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# Editorial letter
# Innovation in family firms: Bridging the theory-practice gap

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Innovation in family firms is still a controversial issue within the academic community and poses some unique challenges for family business owners and managers. This special issue on innovation in family firms results from the cooperation of both academic and business guest editors, in a pioneering initiative that is not usual in academic journals. Indeed, a key feature of this Special Issue has been the collaboration with two family business leaders, who have been involved in the editorial process together with the academics.

The two business editors that we involved are Antonio Gallardo, Vicepresident of Almirall and former director of FBN-Family Business Network, and Ignacio Osborne, CEO of the Osborne Group and Chairman of the Spanish Family Firm Institute.

In order to introduce the six papers that make up this special issue on innovation in family firms, we as academic editors are pleased to include some comments from the business editors that emerged during our interactions with the aim to make a step forward toward bridging the gap between research and practice on family business innovation, acknowledging the different perspectives and approaches adopted by academics and practitioners. As the business editor Mr. Osborne points: "Innovation issues in family firms are nowadays more important than ever, due to the rapid developments that are occurring in the business world and its corresponding technologies".

Despite being a topic analyzed by a number of authors over time (Feranita, Kotlar and De Massis, 2017; Aparicio, Iturralde and Sánchez-Famoso, 2020 in this issue; Chrisman, Chua, De Massis, Frattini and Wright, 2015), the study of innovation in family business still requires a greater volume of research to provide answers to the needs of family businesses. The distinctive nature of family firms results in a complex influence on the innovation process (De Massis, Frattini and Lichtenthaler, 2013), which is reflected in mixed research findings. For instance, the conclusions of the published research offer sometimes contradictory results, since family businesses can be considered innovative (Aronoff, 1998; Craig and Moores, 2006) or conservative (Sharma, Chrisman, y Chua, 1997; Zahra, Hayton y Salvato, 2004; Gómez-Mejía et al., 2007), with several studies that can support whatever of the two options.

Family businesses present a number of characteristics that, a priori, seem to favor innovation, such as long-term orientation (Tagiuri and Davis, 1996; Ward and Aronoff, 1994), the desire for continuity through the following generations (Miroshnychenko et al., 2020; Gallo, 1995), patient capital (De Massis, Audretsch, Uhlaner and Kammerlander, 2018; Sirmon and Hitt, 2003), and the long tenure of their main leaders (Lorenzo, 2020). The replacement of the prior generation by the next generation implies the access of younger people to the leadership of the company, who also often present a greater level of qualification (De Massis et al., 2008;

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Cabrera-Suárez, 2011). Young and qualified leaders would provide a new momentum to the firm, by means of the renewal of the firm (Núñez-Cacho and Lorenzo, 2020). Likewise, the successors receive an important legacy by means of the values of the family business (Erdogan et al., 2020), such as effort, perseverance, austerity, excellence, long-term orientation and entrepreneurial spirit, as basic foundations of their way of understanding business activity (Bermejo, 2008). Accordingly, the new generation managers could be in the best conditions to reinvent the company, since they know the business from within and they also provide the new vision of a person with a working life ahead. Another factor that favors the renewal impulse of the next generation is the familial support to carry out a prolonged tenure over time, which will not be as conditioned by short-term results as in other types of companies, by the so-called patient capital (Sirmon and Hitt, 2003) of the family business (Lorenzo, 2020). But, even if these ideal conditions are met in a specific family firm, it is not guaranteed that the company realizes the innovation it needs. Therefore, it is needed to shed more light about the determinants and conditions for innovation.

The editors of this special issue selected a number of papers to reflect the state-of-the-art on this topic, indicating some of the most promising research lines on innovation. According to the business editor Mr. Gallardo, "A very important aspect emerging from this special issue is that the papers published in it reveal that external contributions to the internal know-how of the family and the business are often vital to help produce the changes needed by a family firm for innovation to take place".

Innovation in the family business has been a phenomenon of great interest to researchers, especially in the last decade. This is highlighted in the article that opens this special issue by presenting a complete bibliometric review of the literature on innovation in family businesses. Generally, researchers have noted that the influence of the family is the factor that makes this type of businesses different from the other ones (Habbershon and Williams, 1999; Lorenzo and Núñez-Cacho, 2012). However, in order to conclude that this is really true, it is necessary to identify the nature of these differences and determine how and why they affect the innovative behavior of the family business.

The paper Innovation on family businesses: A holistic bibliometric (Aparicio,et al. 2020) offers an overview of the research field through an analysis of 207 articles that were published between 1994 and 2017. The authors complement other recent reviews such as those by Feranita et al. (2017) and Calabrò, Vecchiarini, Gast, Campopiano, De Massis and Kraus (2019), and reflect about the take-off of research on innovation that takes place since 2009. In the study two differentiated periods are highlighted: An initial one that covers the years 1994 to 2009, and one of expansion from 2010 to 2017. In addition, they identify the most influential journals, the most referenced articles, the most productive scholars -namely, De Massis, Frattini, Craig, Chrisman, Fang, Kotlar and Nordqvist appear as the most productive and referenced ones- and the main lines of research developed, providing a clear and synthetic map of innovation research in family businesses today. This paper approaches innovation from a more theoretical perspective, and also presents the lines of research that are currently being developed. These lines include the internal factors of the family business and its influence on innovation, as well as external factors, among others advances in research in the subject.

The paper An Analysis of Open Innovation Determinants: The Case Study of Singapore based Family owned Enterprises, by Koh, Kong and Timperio (2020, this issue) analyzes the drivers of open innovation by studying cases of family businesses in Singapore. The authors highlight the external determinants and catalysts of innovation projects, such as family and business culture, access to external funds, government support for initiatives, market dynamics and partnership between companies. In addition to these six external determinants, there are two other factors that have a great influence on open innovation. First, family capital, which is the main source of financing for innovative initiatives. Second, a strong external network, supported by Singapore's legal and regulatory framework that fosters innovation, promotes the development of an enabling business environment so that the spirit of innovation can truly thrive. Most of the surveyed companies' managers mentioned process innovation as the most critical aspect, and also organizational innovation. Process innovation is considered superior by the companies included in the sample due to their capabilities to drive product innovation, marketing and organizational structure (and people). Organizational innovation is also considered of utmost importance, due to the need to adopt technologies such as digitalization, robotics or automation, which require an adequate organizational structure. Some ideas from the surveyed managers highlight these statements, like: "The correct processes create the necessary conditions to shape the products, as well as the marketing and organization structures," as well as "Having cutting-edge processes underway is a key differentiator." This study also reflects the need to establish new financing mechanisms adapted to the peculiarities of innovation processes. External capital injection and stimulus policies are necessary, although not sufficient, since they

must be combined with the determinants of the internal functioning of family businesses.

The relevance of the external network is also highlighted in the paper Collaborative innovation in the family SME: conceptualization, goals, and success factors, by Arzubiaga et al.(2020, this issue), which analyzes the strategy of collaborative innovation that seeks the creation of knowledge, new product designs and Improving the efficiency of the production process.

Among the conditions of collaborative innovation, four groups stand out: The composition of the management team (in terms of family members percentage and number of generations involved in management), abilities (cognitive factors, absorption capacity and trajectory in innovation), attitudes, and legacy preservation, (referring to socio-emotional wealth and internal behavior). These factors of small and medium family businesses play a crucial role in the successful design and implementation of collaborative innovation. The main contributions of this paper can be summarized in the need for establish solid bases to deepen in the future the study of collaborative innovation. Moreover, a second contribution refers to the identification of the distinguishing characteristics of family SMEs. Arzubiaga, Maseda, Uribarri and Palma Ruiz (2020, this issue) also propose the analysis of the possible moderating effects of firm size and the sector to refine the impact of the variables in this model, looking to achieve excellence in collaborative innovation. As business reviewer, Mr. Osborne have highlighted collaborative innovation as one of the relevant issues in order to reinforce the role of innovation in their companies.

Absorptive capacity is another aspect of great interest to researchers. There are numerous factors that condition it, some of them are features of the family character that make the behavior of family businesses paradoxical (Kotlar et al. 2020). The paper titled A mediating model of innovative capacity between absorptive capacity and family business performance by Hernández-Perlines, Ariza-Montes and Araya-Castillo (2020, this issue) addresses the issue about absorptive capacity. Absorptive capacity is related to the identification, assimilation and exploitation of new knowledge by the company. Those family businesses that have these capabilities improve their performance. In addition, this effect is enhanced by the innovative capacity of the company, which acts as a mediator between absorption capacity and the company's performance, reinforcing this relationship. Thus, family business managers should focus their efforts on providing their organizations with the necessary skills to absorb and exploit knowledge. This will be easier if the company has developed innovative capabilities. In this sense, the business editor Mr. Gallardo points that: "There is also the possibility of establishing an advisory council with external collaborators that serves as a contrast to the company's board, in which oftentimes the weight of the family is too decisive."

The last two papers in this special issue address the role of family involvement in relation to innovation. Does too much love hinder innovation? Family involvement and firms' innovativeness in family-owned Small Medium Enterprises (SMEs), by Filippo Ferrari (2020, this issue) reflects on the role of family cohesion and its flexibility in the process of innovation, drawing upon the Olson Circumplex model (Olson, 2000) which is applied in a sample of Italian family businesses. The study indicates that unbalanced families show the lowest levels of innovation, although family cohesion and flexibility do not show a significant correlation with the overall level of organizational innovation. Flexibility shows a positive correlation with the process and behavioral innovation, which can be explained by the demand for new forms and organizational routines to deal with process innovation. Here the author suggests some human resources practices that promote flexibility, such as labor rotation (Ortega, 2001), or the development of a horizontal internal career (Ichniowsky et al. 1996, 1997, 1999). Families that lack cohesion show a negative correlation with strategic innovation and process innovation. Ferrari (2020, this issue) considers as disconnected family systems those in which family members are not cohesive and have little family loyalty. On the other hand, innovation in processes is encouraged with new ideas through contributions in terms of new ways of doing things. According to the authors, the Olson Circumplex model (Olson, 2000) offers a framework that can diagnose the extent to which family systems are balanced and how the effects of balanced or unbalanced family dynamics can affect the family business (Daspit et al. 2018). Business reviewers were especially interested on the conclusions of this paper, and also pointed that it would be necessary more research on that kind of negative influences stemmed from lack of cohesion within the business family.

Entrepreneurial orientation and product innovation: The moderating role of family involvement in management, by Fredyma, Ruiz Palomo and Diéguez (2020, this issue) addresses a classic concept closely linked to the study of innovation such as entrepreneurial orientation. The relationships between this variable and product innovation, incremental innovation and radical innovation are examined. The influence of family performance on the company is also analyzed. In their conclusions, Fredyma et al.

(2020, this issue) point out that family involvement weakens the positive effect of entrepreneurial orientation in product innovation, especially in case of radical innovation. Therefore, the family business must be aware of these weaknesses to correct them, professionalizing with non-family managers and including their participation in innovation decisions. This conclusion is stressed by both business editors, Mr. Osborne and Mr. Gallardo, who point out that: "Having a network of external collaborators, some of them generalists and others specialized in specific problems, is nowadays practically indispensable."

Finally, the academic editors sincerely appreciate the contributions of two prominent Spanish businessmen, who have contributed to enrich this special issue with a business perspective, which helps to overcome the division that is sometimes perceived between the academic world and the business one. Both Antonio Gallardo and Ignacio Osborne represent the entrepreneurial vision that they have been able to maintain in their families and in their companies for generations. We all know how challenging it is for a family business to be entrepreneurial across generations (e.g., De Massis, Eddleston and Rovelli, 2020). Last but now least, we want to express our gratitude to the editor of the European Journal of Family Business, Professor Vanesa Guzmán for her collaboration and contributions.

The Osborne Group, founded in 1772, is one of the oldest family businesses in Europe. The group evolved from the original business of raising and exporting wines from Jerez to a wider food and beverage group which includes quality wines from various Spanish designations of origin, premium spirits, and products derived from Iberian pork, with a growing international acceptance, entering markets as demanding as China. Ignacio Osborne, a member of the sixth family generation, is the current president of the company since 2017, after 21 years as CEO. The company has been especially innovative in marketing, creating the symbol of the bull in the 50s, which has become a symbol that identifies the Spanish, transcending its initial origin as a reference for the winery.

Almirall is a pharmaceutical company founded in 1943. It is currently run by the second generation, which are giving way to the third. Although innovation is an essential requirement to compete in pharmaceutics, Almirall has managed to develop some well-known products in Spain, as Almax and Cleboril, becoming one of most innovative companies in the industry. Antonio Gallardo is honorary vice president of his company, which he chaired for 26 years. In addition, he was also president of the Family Council and the Family Office, as well as a member of the Executive Committee of the Family Business Network and vice president of the Family Business Institute.

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# Innovation in family firms: a holistic bibliometric overview of the research field

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**Abstract** This paper presents a bibliometric analysis of innovation in family firms, focusing on aspects that prior literature review studies did not fully understand or evaluate. It is based on the bibliometric evaluation of 207 scientific articles published from 1994 to 2017 with innovation in family firms (IFF) as the title of the subject, keywords, and abstract. The authors discuss the results from the perspective of performance indicators and co-authorship visualization, giving a holistic bibliometric overview of the research topic. Research on IFF has emerged as an important study area, with an increasingly established position. The field has attracted researchers and has led to the development of a wide body of literature. This study provides a synthesis and organization of existing knowledge on IFF research.

**CÓDIGOS JEL**
M1,M2

**PALABRAS CLAVE**
Empresa Familiar;
Innovación;
Revisión bibliométrica

**Innovación en empresas familiares: una visión bibliométrica holística del campo de investigación**

**Resumen** Este artículo presenta un análisis bibliométrico de la innovación en empresas familiares, enfocándose en aspectos que los estudios previos de revisión de literatura no entendieron o evaluaron completamente. Se basa en la evaluación bibliométrica de 207 artículos científicos publicados de 1994 a 2017 con la innovación en las empresas familiares (IEF) como título del tema, las palabras clave y el resumen. Los autores discuten los resultados desde la perspectiva de los indicadores de rendimiento y la visualización de la coautoría, dando una visión general bibliométrica holística del tema de investigación. La investigación sobre IEF ha surgido como un área de estudio importante, con una posición cada vez más establecida. El campo ha atraído a investigadores y ha llevado al desarrollo de un amplio cuerpo de literatura. Este estudio proporciona una síntesis y organización del conocimiento existente sobre la investigación de IEF.

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## Introduction

Research interest in family firms has increased significantly over the last decade (Debicki, Matherne, Kellermanns, & Chrisman, 2009). This can be attributed partly to the fact that family-owned firms are the oldest form of business organizations (Gersick, Davis, Hampton, & Lansberg, 1997), and the fact that such type of business organizations continue to hold key positions in all economies worldwide (Credit Suisse, 2018; PwC, 2018).

Scholars focusing on family firms have been interested in understanding the distinctive and idiosyncratic characteristics of family firms—examining such firms based on two strategic theories: resource-based view (RBV) (Wernerfelt, 1995) and agency theory (AT) (Schulze, Lubatkin, Dino, & Buchholtz, 2001; Schulze, Lubatkin, & Dino, 2003). Both of these approaches combined with maintaining family control can influence behavior on innovation in family firms (IFF) (Chrisman, Chua, & Steier, 2005). Nevertheless, research on family business has shifted such that scholars now consider behavioral theories, which highlight that IFF is motivated by non-financial objectives (Miller & Le-Breton-Miller, 2014) such as socio-emotional wealth (SEW) (Gomez-Mejia, Hayes, Nunez-Nickel, Jacobson, & Monavo-Fuentes, 2007) and social capital (SC) (Arregle, Hitt, Sirmon, & Very, 2007; Gedajlovic & Carney, 2010; Pearson, Carr, & Shaw, 2008). Behavioral theories imply that resources are difficult to duplicate (Zahra, Hayton, & Salvato, 2004). In line with this, the concept of "familiness" and family culture may create an environment of trust and shared goals (Dibrell & Moeller, 2011), which can be a possible source of competitive advantage.

On the one hand, it is widely recognized in research on family firms that the first goal of family firms is to pass on the company to the next generation (e.g., Sanchez-Famoso, Maseda, & Iturralde, 2014; Sharma, 2004; Sirmon, Arregle, Hitt, & Webb, 2008). On the other hand, it is a common practice in the majority of family firms for the family to maintain control over the company (Chirico & Salvato, 2016; Cruz & Nordqvist, 2012) through either ownership (Sanchez-Famoso, Akhter, Iturralde, Chirico, & Maseda, 2015) and/or management (D'Amato, 2017; Nordqvist & Melin, 2010; Sanchez-Famoso, Maseda, & Iturralde, 2017). As a result, a family firm will have more than one generation in both ownership and management positions (Drakopoulou Dodd, Anderson, & Jack, 2013; Craig & Dibrell, 2006; Llach & Nordqvist, 2010). These singularities of the vast majority family firms are viewed as positive aspects for accomplishing IFF. However, there are some negative effects that constrain IFF including their conservative posture (Gilinsky, Santini, Lazzeretti, & Eyler, 2008; Habbershon, Williams, & MacMillan, 2003), risk aversion (De Massis, Sharma, Chua, & Chrisman, 2012), and limited propensity to invest capital in innovation projects (Block, 2010). These relationships are more complex and multidimensional than predicted. Therefore, there is limited current understanding on the topic of IFF and new research seems necessary.

To advance scientific knowledge, researchers generally emphasize the importance of classifying the literature of a research area based on the main trends in the discipline (Bjork, Offer, & Söderberg, 2014). A review of literature engages researchers and practitioners not only by providing a transparent audit trail for legitimizing the order and flow of articles but also by highlighting and updating the landscape. A systematic literature review on IFF already exists. For instance, De Massis, Frattini, and Lichtenthaler (2013) focused on technological innovation. The review by Feranita, Kotlar, and De Massis (2017) contributes to the research on IFF from the perspective of collaborative innovation. More recently, Calabro, Vecchiarini, Gast, Campopiano, De Massi & Kraus (2018) intend to expand the existing understanding of IFF through the construction of a theoretical bridge that includes organizational innovation and a business model. Despite the important contributions made by these literature reviews, the increasing development of computer technology, Internet, and bibliographic electronic databases is what allows for the incorporation of a bibliometric perspective (Baier-Fuentes, Merigó, Amoros, & Gaviria-Marin, 2018; Cobo, Martínez, Gutiérrez-Salcedo, Fujita, & Herrera-Viedma, 2015) in the bibliographic literature review for an in depth understanding of the research area. Bibliometric methods offer systematized and repeatable processes that can help to understand the dissemination of knowledge in a field, while highlighting gaps and opportunities that can help advancements in the field, and also provide objective criteria for assessing research development in a field and represent an important and valuable tool for evaluating scholarship quality and productivity (Cobo et al., 2015)

Thus, the present study aims to add this bibliometric perspective to research on IFF. This provides a synthesis and organization of existing knowledge. First, using performance analysis and, in particular, certain productivity and impact indicators, it is possible to highlight and provide an update on an overview of the research on IFF, revealing patterns in journals, articles, and authors. Second, establishing a network among scholars helps to detect which of them are collaborating in the publications. Third, with a deeper reading of the articles in each group of publications resulting from co-authorship analysis, the authors identify some

areas of research that have been developed by the most prolific scholars in the area.

## Methodology

Bibliometrics can be defined as a part of scientometrics that utilizes mathematical and statistical methods to study and analyze the scientific activity in a research field (Callon, Courtial, & Laville, 1991). Bibliometric analysis provides objective criteria for evaluating development in a research field, and the technique's importance in assessing academic quality and productivity is increasing (Murgado-Armenteros, Gutiérrez-Salcedo, Torres-Ruiz, & Cobo, 2015). Bibliometric methods have two main uses: performance analysis and science mapping (Cobo, López-Herrera, Herrera-Viedma, & Herrera, 2011). Performance analysis seeks to evaluate the research and publications of individuals and institutions. Science mapping aims to reveal the structure and dynamics of scientific fields (Zupic & Carter, 2015). Therefore, bibliometrics contribute to the advancement of science in several ways, such as recognizing the most relevant scientific publications and productive authors, establishing the most cited studies and identifying key themes in the field, and generating indicators of scientific production. This general methodological approach is adapted for the purpose of this study. Thus, to identify some lines of research that have been developed by the most productive researchers in the area, we conduct science mapping based on co-authorship analysis. The methodological design used for this bibliometric review has been developed in a sequential process. First, to begin the study, it is necessary to adopt a systematic search of articles, as this involves the selection of source document. Second, it is important to show the evolution of the number of publications per year in the area because it is the starting point to place the ascent interest of the topic in the scholarship. Third, to show the journals, authors and articles with maximum influence (citations) and contribution (production) in the area, we use performance analysis. This double view to measure the importance of the research allows us to make an important reflection that helps to conduct the final part of the article, that is, co-authorship analysis. This final analysis is focused on the most productive groups of authors that allow for the identification of main research trends.

### Selection of source document

The first step in a bibliometric analysis is to create a database of articles for conducting the analysis. There are several sources for accessing data, including Web of Science (WoS), Scopus, and Google Scholar. The scope of the various databases of scientific documents is different since they do not cover journals in the same way. The present study only considers bibliographic records obtained from WoS. The authors use this database because it provides a set of metadata that are essential for this type of analysis, including abstracts, references, number of citations, lists of authors, institutions, countries, and the journal impact factor (Carvalho, Fleury, & Lopes, 2013).

To conduct the analysis, we considered articles covering a period of 24 years, that is, from 1994 to 2017 (retrieved on September 3, 2018). We selected 1994 as the starting year because the first paper on IFF with the search combination terms is that of Souder and Thomas (1994). We know that prior to 1994 there were some articles of interest on the topic (Calabro et al., 2018), but these previously published articles do not appear in the systematic search. First, the selection of articles related to IFF was conducted using a combination of key terms such as (“Innovate*”) AND ("family business*" OR "family firm*" OR "family enterprise*" OR "family influence*" OR "family owned*" OR "family controlled*" OR "family SME*" OR "family involvement") in the topic tab (including titles, Author Keywords, and abstracts of the bibliographic references) of the WoS

Subsequently, documents from WoS were processed following limitations such as: (1) corpus of the research document was restricted to “articles” and “reviews”; and (2) documents included in the categories “business” or “management” on the WoS. Using such search criteria, we obtained 207 articles that formed the resource for our bibliometric study.

### IFF in the Family Firm Scholarship

The interest of a research topic can be evidenced from two complementary perspectives. First, reflecting the number of published papers and their evolution over time (the most common perspective of a bibliometric performance analysis). Second, considering the relative importance of the topic in a global framework, a family firm is the general reference of scholarship in this case.

Figure 1 shows the evolution of the literature on family firms, on IFF, and the proportion of articles on IFF within the total family firm

research area. We observe that research on IFF is evolving and this development is even more significant on the total number of family firms that are within the scope of this research area. Therefore, the topic of innovation in family business is being consolidated.

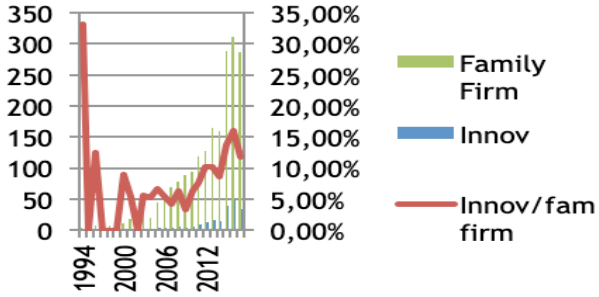


**Figure 1** Evolution of scientific research on IFF.

Table 1 presents the number of articles per year (TP) and the total number of citations (TC) obtained for them, considering the citation thresholds of 150, 100, 50, 20, 10and 1. Based on the number of articles per year on IFF, the evolution of the field of study shows that the subject area's overall tendency has been ascendant, especially since 2009. Therefore, it is possible to distinguish two periods: the *initial period* before 2009 (T1) and the *expansion period* after 2009 (T2). The dates indicate that in the initial period (1994 –2009) only 24 articles had been published, while in the expansion period (2010–2017) there were nearly 183 publications, with 124 belonging to the last three years (70% of the expansion period). All these indicators reinforce that research on IFF is attracting increasing interest among scholars, considering the number of articles. Further, Table 1 will be analyzed in the next section for the most influential articles, because three articles with more than 150 citations and three others with more than 100 citations could be reference articles on the topic. Nearly 25% of the studies did not receive any citations with most of them falling in the latest period.

