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# Family Management and Firm Performance in Family SMEs: The Mediating Roles of Management Control Systems and Technological Innovation

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**Abstract:** The aim of this research is to analyze the mediating role of the use of management control systems (MCS) and the achievement of technological innovation (TI) in the relationship between family management and firm performance in family small and medium-sized enterprises (SMEs). A questionnaire was conducted by 617 managers of family SMEs in Spain, and our model was tested using partial least squares. Our findings show that both MCS and TI play crucial mediating roles in the understanding of the relationship between family management and firm performance. As a result, family-managed firms that utilize MCS and produce TI are much more likely to generate better performance. These results encourage family managers to use formal MCS because in that way they will contribute to obtaining better firm performance, directly and indirectly through TI. We focus on private family SMEs, because these specific firms contribute significantly to the economies worldwide. This paper contributes to resolve the controversy regarding the relationship between family management and firm performance introducing MCS and TI as mediating factors.

**Keywords:** family business; performance; management control systems; innovation; SMEs; partial least squares

## 1. Introduction

Previous research literature highlights the importance of family firms in developed economies due to their importance to promote employment, to drive economic activity, and to contribute to wealth generation in countries through gross domestic product [1,2]. This is the reason for the broadening of a recent, but already well established, family businesses research field. In this sense, previous research literature considers different management behaviors between family and non-family firms [1,3]. Furthermore, most of family firms are small and medium enterprises (SMEs) [4]. Consequently, we focus the study on family SMEs due to their particular relevance in the literature on Economics [5].

Likewise, it is widely accepted that innovation favourably influences long-term firm performance [6] and increases the competitiveness of the business [7]. However, there is previous research highlighting the existent paradox of R&D investments [8] and the interplay between R&D expenses and the obtaining of innovation outcomes in SMEs [9]: SMEs not only seem to carry out less expensive and risky R&D activity but also are probable to be the source of most innovations, producing more patents and innovations that larger firms control by R&D investments. As a consequence, recent literature has emphasized the importance of considering the differences between the types of SMEs [10] and also taking into account the high level of heterogeneity within the small and medium family firms, concerning innovation and its role as a driver of SME performance [8,11,12].

More specifically, prior literature has found contradictory results regarding the influence of family involvement on firm performance [13], despite the fact that family-involved firms tend to invest for the long term, generating unique capabilities that sustain competitive advantage [14]. The findings have not been consistent enough when the particular impact of family management on firm performance has been tested [15,16]. These inconclusive results suggest that the explanation of this 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 the acceptance of the heterogeneity of family firms [17], and some authors have claimed that studies should be more focused on the mediators and moderators of the effect of family involvement and firm performance [18].

This study concentrates on management control systems (MCS) and technological innovation (TI), two variables that allow gaining sustainable competitive advantages [19,20], as mediator variables in the relationship between family management and firm performance of family-owned SMEs, following calls to go beyond input–output models and the lack of studies on private SMEs [21].

We initially explained in two steps how family management impacts on firm performance through the use of MCS: Firstly, we justified how family management influences the use of MCS, and secondly, we showed how MCS impacts on firm performance. In this sense, MCS become key tools that managers should use for planning, budgeting, analyzing, measuring, and evaluating useful information for a proper decision-making process [22]. Furthermore, MCS are considered a sustainable competitive advantage when they are correctly developed and structured [23]. Moreover, MCS help to carry out sustainability policies to achieve long-term performance [24]. However, previous literature reveals MCS have not been sufficiently considered in research on family firms [25], and the scarce previous studies confirmed family firms use MCS to a lesser extent compared to nonfamily firms [26].

We proposed that family management can affect TI through the utilization of MCS. Once we demonstrated the effect of family management on MCS, we focused on the effect of family management on TI through the implementation of MCS. TI has usually been conceptualized as the set of activities through which a firm conceives, designs, manufactures, and introduces a new product, service, or technique [27]. It has also been defined as all changes in the things (products/services) which an organization offers (product innovation) and all changes in the way in which they are created and delivered (process innovation) [28], being an essential determinant of sustainability and organization performance [29]. Prior literature has found mixed results regarding the influence of family management on TI [30,31]. In order to clarify the former varied findings, some recent studies opted for focusing on the impact of family management on the relationship between TI inputs and outputs [32,33], but this influence continues to be an open question. In contrast, we chose to discuss the mediating effect of MCS on the connection between family management and TI as a means to shed light on this unclear association.

Finally, we considered the mediating role of both MCS and TI in the relationship between family management and firm performance for two main reasons: Firstly, there is an emerging stream of research showing how MCS can play an important role in the management of innovation [34]. Secondly, prior research has confirmed that the achievement of TI makes firms outperforming their rivals [35], and it is an essential factor for achieving better sustained performance [36]. Therefore, an understanding of the influence of family management on the achievement of TI is a crucial requisite for really understanding the performance of family-managed firms and their performance differences when compared to other family firms, as well as nonfamily firms.

