373	0.203	0.349	1.028
Use of MCS → Performance	0.137 **	0.04 ₄	0.021	0.247	0.047	0.221	1.116
Tech. Innovation → Performance	0.165 ***	0.04 ₃	0.046	0.268	0.078	0.244	1.109
Indirect effects							VAF
<i>Global indirect effect</i>							
Family managed → Performance	-0.046 ***	0.01 ₃	-0.083	-0.017	-0.073	-0.023	52.1
<i>Individual indirect effects</i>							
Fam. man. → Use of MCS → Performance	-0.023 **	0.00 ₉	-0.050	-0.004	-0.044	-0.007	25.3
Fam. man. → Tech. Innov. → Performance	-0.016 *	0.00 ₈	-0.043	0.001	-0.035	-0.003	18.2
Fam. man. → MCS → Tech. Innov. → Perf.	-0.008 **	0.00 ₃	-0.017	-0.002	-0.015	-0.003	8.6
Family man. → Use of MCS → Tech. Innov.	-0.046 ***	0.01 ₂	-0.080	-0.016	-0.072	-0.023	32.1
Use of MCS → Tech. Innov. → Performance	0.047 ***	0.01 ₄	0.013	0.084	0.022	0.074	
Total effects							
Family managed → Tech. Innovation	-0.144 ***	0.04 ₂	-0.247	-0.036	-0.223	-0.061	
Use of MCS → Tech. Innovation	0.282 ***	0.03 ₇	0.179	0.373	0.203	0.349	
Family managed → Performance	-0.089 *	0.04 ₀	-0.189	0.023	-0.165	-0.003	
Use of MCS → Performance	0.183 ***	0.04 ₂	0.071	0.286	0.095	0.263	
Tech. Innovation → Performance	0.165 ***	0.04 ₃	0.046	0.268	0.078	0.244	

Original path values, as well as 10,000 rep. Bootstrapping Standard Deviations, 99% and 95% bias-corrected confidence intervals reported. VIF: Inner model Variance Inflation Factors. VAF: proportion mediated.

Overall validation criteria [95% CI in brackets]: SRMR = 0.027 [0.017;0.028]; d_{ULS} = 0.077 [0.031; 0.082]; d_G = 0.027 [0.012; 0.028]. R^2 [99% Bias-Corrected in brackets]: Use of MCS: 0.027 [0.003; 0.067]; Technological Innovation: 0.098 [0.045; 0.158]; Performance: 0.065 [0.023; 0.116]. Q^2 as shown in table 1. ^{ns}: $p > 0.05$; ^{*}: $p < 0.05$; ^{**}: $p < 0.01$; ^{***}: $p < 0.001$.