## Most Influential Journals, Authors and Articles IFF.

This section presents and ranks some indicators on the influence of journals, authors, and articles, based on the information found in WoS. There are two methods to analyze the influence, counting the number of papers published and the number of citations received (Merigo & Yang, 2017). The present article implemented a combined method to measure the importance of research on IFF. It allows making an important reflection that conducts the final part of the article where the conceptual structure of the subject area IFF is analyzed through the main research group of authors in the field.

### Most influential journals

Articles on IFF are published in a wide range of journals. This field has progressed remarkably and has a wide structure of academic resources. Table 2 shows the ranking of the 29 most productive and influential journals in the field of IFF.

**Table 1** Citation structure of research on innovation in family firms.

| YEAR | TP | TC | >=150 | >=100 | >=50 | >=20 | >=10 | >=1 |
|---|---|---|---|---|---|---|---|---|
| *Initial period* (T1) | | | | | | | | |
| 1994 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 1 |
| 1995 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1996 | 1 | 108 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1998 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1999 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2001 | 1 | 73 | 0 | 0 | 1 | 1 | 1 | 1 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 2 | 10 | 0 | 0 | 0 | 0 | 0 | 2 |
| 2004 | 1 | 84 | 0 | 0 | 1 | 1 | 1 | 1 |
| 2005 | 3 | 442 | 1 | 2 | 2 | 3 | 3 | 3 |
| 2006 | 3 | 191 | 0 | 0 | 2 | 3 | 3 | 3 |
| 2007 | 3 | 403 | 1 | 1 | 2 | 3 | 3 | 3 |
| 2008 | 5 | 305 | 1 | 2 | 2 | 2 | 5 | 5 |
| 2009 | 3 | 115 | 0 | 0 | 1 | 2 | 2 | 3 |
| *Expansion Period* (T2) | | | | | | | | |
| 2010 | 6 | 220 | 0 | 0 | 1 | 4 | 5 | 6 |
| 2011 | 9 | 252 | 0 | 1 | 1 | 4 | 5 | 8 |
| 2012 | 13 | 515 | 0 | 1 | 4 | 8 | 10 | 13 |
| 2013 | 17 | 366 | 0 | 0 | 1 | 7 | 13 | 16 |
| 2014 | 14 | 238 | 0 | 0 | 1 | 4 | 10 | 14 |
| 2015 | 40 | 377 | 0 | 0 | 1 | 5 | 14 | 36 |
| 2016 | 50 | 110 | 0 | 0 | 0 | 1 | 3 | 31 |
| 2017 | 34 | 19 | 0 | 0 | 0 | 0 | 0 | 10 |
| TOTAL | 207 | 3833 | 3 | 8 | 21 | 49 | 79 | 157 |
| *% over TC* | | | 1,45% | 3,86% | 10,14% | 23,67% | 38,16% | 75,85% |

R: rank; TP and TC: total papers and cites; >= 150, >=100, >=50, >= 20, >=10, >=1 number of papers with 150, 100, 50, 0, 10 and 1 o more citations.

Specifically, Table 2 shows journals with three or more articles on IFF, as well as those with only one or two articles but with more than 50 or 20 citations, respectively. In addition, some bibliometric indicators, such as the total number of IFF papers (TP), total number of citations (TC), and the ratio of TC/TP are presented. Further, we have included articles with more than 150, 100, 50, 10 citations, and even a single citation. Finally, Table 2 shows the number of articles in each period, that is, T1 and T2, and the 2017 impact factors of the journals.

According to Table 2, it is observed that the most influential journals researching IFF, considering the number of articles published, are two journals with specific topics on family firms, namely *Family Business Review* and *Journal of Family Business Strategy*. It is necessary to note that if we consider the *expansion period* (T2), *Journal of Family business Strategy* publishes a greater number of articles. Table 2 also highlights the importance *Journal of Product Innovation Management* gives to research on IFF, since this journal published eight articles on the topic during the expansion period.

**Table 2** Most influential journals in IFF.

| R | JOURNAL | TP | TC | TC/TP | >=150 | >=100 | >=50 | >=20 | >=10 | >=1 | T1 | T2 | IF |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | FBR | 18 | 1119 | 62,17 | 2 | 2 | 6 | 12 | 14 | 18 | 6 | 12 | 3,82 |
| 2 | JFBS | 15 | 81 | 5,40 | 0 | 0 | 0 | 1 | 3 | 12 | 0 | 15 | 2,61 |
| 3 | SBE | 12 | 298 | 24,83 | 0 | 0 | 3 | 4 | 6 | 9 | 2 | 10 | 2,86 |
| 4 | JPIM | 9 | 195 | 21,67 | 0 | 0 | 0 | 4 | 8 | 9 | 1 | 8 | 4,31 |
| 5 | JBR | 9 | 93 | 10,33 | 0 | 0 | 0 | 1 | 3 | 8 | 2 | 7 | 2,51 |
| 6 | ETP | 7 | 298 | 42,57 | 0 | 2 | 2 | 4 | 5 | 7 | 2 | 5 | 5,32 |
| 7 | APJM | 7 | 65 | 9,29 | 0 | 0 | 0 | 2 | 3 | 6 | 0 | 7 | 2,47 |
| 8 | JSBM | 6 | 169 | 28,17 | 0 | 0 | 2 | 3 | 3 | 5 | 1 | 5 | 3,25 |
| 9 | ALA | 6 | 1 | 0,17 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0,62 |
| 10 | CMR | 5 | 30 | 6,00 | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 5 | 3,30 |
| 11 | EJIM | 5 | 8 | 1,60 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 5 | 0,67 |
| 12 | JFBM | 5 | 6 | 1,20 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 5 | --- |
| 13 | JBE | 4 | 85 | 21,25 | 0 | 0 | 0 | 2 | 2 | 4 | 0 | 4 | 2,92 |
| 14 | IJEBR | 4 | 40 | 10,00 | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 4 | 1,19 |
| 15 | RIBS | 4 | 3 | 0,75 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | --- |
| 16 | JBV | 3 | 320 | 106,67 | 0 | 2 | 3 | 3 | 3 | 3 | 1 | 2 | 6,00 |
| 17 | CGIR | 3 | 42 | 14,00 | 0 | 0 | 0 | 0 | 3 | 3 | 1 | 2 | 2,75 |
| 18 | BH | 3 | 21 | 7,00 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 2 | 1,08 |
| 19 | MD | 3 | 9 | 3,00 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 1,53 |
| 20 | IEAMJ | 3 | 6 | 2,00 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 2,41 |
| 21 | IJIM | 3 | 1 | 0,33 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | --- |
| 22 | ERD | 2 | 140 | 70,00 | 0 | 0 | 1 | 2 | 2 | 2 | 0 | 2 | 2,79 |
| 23 | MIR | 2 | 36 | 18,00 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 2,28 |
| 24 | JMO | 2 | 35 | 17,50 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 1,19 |
| 25 | RMS | 2 | 23 | 11,50 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 2 | 1,48 |
| 36 | JMS | 1 | 163 | 163,00 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 5,33 |
| 37 | IMM | 1 | 131 | 131,00 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 3,68 |
| 38 | JCR | 1 | 84 | 84,00 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 3,54 |
| 39 | SMJ | 1 | 55 | 55,00 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 5,48 |

*Note: R: rank; TP and TC: total papers and cites, TC/TP cites per article. IF: Impact Factor. ; >= 150, >=100, >=50, >= 20, >=10, >idelsol@iefamiliar.comidelsol@iefamiliar.com=1,= number of papers with 150, 100, 50, 0, 10 and 1 o more citations. T1,The first initial period before 2009, T2 the expansion period after that year. FBR, Family Business Review; JFBS, Journal of Family Business Strategy; SBE, Small Business Economics; JPIM, Journal of Product Innovation Management; JBR, Journal of Business Research; ETP, Entrepreneurship Theory and Practice; APJM, Asia Pacific Journal of Management; JSBM, Journal of Small Business Management; ALA, Academia-Revista Latinoamericana de Administracion; CMR, California Management Review; EJIM, European Journal of International Management; JFBM, Journal of Family Business Management; JBE, Journal of Business Ethics; IJEBR, International Journal of Entrepreneurial Behaviour & Research; RIBS, Review of International Business and Strategy; JBV, Journal of Business Venturing; CGIR, Corporate Governance-An International Review; BH, Business History; MD, Management Decision; IEAMJ, International Entrepreneurship and Management Journal; IJIM, International Journal of Innovation Management; ERD, Entrepreneurship and Regional Development; MIR, Management International Review; JMO, Journal of Management & Organization; JMS, Journal of Management Studies; IMM, Industrial Marketing Management; JCR, Journal of Consumer Research; SMJ, Strategic Management Journal; AMR, Academy of Management Rev*

Another important aspect to consider in this section is the analysis on the total number of citations on IFF. *Family Business Review* stands out for having the largest number of TCs with 1119 citations, followed by *Journal of Business Venturing*, *Small Business Economics* and *Entrepreneurship, Theory and Practice*, with 320, 298, and 298 citations, respectively. Subsequently there is a third group of journals such as *Journal of Product Innovation Management*, *Journal of Small Business Management*, *Entrepreneurship and Regional Development*, *Journal of Management Studies*, and *Industrial Marketing Management*, which have more than 100 citations. If we analyze the average number of citations per article, those published in *Journal of Management Studies are* highlighted for their 163 citations; articles published in *Industrial Marketing Management* with 131 citations, and three published in *Journal of Business Venturing* with more than 100 citations per article on average. Several factors explain this marked difference between the groups of journals (Baier-Fuentes et al.,

2018). The first factor is the overall quality of the journals. Note that most of the journals with a high number of IFF citations have a high impact factor (IF) and are well recognized in their respective fields. A second factor could be the orientation of the journals. For example, all the journals presented in Table 2 have a TC indicator that is greater than 100 and a strong orientation for publishing articles that are related to innovation in companies, research on family firms, or those that have featured issues on management, entrepreneurship, and/or small businesses.

From Table 2, it is interesting to analyze the progress of IFF research in journals. The numbers of papers published are grouped into two periods: T1 and T2. In T1, six articles were published in *Family Business Review*, two articles each in *Small Business Economics*, *Journal of Business Research* and *Entrepreneurship Theory and Practice,* and one article in ten other journals. Later, we will examine (see Table 3) the articles published in T1 with greater impact. Finally, from a general perspective, the results show that research on IFF has been progressively published in higher number of journals. Specifically, in T1 the 24 articles were published in 16 journals, while the 183 articles published in T2 did so in 75 journals. In T2 a wide variety of journals from covering business and management areas published IFF-based articles to explain their phenomena of study.

**Most cited articles**

The number of citations of an article reflects the influence, popularity, and attention received from the scientific community. In this section, we analyze the most-cited articles in journals covering business and management areas in WoS. Table 3 shows the articles with more than 50 citations in WoS -total cites (TC), considering only the citations of the 207 articles (TCIFF), and the citations per article (TC/TP)-.

The three most influential articles of the *initial period* have a significant number of citations (less than 284 and above 163). These citations have accumulated over more than ten years (2005–2017), so the average number of citations is more than 10 or 20 per year. It is most likely that this is not a high volume of citations per article and year, compared to other more established areas; but considering that prior to 2005 there were only seven articles on this topic, it is certain that most of the 200 papers between 2005–2017 frequently cited these three articles. Furthermore, Zhara (2005) is clearly the reference article based on the highest number of citations in WoS (284) and among papers published in the IFF dataset. Analyzing the research areas of this most cited, it is worth mentioning that all these articles have a common interest in innovation, analyzing it from an organizational point of view, instead of technical or product innovation. Zahra (2005) focuses on the influence of family ownership and CEO founders in promoting entrepreneurship and selective venturing into new market domains. Naldi, Nordqvist, Sjöberg, & Wiklund (2007), the second most referenced article from the dataset´s articles (45 citations), follows the same focus of research and addresses a comparison between family and nonfamily firms for their risk-taking tendency, and the relationship between proactiveness, innovativeness, and impact on firm performance. Eddleston, Kellermanns, & Sarathy (2008) show that strategic planning is more important for family firms that lack (technical) innovative capacities. Finally, in T2 it is important to highlight Chua, Chrisman, Steier, & Rau (2012) article, as it contributes to a better understanding of the heterogeneity of family firms by examining how vision and goals, as well as the discretion engendered by family control, influence various competitive strategies, and specifically innovation.

**Most productive and cited authors**

The field of IFF is characterized by continuous growth and the participation of a large number of authors. The results indicate that 455 authors contributed toward publishing 207 documents on IFF research, which is an average of 2.20 authors per article. The fact that only 12 authors have published more than three articles indicates that concentration in the field is not high. It is also noteworthy that 85.5% (389/455 authors) published only one article. It is a common result because, as mentioned above, it is a relatively new area of research with growing number of publications that has not yet reached maturity.

To obtain a broader view of IFF research, authors with greater presence and influence, as well as temporal evolution of publications in the field, are determined.

Table 4 illustrates 25 authors who have published three or more papers; 9 authors with two papers but with more than 50 cited; and 9 authors with one paper but with more than 100 cited.

Note that the authors are ordered decreasingly according to their productivity in the field (TP). In the case of a tie, we considered the total number of citations in the field (TC). Furthermore, Table 4 shows TC and TP of each author per period, that is, initial period (T1) and *expansion period* (T2).

**Table 3** List of most cited papers.

| R | Title | Authors | Journal | Year | TC | TCIFF | TCIFF/TC | T1 | T2 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Entrepreneurial risk taking in family firms | Zahra, SA | FBR | 2005 | 284 | 53 | 18,7% | X | |
| 2 | Entrepreneurial orientation, risk taking, and performance in family firms | Naldi, Lucia; Nordqvist, Mattias; Sjoberg, Karin; Wiklund, Johan | FBR | 2007 | 262 | 45 | 17,2% | X | |
| 3 | Resource configuration in family firms: Linking resources, strategic planning and technological opportunities to performance | Eddleston, Kimberly A.; Kellermanns, Franz Willi; Sarathy, Ravi | JMS | 2008 | 163 | 23 | 14,1% | X | |
| 4 | Innovativeness among small businesses: Theory and propositions for future research | Hausman, A | IMM | 2005 | 131 | 10 | 7,6% | X | |
| 5 | Should I stay or should I go? Career choice intentions of students with family business background | Zellweger, Thomas; Sieger, Philipp; Halter, Frank | JBV | 2011 | 116 | | 0,0% | | X |
| 6 | Sources of Heterogeneity in Family Firms: An Introduction | Chua, Jess H.; Chrisman, James J.; Steier, Lloyd P.; Rau, Sabine B. | ETP | 2012 | 112 | 17 | 15,2% | | X |
| 7 | Industry characteristics and internationalization processes in small firms | Boter, H; Holmquist, C | JBV | 1996 | 108 | | 0,0% | X | |
| 8 | The Role of Family Influence in Firms' Strategic Responses to Threat of Imitation | Sirmon, David G.; Arregle, Jean-Luc; Hitt, Michael A.; Webb, Justin W. | ETP | 2008 | 100 | 23 | 23,0% | X | |
| 9 | R&D investments in family and founder firms: An agency perspective | Block, Joern H. | JBV | 2012 | 96 | 42 | 43,8% | | X |
| 10 | Corporate governance and strategic change in SMEs: The effects of ownership, board composition and top management teams | Brunninge, Olof; Nordqvist, Mattias; Wiklund, Johan | SBE | 2007 | 94 | | 0,0% | X | |
| 11 | Long-term orientation: Implications for the entrepreneurial orientation and performance of family businesses | Lumpkin, G. T.; Brigham, Keith H.; Moss, Todd W. | ERD | 2010 | 91 | 14 | 15,4% | | X |
| 12 | Research on Technological Innovation in Family Firms: Present Debates and Future Directions | De Massis, Alfredo; Frattini, Federico; Lichtenthaler, Ulrich | FBR | 2013 | 85 | 52 | 61,2% | | X |
| 13 | Families and innovative consumer behavior: A triadic analysis of sibling and parental influence | Cotte, J; Wood, SL | JCR | 2004 | 84 | | 0,0% | X | |
| 14 | The natural environment, innovation, and firm performance: A comparative study | Craig, Justin; Dibrell, Clay | FBR | 2006 | 84 | 30 | 35,7% | X | |
| 15 | A 10-year longitudinal investigation of strategy, systems, and environment on innovation in family firms | Craig, JBL; Moores, K; Cassar, G | FBR | 2006 | 75 | | 0,0% | X | |
| 16 | Family Firms and Entrepreneurial Orientation in Publicly Traded Firms A Comparative Analysis of the S&P 500 | Short, Jeremy C.; Payne, G. Tyge; Brigham, Keith H.; Lumpkin, G. T.; Broberg, J. Christian | FBR | 2009 | 75 | | 0,0% | X | |
| 17 | Strategic goals and practices of innovative family businesses | McCann, JE; Leon-Guerrero, AY; Haley, JD | JSBM | 2001 | 73 | 15 | 20,5% | X | |
| 18 | Innovativeness in family firms: a family influence perspective | Kellermanns, Franz W.; Eddleston, Kimberly A.; Sarathy, Ravi; Murphy, Fran | SBE | 2012 | 73 | 26 | 35,6% | | X |
| 19 | Entrepreneurial orientation in long-lived family firms | Zellweger, Thomas; Sieger, Philipp | SBE | 2012 | 62 | 11 | 17,7% | | X |
| 20 | Product Innovation in Family versus Nonfamily Firms: An Exploratory Analysis | De Massis, Alfredo; Frattini, Federico; Pizzurno, Emanuele; Cassia, Lucio | JSBM | 2015 | 58 | 35 | 60,3% | | X |
| 21 | Risk abatement as a strategy for R&D investments in family firms | Patel, Pankaj C.; Chrisman, James J. | SMJ | 2014 | 55 | 18 | 32,7% | | X |
| 22 | The relationship between entrepreneurial orientation and growth: The moderating role of family involvement | Casillas, Jose C.; Moreno, Ana M. | ERD | 2010 | 49 | 6 | 12,2% | | X |
| 23 | The Impact of Family Involvement on the R&D Intensity of Publicly Traded Firms | Munoz-Bullon, Fernando; Sanchez-Bueno, Maria J. | FBR | 2011 | 49 | 23 | 46,9% | | X |
| 24 | Family business performance: The effects of gender and management | Danes, Sharon M.; Stafford, Kathryn; Loy, Johnben Teik-Cheok | JBR | 2007 | 47 | | 0,0% | X | |
| 25 | Corporate Social Performance and Innovation with High Social Benefits: A Quantitative Analysis | Wagner, Marcus | JBE | 2010 | 47 | 6 | 12,8% | | X |
| 26 | The family innovator's dilemma: how family influence affects the adoption of discontinuous technologies by incumbent firms | Koenig, Andreas; Kammerlander, Nadine; Enders, Albrecht | AMR | 2013 | 47 | | 0,0% | | X |
| 27 | Charting the Future of Family Business Research: Perspectives From the Field | Litz, Reginald A.; Pearson, Allison W.; Litchfield, Shanan | FBR | 2012 | 45 | 19 | 42,2% | | X |
| 28 | Technology Acquisition in Family and Nonfamily Firms: A Longitudinal Analysis of Spanish Manufacturing Firms | Kotlar, Josip; De Massis, Alfredo; Frattini, Federico; Bianchi, Mattia; Fang, Hanqing | JPIM | 2013 | 44 | 24 | 54,5% | | X |
| 29 | The Ability and Willingness Paradox in Family Firm Innovation | Chrisman, James J.; Chua, Jess H.; De Massis, Alfredo; Frattini, Federico; Wright, Mike | JPIM | 2015 | 43 | 21 | 48,8% | | X |

*R: rank. TC: total cites, TCIFF: total cites among articles of the IFF dataset. TC/TP: cites per article*

In the *initial period*, Zahra highlights the most cited articles on this topic. It is worth mentioning that Zahra is an important author who has worked in different disciplines of social sciences, particularly in the field of entrepreneurship. The research by Zahra has been diverse, ranging mainly in the three areas of management and strategy- entrepreneurship, international entrepreneurship, and social entrepreneurship (Audretsch, 2015).

Nordqvist is another important author in T1, contributing two articles, but since the author has also published in T2, the total number of articles are four, reaching a total number of citations of TP=4 and TC= 373.

The two articles published in the *initial period*, with Wiklund between others authors, are in category of most-cited articles (see Table 3).

In 2007, Nordqvist and Wiklund published "Entrepreneurial orientation, risk taking, and performance in family firms" in the journal *Family Business Review*, co-authored by Naldi and Sjoberg. This is a reference article focusing on risk taking as an important dimension of entrepreneurial orientation and its impact on family firms with 262 citations (Naldi et al., 2007).

It is also necessary to highlight the influence of Craig, with three articles during each period. He coauthored with Dibrell the article "The natural environment, innovation, and firm performance: A comparative study" (Craig & Dibrell, 2006), and appears in Table 3 as one of the 21 most cited articles on IFF ($13^{th}$ position).

In *the expansion period,* the top rankings are for De Massis with 13 articles and Frattini with 8 articles.

De Massis is the author with best combination of productivity and influence in the context of IFF research. He is an author with high productivity and 339 citations. These authors concentrate all their publications in this period.

The article "Research on Technological Innovation in Family Firms: Present Debates and Future Directions" (De Massis, Frattini & Lichtenhaler, 2013) with more than 17 citations per year is reflected in Table 3 as one of the 12 most-cited articles on IFF.

In this article, the authors analyze the state of research in technological innovation in the area of FF.

## Most Productive Groups of Authors with Significant Research Lines in IFF

Science is collaboration and it can be understood as a form of scientific social network where scholars share knowledge.

This network can be represented as a graph in which the nodes are scholars and links are specific forms of scientific collaboration between them (Sonnenwald, 2007).

Thus, co-authorship is an indicator of scientific collaboration in which authors publish their research outcomes through writing papers. Whenever scholars publish a co-authored article, they have contributed to an individual co-authorship network, which reveals only those authors that have made direct contributions to the article content.

If individual co-authorship networks are analyzed in aggregate form, this network exhibits interconnected relationships among scholars (Li, Liao, & Yen, 2013).

Assuming that co-authorship indicates a level of scientific collaboration, we used network analysis to identify authors in a co-authorship network (Noyons, Moed, & Van Raan, 1999).

We reduced the network focusing on the connections between scholars who had published two or more articles on IFF, and with a minimum of one co-authoring relationships.

Overall, 24 authors meet these restrictions.

The reduced network is represented in a diagram (Figure 2), created with VOSviewer software (version 1.6.9).

This analysis of co-authorships among the most productive authors allows a systematized vision of the main research groups in the IFF field. Focusing on the thematic similarities between the articles by related authors in each cluster, it is possible to categorize the information into themes. In several instances, the themes were identified by analyzing the title, abstract, and keywords of each article. In other cases, an in depth analysis of the article was required.

After identification and content revision, the articles spread among the co-authorship groups are organized into three main research streams.