We tested our hypotheses using a sample of 617 family-owned, private, small and medium-sized enterprises, while former literature has focused attention primarily on public firms. We analyzed this specific group because prior research suggests that large and SME family businesses may differ from each other [37,38]. In that sense, most businesses are private SMEs, and they play a significant role in worldwide economies.

We contribute to previous 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.

Following 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 attainment of TI mediate the relationship between family management and firm performance. We emphasize that the utilization of MCS can assist in reducing specific agency costs in family-managed firms and in finding the right balance between economic and non-economic goals, improving the attainment of TI outputs and firm performance. Furthermore, we recognize that it 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, ultimately influencing firm performance. In short, this study contributes to the debate on the antecedents of performance in family firms, pointing out that firm performance is not dependent only on the firm’s decision to hire family or nonfamily managers but results also show that the utilization of MCS and the achievement of TI are essential to illuminate the performance deviations between family-managed and nonfamily-managed firms and even among family-managed firms because of heterogeneity.

After this introductory section, Section 2 analyzes the main theoretical aspects of family management and firm performance, as well as the roles 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 businesses, the involvement and the role of family members in the firm’s management has been proven to have a great influence on firm performance, and a handful of arguments have been used to explain this phenomenon. Thus, literature has produced mixed and contradicting results regarding the meaning 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’s and the firm’s interests [39] by avoiding the agency costs of nonfamily-managed firms. Additionally, family-managed firms possess competitive advantages because their own family-business subsystems generate a bundle of unique resources and capabilities [40,41]. Thus, family management enhances monitoring and top managerial incentives because they may have profound knowledge regarding the business [42]. Moreover, they have positive features related to social capital, protecting the family name and reputation and sustaining the firm in times of trouble, which includes better customer service or long-term sustaining relationships with stakeholders and the community [13,43] and, as a consequence, higher firm performance.

However, specific costs for family-managed firms, far from traditional agency costs, can arise and have a negative impact on the firm’s performance [44,45]. The 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 [46], which is detrimental to the firm’s performance. The active involvement of family members may also limit human capital [47], as well as the discretion and latitude of nonfamily managers [48], and might even increase family conflicts [49]. Furthermore, family-managed firms may erode performance by making business decisions based on enhancing socioemotional wealth at the expense of economic objectives [50].

The vast majority of prior studies regarding the effect of family influence on firm performance have mainly used data collected from public family firms and have explored the direct effect of family management on firm performance. Additionally, previous empirical research focused on private family firms has not provided a uniform answer to whether family-managed firms outperform nonfamily-managed firms as the results are mixed. While some studies did not find significant differences regarding performance between family and nonfamily-managed firms [16,51], other research

observed a negative relationship between the active involvement of family members in management and firm performance [15]. Despite recognizing the relevant contribution of these studies to the literature on family firm performance, we observed an over-reliance on input–output models and a focus mainly on public family firms. As a consequence, we believe that taking into account the mediating role of the utilization of MCS and the achievement 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, with the net effect being ambiguous, we advance 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 Management Control Systems

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 between family and nonfamily businesses in the implementation of MCS that need further research [52]. In fact, family influence is an important and distinct factor that has not been sufficiently considered by most MCS studies, as there are relatively few studies on MCS making the distinction between family and nonfamily firms [25,53]. The few previous studies have found that family firms are characterized by using MCS to a lesser extent compared to nonfamily businesses, giving MCS a different use [26,52,54,55].

Family firms use MCS to a lesser extent for several reasons [56]: firstly 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, family firms consider the use of informal and subjective management controls as the prevalent system of MCS [57]. Informal and family-based controls usually remain well-established throughout the organization’s operations [58], and MCS are often used only for internal interests (family members) [59]. In addition, the expected involvement in management of family members, the consequent trust within the management team (informal organization), the family firm’s long-term orientation, and the emphasis on non-financial goals may influence the choice of MCS [53].

Since previous evidence indicates less use of MCS because family firms developed more informal MCS, it is essential to face the dynamic process of transitioning from an informal management system to the development of a well-established MCS. Hence, MCS becomes a critical factor for the success of organizations [22], particularly when small family firms (owner-manager) move from informal methods in the decision-making process to more formal methods according to the business life cycle [55]. Therefore, business growth seems to be another factor that determines the move 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 [60].

### 2.2.2. Management Control Systems 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 consists of considering a formal performance measurement system in order to explicit the set of means-end relationships that the company has followed to achieve its strategic intent [61]. In that sense, behavioral and organizational outcomes relate to the usefulness of MCS [62] because, when MCS are useful for the members of the organization providing enhanced information, the decision-making process leads to improved decisions and achieving better organizational goals. Furthermore, 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 [62].