**Table 4** The most productive authors and cited authors.

| R | AUTHORS | TC | TP | TC/TP | T1P | T1C | T1C/T1P | T2P | T2C | T2C/T2P |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | De Massis, A. | 339 | 13 | 26,08 | 0 | 0 | 0,00 | 13 | 339 | 26,08 |
| 2 | Frattini, F. | 269 | 8 | 33,63 | 0 | 0 | 0,00 | 8 | 269 | 33,63 |
| 3 | Craig, Justin B. | 229 | 6 | 38,17 | 3 | 186 | 62,00 | 3 | 43 | 14,33 |
| 4 | Chrisman, James J. | 233 | 5 | 46,60 | 0 | 0 | 0,00 | 5 | 233 | 46,60 |
| 5 | Fang, H. | 88 | 5 | 17,60 | 0 | 0 | 0,00 | 5 | 88 | 17,60 |
| 6 | Kotlar, J. | 84 | 5 | 16,80 | 0 | 0 | 0,00 | 5 | 84 | 16,80 |
| 7 | Nordqvist, M. | 373 | 4 | 93,25 | 2 | 356 | 178,00 | 2 | 17 | 8,50 |
| 8 | Kellermanns, F. W. | 273 | 4 | 68,25 | 1 | 163 | 163,00 | 3 | 110 | 36,67 |
| 9 | Kammerlander, N. | 91 | 4 | 22,75 | 0 | 0 | 0,00 | 4 | 91 | 22,75 |
| 10 | Wright, M. | 63 | 4 | 15,75 | 0 | 0 | 0,00 | 4 | 63 | 15,75 |
| 11 | Kraus, S. | 39 | 4 | 9,75 | 0 | 0 | 0,00 | 4 | 39 | 9,75 |
| 12 | Memili, E. | 31 | 4 | 7,75 | 0 | 0 | 0,00 | 4 | 31 | 7,75 |
| 13 | Zellweger, T. | 201 | 3 | 67,00 | 0 | 0 | 0,00 | 3 | 201 | 67,00 |
| 14 | Chua, Jess H. | 158 | 3 | 52,67 | 0 | 0 | 0,00 | 3 | 158 | 52,67 |
| 15 | Dibrell, C. | 113 | 3 | 37,67 | 1 | 84 | 84,00 | 2 | 29 | 14,50 |
| 16 | Uhlaner, L. M. | 52 | 3 | 17,33 | 1 | 4 | 4,00 | 2 | 48 | 24,00 |
| 17 | Matzler, K. | 25 | 3 | 8,33 | 0 | 0 | 0,00 | 3 | 25 | 8,33 |
| 18 | Welsh, Dianne H. B. | 20 | 3 | 6,67 | 0 | 0 | 0,00 | 3 | 20 | 6,67 |
| 19 | Iturralde, T. | 18 | 3 | 6,00 | 0 | 0 | 0,00 | 3 | 18 | 6,00 |
| 20 | Maseda, A. | 18 | 3 | 6,00 | 0 | 0 | 0,00 | 3 | 18 | 6,00 |
| 21 | Sanchez-Famoso, V. | 18 | 3 | 6,00 | 0 | 0 | 0,00 | 3 | 18 | 6,00 |
| 23 | Dieguez-Soto, J. | 6 | 3 | 2,00 | 0 | 0 | 0,00 | 3 | 6 | 2,00 |
| 24 | Calabro, A. | 3 | 3 | 1,00 | 0 | 0 | 0,00 | 3 | 3 | 1,00 |
| 25 | Lopez-Fernandez, M. | 2 | 3 | 0,67 | 0 | 0 | 0,00 | 3 | 2 | 0,67 |
| 22 | Serrano-Bedia, A. | 2 | 3 | 0,67 | 0 | 0 | 0,00 | 3 | 2 | 0,67 |
| 26 | Wiklund, J. | 356 | 2 | 178,00 | 2 | 356 | 178,00 | 0 | 0 | 0,00 |
| 27 | Eddleston, K. A. | 236 | 2 | 118,00 | 1 | 163 | 163,00 | 1 | 73 | 73,00 |
| 28 | Sarathy, R. | 236 | 2 | 118,00 | 1 | 163 | 163,00 | 1 | 73 | 73,00 |
| 29 | Sieger, P. | 178 | 2 | 89,00 | 0 | 0 | 0,00 | 2 | 178 | 89,00 |
| 30 | Brigham, K. H. | 166 | 2 | 83,00 | 1 | 75 | 75,00 | 1 | 91 | 91,00 |
| 31 | Lumpkin, G. T. | 166 | 2 | 83,00 | 1 | 75 | 75,00 | 1 | 91 | 91,00 |
| 32 | Steier, L. | 114 | 2 | 57,00 | 0 | 0 | 0,00 | 2 | 114 | 57,00 |
| 33 | Block, J. H. | 106 | 2 | 53,00 | 0 | 0 | 0,00 | 2 | 106 | 53,00 |
| 34 | Moores, K | 102 | 2 | 51,00 | 2 | 102 | 51,00 | 0 | 0 | 0,00 |
| 35 | Zahra, SA | 284 | 1 | 284,00 | 1 | 284 | 284,00 | 0 | 0 | 0,00 |
| 36 | Naldi, L. | 262 | 1 | 262,00 | 1 | 262 | 262,00 | 0 | 0 | 0,00 |
| 37 | Sjoberg, K. | 262 | 1 | 262,00 | 1 | 262 | 262,00 | 0 | 0 | 0,00 |
| 38 | Hausman, A | 131 | 1 | 131,00 | 1 | 131 | 131,00 | 0 | 0 | 0,00 |
| 39 | Halter, F. | 116 | 1 | 116,00 | 0 | 0 | 0,00 | 1 | 116 | 116,00 |
| 40 | Rau, S. B. | 112 | 1 | 112,00 | 0 | 0 | 0,00 | 1 | 112 | 112,00 |
| 41 | Boter, H | 108 | 1 | 108,00 | 1 | 108 | 108,00 | 0 | 0 | 0,00 |

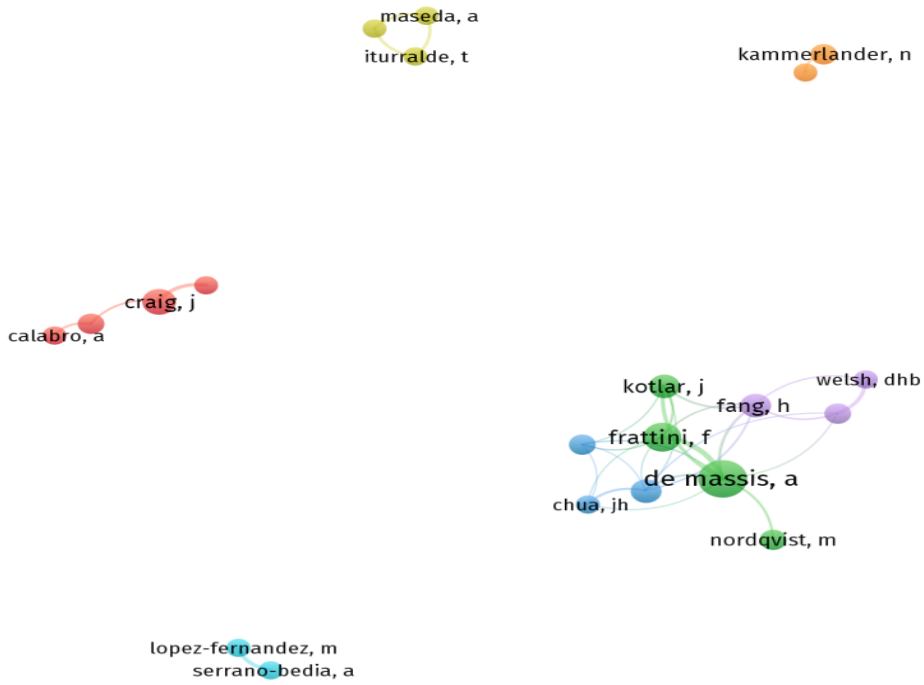


**Figure 2.** Co-authored research on IFF

**Table 5** Co-authorship groups and associated research streams.

| Cluster | AUTHORS | Research Topics |
|---|---|---|
| 1 | Craig, J.; Dibrell, C.; Kraus, S.; Calabro, A. | Internal factors of IFF |
| 2 | Nordqvist, M.; De Massis, A.; Frattini, F.; Kotlar, J. | Internal Factors of IFF, External Factors of IFF Advances in IFF |
| 3 | Chua, J. H.; Chrisman, J.; Wright, M. | Internal Factors of IFF |
| 4 | Sanchez-famoso, V.; Iturralde T.; Maseda, A. | Internal Factors of IFF Advances in IFF |
| 5 | Memili, Esra; Fang, Hanqing; Welsh, Dianne | Internal Factors of IFF Advances in IFF |
| 6 | Serrano-Bedia, A., Lopez-Fernandez, M.; | Internal Factors of IFF |
| 7 | Kammerlander,; Zellweger, | Internal Factors of IFF |

## Main Research Streams in IFF Co-authorship Groups

In this section, we develop a content overview of each of the three research streams (Table 5), identified from the publications of the co-authorship groups. The three research streams considered are internal factors of IFF, external factors of FF, and advances in IFF.

It is important to emphasize that the same co-authorship group may have developed more than one research stream, and different co-authorship groups may have worked on the same research stream.

### Cluster A: Internal Factors of IFF

The studies in this cluster focus on identifying the internal characteristics of family firms that affect innovation behavior. These investigations draw on resource-based view (RBV) (Craig, Dibrell, & Garret, 2014; Basco & Calabro, 2016), upper echelons theory (Craig, Pohjola, Kraus, & Jensen 2014), stewardship theory (Neubaum, Thomas, Dibrell, & Craig, 2017), socio-emotional wealth (SEW) (Calabro, Minola, Campopiano, & Pukall, 2016), and social capital theory (Sanchez-Famoso, Maseda & Iturralde 2014, 2017; Sanchez-Famoso, Iturralde, & Maseda, 2015). Using these theories, this article highlights the heterogeneity of family firms and the role of internal attributes in business strategy (Craig & Dibrell, 2006; Craig, Moores, & Cassar, 2006). In this sense, each family firm possesses a unique set of internal characteristics such as family culture, non-economic goals, internal relationships, and board composition, which are acquired and developed over time. These family firms' singularities further determine the degree of efficiency and, therefore, strategic decisions such as involvement in innovation.

Family culture is a possible measure of the firm's organizational resources (Craig et al., 2014). It represents the knowledge accumulated throughout the family history and is related to

better management of fluent communication, which directly relates to innovation and creativity (Neubaum et al., 2017).

Non-economic goals are indeed related to less investments in R&D because family members want to protect their SEW, thus avoiding taking innovation risks, which affect the firm's innovations (Calabro et al., 2016).

Internal relationships refer to relationships inside the family firms (Sanchez-Famoso, Maseda & Iturralde 2014, 2017; Sanchez-Famoso, Iturralde, & Maseda, 2015). These relationships include not only those between family members but also between non-family members; two different groups that coexist in the majority of family firms (Mitchell, Morse, & Sharma, 2003; Sanchez-Famoso et al., 2015). The shared vision of the business, same language, and intensity of the relationships are antecedents of IFF. Ownership and family management (Sanchez-Famoso et al., 2015, Sanchez-Famoso, Maseda & Iturralde, 2017) play a moderate role between internal relationships and innovation. This is could be attributed to the fact that if more family members are part of the top management team (TMT), the firm's innovation propensity increases; however, according to Lohe and Calabro (2017) conflicts can emerge due to the different perspectives expressed by the TMT members.

Overall, the board has a relationship with the firm's innovation behavior (Lopez-Fernandez, Serrano-Bedia, & Perez-Perez, 2016). The board's composition (number of family members, non-family members, and interlocks) is the main characteristic that could affect strategic decisions (Serrano-Bedia, Lope-Fernandez, & Garcia-Piqueres, 2016). The chief executive officer's (CEO) tenure (Lopez-Fernandez, Serrano-Bedia, & Palma-Ruiz, 2016) may have less incentive to invest in R&D in family firms due to SEW protection.

Another internal factor that matters is how the creation of family firms affects innovation (Brunninge, Nordqvist, & Wiklund, 2007; Zellweger & Sieger, 2012). In this respect, entrepreneurial behaviors influence both innovation and long-term success (Kammerlander & Ganter, 2015; Kammerlander, Dessi, Bird, Floris, & Murru, 2015). If the family firm is created with the main aim of preserving SEW, the firm can continue across generations (Welsh, Memili, Kaciak, & Al Sadoon, 2014); however, firms can fail in starting or operating new ideas and innovations (Memili, Welsh, & Kaciak, 2014). In this sense, family support in difficult times is fundamental for continuing with the company (Memili, Fang, & Welsh, 2015). The authors who focused on this internal aspect of family firms are based in specific theories such as planned behavior theory (Zellweger, Sieger, & Halter, 2011; Zellweger & Sieger, 2012) and organizational psychological capital (Memili, Welsh, & Kaciak, 2014, Memili, Fang & Welsh, 2015; Welsh, et al., 2014)

**Cluster B: External Factors of IFF**

A central finding in the literature is that innovation in family firms depends on external resources. In this sense, IFF is also a process that derives from the strengthening of the family firm's core competences. These resources include not only financial or human capital but also connections with other firms and institutions (Kotlar, De Massis, Fratiini, Bianchi, & Fang, 2013; Kotlar, Fang, De Massis, & Frattini, 2014). In a competitive era, success depends on the ability to produce new or improved products and tacit knowledge constitutes the most important basis for innovation-based value creation (Memili, Fang, Chrisman, & De Massis, 2015). However, it is difficult to exchange a firm's innovation activities over long distances (Chrisman, Fang, Kotlar, & De Massis, 2015). Therefore, innovation activities are collective achievements that require key roles from numerous entrepreneurs (Memili et al., 2015), rather than an isolated decision within a single firm. External financial availability liberates family firms from the need to generate funds internally by helping them raise capital from external sources at a reasonable cost (Welsh et al., 2014).

**Cluster C: Advances in IFF**

In this cluster, advanced research studies on IFF appear. They develop a theory at the important intersection of family firms and innovation (De Massis, Frattini & Lichtenhaler, 2013). As it is shown that innovation helps family firms to respond effectively to shifts in market dynamism (Chrisman, Chua, De Massis, Frattini, & Wright, 2015; De Massis, Frattini, Kotlar, Petruzzelli, & Wright, 2016), articles in this cluster call for some research streams to study why innovation makes it possible to recognize market dynamism (De Massis, Di Minin, & Frattini, 2015). The theories used in this research stream are agency, RBV, grounded, and SEW. The singularities of family firms may be important precursors of the innovation. They call for undertaking research considering the essence of focus, which explains why there is no common result on how to make innovation happen in family firms. They agree that there is a need to address how family firms manage radical innovations and explore disruptive innovation (Brunninge et al., 2007; Casprini, De Massis, Di Minin, Frattini, & Piccaluga, 2017; De Massis, Frattini & lichtenhaler, 2013). Thus,

building on this, it would be interesting to explore the relations between ambidexterity and new product development management associated with loose-coupled partners and complementors, and the limits and risks of a pivot strategy. On the other hand, there is a need to focus on the critical capabilities that are important for innovation, such as dynamic and integration capability (De Massis, Frattini, Pizzurno, & Cassia, 2015; Fitz-Koch & Nordqvist, 2017). These streams of research are expected to not only advance theoretical understanding but also improve how family firms manage and organize innovation.

## Conclusion

This study examined the scientific research in IFF between 1994 and 2017, based on publications available in the WoS database. The evolution in the field of study shows that the topic's overall tendency has been ascendant, especially since 2009. Thus, it is possible to distinguish two different periods: the *initial period,* prior to 2009 (T1), and the *expansion period,* after the year 2009 (T2).

Although this study is not the first attempt to conduct a comprehensive and systematic review of academic IFF research, this article adds a bibliometric perspective to the IFF research topic, providing a synthesis and organization of existing knowledge in this research stream. Thus, this article provides a broad view of the research in this field and attempts to contribute to the increased generation of literature on IFF and, in doing so, facilitates the work of academics, students, consultants, family business entrepreneurs and sociologists. According to the study's limitations, the information presented in this study is expected to be complementary and informative to other bibliographic literature reviews. Second, the dataset was gathered exclusively from the WoS database. Thus, data from other sources (e.g., Scopus and Google Scholar) were not used. Finally, co-authorship analysis has been used to identify the main research streams instead of other mapping techniques, such as co-citation and citation, to complete the bibliometric overview.

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# An Analysis of Open Innovation Determinants: the Case Study of Singapore based Family owned Enterprises

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**JEL CLASSIFICATION**
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**KEYWORDS**
Open Innovation; Innovation Determinants; Family Business; Asia-Pacific; Tradition in Innovation

**Abstract** Family businesses play an important role in the growth of global economy, and while they are arguably perceived as a conservative form of organization with high risk aversion and reluctance to change, counterintuitive empirical evidence show that they are most effective in ideation and commercialization of innovation projects. In the current business environment of rapid change in work patterns, fast adoption of enabling technologies for seamless collaborations across industry and geography, along with intense competition and high uncertainty, enterprises have no choice but to maximize returns on innovation investments. Therefore, they are increasingly dependent on an ecosystem-based approach to innovation management, which has shown greater likelihood to create radical innovations and enable profit generation.
The objective of this paper is to analyse determinants of open innovation practices in family-owned enterprises in consideration of the joint effect of in-company enablers and external factors. Drawing on a sample of 33 Singapore based family-owned firms, our findings confirmed the key drivers such as family and business culture, access to external funds, government supported initiatives, market dynamics, partnership, network, family capital, and external network. Managerial implications about the necessity to leverage both environmental determinants and internal innovation capabilities to foster novel business ideas are also highlighted in the conclusion of the paper.

**CÓDIGOS JEL**
M19, O31, O32

**PALABRAS CLAVE**
Innovación Colaborativa; Factores de Innovación; Empresa Familiar; Asia Pacífica; Innovación Tradicional

**Un análisis de los factores determinantes de la innovación: el estudio de caso de las empresas familiares con sede en Singapur**

**Resumen** Las empresas familiares desempeñan un papel importante en el crecimiento de la economía global, y aunque posiblemente se las perciba como una forma conservadora de organización con alta aversión al riesgo la evidencia empírica muestra que son más efectivas creando y comercializando proyectos de innovación. En el entorno empresarial actual de cambio rápido en los patrones de trabajo, la adopción rápida de tecnologías habilitadoras para colaboraciones fluidas en toda la industria y la geografía, junto con la intensa competencia y la alta incertidumbre, las empresas no tienen más remedio que maximizar los rendimientos de las inversiones en innovación. Por lo tanto, dependen cada vez más de un enfoque basado en el ecosistema para la gestión de la innovación, que ha demostrado una mayor probabilidad de crear innovaciones radicales y permitir la generación de ganancias. El objetivo de esta investigación es analizar los determinantes de las prácticas de innovación en las empresas familiares en consideración del efecto conjunto de los facilitadores internos y los factores externos. Basándose en una muestra de 33 empresas familiares con sede en Singapur, nuestros hallazgos confirmaron los impulsores clave como la cultura familiar y empresarial, el acceso a fondos externos, las iniciativas respaldadas por el gobierno, la dinámica del mercado, la asociación, la red, el capital familiar y la red externa. Las implicaciones gerenciales sobre la necesidad de aprovechar los determinantes ambientales y las capacidades de innovación interna para fomentar nuevas ideas de negocio también se destacan en la conclusión del artículo.

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## Introduction

Traditionally, family businesses around the world have often been perceived as less innovative compared to their non-family owned counterparts due to their apparent risk aversion and reluctance to change [ (Gaskell, 2018), (Marín, Hernández, del Valle, & Castillo. M., 2016)]. This is however open to debate and, in fact, counterintuitive empirical evidence in recent years show that family enterprises are the most innovative organizations among all. They are not only the ones securing the greatest number of patents and new products, but are also most effective in ideation and commercialization of these innovation projects (Duran, Kammerlander, van Essen, & Zellweger, 2015).

Innovation is not a new phenomenon. Arguably, as written by Fagerberg & Mowery (2006), innovation "is as old as mankind itself". Inherently, human beings have the tendency to think and develop new and better ways to do things and to experiment in practice and, as such, research in business innovation have proliferated in recent years, with a steep spike in publications in the early 2000s [ (De Massis, Sharma, Chua, & Chrisman, 2012), (Gunday, Ulusoy, Kilic, & Alpkan, 2011), (Fagerberg & Mowery, 2006)]. The acute competition among firms registered since the turn of the century, the rapid growth of internet and its contribution to globalization and technological advancement, have in fact brought about greater attention on innovation practices, and the ability to create newness is nowadays regarded as a fundamental area in corporate strategy and the main provider of competitive edge (Lopez-Fernandez, Serrano-Bedia, & Gómez-López, 2015).

It is in fact a broadly recognized paradigm that innovation plays the pivotal role of enabling firms to pursue the threefold objective of top-line growth, bottom-line growth, and business sustainability in the long run [ (BFI@SMU; UOB, 2015), (Forsman & Temel, 2011), (Fuetsch & Suess-Reyes, 2017)].Therefore its contribution to a firm's survival and growth is without doubt.

As a general definition, innovation essentially refers to the inherent ability of firms to withstand competition through the identification of novel and better ways to acquire and execute tasks related with products, processes, systems, structures, services, and marketing methods (Calantone, Cavusgil, & Zhao, 2002).

However, while the creation of novel ideas, products, and services was oftentimes viewed in the past as an exclusive result of internal activities such as in-house R&D, there is an increasing volume of studies that recognizes the critical contribution of environmental/ external elements as well (Wynarczyk, Piperopoulos, & Mcadam, 2013). Chesbrough, who is considered the pioneer of this ecosystem-based slant, names this model "open innovation" (Chesbrough, 2003). The open approach, unlike its closed counterpart, leverages on the continuous "inflows and outflows of knowledge" across firms and stakeholders to accelerate creation of newness (Chesbrough & Crowther, 2006). Collaborative idea generation, sharing of intellectual property, and continuous cross-sector interaction are the basic principles of the open approach. Their combination in turn leads to an innovation that is open to various individuals and enterprises in the system [ (Wynarczyk, Piperopoulos, & Mcadam, 2013), (Pervan, Al-Ansaari, & Xu, 2015)]. The open approach has undoubtedly been well received by the vast majority of the 21st century companies due to its track record for a consistent raising of the bar of innovation practices across industries and firms, and the academic community has spent significant efforts to document its mechanisms across corporates and industries.

However, in spite of its obvious relevance, while open innovation practices have been widely investigated in large corporates, its family-owned counterpart has not always received the scholarly attention it deserves. To date, the literature has been unable to provide conclusive findings to fundamental research questions related to drivers of open innovation in family owned enterprises in consideration of both in-company drivers and environmental determinants (Hossain & Kauranen, 2016). Scholars have in fact focused mostly on the business dynamics piece of innovation, and often overlooked the family system (De Massis, Di Minin, & Frattini, 2015). Our current study is an attempt to fill this gap, and by focusing on cases of Singapore based family firms, it aims to make three contributions. Firstly, to help family-owned firms navigate the complex landscape of innovation initiatives. Secondly, considering that past research had long sought to understand determinants of innovation, with limited work done in consideration of the joint effect of inner-workings of family-owned enterprises and external drivers, this research will bring a holistic approach and provide family firms and policy makers with key strategic insights to push the innovation agenda forward. Thirdly, this work will debate on the impact of tradition and past knowledge in innovation initiatives (de Massis, Frattini, Kotlar, Petruzzelli, & Wright, 2016).

The reasons to focus on family businesses, in Singapore, is twofold. Firstly, family business is the most common ownership business model in the world. They are the backbone of the global economy, with an estimated contribution of over 70% of global GDP, a provision of 50-80% of worldwide private sector jobs, and a financial capital currently supporting 85% of start-ups [

(Osunde, 2017), (European Family Businesses, 2012)]. Southeast Asia, oftentimes defined the engine of global development (United Nations, 2018), has even higher dependency on family firms. Regionally, 80-90% of large companies are family-owned, and there are "good reasons to assume that their role in their respective national economies will remain crucial" (Björnberg, Elstrodt, & Pandit, 2014). Singapore is strategically positioned at the heart of Asia, and besides its well-cemented position as a Southeast-Asian business hub (EDB Singapore, 2017), the city-state is regarded as one of the pioneers of innovation practices in the region. Tracing the history of the nation, it is evident that while in the past, technology and innovation had served in a functional role, today they are "the central engines powering an ambitious economy" (Ng, Lim, & Wong, 2018). Given that Singapore's most valuable resource is its people, the national government has recognized early that a leading role in the field of innovation, science and technology would set Singapore apart on its journey to become the "Global Asia node" [ (Ng, Lim, & Wong, 2018), (Lung, 2018)]. Therefore, developing a deep understanding of Singapore family-owned enterprises' innovation behaviour is fast becoming a crucial long-term priority, not only for those firms who are currently active in the Lion City, but also for investors and policy makers that must ultimately decide how to better foster the development of the region as a whole.

This paper therefore hopes to provide strategic insights to practitioners, family businesses, and policy makers by addressing the following questions:

- How do Singapore family-owned businesses interpret innovation, and what is their underlying innovation culture?
- What are the main environmental and inner-working drivers of innovation in Singapore based family-owned enterprises ?