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 a company and the net profit per employee [63]. Chenhall and Langfield-Smith (1998) also found evidence on the positive relationship between the use of MCS and a company's performance [64]. Similarly, Piercy, et al. (1999) showed that the greater the extent of behavior-based management control, the higher the outcome performance of employees concerned [65].

In that sense, Dávila's (2000) qualitative research positively relates MCS with performance, including 10 case studies in Europe and the US designed to evaluate a diversity of product development projects and MCS [66]. Adler, et al. (2000) showed, after analyzing 165 industrial companies in New Zealand, that MCS positively influence product performance [67]. Eventually, Kennedy and Affleck-Graves (2008) indicated how the implementation of Activity-Based Costing control systems has a positive effect on performance [68]. In addition, 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 strategies [69]. The result obtained demonstrates that the right fit of initial MCS is very useful for managers and more likely to increase performance. Finally, Bedford [34] developed empirical research using a survey addressed to top managers of 400 Australian firms, and the author's 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) [34].

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 in 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 [70]. Literature is divided as to the answer to the question [71,72].

Some studies argue that family managers are a common source of socioemotional wealth for a family [73] and have as an essential and vital objective the protection of the family's affective endowment [44]. Consequently, family-managed firms opt for making lower investments in R&D [30] to limit the requirements of external financing, given that nonfamily capital might endanger the control of the firm and the latitude and discretion of family management [74]. Therefore, family-managed firms may have a lower willingness to innovate due to risk aversion, disinclination to share control and socioemotional issues. Given that family-managed firms often will prefer to restrict R&D expenses, the likelihood of achieving TI will consequently be obviously reduced. Moreover, the family firm's ability to innovate may be influenced by a 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 [46,49].

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 a firm's resource orchestration and less affected by resource allocation preferences [33]. A family CEO increases the willingness and ability to monitor the innovation process [39] and the establishment of long and trusted relationships with stakeholders, access to external knowledge [75] and, as a result, generates greater innovation output. Furthermore, family management provides higher tacit knowledge [76], which produces higher innovation outcomes [77].

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

### 2.3.2. Management Control Systems and Technological Innovation

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 [34]. The use of MCS (developing a levers-of-control framework) by top management is necessary because they have pivotal roles in successful innovation and the learning process within business organizations [78,79]. In that respect, the interactive use of formal information systems assists the exchange of tacit knowledge and promotes the development of new technologies [80]. Furthermore, the essence of MCS is to manage the inherent organizational tension between creative innovation and predictable goal achievement [81]. In this sense, innovation requires adequate use of MCS [82] because they are necessary to ensure innovation effectiveness [83]. Consequently, previous literature positively relates MCS to innovation and performance [66], showing that the greater the use of MCS, the greater the effect of innovation on the performance of SMEs [84].

Similarly, in the specific case of TI through new product development, empirical research confirmed that MCS play an important role in the TI process [85], both in exploratory (radical) and exploitative (incremental) innovations [86], enhancing the performance of the innovation projects.

Nevertheless, it remains unclear whether the same MCS are similarly effective across distinct types of innovation, as well as how MCS run when implementing multiple and potentially conflicting innovation modes [34].

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 in the Relationship between Family Management and Firm Performance

Innovating technologically is an indispensable requisite for exploring new opportunities [87], entering into competition superbly [88] and becoming a competent contender in the global market [89]. Previous literature has confirmed that firms engaged in TI generate growth, create value, and outperform others [90] and that TI is imperative for driving a firm's competitive advantage [91] and national development [92].

Prior researchers have found that achieving TI contributes decisively to generating greater performance [93]. Specifically, strategy and product innovation [94] and process innovation [95] have been shown to also have positive impacts on firm performance. In addition, other studies have highlighted the influence of product advantage on market performance [96] or the moderating role exerted by the business' operating environment in the relationship between technology strategy and performance [97].