The rest of the paper is structured as follows. Section 2 reviews literature on innovation, innovation models, and drivers of innovation in family-owned entreprises. This is followed by a detailed analysis of research gaps that the present work seeks to fill. Section 3 discusses the Singapore family business context along with a comprehensive analysis of the innovation landscape in the city-state. Section 4 presents the research framework, along with a detailed analysis of research contribution. Section 5 discusses the methodological approach, input data, and survey structure. Section 6 presents analysis of the results. Lastly, section 7 discusses managerial implications, research limitations and directions for future research.

## Research Background

Business innovation management, especially in corporates, has been widely investigated and many research papers are available in this domain. Some research looked at drivers (or determinants) of innovation, some other attempted to define innovation models, whereas another piece conducted in-country analysis to map the status of innovation practices around the globe. This section reviews previous scholarly work in these areas while introducing fundamental concepts such as definitions of innovation, it also provides insights from previous research on drivers of innovative projects, and innovation models.

Defining Innovation. Despite the broad use of the term innovation, there is often no real agreement on what this term means. Some authors look at innovation from a process perspective, others may define the term from the standpoint of methods, ideas or products. However, the common understanding across industry, academic and practice is that innovation encompasses a series of initiatives geared toward the provision of added value to customers, the scaling up of value delivery to a larger set of customers or some combinations of the two (Galper, 2016). Literature typically categorizes innovation definitions into two main groups namely customer experience innovation and company transformation innovation. Customer experience innovation focuses on how customers directly experience companies' products and services or their perception of the brand, whereas company transformation innovation impacts the inner-workings of firms and typically refers either to processes or people (Galper, 2016).

According to Oslo Manual, innovation can materialize in a variety of forms namely product, process, marketing, and organisational (OECD & Eurostat, 2005). Product innovation refers to introducing a new product or service to the market or it represents a significant improvement of an existing one. Improvements might include technical specifications, software, raw materials or components and materials, user friendliness or other functional characteristics (OECD & Eurostat, 2005). Typically, product innovation has a direct impact on top-line growth. Process innovation refers instead to the adoption of an improved production or delivery method, which might include changes in production techniques, equipment and/or software (OECD & Eurostat, 2005). Process innovation is generally cost-cutting in nature (e.g. new manufacturing process to reduce unit cost) and is typically reflected in bottom-line growth. Marketing innovation is about the

implementation of new marketing methods and usually consists of changes of any of the four P's of marketing: product (e.g. design or packaging), promotion, price and/or placement (OECD & Eurostat, 2005). Lastly, organizational innovation is about new organizational methods in business practices, workplace organization or external relations (OECD & Eurostat, 2005).

Innovation Determinants. Family-owned enterprises are intrinsically different from their non-family owned counterparts (Gallo, Tàpies, & Cappuyns, 2004),and these dissimilarities are also reflected in the way innovation practices are driven at firms' levels. In fact, unlike non-family owned enterprises, family businesses have the additional family component impacting the way the business is structured and organized (Kellermanns, Eddleston, Barnett, & Pearson, 2008). Literature in innovation management in family businesses divides innovation determinants into two main categories namely external and internal drivers.

External determinants are defined as ecosystem-driven elements that can enable, or limit, the ability of firms to innovate (Avlonitis & Gounaris, 1999). Major external catalysts include government support [ (Hadjimanolis, 1999)] partnerships with academia, public agencies, and other private firms (Perkmann & Walsh, 2007), access to external funds (Zhu, Wittmann, & Peng, 2011), and market dynamics (Huizingh, 2011).

Internal determinants are inner-working enablers of innovation. Internal drivers of innovation comprised family and business culture (Hernández-Perlinesa & Mancebo-Lozano, 2016), which amongst others include factors like family involvement (Lopez-Fernandez, Serrano-Bedia, & Gómez-López, 2015), inter-generational involvement (Sharma, Chrisman, & & Chua, 1997), CEO/ C-suite thinking (Zahra, 2005) and business network (Öberg, 2018).

Innovation Models. The concepts of open and closed innovation have attracted interest from academic and practitioners' communities alike. Of the two approaches, the so-called open model has received greater attention, especially in most recent times (Huizingh, 2011). In fact, although the two paradigms at first glance seem to point in opposite directions, oftentimes open innovation is considered the natural development of its closed counterpart. Scholars debate that this evolution from a closed into an open model was made necessary by the combined effect of environmental factors such as change of work patterns (e.g. higher workforce mobility), rise of technologies enabling collaborations across industries and geographies and increased interest of all stakeholders (e.g. suppliers) to contribute in a new way to the creation of innovation [ (Chesbrough, 2003), (Dahnlander & Gann, 2010)]. Additionally, in the current business context where profit margins are increasingly affected by stiff competition and uncertainty, it is critical for companies to maximize their returns on innovation investments. Firms emphasizing inside-out open innovation have shown great likelihood to create radical innovations and sell a higher number of new products (Inauen & Shenker-Wicki, 2012). Hence a growing pool of firms are shifting towards an ecosystem-based approach to boost internal capabilities to improve processes, systems, and products through novel collaborative solutions [, (Wynarczyk, Piperopoulos, & Mcadam, 2013), (Furr & Shipilov, 2018), (EDB Singapore, 2017)].

Research Gaps

Despite the large amount of research papers available in the domain of business innovation management, it appears that the body of literature is currently unable to provide conclusive findings to fundamental questions about the role of key innovation drivers and their underlying structure, especially within the niche of family-owned enterprises. In addition, limited knowledge has been developed in regard to innovation-enabling determinants in a family-business dominated economy such as Singapore. In fact, from the analysis of previous scholarly work, it appears that the vast majority of the research have focused on Western societies, where findings are not directly applicable to the Asian context. There is a significant void in literature about open innovation in Asia, whereby cultural values are heavily embedded within the way families conduct business. Unlike in Europe and the United States, Asian family-owned businesses are often young organizations where the family has been in business for not more than 50 years [ (The Business Times, 2018) (Koh & Kong, 2016a)]. Additionally, while there is a fair number of studies which focused on either internal or external determinants of innovation, there is relatively little attention on their joint effects on firms' performance. Thus, this paper aims to fill these gaps, and by analyzing the perspectives of a diverse group of Singapore family enterprise, this work will map the status of innovation practices in the city-state of Southeast Asia.

## The Case Study of Singapore

### Why Singapore Family Enterprises

Located in South East Asia with a GDP of $297.0 billion, Singapore is considered, together with Hong Kong, South Korea and Taiwan, as one of Asia's four economic tigers. Since its independence in 1965, the city-state has gone through an impressive journey of growth and the nation is considered one of the wealthiest countries in the world per capita (US News, 2018).

According to data from the national department of statistics, in 2017 Singapore counted over 220.000 enterprises, of which 99% were SMEs and 85% were locally owned. Similarly, employment reached 3.4 Million people (excluding domestic foreign workers), of which 65% were absorbed by SMEs, and 68% by local firms. Real GDP growth in 2017 was measured at 3,4% (Singapore Department of Statistics, 2017).

Despite the strong appeal and highly favourable conditions for multinational corporations (MNCs) to establish themselves in the city-state, local family-owned enterprises still dominate the domestic economy. Looking at the Singapore Exchange for instance, family-owned firms made up over 60% of listed firms (The Straits Times, 2015), and their role as SMEs, which is by far the key engine of Singapore's economy, is even more central (Gov.sg, 2017). Family businesses contribute to nearly 70% of the national GDP and employ 50% of the workforce (Family Firm Institute, 2018). Additionally, although their presence spans across all sectors of Singapore's economy, their main role is registered in pivotal industries of the local economy such as construction, hospitality, real-estate, manufacturing, services and trading (The Straits Times, 2015).

The country has been consistently ranked as one of the most cosmopolitan cities globally, and its millennials, who often represent the next generation of business leaders, are global citizens while anchored to their own ethnic and cultural roots [ (Yeoh, 2004), (Timperio, Tan, Fratocchi, & Pace, 2016)].

**A Track Record of Open Innovation Excellence**

Over its 50 years of history, Singapore has earned a reputation of being a global innovation hub "at the cutting-edge of modern business" (Basulto, 2015). With a proven track record of excellence, the city-state has always been riding the wave of innovation to set itself apart (Basulto, 2015). In the mid-1960s and 1970s the role that Singapore played was as a low-cost manufacturing hub. By late 1970s and early 1980s, the national economy quickly moved up the value chain of electronics and semiconductors industries to become (after the economic stagnation of 1997 Asia financial crisis) a leading knowledge-based economy today [ (Basulto, 2015), (Wong, 2008), (Tan & Phang, 2005)].

At the present time, Singapore business ecosystem collaboratively embraces and promotes the open innovation model [ (Shiao, 2018), (Straitstimes.com, 2018)]. According to a recent research by EDB Singapore published in Harward Business Review (2017), Asia, and Singapore in particular, offers not only favourable conditions to do business, but also a wide array of soft-factors which in turn enable the region to be on the "leading edge of the innovation curve" (EDB Singapore, 2017). As a result, countless examples of home-grown family owned enterprises with strong innovation capabilities are available, and organizations like Goldbell Group, PBA (Precision Bearings and Automation) Singapore, Cycle & Electric company (Cyclect), Chef-in-Box by JR Group, Hai Sia Seafood, Q Industies, are few of the most successful innovation cases [ (Koh & Kong, 2018a), (Koh & Kong, 2016b)]. Bloomberg 2017 global Index on the state of innovation ranks Singapore in third position, ahead of Germany, Switzerland and Finland, and first among other Southeast Asian nations (Jamrisko & Lu, 2018).World Intellectual Property Organization positions the Lion City as the most innovative economy for South East Asia, East Asia, and Oceania, and fifth on a global scale (WIPO, 2018).

## Research Framework

In light of previous investigations, both descriptive and empirical in nature, and research gaps described in section two, this study argues that both external (ecosystem) and internal (inner-workings) factors jointly contribute to building family firms' innovation capabilities. This is still a debatable issue within the academic community, and to date the body of literature has been unable to provide conclusive and widely applicable findings. Thus, this study aims to capture the Southeast Asian perspective by mapping the state of innovation practices in the use case of Singapore.

**External Determinants**

With regards to external determinants of innovation, literature mostly focuses on four distinct factors namely government support, access to external capital, partnerships, and market dynamics.

Government support. Government plays a critical role in building business ecosystems conducive to innovation. They establish policies (Wonglimpiyarat, 2011), design incentive schemes for innovation to thrive, build the legal and regulatory framework (Spithoven, Vanhaverbeke, & Roijakkers, 2013), and shape the workforce's skillsets through the implementation of educational and training programmes (Mani, 2011). According to a recent study by Pervan, et al. (2015) on environmental determinants in Dubai SMEs, government policies have a significant impact on innovation capabities. GreenDot Group for example, which is just one of the many success stories of Singapore based family-owned enterprises, enlisted the support of SPRING Singapore (today named "Enterprise Singapore") to incapsulate

design thinking concepts withing their branding strategy with the aim to gain a deeper understanding of their target group (Koh & Kong, 2018b).

Access to external resources. Availability and access to capital is also a key leverage to generate and implement new business ideas, ventures, or even business models. Singapore offers a wide range of financing possibilities including banks, financial institutions, peer-to-peer crowdfunding, angel investors, and more (linkflow Capital, 2018). In this research, we are interested to understand whether the current schemes enable innovation in family businesses, and whether banks and financial institutions in Singapore are supportive in funding innovation ideas and projects.

Partnerships. Academic-industry collaborations as well as partnerships with other private firms or public agencies, are increasingly becoming a key element of efficient national innovation systems. For example, under the academic-industry collaboration scheme, universities become a major contributor of businesses' innovation strategies, especially from the angle of generating and disseminating new and relevant knowledge to private businesses [ (Pertuze, Calder, Greitzer, & Lucas, 2010), (Fischer, Vonortas, Schaeffer, & Queiroz, 2016)]. In this regard, Singapore is growing a vibrant national innovation system where academic research excellence plays an increasingly important role. In 2016, on its Research Innovation Enterprise (RIE) 2020 Plan, the national government has unveiled a S$19 billion (nearly USD $14 billion, equal to +18% from previous 2015 RIE) plan to support Singapore's R&D efforts with the aim to address national challenges but also to create value to spin off drivers of economic growth. [ (National Research Foundation, 2018), (Fai & Kek, 2016 )].

Market dynamics. The nature of the market, the competition level, and product types, can create the conditions for firms' to foster their innovation capabilities (Reeves & Deimler, 2011). Rapid changes of market conditions create in fact new business opportunities, and tend to speed up innovation processes so as "to meet unmet needs" (Nemet, 2009). Singapore is a highly dynamic market and a catalyst of dynamism across the entire Southeast Asian region. Looking at 2017 alone, the city-state received US$62b of foreign direct investment, standing in 5th position in the global top 20 foreign investment hubs (Singapore Business Review, 2018). In addition to the dynamism related to foreign investments, favourable regulatory framework, and favourable taxation schemes for foreign firms contribute to raise the bar of competitiveness in the domestic market.

**Internal Determinants**

According to previous investigations, elements like family and business culture (family involvement, top management or C-Suite philosophy towards innovation and company culture) and extented business network are the internal factors that contribute to family firms' innovation capabilities.

Family and Business Culture. Family and business culture factors are related to innovation management in family enterprises such as family involvement, multi-generational involvement, innovative characteristics/CEO strategic thinking which are more than general organizational culture. Family involvement typically refers to the degree of involvement of family members in the management organization and structure of the family firm (Lopez-Fernandez, Serrano-Bedia, & Gómez-López, 2015). Most research published to date concur that a greater family involvement corresponds to a higher interest of the firm to pursue innovation initiatives. In fact, direct involvement of family members takes away the need for short-term/ quick wins to move the focus to longer-term goals, which are the typical timeframes of innovation initiatives (Mustakallio, Autio, & Zahra, 2002). In regards to multi-generational involvement, according to survey findings of Deloitte (2016), the majority of next-generation business leaders believe that innovation is key for business survival and growth. The 61% of respondents argued that the current generation are well aware of challenges in innovation but, according to 40% of respondents, current generation leaders were not willing to take the risks associated with it. Additionally, 51% of next-generation leaders shared their intention to be more risky in their decision-making, although in a more controlled way. In this regard, PBA Singapore is a good example of differences in cross-generational perceptions of innovation and inner strengths of this "sandbox approach". PBA Singapore's CEO Derrick Yap, when he first joined the organization, had to convince its father of his capabilities to transform the business by taking on the great challenge of transforming the company's Malaysian market business with the support of only a six-member team. Today, Malaysia contributes to 30% of PBA's group revenue streams (Koh & Kong, 2018a). The level of involvement of top management (e.g. CEO) or C-Suite also appears to have a certain degree of impact on the firm's innovation capabilities (Yadav, Prabhu, & Chandy, 2007). In this regard, Dyer and Gregersen (2012) wrote that the "behaviour of leaders matter—big time", in the innovation processes. Additionally, risk-taking behaviour of management, encouragement of creativity, and participation of all staff in the innovation process, to name but a few, are also

critical elements of innovation orientation [ (Maher, 2014), (Szczepańska-Woszczyna, 2014)].
Network. A business network consists of a series of companies that are directly and indirectly connected through social and/or economic ties. Innovation is connected to business networks in several ways. This connection might exist due to the fact that creation of newness may be the result of interaction between business partners (Öberg, 2018), but also due to the change that innovation will bring in the interaction patterns among business partners, [ (Ostendorf, Mouzas, & Chakrabarti, 2014)].

**Contribution of the Current Research**

This work will shed light on key catalysts of open innovation in family-owned firms. Particularly, by leveraging on a sample of family firms in Singapore, a highly dynamic, yet culturally Asian society in Southeast-Asia, this research will bring the following contributions:

- Identify the main drivers of innovation across family firms examining both internal and external determinants. This will enable academics and practitioners to identify the most critical factors fostering innovation in Singapore based family firms,
- Illustrate the unique elements of Singapore family-owned business culture with regard to innovation management practices.
- Understand the impact of tradition and past knowledge in the innovation activities to specifically understand whether firms with strong ties to traditional values are able to roll successful innovation initiatives, and if so to what extent.
- Bridge theory with practice, and provide family businesses with a set of key determinants, as well as practical insights for policy makers to build a more inclusive and thriving innovation ecosystem.

## Methodology and Sample Characteristics

**Survey Structure & Measurement of Constructs**

In order to test the meet the research objectives, a questionnaire was developed and a survey administered over the period October – December 2018. The items used to measure the constructs were finalized based on an extensive literature review on business innovation management in combination with group discussions with senior executives of Singapore family-owned businesses. The combination of literature with focus group discussions was needed to ensure that wording and sequencing of questions were appropriate before administering the actual questionnaire. As a result, a questionnaire of 71 items was conceived. Out of these 71 survey items, 33 were about demographics of respondents and characteristics of industries they operate in, whereas the remaining 38 were in the form of a seven-point Likert scale anchored on environmental and inner-workings determinants of open innovation.
Environmental Determinants. Questions designed to assess government-supported initiatives require opinions on the policies designed by the national government to support the development of firms' innovation capacities, and particularly about availability and accessibility to government financial assistance schemes, but also about orientation of innovation initiatives towards creation of intellectual property (IP). Questions on accessibility to financial resources required responses on non-government related financial schemes including both external funding (e.g. angel investors, crowd funding, and bank loans) and internal funding (family capital). Partnerships were measured through questions regarding collaborations with education institutions (universities, polytechnic) and public sector agencies, as well as eagerness to repeat such experiences in future. Finally, market dynamics were assessed using questions on industries' competitiveness level, as well as industries' eagerness to embrace mega trends such as automation, 3D printing, artificial intelligence and machine learning.
Internal Determinants Questions related to family and business culture required responses on family's approach and philosophy towards innovation such as risk-taking behaviour, family involvement, knowledge of the industry, top management involvement in innovation initiatives, passion for newness, and level of innovation from next-generation business leaders. Business network was measured using ad-hoc questions on type of network fostering innovation, and access to friends and acquaintances' finances to fund innovation.
After the data collection phase, a series of multivariate statistical analysis using SPSS v25 software package were undertaken in order to explore the structure of innovation enabling determinants. Details of analysis and results are included in Section 6.

**Sample**

Firms to be contacted are family-owned organizations sited in Singapore. Considering that literature has been quite ambiguous in defining enterprises that fall under the umbrella of family businesses (Voordeckers, Van Gils, & Van den Heuvel, 2007), we defined our sample to include organizations that are controlled by one family group through "a clear majority of ordinary voting shares", and have family representation at management level (Lopez-Fernandez, Serrano-Bedia, & Gómez-López, 2015). In order to identify the group of firms to include in the study, the database of the "Business Families

Institute, Singapore Management University" (BFI@SMU) was used. In total, 100 family enterprises operating in key industries of Singapore economy such as construction, hospitality, real-estate, manufacturing, services and trading were approached to take part in the research. These organizations constitute the population targeted by this research. The questionnaire was sent via e-mail, with follow up clarifications via phone calls. To motivate a timely and complete response, the respondents were informed that they will receive a summary of research findings when the report is launched. Overall, a total of 61 unique subjects participated in the survey, of which 28 questionnaires were discarded due to incomplete responses. The remaining 33 responses which were eventually considered valid were provided by family enterprises with overseas presence in 15 countries across ASEAN (mostly Singapore, Malaysia, China, Indonesia, and Vietnam) and beyond (Hong Kong, India, Brazil etc.), and business profiles of respondents are summarized in Table 1.

**Table 1** Business Profile of Respondents.

| Category | % |
|---|---|
| Industry of Firms | |
| Logistics & Supply Chain (Procurement, Transportation, Storage) | 30% |
| Manufacturing | 17% |
| Wholesale and retail trade | 13% |
| Construction and/or property development | 7% |
| Food & Beverage related services | 7% |
| Financial Services and/or insurance activities | 6% |
| Professional, scientific and technical activities | 6% |
| Others (ICT, Hospitality, Chemicals, Healthcare, and other) | 15% |
| Size of firm | |
| Below 50 employees | 20% |
| Between 50 and below 200 employees | 30% |
| Above 200 employees | 50% |
| Annual Turnover | |
| Above S$ 1 and below 5 Mil | 18% |
| Above S$ 5 and below 20 Mil | 12% |
| Above S$ 20 and below 50 Mil | 21% |
| Above S$ 50 and below 100 Mil | 14% |
| S$100 Mil and above | 35% |
| Gender of Individual | |
| Male | 80% |
| Female | 20% |
| Group Age of Individual | |
| 18-29 | 21% |
| 30-39 | 52% |
| 40-49 | 15% |
| 50-59 | 6% |
| 60-69 | 6% |
| Generation of Individual | |
| First | 3% |
| Second | 58% |
| Third | 27% |
| Fourth and above | 12% |

## Analysis & Results

This study serves to examine the correlation between environmental and internal innovation drivers on family-owned firms' innovation capabilities. That is, this research aims to deepen the understanding on innovation determinants taking into consideration the joint effect of both external and inner-working factors. In this section of the paper, we provide insights on the techniques that were selected to meet the objectives of this study as well as research findings. Results are structured into two main areas namely demographic and multivariate statistical analysis.

Demographics. Following the survey, the primary data collected was consolidated. Prior to the testing of the research hypotheses, a descriptive analysis of questionnaire responses matched to demographic profiles of respondents and their industries was undertaken to summarize key characteristics of data collected. Key information is summarized in Tables 2, 3, and 4.

**Table 2** Respondents' Sentiment about Innovation within their Industries.

| Category | % |
|---|---|
| Competition Level | |
| Intense | 90% |
| Oligopoly | 10% |
| Pace of Innovation | |
| Fast | 33% |
| Moderate | 9% |
| Slow | 58% |
| Key Driver of Competitiveness | |
| Heavy physical infrastructure | 68% |
| Intellectual property | 18% |
| Capital intensity | 4% |
| Combination of above options | 10% |

The large majority of respondents (90%) is operating in industries characterized by intense competition levels. However, surprisingly, respondents characterize the pace of innovation as "slow", which is likely related to the type of businesses which our sampled firms were involved in. The interviewed firms operated mostly in traditional businesses, where physical infrastructure were the main assets rather than intangible assets and resources such as intellectual property.

**Table 3** Respondents' sentiment about the importance of various Innovation forms.

| Innovation types | Utmost Importance | Of secondary Importance | Of tertiary Importance | Of Least Importance |
|---|---|---|---|---|
| Product | 25% | 14% | 32% | 29% |
| Process | 43% | 39% | 18% | 0% |
| Marketing | 7% | 18% | 32% | 43% |
| Organizational | 25% | 29% | 18% | 29% |

Most responders (43%) believed that process innovation was the most critical form among all types of innovation, followed by organizational

innovation that had been ranked as top priority by 25% of our respondents. Interestingly, product innovation does not represent the primary form for our sampled firms. In fact, only 14% of respondents ranked this as the main priority.

**Table 4** Sales due to innovation, market share, and growth of innovation espenses.

| Percentage | Revenue percentage growth due to innovation (period 2013-2018) | Innovation expenses percentage increase (period 2013-2018) |
|---|---|---|
| Less than 5% | 40% | 43% |
| Between 5% and 10% | 20% | 17% |
| Between 10% and 30% | 17% | 27% |
| Between 30% and 50% | 17% | 7% |
| Between 50% and 70% | 7% | 3% |
| Between 70% and 100% | | - |
| More than 100% | | 3% |

The large majority of the sample did not leverage on innovation to drive their revenue streams in the period of consideration. 40% of the sample had in fact experienced less than 5% revenue growth due to innovation, which partially explained also the limited investment on innovation projects.

Multivariate Statistical Analysis. In order to meet the objectives of this study an exploratory principal component analysis (PCA) along with a measurement of internal consistency (reliability) of constructs via Cronbach's alpha and convergence via composite reliability and Average Variance Extracted (AVE) was conducted.

**Factors Structure**

PCA is a variable-reduction mathematical procedure that allows us to reduce a larger set of correlated variables into a smaller set of uncorrelated "artificial" constructs namely "principal components". Principal components are the underlying factors accounting for most of the variance of original variables [ (LAERD , 2018), (Gunday, Ulusoy, Kilic, & Alpkan, 2011)]. As mentioned, in this study PCA was used with the twofold objective of deepening the understanding of intrinsic connections across various constructs (innovation and drivers of innovation. In particular, a PCA with varimax rotation was performed on innovation drivers and, as suggested by Kim & Mueller (1978) only factors with eigenvalues greater than 1 were retained for further analysis (results in Table 5 and 6). As a result, nine factors are extracted of which eight were related with drivers of innovation, and one represented firms' innovation capabilities.. These factors were labelled based on the items included in each. The total variance explained on innovation drivers was 84%. Cronbach's alpha test and composite reliability were above the recommended 0.600/0.700 principle (except for composite reliability for factor 8, which was slightly below the threshold of 0.6), hence it can be stated that the survey items performed well in capturing their respective latent variables (Hair Jr., F., Black, Babin, & Anderson, 2014). Average Variance Extracted (AVE) was also calculated for convergence validity so as to assess the extent to which the variance of latent variables were explained by the survey items. Considering that all AVEs values are greater than 0.50 threshold, it can be concluded that more than the 50% of the variance of constructs can be explained by their respective items (Vinzi, Chin, Henseler, & Wang, 2010).

Findings from PCA highlighted that all innovation drivers documented in existing literature are relevant for the Singapore context, in addition, two further catalysts namely family capital and (personal) network also play a role in the fostering of innovation initiatives. Thus, results of PCA bring a few considerations. First, private family wealth plays a significant role in fostering innovation initiatives in Singapore. Second, the distinctive elements of family and business culture of Singapore family-owned enterprises include family involvement, know-how of internal processes and products, passion for innovation, innovation spirit, and risk-taking attitude (which are correlated via Cronbach alpha of 0.902). Third, personal network and professional network are independent elements and both are drivers of innovation initiatives. Results of PCA are valid considering that Reliability, Convergence, AVE, and discriminant validity are within acceptable ranges.

After reducing the initial set of variables into a more manageable subset of factors, a correlation analysis was performed to understand correlation among components and results are in Table 6.

While not all correlations were statistically significant, some interesting associations also emerged, suggesting the possible existence of indirect effect (mediations) of innovation drivers on innovation capabilities.

**Table 5** Cronbach's alpha, Factor Loading, Eigenvalues, Variance explained, AVE, loadings, and composite reliability (Drivers of Innovation).

| No | Items | Factor Load | Eigenvalue | Cum. % Variance Explained | Cronbach α | AVE | Composite Reliability |
|---|---|---|---|---|---|---|---|
| 1 | **Family and business Culture** | | 6.996 | 19% | 0.902 | 0.608 | 0.902 |
| | Family involvement drives innovation. | 0.736 | | | | | |
| | An extensive know-how of internal processes, product, and organization foster innovation. | 0.576 | | | | | |
| | Passion for newness is a fundamental driver of innovation | 0.831 | | | | | |
| | Innovation spirit foster innovation and progress | 0.793 | | | | | |
| | Top management involvement foster innovation | 0.809 | | | | | |
| | The willingness to take risks impacts outcomes of innovation | 0.896 | | | | | |
| 2 | **Access to external Funds** | | 3.286 | 32% | 0.883 | 0.566 | 0.900 |
| | It is easy relatively easy to access to angel investors to fund innovation initiatives | 0.949 | | | | | |
| | It is relatively easy to access to crowd funding to fund innovation initiatives | 0.951 | | | | | |
| | It is relatively easy to obtain bank loan to fund innovation initiatives | 0.677 | | | | | |
| 3 | **Government Supported Initiatives** | | 2.165 | 43% | 0.74 | 0.501 | 0.830 |
| | The national government provides with a series of financial assistance schemes such as grants, loan & insurances, tax incentives, investments which are very helpful to nurture innovation in family firms. | 0.580 | | | | | |
| | It is easy to identify the most appropriate government financial assistance scheme(s) that fits with my needs, and I believe it is easy to apply for such schemes. | 0.900 | | | | | |
| | Advanced technology is a key element to withstand competition | 0.650 | | | | | |
| | People are the main source of innovation | 0.670 | | | | | |
| | Innovation initiatives shall be oriented towards generation of Intellectual properties | 0.700 | | | | | |
| 4 | **Market Dynamics** | | 1.761 | 52% | 0.685 | 0.647 | 0.785 |
| | Innovation is necessary to withstand competition | 0.843 | | | | | |
| | Mega trends such as automation, 3D printing, Artificial Intelligence, Machine Learning etc. have transformed businesses and there is the need to leverage on those to withstand the acute competition | 0.764 | | | | | |
| 5 | **Partnerships** | | 1.574 | 60% | 0.709 | 0.713 | 0.832 |
| | Partnerships with educational institutes (universities, high schools) foster innovation | 0.781 | | | | | |
| | Partnerships with public sector organizations foster innovation | 0.903 | | | | | |
| 6 | **Network** | | 1.31 | 68% | 0.618 | 0.585 | 0.733 |
| | Do you use friends' capitals to fund innovation? | 0.881 | | | | | |
| | Partnerships with private sector firms foster innovation | 0.627 | | | | | |
| 7 | **Family capital** | | 1.108 | 76% | - | 0.775 | 0.775 |
| | Family capital are the main source of funds for innovation initiatives | 0.88 | | | | | |
| 8 | **External Network** | | 1.053 | 84% | 0.688 | 0.5 | 0.662 |
| | Singapore's legal and regulatory framework nurtures innovation and promotes the development of a conducive business environment whereby innovation spirit can truly thrive | 0.801 | | | | | |
| | A solid network fosters innovation | 0.600 | | | | | |

**Table 6** Correlation Analysis.

| | μ | SD | Family and business Culture | Access to external Funds | Government Supported Initiatives | Market Dynamics | Partnership | Network | Family capital | External Network |
|---|---|---|---|---|---|---|---|---|---|---|
| Family and business Culture | 5.2 | 1.7 | 1 | -0.026 | .329** | 0.157[1] | -0.092 | .215* | -0.132 | .328** |
| Access to external Funds | 2.1 | 1.8 | | 1 | 0.145[1] | -0.026 | 0.096 | .275* | 0.000 | .267* |
| Government Supported Initiatives | 4.4 | 1.7 | | | 1 | -0.021 | -0.009 | .240* | 0.056 | .351** |
| Market Dynamics | 4.5 | 1.8 | | | | 1 | 0.135[1] | -0.059 | -0.189[1] | .334** |
| Partnership | 2.2 | 1.9 | | | | | 1 | .216* | -0.054 | -0.031 |
| Network | 2.5 | 2.0 | | | | | | 1 | 0.289[1] | .231* |
| Family capital | 4.8 | 1.8 | | | | | | | 1 | -.308* |
| External Network | 4.4 | 1.6 | | | | | | | | 1 |

** Correlation is significant at the 0.01 level
* Correlation is significant at the 0.05 level
[1] Correlation is significant at the 0.1 level

## Discussion

This study analysed catalysts of open innovation in Singapore based family-owned enterprises in consideration of both environmental and inner-working determinants. The first finding of this research is a confirmation of the general strong passion of family-owned enterprises to undertake innovation initiatives. Srinivasa Raghavan Nadathur, founder of Nadathur Estates, in a recent conversation about his firms' approach on innovation mentioned that "The passion for innovation, to experiment, to create something that nobody has attempted before is intrinsic in Nadathur DNA" (Business Families Institute, 2018). The same passion has been detected throughout focus groups discussions and comments in the survey.

Regarding the empirical findings, drawing on a sample of 33 relevant family firms' responses, various insights can be offered to both scholars and practitioners.

First, while previous literature highlight six major factors among determinants of open innovation, our current research detected eight determinants. Particularly, two additional innovation determinants namely family capital and external network were detected via PCA. The remaining six catalysts of innovation projects (family and business culture, access to external funds, government supported initiatives, market dynamics, partnership, network, family capital, and external network) were found to play an important role in the Singapore family business ecosystem, confirming existing literature in this regard.

Second, the vast majority of our sampled firms mentioned process innovation as the most critical type, followed by organizational innovation. Process innovation is considered superior by our sampled firms due to its capabilities to drive product innovation, marketing and organisation structure (and people). Similarly, organizational innovation is ranked of utmost importance due to the increasing need to adopt technologies such as digitalization, robotics and automation, which demand that a proper organizational structure be in place. One of the respondents, a 3rd generation family business leader of a Singapore SME in his responses to this survey questionnaire highlighted that "The right processes create the necessary conditions to shape products, as well as marketing and organisation structures". On the same lines, a 2nd generation family business leader of another Singapore based family-owned firm reasoned out that "It is important that we have an efficient process in our business to minimize costs and increase customer satisfaction, especially in the current business context of stiff competition and uncertainty. Having in place cutting-edge processes is a key differentiator".

Third, access to external funds is quite important to family businesses of Singapore, and findings of this study highlight that for Singapore family enterprises, external funds can be of diverse nature such as from angel investors, or crowd funding, but banks loans and they appeared to be still the preferred funding mechanism for innovation initiatives. Policy makers should take these factors into consideration when strengthening policy intervention for innovation. For instance the government could focus on catalysing innovation-thinking and culture through a process of continuous policy support and strategy development e.g. via facilitation of funds acquisition, training, incubator and acceleration activities.

### Managerial Implications

This study provides strategic insights for family business firms to navigate the complex landscape of innovation initiatives, and also key takeaways for policy makers to strengthen their policy intervention for innovation. Particularly, insights of this study show that while environmental determinants have an important role in the development of innovation capabilities internal factors play a fundamental role too. Therefore, while injection of external capital and policies are still necessary, it appears that those elements alone are but not sufficient. Therefore, while the external ecosystem plays a crucial role for the development of innovation capabilities, it must be coupled with inner-workings determinants of the family firms too. Therefore, for family business to successfully innovate, both dimensions must be concurrently taken into account and nurtured.

### Limitations

This work has a number of limitations. The first is the limited generalizability of the results to other Southeast Asian countries. Despite the fact that Singapore is one of the most cosmopolitan cities in the world characterized by family-owned enterprises with a wide exposure to other neighbouring countries' culture, Singapore's business ecosystem is unique and thus the findings from this study cannot be generalized to the context of other Southeast Asian countries. The second limitation is the small sample size. A wider pool of respondents would reinforce current findings and provide deeper insights on the status of innovation practices in the city-state.

**Future work**

Findings of this study opened several avenues for future research. First, one can apply structural equation modelling (SEM) to uncover mediations among variables, weights, loadings, paths, as well as provide an estimation of latent variables scores. As mentioned earlier in this paper, outcomes of PCA and correlation analysis suggest the possible existence of indirect effect (mediations) of innovation drivers on innovation capabilities. Thus a future study might want to fill this gap through a larger sample of data. Second, for future studies one can expand the geographic scope from one single nation to the entire ASEAN region. This would allow cross-comparison of country's business ecosystem, and status of innovation practices across the Southeast Asian region. This is particularly relevant in light of developments in the ASEAN Economic Community (AEC) arising from cross-border trade and thus open innovation practices. Third, future research could comparatively assess the perception of innovation practices between current and next generations. This would allow for the design of appropriate strategies to foster innovation initiatives across multi generations to build lasting innovation capabilities within family firms.

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# Collaborative innovation in the family SME: conceptualization, goals, and success factors

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**KEYWORDS**
Collaborative innovation, Family SME; Innovative capabilities; Innovative attitudes; Management team

**Abstract** In a constantly changing environment, collaborative innovation enables the knowledge creation and new product designs, the improved efficiency of the production process, and the reduction of time-to-market. However, the achievement of such results in the family SME depends mainly on the unique characteristics of this type of organization, which in turn, represent the most widespread kind of business worldwide. Therefore, the objective of this article is to analyze how the composition of the management team, the factors related to the capabilities –cognitive factors, absorptive capacity, and innovative trajectory- and the attitudes –preservation of SEW and intra-organizational behavior- of the decision makers, mainly influenced by the family, affect when designing and implementing collaborative innovation processes in a successful way.

**CÓDIGOS JEL**
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**PALABRAS CLAVE**
Innovación colaborativa; PYME familiar; capacidades innovadoras; actitudes innovadoras; equipo directivo

**La innovación colaborativa en la pyme familiar: conceptualización, objetivos y factores de éxito**

**Resumen** En un entorno en constante cambio, la innovación colaborativa permite la creación de conocimiento y de nuevos diseños, la mejora de la eficiencia del proceso de producción y la reducción de tiempo para la comercialización de los nuevos productos. Sin embargo, la consecución de tales resultados en las pymes familiares depende en buena medida de las características propias de este tipo de organizaciones, que a su vez representan el tipo de empresa más extendida a nivel mundial. Por lo tanto, el objetivo de este artículo es analizar como la composición del equipo directivo, los factores relacionados con la capacidad –factores cognitivos, capacidad absorptiva y trayectoria innovadora- y las actitudes –preservación del legado socio-emocional y comportamiento intra-organizacional- de los decisores, en buena medida influenciados por la familia, afectan al momento de diseñar e implementar los procesos de innovación colaborativa de manera exitosa.

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## Introduction

In today´s dynamic and global environment, in which the demands of the different agents that intervene in the market change at a dizzying speed and the development of new technologies is continuous, companies are forced to adapt to new scenarios to offer innovative answers (Paunov, 2012). It is in this context that one can easily understand the reason why studies on innovation processes have boomed in recent years (Holt and Daspit, 2016; Kraiczy, Hack, and Kellermans, 2014). Far from being conceived as a linear, delimited and automatic process, innovation is considered as a changing process, with no apparent limits and, above all, dynamic (Chang, Hughes, and Hotho, 2011). This process allows the experience and knowledge of different people and organizations to interact, that is to say, that the know-how flows between the various agents, favoring its feedback (Jensen, Johnson, Lorenz, and Lundvall, 2007). Thus, the mechanisms that allow interaction within the organizations themselves (collaboration between different units, or the participation of the company's personnel in the innovation processes) and the networks with which the company relates to its environment (other companies, universities, research, and technology centers) are gaining increasing prominence (Öberg, 2016). In this context, De Massis, Frattini, and Lichtenthaler (2012) argued that given the interaction between agents has a significant impact on the future of innovation, and collaborative innovation will have a very prominent role soon, both internally (intra-organizational collaboration) and externally (inter-organizational collaboration).

Collaborative innovation is defined as voluntary agreements among independent firms, who exchange and share capital, information, knowledge, and technology to achieve a common innovation goal (Feranita, Kotlar, and De Massis, 2017; Un, Cuervo-Cazurra, and Asakawa, 2010). It is a particularly interesting strategic option for small and medium-sized enterprises (SMEs) since it enables the development of new resources and capabilities to maintain and improve their competitiveness in the market (Muñoz-Bullón, Sanchez-Bueno, and De Massis, 2019). Besides, it allows to have resources that could not be obtained otherwise, or that would imply an excessive cost, and all this without having to give up the desire to be creative and innovative (Miles, Miles, and Snow, 2005). However, this activity is not without risks, given the complexity of the process and the numerous agents and factors that intervene. This complexity is accentuated by the nature of family-owned SMEs, which represent between 80-90% of commercial companies and are responsible for 70% of the employment generated in the private sector (Instituto de Empresa Familiar de España, 2016). In this regard, the lack of studies on collaborative innovation in the field of family businesses is particularly striking (Casprini et al., 2017; De Massis, Frattini, and Lichtenthaler, 2012; Feranita et al. 2017). Thus, the research carried out on the collaborative innovation process has focused mainly on the study of large companies (Spithoven, Vanhaverbeke, and Roijakkers, 2013), leaving the smaller ones relegated to a second stage, even though these smaller companies, as previously stated, represent the critical element of economic and social development.

For all the above reasons, this article focuses on the collaborative innovation processes in the family SME. For this purpose, a conceptualization of this phenomenon is presented by analyzing the factors that affect the success of the family SME when dealing with collaborative innovation processes, as well as the perceived benefits. In this way, this article makes at least two theoretical contributions. Firstly, a contribution to the innovation literature is formed by carrying out a conceptualization of the collaborative innovation process, aiming to deepen in its solid foundation to delve into and inspire a more rigorous approach. Secondly, a comprehensive approach of collaborative innovation processes in the context of the family business is offered, by identifying their distinctive characteristics and how such can influence this type of strategy.

From a practical point of view, this study also contributes to those responsible for designing and executing public policies in the field of innovation. It is expected for public institutions to act as facilitators of business innovation processes (Kontinen and Ojala, 2011), with the difficult task of distributing the limited public resources among companies that want to pursue innovative activities (Zúñiga-Vicente, Alonso-Borrego, Forcadell, and Galán, 2014). In this regard, two of the main distinctive features of family businesses are their long-term orientation and their close ties with the communities where they are based (Lumpkin, Brigham, and Moss, 2010), the fact of highlighting the benefits that family SMEs attain from innovation processes enables public institutions to assess the effect of the invested public resources more precisely.The remainder of this article is structured as follows. Next section describes a conceptualization of collaborative innovation, highlighting which are the objectives sought through the implementation of this type of processes. Subsequently, the main distinctive characteristics of family SMEs are briefly discussed. Afterward, the different elements that make up the theoretical model of

collaborative innovation processes in family SMEs are thoroughly explained, focusing on the composition of the management team as well as on the differential factors related to capacity and attitude of family SMEs. In the last section, the contributions of this study are summarized, and a series of relevant aspects are outlined for future studies.

## Collaborative Innovation

### Conceptualization

Collaborative innovation is defined as the creation of innovations beyond the limits of the company, and even the industry or sector, through the exchange of ideas, knowledge, experiences, and opportunities (Ketchen, Ireland, and Snow, 2007). It refers to a process of creation and development that involves multiple actors, from outside and from within organizations, working together in order to generate ideas, concepts or solutions in the form of product, process or service (Skippari, Laukkanen, and Salo, 2017) for business or for their own use (Haefliger, 2012). During its development and regularly, the collaborating agents reveal the results of their individual and collective efforts with the agreed partners (Baldwin and von Hippel, 2011).

Social capital is defined by Bourdieu (1986: 248) as "the sum of real or potential resources linked to the possession of a lasting network of relations of knowledge and mutual recognition." It is considered a key element for strategic collaborations, increasing the probability of successful collaborations due to the trust and willingness to share resources among the partners (Hitt, Ireland, Camp, and Sexton, 2001; Nahapiet and Ghoshal, 1998; Siebert, Kraimer, and Liden, 2001). In this sense, Galán and Castro (2004: 108) pointed out that "confidence can lead to joint efforts and, for this reason, it is considered as an antecedent and an extraordinary lubricant of collaboration." Also, they added that "when two units begin to trust one another the willingness to share resources increases without worrying about the advantages that the other party will incur."

In this way, the existence of inter-organizational trust implies excellent coordination of tasks among the companies that sustain relationships or transactions, providing relevant knowledge about their norms, routines, and procedures (Gulati, Nohria, and Zaheer, 2000). In this regard, Davis and Eisenhardt (2011) emphasized the significant interactions among the several members of the supply chain, which is one of the main productive ecosystems where collaborative innovation occurs, through the search for complementary partners with the resources needed (Venkatesh and Yadav, 2011).

## Objectives of collaborative innovation

Companies committed to collaborative innovation pursue several specific goals that can be grouped in three major groups: enabling knowledge creation and new product designs, improved efficiency of the production processes, ad reduction of time-to-market (Skippari et al., 2017).

### Enabling knowledge creation and new product designs

Collaboration among different organizations or agents in the innovation chain, from the idea generation to its conversion into a product or service, stimulates the cross-fertilization of shared knowledge and experiences (Swink, 2006), which leads to a higher number of initiatives on new products or services (Faems, van Looy, and Debackere, 2005). These benefits can be especially valuable in the case of technological innovations by facilitating staff involved in R&D activities with greater access to information and experiences (Roy and Sivakumar, 2010). For example, the collaboration between different organizations increases the quality of product design solutions, thus increasing their attractiveness to customers (Skippari et al., 2017).

Collaborative innovation can also be exciting when companies interact with either potential or current customers (Haefliger, 2012). On this regard, one of the most novel phenomenon developed in recent years is the co-design of products, which is the result of the collaborative work between companies and consumers (Fuchs and Schreier, 2011). This collaboration allows consumers to benefit from improvements in the products they usually consume, ensuring that these products will have better acceptance in the market, thus reducing the likelihood of rejection by better understanding what customers value (Tsai, 2009). In this search and identification of new markets, it is also worth noting that customized products and services tailored to niche audiences, which are willing to pay more if they can design the product themselves (Franke, Schreier, and Kaiser, 2010).

### Improved efficiency of the production process

Collaborative innovation can also be beneficial concerning efficiency and cost reduction in the development and production stages (Min et al., 2005). Thus, the collaboration between different companies allows managing learning and knowledge of the product creation processes (Öberg, 2016). A partnership facilitates cost reduction and enables the maximization and shared use of product platforms, global product

designs, and generations of such products, among others (Swink, 2006).

A clear example of this practice is that carried out by the Spanish family supermarket chain Mercadona with its suppliers (Negocios en Navarra, 2016). Thus, Mercadona establishes collaborative ties with its inter-suppliers both in processes (reducing electricity and water consumption, minimizing waste, and optimizing logistics) and products. Mercadona, aware of its customers' needs and tastes, transfers them to its suppliers specialized in manufacturing, with whom it maintains stable and long-term commercial relationships. Thus, this joint consideration provides richer insights on network innovation output, producing in 2015 alone more than 100 new process improvements and at the same time, establishing solid foundations to collaborate in product and process development shortly.

**Reduction of time-to-market**

Collaborative innovation can also result in a reduction in the time needed to commercialize a new product, a factor that allows companies to extend their market participation (Davis and Eisenhardt, 2011). Multi-organizational innovation teams tend to find solutions more quickly since they have a full range of knowledge sources (Ganesan et al., 2009), which allows faster and more numerous iterations of designs (Holmen, Aune, and Pedersen, 2013). On the other hand, collaboration encourages the reuse and better use of previous design and development work (Street and Cameron, 2007). Besides, the partnership allows the development process to begin without the need to fully complete the last phase design since the most relevant information is accessible to those responsible for making decisions during the product development phase (Swink, 2006).

Finally, although collaborative innovation, in general, leads to the development of new products and services (Rumball, 2007), how the process is developed and even the results acquired vary depending on the type of company that carries it out (Filip, Hansen, and Frölunde, 2016). SMEs have fewer resources than necessary to carry out basic research (Roxas, Piroli, and Sorrentino, 2011). Thus, collaborative innovation processes of SMEs often include as collaborating agents to universities, vocational training institutes and communities, groups and business clusters arising around some of the aspects to be developed as well as to different companies involved in the innovation process (Von Hippel and Von Krogh, 2003).

**The Family SME and its unique characteristics**

A family business is identified as such by the participation of the family in the company. The family influence is determined regarding ownership, management, and government (Steiger, Duller, and Hiebl, 2015; Mazzi, 2011). In addition to family involvement, the behavior and desire to be a family business is undoubtedly another distinguishing feature of this type of organization (Dawson and Mussolino, 2014; Chrisman, Chua, and Sharma, 2005). In this sense, one of the most recognized definitions of family business is the one proposed by Chua, Chrisman, and Sharma (1999), as that entity where the government and management falls on a dominant coalition controlled by members of the same family or a small number of families, whose desire is the sustainable maintenance of the business for future family generations.

The actions of family businesses are based on the dynamic interaction between family and business subsystems with a transgenerational expectation; that is, a desire to keep the company under the family control throughout different generations (Anderson and Reeb, 2003; Habbershon, Nordqvist, and Zellweger, 2010), differentiating from nonfamily counterparts (Zellweger, Eddleston, and Kellermanns, 2010). Thus, family businesses tend to exhibit a clear long-term orientation in their strategic decisions (Le Breton-Miller and Miller, 2006). In this sense, Goel and Jones (2016) pointed out that the need to balance and align the interests of the family and the company means that family businesses have resources and unique governance that directly affects their strategic decision-making. The desire to maintain control of the company in the long-term can translate into a more conservative behavior to avoid risk exposure (Gómez-Mejía, Haynes, Núñez-Nickel, Jacobson, and Moyano-Fuentes, 2007). This fact is known in the literature as the desire to maintain the socio-emotional wealth (SEW), which is one of the priority objectives of family businesses. SEW refers to a set of intangible elements such as the feeling of belonging, the perpetuation of family values, the preservation of the family dynasty, or family altruism, among others (Gómez-Mejía et al., 2007).