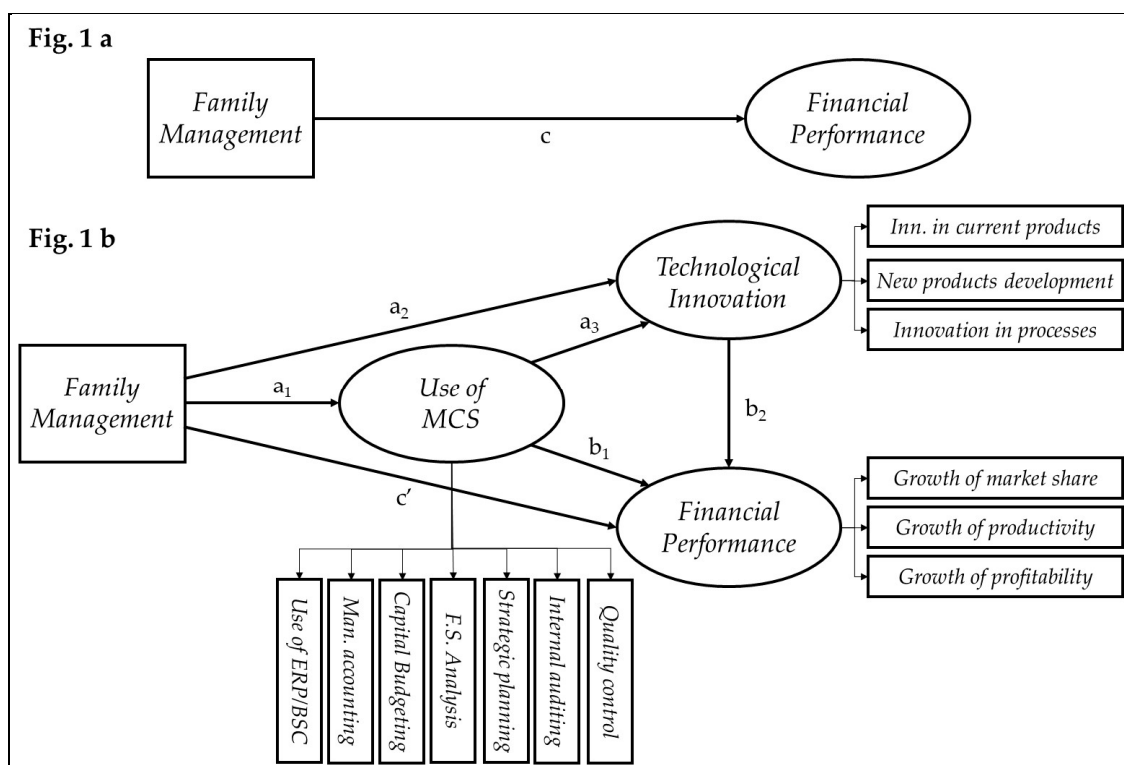
Thus, we propose the following hypothesis:

**H4:** *TI mediates the relationship between family management and firm performance.*

Bearing in mind the above-mentioned theory and empirical evidence, family management will be related to financial performance through, first of all, the use of MCS and then TI. Integrating these two

relationships with mediation generates a three-path mediation model (see Figure 1) [98,99]. To sum up, we tested whether the use of MCS and TI sequentially mediate the relationship between family management and financial performance. In other words, family management impacts the use of MCS, and this will influence the intensity of TI, which will improve the performance of the firm. Therefore:

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



**Figure 1.** Model specifications: (a) total effect model; (b) mediated model.

### 3. Materials and Methods

#### 3.1. Data Collection and Representativeness

We collected data through a survey addressed to 617 managers of family firms in Murcia (Spain) as part of a long-term research activity promoted by the “Observatorio Económico de la PYME”, a research center for SMEs funded by the *Instituto de Fomento de la Region de Murcia*, a public institution that belongs to the Spanish Industry, Firm and Innovation Office. We defined the size of the firms following the European Commission’s 2003/361/EC recommendation [100].

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 family firms managed by a family CEO in our sample is similar to recent studies conducted on family firms in Spain [101]. In the aforementioned study, the percentage of family ownership was, on average, 95% and the presence of a family CEO decreased with the firm size: micro (93%), small (90.3%), and medium (84.1%). Likewise, the percentage of professionalized family firms in the sample was very similar to the proportion found in other academic works [102,103]. Moreover, 90% of SMEs in Spain

are considered family-managed firms [101,104]; therefore, our sample distribution fits this proportion. Sample distribution is very similar between family-managed and nonfamily-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 nonfamily-managed family firms. Thus, about 88% of family-managed firms are small businesses while only 66% of nonfamily-managed counterparts are small-sized firms. As far as business maturity is concerned, about 64% of family-managed firms are 25 years old or less in comparison to 56% of nonfamily-managed family firms.

We replaced companies that chose not to participate in the project with similar (randomly selected) firms in the same industry and geographical 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 [105], and managerial perceptions influence, to a significant degree, the firm's strategic behavior [106].

### 3.2. Measurement Variables

#### 3.2.1. Firm Performance

Firm performance is measured by building three indicators from the perceptions of managers regarding the competitive position of their own companies. With this purpose, we utilized three Likert scale questions concerning growth in market share, improvements in profitability, and improvements in productivity. We followed Quinn and Rohrbaugh's (1983) "rational model" [107,108]. 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 [109,110], and a time lag occurs between the date of the survey and the acquisition of accounting information, which is not officially available until the company publishes its annual accounts. Finally, competitive success is a relative term; thereby, the position of the company against its competitors 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 ownership configures a firm as a family firm [111]. The ownership 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 [112]. Nevertheless, shared vision and goals are specially associated with the level of family involvement [18]. We use family management as a proxy of family influence on decision-making, since we do not have a direct estimation of family vision and goals [113]. In particular, we use a dummy variable that takes a value of 1 when the CEO of the family firm is a family member, and a value of 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 a company through management positions [114].

#### 3.2.3. Management Control Systems

To analyze the degree of implementation of MCS, a measure of the subjective perception of the company manager is required, similar to Chenhall and Morris [115]. 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 similar; and (5) Internal Auditing.



### 3.2.4. Technological Innovation

To measure the TI level of the firm, we used a subjective approach rooted in the firm manager's or owner's judgement regarding the innovative activity of the business. This option appears pertinent in samples composed mainly of SMEs since the objective approaches seem to minimize the innovative attempts of these particular types of firms [116]. Concretely, we used three dimensions for TI, namely the importance of current product innovations, new product development, and innovations in processes, according to previous studies [103]. Consequently, we included six items in the questionnaire as follows: a) "Did your firm make 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 develop 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]"; and c) "Did your firm make 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, using a Likert-type scale, from 0 to 5.

### 3.3. Statistical Controls for Bias

To test for the validity of the survey, we analyzed two types of bias: nonresponse bias, since no respondents could have a different behavior than respondents, and common method bias. That is, due to the nature of the data, it is possible that the relations between the variables were inflated as a consequence of common method variance, since we used the same source to gather data for both the dependent and independent variables [103]. Firstly, to test for nonresponse bias, we used late respondents as surrogates for no respondents [117]. 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 showed no significant differences between the two groups using  $t$  and  $\chi^2$  tests. Considering these outcomes, we found neither nonresponse nor industry bias. Secondly, we controlled this bias using several statistical remedies as suggested by Podsakoff et al. [118] and conducted a partial correlation procedure [119]. Results suggested that the bias of the common method variance is not relevant in our study. Nevertheless, it would be important for future studies to verify our results using different sources of information for the data.

### 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). SEM is particularly suitable for testing the proposed theoretical model because it allows for simultaneous estimation of multiple relationships between latent constructs involving mediation and accounts for measurement errors in the constructs [120]. All our latent variables are composites because we assumed a defining relationship between a construct and its indicators; consequently, PLS-SEM is an appropriate technique to be used in this study [121,122]. Moreover, traditional PLS is also preferable when the sample does not have a sufficiently large data set [123]. We followed the recommendations of Rigdon [124] in the estimates of composites; hence, they were measured in a Mode A weighting scheme. This study used SmartPLS 3.2 software [125].

#### 3.4.2. Mediation Analyses

Figure 1 summarizes our research model. Figure 1a describes the total effect of family management in firm performance and Figure 1b represents H2–H5 mediation hypotheses, which posit how family management affects firm performance through two sequential mediators, the use of MCS and TI, following a three-path mediation model [98,99] whereby the total effect of family management on firm performance can be expressed as the sum of the direct and indirect effects. The latter is estimated by the product of the path coefficients for each of the paths in the mediational chain [126]. The advantage

of this approach is that it is able to isolate together the indirect effects of both mediating variables, that is, the use of MCS (H2:  $a_1b_1$ ) and TI (H4:  $a_2b_2$ ) on performance, the mediating role of MCS in the relationship between family management and TI (H3:  $a_1a_3$ ), as well as the analysis of indirect effects passing through both of these mediators in a sequential series (H5:  $a_1a_3b_2$ ) [127]. Moreover, the Variance Accounted For (VAF) formula was used to determine the size of indirect effect [128]. This formula helps to determine the extent to which the variance of dependent variable is directly explained by independent variables and how much of that variance is explained by the indirect relationship via the mediator variable [129].

A traditional way of testing mediation hypotheses in multiple linear regressions has been the Sobel test [130]. However, such a test cannot be applied with PLS because path coefficients are not independent when computed using PLS. PLS does not provide raw unstandardized path coefficients [131] and the assumption of normality in the sampling distribution of the indirect effect is required for the Sobel test [98]. Alternatively, 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 [132] and performs better than the Sobel test [133,134].

## 4. Results

### 4.1. Model Validation

Descriptive statistics and correlations are shown in Table 1.

Each latent variable in the model was measured by multiple indicators and evaluated in terms of reliability, validity, and composition weights. All the reliability and discriminant validity criteria, such as Cronbach's alpha, Average Variance Extracted, Dijkstra–Henseler's rho ( $\rho_A$ ), and Jöreskog's composite reliability ( $\rho_C$ ) [128], exceed their shortcuts' values, as shown in Table 2 (panel A). In addition, we included 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-sample bias-corrected procedure. Furthermore, we performed a confirmatory composite analysis test following a blindfolding procedure (omission distance of 9) in order to determine the overall predictive relevance of the model as the first step in the quality assessment, since the  $Q^2$  values are above 0 [135]. In the second stage, we assessed the discriminant validity according to cross-loadings (not reported), Fornell–Larcker criterion, and Hetero-Trait Mono-Trait ratio (HTMT) [136], as shown in Table 2 (panel B).