The distinctive cultural elements of the family business, long-term orientation, and risk aversion as a result of their desire to preserve the socio-emotional wealth have a positive effect on strategic decision-making, and therefore, on the adoption of innovation strategies (Arzubiaga, 2019). These strategies are driven by the management team, who are usually influenced by the opinion of the family, given that family members are usually included in the top management team or the board of directors (Minichilli, Corbetta, and MacMillan, 2010). The

fact that the management team is composed of family and non-family members of different generations and that there might be managers who are also owners means that both businessand family objectives have to be considered simultaneously (Kraiczy et al., 2014; Zellweger, 2007).

## Determining factors in collaborative innovation in the Family SME

The collaborative innovation process has a series of unique characteristics when it takes shape in the family SME. In line with the above, the factors related to the capabilities and attitude of these companies affect their collaborative innovation processes. Likewise, these factors are also influenced by the characteristics of the management teams, in which the familial element can have a significant influence (Rondi, De Massis, and Kotlar, in press), farther in the case of SMEs given the limited number of personnel in the top management (Figure 1).

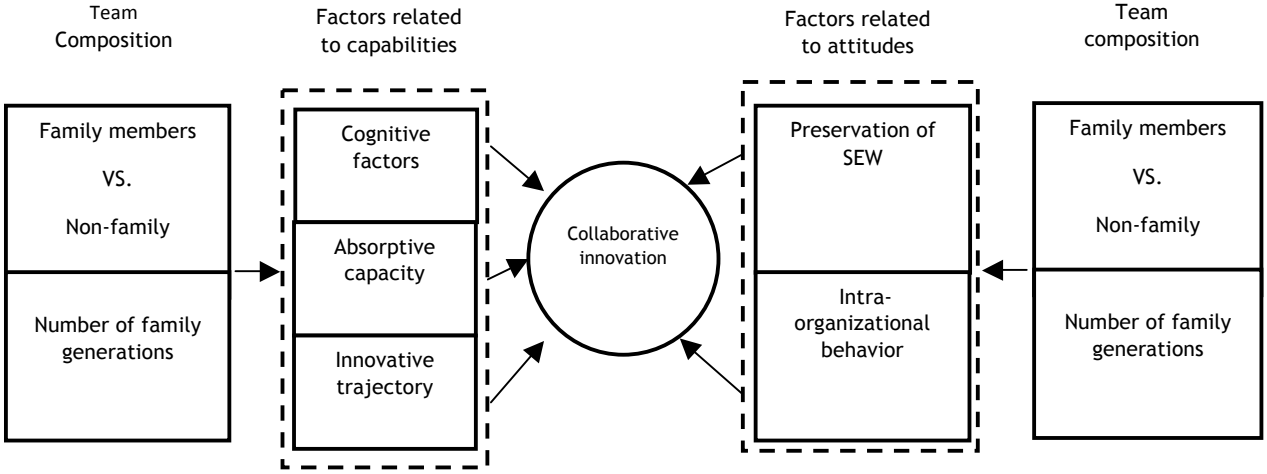


**Figure 1** Factors related to the success of collaborative innovation in the family SME.

Based on the scheme presented in Figure 1, the following sections elucidate on each of the elements that contribute to and affect the collaborative innovation process of the family SME.

### The management team composition

The top management team composition and its diversity are aspects with a strong influence on the behavior and decision-making of the organization (Ling and Kellermanns, 2010). In addition to the diverse elements common to any company, family SMEs have two diversity factors, which are considered unique and differentiated (Kraiczy et al., 2014): the ratio of family members in the management team and the number of generations involved in the management team (Arzubiaga, Maseda, and Iturralde, 2017).

Concerning the presence of family members in top management, their influence as a group stems from an educational base and common organizational culture, sharing experience, and knowledge acquired over time (Lozano-Posso and Urbano, 2017; Minichilli et al., 2010). Besides, they have unique values such as commitment, long-term orientation, and customer service, which gives them a more robust organizational culture and values (Chrisman, Chua, Pearson, and Barnett, 2012). However, a high percentage of family members in the management team can also minimize the broad-mindedness and knowledge of other organizations (Kraiczy et al., 2014), a pivotal point to achieve high efficiency in innovation processes. In this sense, the presence of non-family managers usually provides more diverse external knowledge and perspectives (Talke, Salomo, and Rost, 2010), due to their different managerial skills acquired outside the family business (Veider and Matzler, 2015) and better network contacts with external advisors. These advisors can provide experiences and technical knowledge in various areas (Classen, Van Gils, Bammens, and Carree, 2012), which can be vital to establishing relationships

with third parties to design and implement collaborative innovation projects.

The number of family members can also affect the attitude of managers when making decisions about innovation in general (Minichilli et al., 2010), and collaborative innovation in particular (Magistretti, Dell'Era, De Massis, and Frattini, 2019). Thus, non-family managers may need to demonstrate that their employment is justified (Hiebl, 2015), so they will seek to increase their managerial impact and leave their professional imprint through the design and implementation of more risky projects (Casillas, Moreno, and Barbero, 2011). Also, this fact accentuates the difference in family members concerning the attitude toward risk, minimizing the risk of investment in innovation, with the ultimate goal of preserving the socioemotional wealth of the family in the organization (Gómez-Mejía et al., 2010).

Regarding the number of family generations involved in the top management team, such inter-generational presence is considered a vital diversity factor when making decisions about the innovation processes (Kellermanns and Eddleston, 2006). Thus, the involvement of different generations in the management team allows to diversify the knowledge as a result of the various educational backgrounds, experiences (Talke et al., 2010), different perspectives, and even, different network contacts (Chirico, Sirmon, Sciascia, and Mazzola, 2011). In this way, it is easier to identify the needs of new clients and markets, and the innovation processes can be more efficient by combining the new knowledge provided by the new generations with the tacit knowledge contributed by previous generations (Litz and Kleysen, 2001). However, knowledge combinations across different generations also require a flexible attitude that allows integrating this knowledge (De Clercq and Belausteguigoitia, 2015), shelving inter-generational tensions as to how to address the innovation in collaboration with third parties.

In short, the two primary sources of diversity in the management team composition play a prominent role in the factors related to the capabilities and attitudes of family SMEs when designing and implementing collaborative innovation processes.

## Factors related to capabilities

The competence of the decision-making bodies in the strategic area is also of particular importance when launching innovation projects (Talke et al., 2010). Thus, in the field of collaborative innovation, cognitive factors stand out (Skippari et al., 2017), the absorption capacity (Filip et al., 2016) and the innovative trajectory (Hibbert and Huxham, 2010) as critical factors to success in collaborative innovation processes.

**Cognitive factors**

The cognitive factors of the agents involved in collaborative innovation processes play a crucial role in the design and development of innovations (Corsaro, Cantú, and Tunisini, 2012) and depend, to a large extent, on the knowledge acquired, the experiences lived and the unique social interactions experienced by individuals or teams (Marcel, Barr, and Duhaime, 2010).

As noted above, in family SMEs, most of the times, family members are responsible for leading and making decisions about aspects related to innovation (Sciascia, Mazzola, and Chirico, 2013). Usually, those family members share similar elements such as academic background, business know-how, and business culture acquired over the years (Lozano-Posso and Urbano, 2017; Minichilli et al., 2010). Such excessive homogeneity of cognitive factors, derived from a high proportion of family members in positions of responsibility for innovation processes, can result in a lack of knowledge diversity and diverse perspectives (Chrisman, Fang, Kotlar, and De Massis, 2015). Thus, generating a mental rigidity in the cognitive maps of these decision-makers (König, Kammerlander, and Enders, 2013). It is generally acknowledged that non-family members are the ones contributing more knowledge and new perspectives (Arzubiaga, Iturralde, Maseda, and Kotlar, 2018; Talke et al., 2010), different management capabilities, and better access to external network contacts (Veider and Matzler, 2015). This knowledge diversity and skills promotes the use of external information, thus reinforcing the absorption capacity of the company (Classen et al., 2012).

Nonetheless, the concurrence of new family generations in the decision areas can help alleviate the excessive mental rigidity in the cognitive maps of the management teams with a large proportion of family members of the same generation (Cruz and Nordqvist, 2012). Younger generations will contribute new ideas and network contacts to successfully design collaborative innovation projects (Litz and Kleysen, 2001). For example, the implementation of new technologies and tools (Fang, Kotlar, Memili, Chrisman, and De Massis, 2018), which represents essential knowledge to meet the challenges of a dynamic market (Sciascia et al., 2013). In this sense, family SMEs with high heterogeneous teams into innovation will have a greater tendency towards collaborative innovation and a higher probability of success.

**Absorptive capacity**

The absorption capacity refers to the ability of the organization to assess, assimilate, and apply new knowledge from collaborators (Cohen and Levinthal, 1990). It is based on a series of routines and organizational processes through which companies acquire, assimilate, transform, and exploit new knowledge (Zahra and George, 2002). Therefore, absorption capacity plays a vital role when collaborating with different agents in collaborative innovation processes (Reagans, Zuckerman, and McEvily, 2004).

In the family SME, the absorption capacity varies according to the capabilities of the people who lead the innovation processes (Kotlar, De Massis, Frattini, and Kammerlander, 2019; Kraiczy et al., 2014). Thus, SMEs with a more significant proportion of non-family members in the company, represents a diversity factor regarding knowledge, skills, and expertise (Veider and Matzler, 2015), with a higher probability of success in collaborative innovation processes. In this sense, mixed teams have a higher potential absorption capacity that allows them to be more receptive to the acquisition of external knowledge and more effective when assimilating that know-how (Alexiev, Jansen, Van den Bosch, and Volberda, 2010). In the same way, a more significant proportion of non-family members also increases the real absorption capacity of family SMEs, that is, to transform and recombine the information and knowledge acquired from different sources for later exploitation (Rodan and Galunic, 2004).

Given that family SMEs are reluctant to incorporate managers from outside the family, the absorption capacity can be driven by the inclusion of new generations in the decision-making processes on innovation projects and collaborative innovation (Kellermanns, Eddleston, Barnett, and Pearson, 2008). Thus, the teams responsible for designing and implementing collaborative innovation projects that enjoy a higher absorption capacity will be more effective as they have a higher ability to exploit the rents resultant from this collaboration.

**Innovative trajectory: depth and breadth**

The know-how and expertise accumulated during the organizational life cycle are also influential factors when it comes to success in collaborative innovation processes (Filip et al., 2016). Thus, a long history of innovation leads to a wide range of recombinations of knowledge and experience, which will be of greater importance to the extent that the innovative trajectory has been more profound, in terms of accumulation of knowledge in a specific area, and more broadly, in terms of knowledge diversity in several areas (Davis and Eisenhardt, 2011).

Family SMEs with a more substantial proportion of family members tends to have deeper innovative trajectories, acquiring tacit knowledge about a specific area over the years in the company. This gives them an advantage of knowing how to discriminate, within this scope, which collaborative innovation projects will be more likely to succeed, and identify from the first moment those that should be abandoned (Katila and Ahuja, 2002). However, the lack of knowledge diversity, expertise, and network contacts of those teams composed mostly by family members lessen the innovation trajectory (Arzubiaga, Kotlar, De Massis, Maseda, and Iturralde, 2018), which results in less knowledge and experience about the recombinations of novel elements (Ahuja and Katila, 2004) and translates into less effective collaborative innovation processes.

Consequently, balanced teams concerning family and non-family members, in principle, seem to be in a more advantageous situation to address diverse collaborative innovation projects. Relatedly, the presence of new generations in those bodies responsible for collaborative innovation projects can help to alleviate, in a certain way, the limited breadth of ideas and knowledge that senior management teams of family firms usually portray (Sciascia et al., 2013).

## Factors related to attitudes

The second axis on which the collaborative innovation processes of family SMEs pivot deals with the attitudes of the teams responsible for designing and implementing those processes, as shown in Figure 1. In this regard, two different characteristics can be distinguished that affect the collaborative innovation processes, such as the preservation of socio-emotional wealth (SEW) and risk aversion (Gómez-Mejía et al., 2007), as well as intra-organizational behavior (Nordqvist, Sharma, and Chirico, 2014).

**Preservation of SEW**

The influence of the familial factor on family businesses has been related both to economic results, including competitive advantage and wealth creation, and to results unrelated to the financial scope, including the preservation of tradition, the strengthening of family ties, and the value creation across generations (Pearson, Carr, and Shaw, 2008). Consequently, decision-making also has this twofold facet, pursuing economic objectives, as well as those objectives closely linked to the family (Mahto et al., 2010; Souder, Zaheer, Sapienza, and Ranucci, 2016), such as the preservation of the socio-emotional wealth (Gomez-Mejía et al., 2007).

In this sense, family businesses tend to estimate at all times how different strategic decisions can

affect the business family (Chua, Chrisman, and De Massis, 2015; Vieira, 2014), prioritizing those processes and initiatives that avoid, as far as possible, the assumption of risks for the future of the business family (Gomez-Mejía, Makri, and Kintana, 2010; Kotlar, De Massis, Wright, and Frattini, 2018). Given that collaborative innovation brings uncertainties typical of this type of operations, family SMEs may not be willing to assume certain risks. On the one hand, innovation processes are inherent to chance, since they do not offer certainty of the results (Veider and Matzler, 2015). This uncertainty about the investment recovery, both in financial terms and intangible resources, can jeopardize innovation initiatives in general (Brinkerink and Bammens, 2018; Naldi, Nordqvist, Sjöberg, and Wiklund, 2007). On the other hand, family SMEs are often very reluctant to share knowledge with other collaborators outside the organization (Ireland and Webb, 2007). These companies, many of them located in the industrial sector, have developed for years know-how based on learning-by-doing (Chirico, 2008), resulting in tacit knowledge about a series of specialized products (Duran, Kammerlander, Van Essen, and Zellweger, 2016).

In general, SMEs usually have limited access to resources and lack of specific knowledge and technical expertise within a particular area (George, 2005), leading to difficulties when entering collaborative innovation due to their reluctance to lose experience and not seize knowledge opportunities from the collaborators. Thus, faced with the challenge of disclosing their know-how in addition to not being able to take advantage of what has been contributed by the other participants in the innovation processes, the participation of family SMEs in collaborative innovation with third parties is constrained (Debicki, Kellermanns, Chrisman, Pearson, and Spencer, 2016). Putting at risk the competitive advantage that implies having the differential know-how, in exchange for not obtaining clear benefits.

Given that these issues may affect the future viability of the organization, family SMEs will be conservative when taking part in collaborative innovation processes (De Massis, Chirico, Kotlar, and Naldi, 2013). This conservative attitude will be more accentuated in the case of family SMEs with a large proportion of family members amongst those who make strategic decisions (Kraiczy et al., 2014). This conservative attitude of family members can be weakened with more diversified management teams (Zahra, 2005). Thus, the heterogeneity due to the inclusion of non-family members and the concurrence of different family generations will help to create a prone attitude towards collaboration with third parties in innovation projects.

**Intra-organizational behavior**

Innovation is fundamentally a collaborative effort between people who share ideas, perspectives, and values (Adler and Kwon, 2002). That is why social capital, understood as the set of values, norms, and attitudes that foster collaborative dynamics is a resource that favors the exchange of knowledge and information (Nahapiet and Ghoshal, 1998), as well as innovation processes (Sánchez-Famoso, Iturralde, and Maseda, 2015). The family business, given its peculiar characteristics linked to the family with solid business values and strong social ties (Hall, Melin, and Nordqvist, 2001), are companies with essential reserves of social capital in which inter- and intra-organizational relations have a strong influence on their behavior and dynamics (Sánchez-Famoso, Maseda, and Iturralde, 2017).

In family SMEs, family members in charge of innovation decision-making tend to consider internal ideas and perspectives of higher value than those coming from outside the organization (Menon and Pffefer, 2003). Even though, there may be certain misgivings by family members to the recognition of the ideas and advice of the non-family group inside the organization since it can be understood as a transfer of power to those non-family members (Alexiev et al., 2010). Therefore, the internal social capital that the company possesses or the network of external relations acquired (external social capital), can determine to a large extent the predisposition towards collaborative innovation. Hence, family SMEs in which the inclination for external knowledge prevails will encourage collaborative inter-organizational innovation, while those that value internal cooperative dynamics more will opt for intra-organizational innovation. In this sense, greater participation of new generations in the decision-making process of collaborative innovation can play a unifying role between family groups and those of non-family members of the company (Casillas, Moreno, and Barbero, 2010).

## Conclusions and future lines of research

In this article, a deepening in the conceptualization of collaborative innovation strategy has been made as an increasingly common and widespread phenomenon, outlining the three main objectives pursued by this strategy: the knowledge creation and new product designs, the improved efficiency of the production process and the reduction of time-to-market. However, the achievement of collaborative innovation in the family SMEs depends mostly on the unique characteristics of this type of organization. Thus, factors such as the management team composition -the proportion of family members or the number of

generations involved in management- factors related to capabilities -the cognitive factors, the absorption capacity, and the innovative trajectory in terms of depth and breadth, as well as those factors referred to preferences - conservation of the SEW and inter-organizational behavior- primarily mediated by the influence of the family in all cases, play a crucial role in the successful design and implementation of collaborative innovation.

The main contributions of this work refer to deepen in the solid foundations that allow in the future to delve into the academic study of collaborative innovation and the identification of differentiating characteristics of family SMEs that affect this process, which give rise to future lines of research in this field. On the one hand, a significant advance in this matter would require an empirical study of the model presented in this article, to assess the theoretical development presented here. In this sense, it would be of particular interest to consider the possible moderating effects of the size of the company and sector variables, which would allow refining the impact of the variables of this model. On the other hand, the empirical testing of the model using longitudinal data would shed light on critical decision-making whether or not to be involved in the collaborative innovation process, e.g., the time required for collaborative innovation to bring about benefits for the company.

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# Does too much love hinder innovation? Family involvement and firms' innovativeness in family-owned Small Medium Enterprises (SMEs)

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Family Business; Innovation propensity; Circumplex Model; Family Cohesion; Family flexibility

**Abstract** Current literature suggests that family involvement has an impact on firms' innovation propensity, but it does not yet seem able to explain in which conditions. Adopting a curvilinear model, (Olson's circumplex model of family) this research demonstrates that the family's cohesion and flexibility levels play a significant role in the relationship between family involvement and firm innovation propensity.
Moreover, by investigating a sample of SMEs (N=125) quantitatively, this paper also highlights that a curvilinear model shows a better fit (in comparison to linear models) for explaining the family involvement impact on innovation propensity. Finally, implications for both scholars and practitioners are discussed.

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**PALABRAS CLAVE**
Empresa Familiar; propensión a la Innovación; Modelo Circumplejo; Cohesión familiar; Flexibilidad familiar

**¿Demasiado amor obstaculiza la innovación? Participación familiar e innovación de las empresas en pequeñas y medianas empresas (PYME) de propiedad familiar.**
**Resumen** La literatura actual sugiere que la participación familiar tiene un impacto en la innovación empresarial, pero no puede explicar en qué condiciones. Adoptando un modelo curvilíneo (el modelo de familia circumplex de Olson) esta investigación demuestra que los niveles de cohesión y flexibilidad de la familia juegan un papel importante en la relación entre la participación familiar y la propensión a la innovación empresarial.
Además, al investigar cuantitativamente una muestra de PYME (N = 125), este trabajo también muestra que un modelo curvilíneo muestra un mejor ajuste (en comparación con los modelos lineales) para explicar el impacto de la participación familiar en la propensión a la innovación. Finalmente, se discuten las implicaciones académicas y prácticas.

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## Introduction

Family firms have always shown an ambivalent relationship with innovation dynamics. Some scholars found a negative relationship between family business and innovation propensity (Block, 2012; Chen, Hsu, 2009; Chrisman, Patel, 2012); others conversely found a positive relationship (Gudmundson et al., 2003; Kim et al., 2008; Llach, Nordqvist, 2010). Therefore, literature is still inconclusive and seldom suggests an explanation of the relationship between family involvement and innovation levels. On one side, both long-term orientation (Munoz-Bullon et al., 2011; Dieguez-Soto et al., 2016) and social capital could foster the development of new products and processes (Llach, Nordqvist, 2010; Chen, Hsu, 2009; De Massis et al., 2015). On the other side, risk aversion (Chen, Hsu, 2009) and reluctance to make 'horizontal' partnerships (Dohennels, Froling, 1999) could negatively impact the overall innovation rate.

Occasionally literature is even contradictory: for instance, non-family members' exclusion from strategic decisions seems to lead to both negative (Zahara, 2005) and positive (Madanoglu et al., 2016) outcomes in innovation rate. Finally, as suggested by Sciascia et al., (2013), innovation propensity seems to change over time (Zelleweger, Sieger, 2012), but literature lacks of an explanation of this specific feature.

In general, current literature calls for new insights into to what extent, and how, the internal environment of the family affects the governance of the family firm and the family's pursuit of economic and non-economic goals (Arzubiaga et al., 2019; Daspit et al., 2017; Madanoglu et al., 2016). Although some authors (De Massis et al., 2013; Sirmon & Hitt, 2003) highlight the influence of family involvement on firm's innovation rate, such influence is one of the less understood determinants in the innovation propensity of family firms (Duran et al., 2016). Recently, De Massis and colleagues (2015) affirm that the conditions in which the family has an impact on innovation are still unclear, and research has until now led to inconclusive findings (Craig, Moores, 2006; Morck et al., 2000). Some authors (see for instance Carnes, Ireland, 2013) underline the heterogeneity of families; in that different family firms have different innovative outcomes, but they have been (until now) unable to explain. An as of yet unanswered question is "if familiness [i.e. the outcome of family-firm overlapping] helps both stabilizing and enriching processes, but these have opposite effects on innovation, under what conditions does each process prevail?" (Penney, Combs, 2013, 1422).

Given this theoretical scenario, the purpose of this paper is to explore how and to what extent different levels of family involvement affect business innovation. In order to achieve this goal, limitations shown by the current organizational literature suggest the use of other theoretical approaches. For instance, family science, and social psychology of the family especially, can help to explain family processes and performances (such as innovation propensity), as claimed by previous literature (James et al., 2012, Dyer, Dyer, 2009). To date, this approach has had a limited impact on family business literature (for a review, see Daspit et al., 2017). By applying Olson's circumplex model to the family firms (Olson, 2000; 2011), this research posits that the family's cohesion and flexibility levels play a significant role in the relationship between family involvement and firm innovation propensity. In doing so, this paper highlights a curvilinear relationship between family involvement and firm innovation propensity, as theoretically supposed by previous literature (Penney, Combs, 2013; Sciascia et al., 2013; Daspit et al., 2017).

This paper contributes to the current literature in a threefold way.

Highlighting a curvilinear relationship between family involvement and propensity for innovation, this paper provides an explanation of the limitations shown by previous theoretical 'linear' approaches in explaining this relationship.

Furthermore, highlighting the different ways and intensity of family involvement in the business, this paper addresses family firms' heterogeneity, as advocated by current literature (Melin, Nordqvist, 2007; Sciascia et al., 2013).

Finally, the circumplex model is widely used by counsellors and practitioners in their professional activity. By showing that this approach is also suitable for investigating family firms dynamics academically, this paper builds a bridge between the currently (and too often) separate worlds of scholars and practitioners.

## Theoretical background

Family business literature has frequently highlighted the impact of family' involvement on firm innovation rate (for a literature review see De Massis et al., 2013). Unfortunately, research has until now failed to find a linear correlation between involvement and innovation: several scholars acknowledge this theoretical gap (Padilla-Melendez et al., 2015; Wright &Kellermans, 2011), in spite of the fact that many theories have attempted to support such a correlation.

For example, 'familiness' (Habbershon *et al.*, 2003), is a variable that can differentiate and characterize the firm, resulting in a competitive

advantage, as suggested by the *resource-based view* (RBV) (Habbershon *et al.*, 2003; Sirmon and Hitt, 2003; Habbershon and Williams, 1999; Barney, 1991). Recently, Arzubiaga and colleagues (2019) found that family involvement decreases the positive impact on exploratory innovation, but does not improve the impact on exploitative innovation, unlike expected. Cassia et al (2011) found that shared family values, the desire to defend family reputation and high level of communication among family members are enabling factors for innovation. Conversely, a higher level of risk aversion, less professional management and closeness to the external environment seem to be obstacles in innovation development. However, these authors also affirm that "a number of the proposed factors do not appear to discriminate successful from unsuccessful New Product Development processes" (Cassia et al., 2011, 10). Unfortunately, they are not able to explain these findings, advocating for a better understanding of the family dynamics which underline the innovation processes.