Additionally, this study assessed quality by checking that the standardized root mean square residual (SRMR) does not exceed a value of 0.08 [137]. These results suggest a good fit in model specifications. Finally, we checked that SRMR [138], unweighted least squares distance ( $d_{ULS}$ ), and geodesic discrepancy ( $d_G$ ) [139] are in their own bias-corrected 95% confidence interval (CI), suggesting that our model is valid and meaningful [140]. Moreover, constructs Variance Inflation Factors (VIFs) ranged from 1.00 to 1.12, suggesting that collinearity is not a problem (see Table 3) [141].

**Table 1.** Descriptive statistics and empirical correlations of measures.

		Mean	SD <sup>1</sup>	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	Strategic 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						

<sup>1</sup> Population standard deviations of an empirical original matrix.

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

Panel A. Outer model validation and confirmatory composite analysis							
	Loading	SD *	Q <sup>2</sup>	$\alpha$	$\rho_A$	$\rho_C$	AVE
<b>Use of MCS</b>							
ERP/BSC systems	0.638	0.033	0.019	0.852	0.854	0.888	0.532
Managerial accounting	0.744	0.026	0.016				
Capital budgeting	0.758	0.026	0.002				
Financial statement analysis	0.803	0.019	0.014				
Strategic planning	0.788	0.021	0.016				
Internal auditing	0.695	0.027	0.011				
Quality control systems	0.666	0.03	0.013				
<b>Technological innovation</b>							
Innovation in existing products	0.845	0.019	0.066	0.775	0.789	0.868	0.688
New products development	0.793	0.026	0.056				
Innovation in processes	0.849	0.019	0.068				
<b>Firm performance</b>							
Market share growth	0.869	0.017	0.045	0.869	0.889	0.919	0.791
Productivity	0.905	0.013	0.058				
Profitability	0.893	0.015	0.031				
Overall validation criteria [95% confidence interval (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]							
Panel B. Discriminant validity							
		I	II	III	IV		
<b>I</b>	Family-managed	<b>1</b>	<i>0.18</i>	<i>0.16</i>	<i>0.09</i>		
<b>II</b>	Use of MCS	−0.16	<b>0.73</b>	<i>0.36</i>	<i>0.22</i>		
<b>III</b>	Technological innovation	−0.14	0.30	<b>0.83</b>	<i>0.24</i>		
<b>IV</b>	Performance	−0.09	0.19	0.21	<b>0.89</b>		

**Panel A.** Original sample loadings reported. Significance and standard deviations (SD) performed by 10,000 repetitions Bootstrapping procedure. Q<sup>2</sup>: cross-validated redundancies index performed by a 9-step distance-blindfolding procedure.  $\alpha$ : Chronbach's alpha;  $\rho_A$ : Dijkstra-Henseler's rho;  $\rho_C$ : Jöreskog's composite reliability; AVE: Average Variance Extracted; \*: All loadings are significant at a 0.001 level; **Panel B.** HTMT ratio over the diagonal (italics). Fornell-Lacker criterion: square root of AVE in diagonal (bold) and construct correlations below the diagonal.

**Table 3.** Structural model and hypotheses testing.

	Path	SD	f <sup>2</sup>	95CI	VIF
<b>Direct effects</b>					
Family-managed → Use of MCS	−0.164 ***	0.039	0.028	[−0.235; −0.080]	1.000
Family-managed → Technological Innovation (TI)	−0.098 *	0.042	0.010	[−0.178; −0.017]	1.028
Family-managed → Financial Performance (FP)	−0.043	0.040	0.002	[−0.122; 0.041]	1.038
Use of MCS → TI	0.282 ***	0.037	0.086	[0.203; 0.349]	1.028
Use of MCS → FP	0.137 **	0.044	0.018	[0.047; 0.221]	1.116
TI → FP	0.165 ***	0.043	0.026	[0.078; 0.244]	1.109
<b>Indirect effects</b>					
<b>(a) Global indirect effect</b>					
Family-managed → FP	−0.046 **	0.013		[−0.073; −0.023]	52.1
Use of MCS → TI → FP	0.047 ***	0.014		[0.022; 0.074]	25.6
<b>(b) Individual indirect effects</b>					
Family-managed → Use of MCS → FP	−0.023 **	0.009		[−0.044; −0.007]	25.3
Family-managed → TI → FP	−0.016 *	0.008		[−0.035; −0.003]	18.2
Family-managed → Use of MCS → TI → FP	−0.008 **	0.003		[−0.015; −0.003]	8.6
Family-managed → Use of MCS → TI	−0.046 ***	0.012		[−0.072; −0.023]	32.1

Table 3. Cont.

	Path	SD	f <sup>2</sup>	95CI
<b>Total effects</b>				
Family-managed → Technological innovation	−0.144 ***	0.042		[−0.223; −0.061]
Use of MCS → Technological innovation	0.282 ***	0.037		[0.203; 0.349]
Family-managed → Performance	−0.089 *	0.040		[−0.165; −0.003]
Use of MCS → Performance	0.183 ***	0.042		[0.095; 0.263]
Technological innovation → Performance	0.165 ***	0.043		[0.078; 0.244]

R<sup>2</sup> [99% CI 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]. Blindfolding Q<sup>2</sup> index as shown in Table 2; original path values reported. SD: Standard Deviation; f<sup>2</sup>: size effect index; 95CI: 95% Bias Corrected Confidence Interval; VIF: Inner model Variance Inflation Factors; VAF: Variance Accounted Formula × 100 represents the proportion mediated. Significance, standard deviations, 95% bias-corrected CIs were performed by 10,000 repetitions Bootstrapping procedure; \*:  $p < 0.05$ ; \*\*:  $p < 0.01$ ; \*\*\*:  $p < 0.001$ .

#### 4.2. Hypotheses Testing

Our results suggested that family involvement in managing the business has 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 with mediation hypotheses. Path coefficients and their 10,000 resampling bootstrap significance levels are reported in Table 3 and Figure 2.

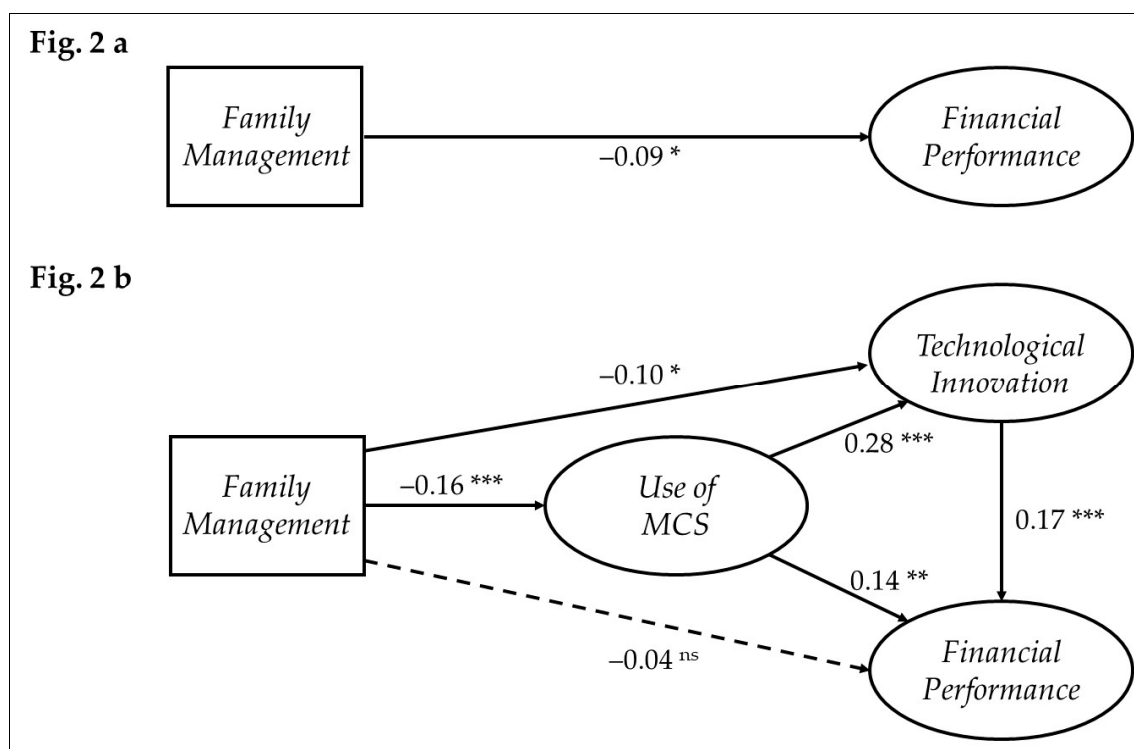


Figure 2. Results. <sup>ns</sup>  $p > 0.05$  (not significant); \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

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 [99,132]. Following Chin's (2010) suggestions [142], we chose the bootstrapping procedure to test the indirect effects. This generates 95% bias-corrected CIs for each individual indirect effect and sequential mediation (see Table 3).

The total effect of family management over performance shows a significant influence while direct effects are not significant, suggesting that MCS and TI fully mediate the relationship between family management and performance [143]. 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, with 25.3% through the use of MCS, 18.2% through TI, and an additional 8.6% sequentially. These results support H2, H3, and H5, respectively. Moreover, we found that the indirect effect of MCS on performance is positive and significant. TI mediates the relationship between MCS and performance. In fact, these findings allow us to state that the use of MCS enhances the mediating effect of TI on the family management–performance relationship. Finally, the use of MCS partially mediates between family management and TI, supporting H4. The proportion mediated is 32.1% of the total effect of family management on TI.