Research based on *stewardship theory* (Davis, Schoorman, and Donaldson 1997) suggests that family members develop a strong sense of belonging and identification with their own family, and thus they are seldom engaged in opportunistic behaviours. The distinctive stewardship orientation of family versus non-family firms may idiosyncratically affect the characteristics of the product innovation process (De Massis et al., 2015). Following this approach, Kellermans and colleagues (2012) introduced the concept of *family members reciprocity*. In their view (see also Astrachan et al., 2002; Klein et al., 2005), reciprocity, by triggering altruistic dynamics and knowledge sharing among family members (Eddleston, Kellermans, 2007), fosters innovation rate. However, their research does not fully support the hypothesis. Their conclusion is that the influence of family involvement on innovation propensity is a complex phenomenon, which does not follow a linear relation, and could result both in positive and negative outcomes.

Literature suggests that also A*gency Theory* does not show a good fit for explaining high/low innovation rate. On one hand, this approach suggests that a typical value that is considered to significantly influence the dynamics of family firms is *altruism* (Dyer, 2003; Shulze et al., 2001). As argued by Shulze et al. (2001), altruism leads family members to be considerate of one another, promote and sustain the family bond; and this in turn promotes loyalty, commitment to the family firm's long-term prosperity and knowledge sharing. On the other hand, in a family firm, the Principal and the Agent are often the same person, and altruism could affect strategic choices about innovation. For instance, hiring a next generation member who is not properly skilled and, as a consequence, undermining knowledge improvement and eventually hindering the innovation rate. Moreover, literature investigating the decentralization of strategic decisions to non-family members is still inconclusive: this kind of delegation could have both negative (Zahara, 2015) and positive (Madanoglu et al., 2016) consequences for innovation.

Finally, research based on *Behavioural Theory* suggests that family firms are strongly focussed on maintaining strategic control among family members. For instance, some authors (Astrachan and Jaskiewicz 2008; Zellweger and Astrachan 2008), highlight the relevance of non-economic goals as development and conservation of socio-emotional wealth (SEW) for the family (Gomez-Mejia et al., 2007). Berrone and colleagues affirm that "family firms are typically motivated by, and committed to, the preservation of their SEW, referring to non-financial aspects or "affective endowments" of family owners" (Berrone et al., 2012, p. 259). However, literature suggests that there is also a *dark side* of involvement that can lead to opportunism, complacency and blind faith (Eddleston & Kidwell, 2012; Ferrari, *forthcoming*; Steier, 2001; Sundaramurthy, 2008), and can also negatively affect proactive stakeholder engagement (Kellermans et al., 2012). More recently, Dieguez-Solo et al. (2016), analyse the relationship between family involvement and innovation through the SEW lens. They find that this relationship is not entirely clear, leading to negative results in short-term exploration, but positive in long-term exploitation.

In summary, organizational literature hasn't yet answered the question: in a family firm, in which conditions does family involvement foster (or hinder) firm innovation propensity? This paper suggests that current literature fails to explain the innovation process because it searches for a direct relationship between family involvement and innovation levels. Chrisman et al. (2014b) posit that the difference in outcomes could be due to a complex system of factors like continuity, command, community and

connections, requiring a *non-linear approach* in order to explain the outcomes of family involvement. An alternative, psychological approach would therefore suggest that the relationship between family involvement and firm innovation propensity could be curvilinear rather than linear: too high or too low cohesion/ flexibility levels could undermine the propensity to innovation. Thus, drawing on social psychology of the family, this research adopts the circumplex model (Olson, 2011; see Figure 1 below), a curvilinear model of the family involvement.

## The Circumplex model

Social psychology of the family literature shows that family flexibility/adaptability plays a prominent role in ensuring some desired organizational outcomes such as reciprocity, knowledge development and, more in general, balanced relationships between family members (Olson, 2000; Michael-Tsabari, Lavee, 2012).

Every situation experienced by a family can be defined by assessing two different and variable family features: its *cohesion* (how self-oriented the family is) and its *flexibility* or adaptability (how changeable and adaptable the relationships within the family are; for an assessment of these dimensions, see also Beavers & Hampson, 1995; Olson, 2000; 2011; Michael-Tsabari, Lavee, 2012). Family *cohesion* is defined as "the emotional bonding that family members have towards one another" (Olson, 2000: 145), and family *flexibility* refers to the "amount of change in [the family's] leadership, role relationships and relationship rules" (Olson, 2000: 147).

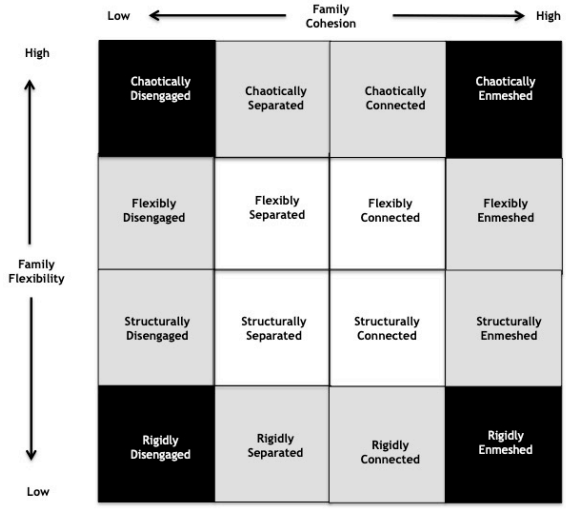


**Figure 1** The circumplex model (source: Olson, 2000).

Regarding the different levels of cohesion, a family could be: disengaged, separated, connected, or enmeshed. A very low cohesion level (disengaged family) is characterized by lack of commitment, antagonism among family members, and a general family trend for expulsion and/or escape. Disengaged family systems are composed of highly independent members who have little or no attachment or commitment to the family. Members often "do their own thing" without seeking support or guidance from other family members (Olson, 2000: 147).

A low or moderate cohesion level (separated family) is characterized by strong individualism, competition for the resources, and infrequent communication among members (both qualitative and quantitative). A medium-high or high cohesion level (connected family) is characterized by commitment but at the same time respect for individual needs and career/life paths and full support (both economical and emotional) of members' autonomy. Finally, a very high cohesion level (enmeshed family) is characterized by the collective prevailing over individuals; strict resource sharing; continuous boycotting and undermining of members' autonomy.

Moreover, regarding the different levels of internal relationships, flexibility/adaptability, a family could be: strict/rigid, structured, flexible/versatile, or chaotic. A very low flexibility level (rigid family) is characterized by un-modifiable role/job descriptions, and recursive dynamics (both affective and relational). In a family characterized by low or moderate flexibility level (structured family) the family system, especially the senior, strictly controls the affective and relational features, restricting and norming them. A high flexibility level (flexible family) is characterized by a flowing relational system, and is well suited to different situations. The leadership is circulating, and makes the most of the juniors (for example, their skills or attitudes). A very high flexibility level (chaotic family) is characterized by a lack of reference points, the relational system is neglected, and the seniors do not provide guidance.

Each dimension/variable (both cohesion and flexibility) could be described in a curvilinear graph, whose extreme values are negative (dysfunctional). Due to the aforementioned familiar dimensions/variables, given the different values of both cohesion and flexibility, each combination could result in 16 different kinds of family. Among these 16 types, family businesses experience the highest likelihood of positive outcomes in families which are balanced, that is at the same time both connected/separated and flexible/structured (Michael-Tsabari, Lavee, 2012).

The circumplex model has been previously applied in order to investigate several family features and family firms' performance (for a review, see Daspit et al., 2017). Lee (2006)

investigated the impact of balanced cohesion and flexibility on job satisfaction; Nosé, Korunka, Frank, & Danes (2015) found that balanced family structures reduce relationship conflict within the family. Additionally, circumplex research shows that balanced levels of cohesion and flexibility help the family firm to survive through business transmission (Labaki, 2011). More generally, balanced family structures lead to positive outcomes in family performance (Zody, Sprenkle, MacDermid, & Schrank, 2006) and even ensure success over multiple generations (Michael-Tsabari & Lavee, 2012). As a conclusion, ongoing literature supports the application of the circumplex model to family business. However, as remarked on by Daspit and colleagues "these studies tend to address the impact of only one or two extreme family structures on family firms […], thus potentially overlooking family system effects that a more detailed and nuanced application of circumplex theory might uncover" (2017, 13).

Regarding firm innovation levels, as a curvilinear model, Olson's circumplex model seems well suited for explaining the impact of family involvement on the firm's innovation propensity: as suggested by previous literature, unbalanced/dysfunctional situations could lead to negative outcomes, also for innovation propensity.

Thus, it is possible to set the following hypothesis:

*H1: Family firms in an unbalanced situation (rigid, chaotic, disengaged or enmeshed) show lower levels of innovation propensity compared to firms in balanced situations.*

**The research**

The survey was carried out on a sample of Italian family SMEs (N=125). These firms are characterized by a full overlapping between ownership, family, and management; furthermore, in these firms (at least in the smallest ones) the owners are often directly involved in production (Ward, 1987; Gersick et al., 1997; Tagiuri, Davis, 1996). This kind of firm was chosen due to the fact that they are the most widespread type in the Italian context (Bugamelli et al., 2012; Pellegrino and Zingales, 2014; see also the general framework of Curimbaba, 2002).

The sample

In order to select the participants, the research was carried out with the help of a young entrepreneurs association ('Giovani Impenditori Confindustria'). Starting from the association's database, an exploratory mailing list was formed in order to collect the consensus to participate in the research.

Following this, a second more specific mailing was done in order to find the firms with two specific characteristics:

1. A single family must share at least 50% of the ownership;
2. The strategic decisions must be managed by the family

The data gathering started at the beginning of November, 2017, and was completed by the end of April 2018; 125 questionnaires were collected.

**The methodology**

Innovation propensity was measured using the Organisational Innovativeness Questionnaire (Wang, Ahmed, 2004). This tool is a well-developed and validated measurement instrument of organisational innovation propensity, based on five factors:

- Product innovativeness, defined as "the novelty and meaningfulness of new products introduced to the market in a timely fashion" (Wang, Ahmed, 2004, 304). Item example: "In new product and service introductions, our company is often first-to-market".
- Market innovativeness, defined as "the newness of approaches that companies adopt to enter and exploit the targeted market" (Wang, Ahmed, 2004, 305). Item example: "In comparison with our competitors, our products' most recent marketing programme is revolutionary in the market".
- Process innovativeness, defined as "an organisation's ability to exploit their resources and capabilities, and most importantly, the ability to recombine and reconfigure its resources and capabilities to meet the requirement of creative production" (Wang, Ahmed, 2004, 305). Item example: "We are constantly improving our business processes".
- Behavioural innovativeness, "demonstrated through individuals, teams and management that enable the formation of an innovative culture, the overall internal receptivity to new ideas and innovation" (Wang, Ahmed, 2004, 305). Item example: "In our company, we support individuals who do things in a different way", and
- Strategic innovativeness, defined as "an organisation's ability to identify external opportunities in a timely fashion and match external opportunities with internal capabilities in order to deliver innovative products and explore new markets or market sectors" (Wang, Ahmed, 2004, 306). Item example: "Key executives of the firm are willing to take risks to seize and explore "chancy" growth opportunities".

Family cohesion and flexibility was measured with the short Italian version of Olson's FACES IV

(Loriedo et al., 2013). This tool provides six different sub-scales for each family dimension:

- Disengaged (item example: "When we are at home, each of us seems to avoid the others");
- Separated/Connected (item example: "Each of us feels involved in the other family members' lives");
- Enmeshed (item example: "We spend too much time together");
- Strict/Rigid (item example: "In family relationships, each of us plays a strictly defined role");
- Structured/Versatile (item example: "Our family explores different work-related problem-solving methods/ ways to solve problems) and
- Chaotic (item example: "In our family we always seem disorganized").

The relationship between family situation and innovation propensity was measured with a correlation test. Moreover, statistically significant relationships were also measured with a regression analysis test.

Empirical evidence (Zahra, 2005; Duran et al., 2016; Zellweger, Sieger, 2012) suggests that when the first generation is still active in the family business, the propensity to innovate is lower. Literature suggests that innovation is often perceived as a threat to the family firm past history (Dyer & Whetten, 2006), and this fact could even lead to organizational failure (Haveman, Khaire, 2004). However, further evidence suggests that the type of involvement matters more than the involved generation (Arzubiaga et al., 2019). Given this ambiguous empirical evidence, the relationship between the family generation and the innovation propensity was controlled using an ANOVA test.

## Findings

Statistical analysis based on the available 125 returned, correct, and complete questionnaires shows the following results.

These findings support a negative correlation between the overall organizational innovation propensity and both *enmeshed* families (-.275) and *chaotic* families (-.402). *Enmeshed* families show also a stronger negative correlation with Product Innovation (-.435). *Chaotic* families also show a negative correlation both with Strategic Innovation (-.330) and Process Innovation (-.373). *Disengaged* families show a significant negative correlation with Strategic Innovation (-.300). Finally, *rigid* families show no correlation with the overall organizational innovation propensity level. For each statistically significant correlation, a linear regression was calculated to predict innovation level based on specific family situation.

Findings suggest a significant regression equation was found for *enmeshed* business families in affecting overall Innovation ((F 1, 124) = 19.537, p>.05), with an $R^2$ of .0129; constant = 3.327 - 0.10 (enmeshment)) and Product Innovation especially ((F 1, 124 = 29.016, p>.05), with $R^2$ of 0.1830; constant = 3.529 – 0.187 (enmeshment)). For each point of enmeshment level measured with the Italian short version of Olson's FACES IV, overall family firm Innovation decreased by 0.10 and Product Innovation level decreased by 0.19.

Findings also show that a significant regression equation was found for *chaotic* business families in affecting overall Innovation ((F 1, 124) = 23.938, p>.05), with an $R^2$ of .0.1550; constant =

**Table 1** Correlation matrix between variables

| | *Enmeshed* | *Chaotic* | *Disengaged* | *Rigid* | *Cohesion* | *Flexibility* | *Innovation* | *Product* | *Market* | *Strategic* | *Process* | *Behavioural* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Enmeshed | 1 | | | | | | | | | | | |
| Chaotic | 0,3072 | 1 | | | | | | | | | | |
| Disengaged | 0,1186 | 0,5137 | 1 | | | | | | | | | |
| Rigid | -0,0053 | -0,2114 | -0,1508 | 1 | | | | | | | | |
| Cohesion | -0,2609 | -0,408 | -0,4732 | 0,3227 | 1 | | | | | | | |
| Flexibility | -0,2728 | -0,3722 | -0,3153 | 0,0064 | 0,2776 | 1 | | | | | | |
| *Innovation* | *-0,2753**** | *-0,4023** | *-0,169* | *-0,1003* | *0,0268* | *0,1997* | *1* | | | | | |
| Product | -0,4355* | -0,0759 | 0,1237 | -0,1397 | -0,2076 | -0,1593 | 0,4691 | 1 | | | | |
| Market | -0,1735 | -0,2214 | 0,0047 | -0,1257 | -0,0189 | -0,0882 | 0,5644 | 0,1634 | 1 | | | |
| Strategic | -0,0667 | -0,3309*** | -0,3006*** | 0,0337 | 0,0305 | 0,2435 | 0,4102 | -0,0045 | -0,0286 | 1 | | |
| Process | -0,2347 | -0,3733*** | -0,2622 | 0,0667 | 0,1848 | 0,3261*** | 0,7268 | 0,2224 | 0,0577 | 0,3148 | 1 | |
| Behavioural | 0,1045 | -0,2011 | -0,0731 | -0,0852 | 0,1257 | 0,3017*** | 0,7007 | 0,0179 | 0,3732 | 0,1098 | 0,487 | 1 |

N=126; *** significant for α = .05, * significant for α = .01

3.362 -0.135 (chaotic situation)). Strategic Innovation ((F 1, 124 = 15.249, p>.05), with $R^2$ of 0.1023; constant = 3.284 – 0.183 (chaotic situation)), and Process Innovation ((F 1, 124 = 20.075, p>.05), with $R^2$ of 0.1323; constant = 3.3845 – 0.213 (chaotic situation)). For each point of chaotic situation level measured with the Italian short version of Olson's FACES IV, family firm Innovation decreased 0.16, Strategic Innovation level decreased by 0.10 and Process Innovation level decreased by 0.21.

Furthermore, findings show that a significant regression equation was found for *disengaged* business families in affecting Strategic Innovation ((F 1, 124) = 12.321, p>.05), with an $R^2$ of .083; constant = 3.218 -0.149 (disengaged situation). For each point of disengaged situation level measured with the Italian short version of Olson's FACES IV, family firm Strategic Innovation decreased by 0.08.

In general, family cohesion and flexibility show no significant correlation with the organizational innovation propensity level. However, flexibility shows a positive correlation with Process and Behavioural Innovation (.33 and .30 respectively). Once more, for these statistically significant correlations, a linear regression was calculated to predict innovation level based on flexibility level of the family situation.

Findings show that a significant regression equation was found for *flexible* business families in affecting Process Innovation ((F 1, 124 = 14.753, p>.05), with $R^2$ of 0.10; constant = 2.412 + 0.353 (flexibility)) and Behavioural Innovation ((F 1, 124 = 12.413, p>.05), with $R^2$ of .083; constant = 2.246 + 0.339 (flexibility)). For each point of flexibility level measured with the Italian short version of Olson's FACES IV, family firm Process Innovation increased by 0.35 and Behavioural Innovation level increased by 0.34.

Given these results, H1 (*Family firms in an unbalanced (rigid, chaotic, disengaged or enmeshed) situation show lower levels of innovation compared to firms in balanced situations*) is supported with the exception of a rigid situation. Moreover, the sample shows no difference in organizational innovation propensity controlling for the current owner generation (see Table 2).

## Discussion

### Theoretical contributions

Due to the limitations previously shown by organizational literature in explaining how family involvement affects the firm's innovation rate, this paper fills a theoretical gap shifting the focus from the organizational to the psychological dimension. However, a circumplex model does not replace previous theoretical approaches, but provides a complementary explanation for the relationship between family involvement and innovation propensity. Resource-Based View and Behavioural Theory in particular are effectively complemented by the circumplex model.

Previous research suggested that the Resource Based View does not show a good fit for explaining negative outcomes (Cassia et al., 2011). Literature (Arzubiaga et al. 2019; Minichilli et al. 2010) suggests that family involvement may have a negative impact on innovation propensity due to the level of heterogeneity of managerial knowledge and skills (see also Cruz, Nordqvist, 2012), but the dynamic behind this impact is not yet clear. This research suggests that only extreme scores on the cohesion dimension of the circumplex model (i.e. enmeshed and chaotic family), are negatively associated with positive outcomes due to a over-involvement or an insufficient involvement of the family in the firm,. Hence, such unbalanced situations could explain the lack of social capital (e.g. network with stakeholders) and human capital (e.g. skills and knowledge) development, dimensions considered strategic by RBV in innovation propensity. For example, enmeshed and strict/rigid situations could hinder the construction of a network of relationships and strategic partnership (social capital), and boycott the next generations' work experience (e.g. outside the family firm) and their

**Table 2** Organizational Innovativeness controlling for generation– average values*.

| *Current generation* | *Product Innovation* | *Market Innovation* | *Strategic Innovation* | *Process Innovation* | *Behavioural Innovation* | *Innovativeness* |
|---|---|---|---|---|---|---|
| First | 3.4 | 3.1 | 3.3 | 3.5 | 3.6 | 3.4 |
| Second | 3.2 | 2.6 | 2.9 | 3.6 | 3.3 | 3.2 |
| Third or next | 2.9 | 2.7 | 2.8 | 3.6 | 3.1 | 3.1 |
| **Sample** | **3.2** | **2.8** | **3.0** | **3.6** | **3.3** | **3.2** |

** all values are expressed in a range from 1 to 5; a= .05; p= 0.204*

development of skills and autonomy (human capital).

In addition, this research suggests that the circumplex model helps in explaining the limitations of Behavioural Theory. For instance, striving for control maintenance could undermine the next generation's autonomy and development (Ferrari, 2019; 2017). Recent literature adopting a SEW approach in investigating family firm innovation (see for instance Dieguez-Soto et al., 2016), found a mixed impact (both positive and negative) from family involvement. Moreover, previous literature describes but does not explain heterogeneity in striving for socioemotional wealth (Chrisman & Patel, 2012), for instance analyzing how socioemotional wealth evolves over generations (Berrone et al., 2012). This study suggests that a limitation in SEW literature could be that it does not consider different levels and types of family involvement. Indeed, cohesion levels which/that are too high, resulting in an enmeshed family, could explain negative effects on the relational system, and consequently generating differences in the extent to which family and non-family firms invest in innovation and the way they manage the innovation process, as suggested by literature (De Massis et al., 2015). In other words, this research suggests that too much or too little attention to socioemotional wealth leads to negative outcomes in family firm innovation propensity.

Beyond the adopted theoretical approach, one major criticism of family business literature is that family firms have been treated as a homogeneous population, as highlighted by some authors (Melin, Nordqvist, 2007; Sciascia et al., 2013). Literature often reflects the underlying heterogeneity of family businesses (e.g., Chrisman, Chua, Pearson, & Barnett, 2012), heterogeneity that forces researchers to go beyond a simple family versus non-family dichotomy to explain why the overlapping between the family and the business has different effects in different family firms. This paper highlights that, considering the levels of cohesion and flexibility, the heterogeneity of family businesses can result in (up to sixteen) different situations, each potentially different from the others regarding the impact on business performance.

In summary, previous theoretical approaches have offered suitable explanations for innovation propensity in balanced situations (separated, connected, structured, flexible/versatile family and all combinations of these), while the circumplex model shows a better fit in also explaining the (scarce) innovation propensity in unbalanced situations (enmeshed, disengaged, and chaotic). Furthermore, by specifically measuring the levels of involvement and flexibility of entrepreneurial families, the circumplex model seems to be more accurate in addressing firm heterogeneity, as advocated by recent (and current) literature (Madanoglu et al., 2016; Arzubiaga et al., 2019).

**Specific empirical contributions**

This paper provides evidence that unbalanced families show the lowest innovation propensity levels: accordingly with Hypothesis 1, balanced levels of family cohesion and flexibility show no significant correlation with the overall organizational innovation propensity level. Furthermore, by identifying specific correlations between factors, it is therefore possible to design targeted interventions in order to improve innovation (see below for practical implications).

For instance, flexibility shows a positive correlation with Process and Behavioural Innovation (.33 and .30 respectively). This fact could be explained by considering that innovation in processes and behaviours demands new ways to face organizational routines: hence, flexibility seems to show a good fit in ensuring that organizational outcomes are achieved. The effects of some flexibility-fostering managerial practices, (e.g. job rotation: Ortega, 2001) and other similar human resource innovations (e.g. horizontal rather than vertical internal career), on performance have been documented (Ichniowsky et al. 1996, 1997, 1999).

In contrast, cohesion shows a weak, but negative correlation with Product Innovation (-.21). 'Product innovativeness' is most often referred to as 'perceived newness, novelty, originality, or uniqueness of products' (Henard and Szymanski, 2001): all these features are competence-based and derived from an intimate knowledge of materials and their characteristics. Thus, product innovation is also grounded on knowledge sharing and training activities with non-family members and/or consultants, and cohesion could hinder that processes. Therefore, these findings suggests that, even in a balanced family, cohesion undermines 'product innovativeness'.