## 5. Discussion

Previous literature has started to focus on the heterogeneity of family firms [17] by researching the mediators and moderators of the effect of family involvement and firm performance [18]. Using a PLS approach, we analyzed how the participation of a family CEO may affect the performance of family firms. Our analysis went a step further because we examined the insights to explain this different behaviors according to two instrumental variables that can mediate the relationship between family involvement in management and the distinct performance of family firms. In particular, we considered 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. Hence, this study makes several contributions to the existing research on family business by analyzing the relationships among family involvement in management, MCS, TI, and firm performance. Our study 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 by investigating the mediating effect of MCS. Our results confirmed that family management has a negative effect on the use of MCS [56], 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 family management efficiency in turning TI inputs into outputs, but these results are also mixed [32,33]. However, we chose to make enquiries on the mediating effect of MCS on the connection between family management and TI. We found out that the negative effect of family management on the utilization of MCS has, through it, a negative impact on TI. Third, the lesser extent of TI in family-managed firms has a negative influence on firm performance. Finally, our study makes 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 showed that both the use of MCS and the achievement of TI play crucial mediating roles in the understanding of the relationship between family management and firm performance. Collectively, these findings bring to light an important distinction between family-managed firms using MCS and achieving TI and the rest of the family-managed firms. When family-managed firms utilize MCS and produce TI, they are much more likely to generate better performance, whereas for the other family-managed firms, the opposite is to be expected. In other words, the higher 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 [144], such as those family firms managed by a family CEO. According to the agency theory, family directors (CEOs) 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 behavior on the part of the family manager (CEO) and influences

positively the performance of family firms. The utilization of MCS is especially appropriate in family firms characterized by informal and family-based controls that usually remain well-established throughout the organization's operations [58] and where MCS are often used only for internal interests (family members) [59].

Likewise, our study highlights the relevance of using MCS to improve the chances of achieving TI. The use of formal MCS facilitates the exchange and promotion of specific tacit knowledge [80,145] and can be a control mechanism to reduce managerial entrenchment and mitigate family managers' shirking and opportunistic behavior, thus enhancing the achievement of TI by family management.

Our findings also support the idea 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 45.44% of the total effect. The use of MCS by family management has double impacts on firm performance: one is direct and the other is through its impact on the achievement of TI (see theoretical explanations above). Our research also accentuates the significant role played by TI in generating better firm performance [90]. The achievement of TI may alleviate specific agency costs of family-managed firms. For instance, the achievement of TI requires executive talent and well-prepared human resources with recognized quality and expertise [47]. TI makes family managers better positioned to balance economic and noneconomic goals [50].

The research also recognizes the heterogeneity of family firms [146], which depends on generational stage, management team, CEO, and the composition of the board of directors [17,147]. In particular, we observe the differences coming from the "governance-related heterogeneity" [148]. Governance-related heterogeneity arises from family involvement being based on the difference between family-influenced firms and family-controlled firms [144]. 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, this is very important for mitigating particular agency problems and balancing economic and noneconomic objectives associated with the 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 primarily paid attention to public family firms. We focus on this specific group because most family businesses are private, small and medium-sized, 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 a practical point of view, our results indicated that family management may have a great impact on the use of MCS and TI and, finally, 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, directly and indirectly through TI. Therefore, our study supports the view that firm performance is not dependent only on who occupies the CEO position [149], but it shows that the utilization of MCS is fundamental for explaining why the variations in behavior and performance among family-managed firms may be as large as the variations between family-managed and nonfamily-managed firms [17].

The research also has limitations that provide avenues for future research. In particular, we control family involvement in management through a one-dimension variable (family-managed vs. nonfamily-managed). In order to attain deeper knowledge, future research should consider a multidimensional approach to measuring family involvement in the governance bodies, for example using theoretical or measurement approaches to heterogeneity within family firms, such as "familiness", "socioemotional wealth", "social capital", and the "F-PEC scale". Therefore, extending this current study remains an important task for future research efforts. The study focuses on the case of private small and medium family firms, so it will be interesting to consider the particular behavior of public family firms that maintain different governance structures.

Additionally, family firm heterogeneity can be studied by considering other variables such as CEO family connections [150], family and founder firms [73], and firms acquired by family owners versus those created or inherited by family owners [147]. We focus on the Spanish context which is characterized by being a code-law country. Due to the fact that the institutional setting would affect family–business relationships, further research in a different institutional setting is needed. Finally, the period of time, 2010, when we developed the qualitative research, includes 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 respondents' answers by introducing some bias in the data collected through the survey.

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