Disengaged families show a significant negative correlation with Strategic Innovation (-.30), and a weak negative correlation with Process Innovation (-.26). Disengaged family systems consist of family members who are not cohesive and have little or no family loyalty, thus undermining 'behavioural innovativeness' (both at individual and team levels), which in contrast demonstrates management's willingness to change, and commitment to encouraging new ways of doing things, as well as the willingness to foster new ideas (Rainey, 1999). At the same time, 'process innovativeness' is fostered by contributions in terms of ideas, new ways of doing things, desire for both exploitative and explorative dynamics. Individuals who fulfil these

ambidextrous roles might face tensions in terms of different kinds of cognitive orientation requested by contradictory activities, such as efficiency-oriented versus variability-increasing tasks (Bonesso, Gerli, Scapolan, 2014; Swart & Kinnie, 2007). Hence, a scarce sense of belonging could easily undermine individual ambidexterity and eventually result in low Process Innovation

Enmeshed families show a negative correlation with both the overall innovation propensity level (-.275) and with Product Innovation (-.43). These findings seem to support previous empirical research, although it was carried out on strategic management rather than innovation propensity specifically. For instance, Vozikis et al. (2013) underline the relationship between family cohesion and preference for family in firm-level decisions. Extremely high levels of cohesion in the family translates to preference for family in the family firm, thus hindering the non-family members' contributions in terms of ideas, knowledge and skills, all issues at the base of new product development. Thus, as suggested by Daspit and colleagues (2017, 17), "if non-family members are indeed less likely to be hired and promoted, the organization is likely to suffer from a lack of specialized skills and diverse knowledge resources gained from the employment and advancement of non-family members".

In this sample, chaotic families show a negative correlation both with Strategic Innovation (-.32) and Process Innovation (-.37). The correlation matrix (see Table 1) also shows a significant correlation (.31) between Strategic and Process Innovation, suggesting the prominent role played by these intertwined features and their effect on firm performance.

Becker (2004) suggested that the chaotically linked system hinders intra-firm coordination and stability due to the lack of synergistic routines that develop in the chaotic context, thus undermining the development of both process and strategic innovation. Moreover, Becker also suggested (2004) that because the internal environment is inconsistent due to the chaotic family structure, the firm suffers from a lack of order, efficiency, and certainty, which may undermine all aspects of firm performance (Chrisman, Memili, & Misra, 2013).

In summary, these empirical findings suggest that unbalanced family situations (enmeshed, chaotic, disengaged) lead to negative outcomes in innovation propensity, thus supporting what is being hypothesized by ongoing theoretical literature (see, for instance, Daspit et al., 2017). Hence, the circumplex model provides rich suggestions on the role played by extreme cohesion and flexibility levels on family firm innovation levels/ innovation propensity (levels).

## Conclusions

The circumplex model seems to be suitable for overcoming the limitations demonstrated by other organizational approaches. This paper suggests that an over-involved/flexible and/or insufficiently involved/flexible family in the firm both lead to negative outcomes in innovation propensity. Therefore, FACES IV is a suitable tool for investigating if and in which conditions family relationships are to the detriment of firm performance, in particular to the innovation propensity. In conclusion this research, by providing empirical evidence supporting the circumplex model's application to family firms, has advanced several streams of research suggested by recent theoretical literature (Daspit et al., 2017).

First, this paper integrates current literature, offering insights into how the family system is a source of family firm heterogeneity, identifying *why* differences in innovation propensity exist rather than simply highlighting the existence of those differences. Indeed, theoretical models such as Resource Based View, Agency Theory, Stewardship Theory and Behavioural Theories show significant limitations in explaining different family firms' performance in innovation propensity. Drawing on Psychology of the Family literature, this research suggests that these limitations are due to the fact that cited approaches posit a linear relationship between family involvement and innovation propensity. Instead, the circumplex curvilinear model shows a better fit for explaining the family involvement impact on innovation propensity.

A further contribution of this paper is to support a theoretical model which is well-suited for defining the different situations in which family involvement leads to negative or positive outcomes in term of innovation level/ innovation propensity. More specifically, this paper provides evidence that some specific conditions play a role in fostering such innovation: enmeshed and mostly chaotic families show lower innovation propensity levels. In doing so, this paper responds to the call for integrating family-specific insights into family business studies (Jennings, Breitkreuz, & James, 2014).

Third, previous literature has tended to address the impact of only one or two extreme family structures on family firms (e.g., Michael-Tsabari & Lavee, 2012; Penney & Combs, 2013): in contrast, by applying a curvilinear model, this paper addresses its investigation to *all* family system dimensions, highlighting the specific impact of each dimension on family firm outcomes.

Finally, focusing on organizational innovation propensity, this paper responds to the call for further empirical research which investigates

specific firm outcomes by applying the circumplex model, (Daspit et al., 2017).

**Practical implications**

As suggested by Daspit and colleagues (2017), the circumplex model offers a guiding framework that can diagnose the extent to which family systems are balanced and how the effects of balanced or unbalanced family dynamics affect the family firm. In addition, focusing on five different 'innovativeness' dimensions (product, market, strategy, behaviour, process), this paper offers a suitable approach in order to identify the specific weaknesses at the base of negative results in one or more of such dimensions. Consequently, this approach also helps psychologists and, more in general, practitioners in designing the proper interventions (e.g. training activities, or organizational re-design etc.) in order to foster organizational innovation propensity. The complex model applied to innovation thus shows real potential in bridging the academic world and the consulting world, as is advocated in this Special Issue (EJFB, forthcoming).

**Limitations and suggestions for future research**

Beyond contributions and practical implications, this paper also presents several limitations.

Findings from this study could be due to a country bias in the sampling process. In fact, the Italian economy consists of small family-managed firms, with low innovation rate, and low capabilities in human resources management or for improving human and financial capital (Eurostat, 2013). Further research would have to involve samples from different organizational populations.

Moreover, it could be very insightful to investigate the specific innovation propensity level of family firms in extreme unbalanced situations (chaotically disengaged, rigidly enmeshed, etc.): due to its limited dimension (few cases belong to these dysfunctional categories), this sample does not allow for this kind of analysis.

Finally, from a methodological point of view, this research gathered data using the short Italian version of the Olson's FACES questionnaire (Loriedo et al., 2013): hence, these findings should be validated in future research by also collecting data with the original full-length-version of the Olson questionnaire.

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# Entrepreneurial orientation and product innovation. The moderating role of family involvement in management.

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**JEL CLASSIFICATION**
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**KEYWORDS**
Family involvement; Entrepreneurial Orientation; Product Innovation; Radical Innovation; Incremental Innovation

**Abstract** In this current research it has been examined, firstly, the Entrepreneurial orientation in relation with Product innovation, Incremental innovation and Radical innovation, and, secondly, the moderating effect of Family involvement in the management of companies in the relationship between Entrepreneurial orientation and Product innovation, Incremental innovation and Radical innovation. Using a sample of 634 Spanish family firms, the results found conclude that the Entrepreneurial orientation has a positive effect on Product innovation, Incremental innovation and Radical innovation, and moreover, they reveal that the Family involvement in the management of companies has a moderating effect on these relations, witnessing that family firms with higher scale of Family involvement in the management of the companies reduces the effect of Entrepreneurial orientation on Product innovation, Incremental innovation and finally, Radical innovation.

**CÓDIGOS JEL**
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**PALABRAS CLAVE**
Implicación familiar; Orientación Emprendedora; Innovación en Productos; Innovación Radical; Innovación Incremental

**Orientación emprendedora e innovación en productos. El efecto moderador de la implicación familiar en la gestión.**
**Resumen** En el presente trabajo se ha analizado, en primer lugar, la relación entre la Orientación emprendedora y la Innovación en productos, Innovación incremental e Innovación radical, y en segundo lugar, el efecto moderador que tiene la Implicación familiar en la gestión de la empresa sobre la relación entre la Orientación emprendedora y la Innovación en productos, Innovación incremental e Innovación radical. Para tal análisis se ha utilizado una muestra de 634 empresas familiares españolas, y los resultados obtenidos han demostrado que la Orientación emprendedora tiene un efecto positivo sobre la Innovación en productos, Innovación incremental e Innovación radical, y además, también han demostrado que la Implicación familiar en la gestión de la empresa tiene un efecto moderador en dichas relaciones, de tal forma que las empresas familiares con mayor Implicación familiar en la gestión reducen el efecto de la Orientación emprendedora sobre la Innovación en productos, Innovación incremental e Innovación radical.

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## Introduction

The Entrepreneurial Orientation, it is understood as a strategic process whereby companies can identify new opportunities and carry out entrepreneurial actions to later take advantage of them (Dess and Lumpkin, 2005), is an important figure in the field of entrepreneurship, due to its Influence on the results, value, and growth of a company, it has been the subject of many studies in recent years. Most of these researches are based on a series of conceptual bases that, constructed on the definition of Miller's Entrepreneurial orientation (1983), were established by Lumpkin and Dess (1996), which are as follows:

- Entrepreneurial orientation includes five dimensions, which are innovation, assumption of risk, proactivity, competitive aggressiveness and autonomy.
- The dimensions of the entrepreneurial orientation are independent but related.
- The direct relationship between the entrepreneurial orientation and the performance may differ because of others mediating or moderating variables.

In the field of entrepreneurship research, there are several studies that have analysed the different relationships of it with other variables, such as business result (Smart and Conant, 1994; George, Wood and Khan, 2001; Rauch et al., 2009), or the growth of a company (Wiklund and Shepherd, 2005; Moreno and Casillas, 2008; Casilla and Moreno, 2010). Likewise, it has been studied the effect and importance of different variables on entrepreneurial orientation, such as the organizational structure (Covin and Slevin, 1988; Green, Covin and Slevin, 2008), degree of dynamism in the sector (Lumpkin and Dess, 2001; Wiklund and Shepherd, 2005), technological intensity in industry (Covin and Slevin, 1989), social capital (Stam and Elfring, 2008), as well as innovation (Elenurm, Ennulo and Laar, 2007; Rauch et al., 2009; Fernández-Mesa et al., 2012), highlighting not only the positive association between entrepreneurship and innovation (Fernández-Mesa et al., 2012), but also its importance on business performance (Newey and Zahra, 2009; Baker and Sinkula, 2009).

Accordingly, investigations indicate that enterprising companies, unlike other conservative companies, innovate more regularly and frequently, while taking risks, which are considered in their product market as strategies (Miller and Friesen, 1982). The concept of Innovation can be understood from different points of view; hence, a company can innovate by: (i) changes in its working methods; (ii) in the use of productive factors or (iii) in the ways of carrying out production. Following the Oslo Manual (2005), there are four types of innovations that cover a wide range of changes which can take place in the activities of a company: (i) Product innovation, (ii) Process innovation, (iii) Organizational innovation and (iv) Marketing innovation.

Bearing in mind the diverse types of innovation described above, most of the researches, as well as in this article, are about Technological Innovation (a concept closely related to Product innovation, according to the Oslo Manual (2005), which Souitaris (2003) justifies as any change in things, products or services offered by an organization (Product innovation) and any change in the way these are created and delivered (Process innovation). The interest in this kind of innovation is mainly due to its major influence on industrial competitiveness and national development since it is an important determinant of sustained performance (Blundell et al., 1999). Additionally, we can differentiate two other forms of innovation: Radical innovation and Incremental innovation (Clausen and Pohjola, 2013). Radical innovations are defined as innovations in products which are new and unknown to the market in which the company operates; while incremental innovations are new product innovations to the company but, not new to the market.

Literature reveals that several researches support the existence of a positive relationship between entrepreneurial orientation and innovation (Nasution et al., 2010). In the same way, there are other studies, which confirm a positive influence of entrepreneurial orientation on product innovation (Boso et al., 2013; Avlonitisa and Salavoub, 2007; Zhou et al., 2005) and on radical innovation (Zhou, Yim, and Tse, 2005). However, to the best of our knowledge, entrepreneurial orientation literature has not analysed the relation mentioned above, distinguishing between radical and incremental innovation. In order to attempts to fill this gap, this study analyses not only the relationship between entrepreneurial orientation and product innovation, but also distinguishes between radical and incremental innovation. We consider, in accordance with Sorescu and Spanjol (2008), that the influence of entrepreneurial orientation on such type of product innovation may differs due to the different levels of efforts which are needed to its implementation (risk-taking, investments or organizational and management capacities) and its impacts in the firm performance (growth, ROA,…).

Furthermore, the context of Family Firm, which plays a very important role in the world economy (Aranoff and Ward, 1995; La Porta et al., 1999; Neubauer and Lank, 1998), presents a special interest in the literature of entrepreneurial orientation (Zahra et al., 2004; Steier, 2007;

Steier, 2009) and innovation (Craig and Moores, 2006; Pittino and Visintin, 2009).

Thus, within the field of entrepreneurship research, family firms present an unique and exceptional context. The singularity of family firms is manifested through its structure of resources and capacities (Sirmon and Hitt, 2003; Dyer 2006), which can ease or restrict its entrepreneurial activities (Habbershon, Williams and MacMillan, 2003; Howorth, 2007; Nordqvist, Habbershon and Melin, 2008). The studies carried out in this field show that there is a dual relationship between family firms and the entrepreneurial orientation (Nordqvist, Habbershon, and Melin, 2008). On the one hand, certain characteristics of family firms help to develop its entrepreneurship (Aldrich and Cliff, 2003), such as its culture (Hall, Melin, and Nordqvist, 2001; Nordqvist et al., 2008; Zahra et al., 2004) or its centralized structure, which also influences the proactive and innovative conduct of the company (Salvato, 2004). However, there are other factors of these types of companies, which have a reducing effect on its entrepreneurship, such as their greater resistance to change or their aversion to risk (Naldi et al., 2007; Zahra, 2005). Such duality, as well as its uniqueness, makes the relationships between entrepreneurial orientation and family firms may become an interesting field of study.

Likewise, in the field of Innovation, there is also much interest in family firms, as well as its relationship with innovation. Traditionally, family firms are considered more conservative (Sharma, Chrisman, and Chua, 1997), less keen to change (Kets de Vries, 1993; Ward, 1997), more risk-averse (Naldi et al., 2007), and with greater difficulty to get access to capital markets (Kets de Vries, 1993), therefore, some studies indicate that the relationship between family involvement in the company and innovation is negative (Chen and Hsu, 2009). Nevertheless, family firms should have incentives to innovate, since that innovation creates wealth and opens up new business opportunities. Hence, it is coherent with their survival instinct and concern for their long-term continuity (Sirmon et al., 2008). In this sense, other studies confirm the existence of a positive relationship between the family involvement in the company and innovation (Zahra 2005; Margaret, 2008; Casillas and Moreno, 2010). In addition, family involvement in a company influences the process of making strategic decisions (Miller, Le Breton-Miller, and Lester, 2011), and therefore, has an impact on decisions related to the innovation. Furthermore, studies on innovation in family firms are usually focused on product (De Massis et al., 2013), process (Classen et al., 2014) or organizational (Madrid-Guijarro, García and Van Auken, 2009) innovation.

Despite the importance of family management to act as a driver of the willingness and ability to impact on product innovation, as far as we know, no one has empirically investigated the interaction effect of family management and entrepreneurial innovation on product innovation. Thus, we bridge an important gap in literature studying the moderating effect of family management in the entrepreneurial orientation-product innovation interplay. In addition, we have not only analysed the moderating effect in the mentioned relationship, but also we distinguish between radical and incremental innovation.

Therefore, we propose the following research questions: Has entrepreneurial orientation a positive impact on product innovation? Does this relationship differ if we distinguish between radical and incremental innovation? And, finally, are these relationships affected by family management?

Bearing in mind the above gaps identified and research questions, the aim of this article is to study the influence of entrepreneurial orientation on product innovation, distinguishing between incremental and radical innovation. Furthermore, this work aims to analyse the moderating effect of Family Involvement in the management of the company in the relationship between Entrepreneurial Orientation and Product Innovation. To this end, we integrate our arguments using Resource Based View as the theoretical background of reference.

For those purposes, an empirical study has been developed through a regression model, using data obtained from a survey, which comprises a total of 634 business managers located in the Region of Murcia (Spain).

The obtained results indicate that family management decreases the positive effect of entrepreneurial orientation on product innovation, radical innovation and incremental innovation. These results contribute to the family business literature in several ways. Firstly, whereas previous studies have mainly analysed the relationship between entrepreneurial orientation and product innovation, we further examine this relationship distinguishing between radical innovation and incremental innovation. In this way, we develop a more fine-grained understanding of entrepreneurial orientation-product innovation relationship. Secondly, we also study the moderating effect of family management in the relationship between entrepreneurial orientation and product innovation, radical innovation and incremental innovation, showing that family management has a negative moderating effect. Thus, this paper contributes to an enhanced understanding of the moderating role of family management in the obtaining of product innovation, giving a more nuanced picture of

entrepreneurial orientation-product innovation relationship.

The current study is divided into several sections. The next section offers the theoretical bases of the entrepreneurial orientation, product innovation and family concepts, as well as the existing relationships between them will be explained. Then, in section three the Methodology used will be described, showing the sample, the data and main the variables, followed by the presentation of the findings obtained. Finally, in section forth the main findings of the study will be exposed and commented.

## Theorical framework an Hypothesis

### The Entrepreneurial Orientation and Product Innovation

Miller (1983, pp.771) has been the pioneer defining the concept of entrepreneurial orientation, according to which entrepreneurial companies are "those that are geared towards innovation in the product - market field by carrying out risky initiatives, and which are the first to develop innovations in a proactive way in an attempt to defeat their competitors". Miller not only defined the concept of entrepreneurial orientation but also established three distinguishing dimensions of it, such as (i) innovativeness, (ii) risk-taking (iii) proactiveness. Later, Lumpkin and Dess (1996) suggested two more dimensions besides the three previous ones proposed by Miller (1983), such as (iv) competitive aggressiveness and (v) autonomy, establishing a total of five dimensions, but this conceptualization has not been widely adopted (Wales et al.. 2013), and it has been argued that the original three-dimension of entrepreneurial orientation is best from a conceptual point of view (George and Marino, 2011). Therefore, focused on Miller´s (1983) original conceptualization, researchers agree on the three dimensions of entrepreneurial orientation (Covin and Wales 2018; Rauch et al. 2009; Wales et al. 2013): innovation, risk-taking, and proactiveness. Moreover, Covin and Slevin (1989, pp.79) have identified these three dimensions as “a basic, unidimensional strategic orientation” which implies that only companies that exhibit high levels of all three dimension should be regarded as entrepreneurial. Furthermore, these three characteristics were positioned by Miller (1983) as the heart of entrepreneurial orientation and are often combined to create a higher-order indicator of firm-level entrepreneurship (Rauch et al., 2009). Therefore, we defined entrepreneurial orientation as a firm-level construct of these three dimensions where innovativeness, risk-taking, and proactiveness, as it has been used in literature (Wiklund and Shepherd, 2005; Rauch et al., 2009; Wales et al., 2013; Wales et al., 2018).

Thus, a dimension of innovativeness is understood, according to Lumpkin and Dess (1996, pp. 142), as "a firm’s tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes". As regards the dimension of proactiveness, according to Hughes and Morgan (2007), it represents a future perspective where companies try to develop new products or improvements in them, anticipating the changes and opportunities that appear in the business setting, promoting changes in current tactics and detecting future market trends. And also, by its own, the risk-taking dimension is understood as “the degree to which managers are willing to make large and risky resource commitments - i.e., those which have a reasonable chance of costly failures’’ (Miller and Friesen, 1978, p. 932). Moreover, Wiklund and Shepher (2005), indicate that this dimension implies the allocation of significant resources by the company to exploit opportunities or carry out strategies whose results are uncertain in unfamiliar situations.

According to the aforementioned, it can be indicated that the entrepreneurial orientation of a company is not an action carried out in a timely or unitary way, but rather it is an activity that implies a continuous strategic performance over time (Covin and Slevin, 1991), which translates into a generating process of the entrepreneurial strategy that decision-makers use to disseminate organizational purposes, maintaining their vision and creating sustainable competitive advantages.

Regarding the concept of innovation, Schumpeter (1934) demonstrated that, this takes place when a new good or change in its quality is introduced, a new production method, the opening to a new market, and the conquest of a new source of

supply of raw materials or the creation of a new company in any industry. According to what he exposed, the development of the economy is due to innovation, understood as the dynamic process through which updated technologies replace the old ones, a process called "creative destruction". According to this point of view, economic growth takes place because of the process of destruction in which the old structure of the industry - its products, its processes, or its organization - changes continuously due to innovation (Link, 1980). In this sense, innovative activity is the main source of innovation and economic progress (Nelson, 1991).

In addition to this, the Oslo Manual (2005, pp. 46) defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations".

Both Schumpeter (1934) and the Oslo Manual (2005) differentiate several types of innovation, namely: (i) Product innovation, (ii) Process innovation, (iii) Organizational innovation and (iv) Marketing innovation. In relation with the different types of innovation indicated before, the present study deals with Product Innovation, not only taking into account its popularity in most of the works (Souitaris, 2003), but also because it is a relevant aspect of sustained performance (Blundell et al., 1999), as well as due to its importance for the survival of a company (Dyer and Song, 1998), its profitability (Ali et al., 1993), its growth and its expansion into new areas (Danneels and Kleinschmidt, 2001). Thus, a company is innovative in products when it provides a new or significantly improved product (good or service) regarding to its characteristics or previous uses (Oslo Manual, 2005; Laursen and Salter, 2006).

Yet, the aim of innovation can be based on a new knowledge or on the reconfiguration, in a new way, of the existing one (Schumpeter, 1934; Drucker, 1985). From an economic point of view, a product, service or production process may be considered as an innovation, but it does not have to be something new in a strict sense, but new in the market where it wants to be introduced (Koellinger, 2008). In this sense, we can differentiate two other concepts within innovation, such as Incremental innovation and Radical Innovation, depending on the degree of novelty of it (Schumpeter, 1934; Oslo Manual, 2005; Anderson and Tushman, 1990), so that the radical innovation consists in the contribution of goods and services that differ significantly in their characteristics or intended uses in relation to the products previously produced by the company and, the incremental innovation, which implies minor changes in the technical specifications of the products already existing in the company. It should also be noted that incremental and radical innovations bring distinct levels of risk and therefore, require different organizational and management capacities. Thus, radical innovations derive from the exploration of new capacities searching greater variations and novelties (March 1991). Companies introducing radical innovations need to substantially change their ways of operating by entering unknown markets and/or introducing new products based on technologies that are new to them. This type of innovation can give several results: on the one hand, it can lead to the destruction of competition (Menguc and Auh, 2010), and on the other hand, it can lead to cannibalization of current products and even changes in competition rules (Hurmelinna - Laukkanen, Sainio, and Jauhiainen, 2008). On top of that, incremental innovation is the result of the exploitation of current capacities and in search of continuous improvements (March, 1991). The research of this type of innovation is one of the simplest tasks (Bessant et al, 2010) since the decisions on that subject are taken within the framework of a trajectory or an established technological paradigm (Dosi, 1982). Therefore, radical innovation, as opposed to incremental innovation, represents a higher risk strategy, but also a higher result (Bessant, Birkinshaw and Delbridge 2004; Sorescu and Spanjol, 2008).

Considering both concepts, entrepreneurial orientation and innovation, these are considered crucial factors for the growth and economic performance of companies. Schumpeter (1961) already warned of the importance of innovation and entrepreneurship, as they are central figures of economic growth and development. Based on his work, recent researches in the field of strategic management and evolutionary economics sustain that companies must be entrepreneurial and put innovation at the

forefront of competition strategy (Teece, 2007). The main reason is because new products are the basis of the company's performance and profitability (Teece, 2007) and such innovations are fundamental for adapting to change market conditions (Nijssen, Hillebrand and Vermeulen, 2005; Bessant et al., 2005). Actually, according to Miles and Snow (1978) ideas, those companies that adopt an innovative orientation can respond quickly to changes in business setting and have a greater capacity to find and exploit new products and market opportunities. Furthermore, entrepreneurial orientation is an important factor not only for the survival of the company, but also for the improvement of its short and long-term results (Wiklund and Shepherd, 2005), since it implies "entrepreneurial strategy-making processes that key decision makers use to enact their firm's organizational purpose, sustain its vision, and create competitive advantage(s)" (Rauch et al., 2009, pp. 763). Moreover it involves a willingness to innovate to rejuvenate market offerings, take risks to try competitors toward new marketplace opportunities (Covin and Slevin, 1991). Thus, the implementation and integration of the strategy of entrepreneurial orientation, not only allows increasing the skills of the company to generate knowledge and provide solutions to fulfil the needs of current and potential consumers (Workman, 1993; Gatignon and Xuereb, 1997), but it also reduces their aversion to risk and thus, favours the development of knowledge generation mechanism and improves processes in product innovation (Miller, 1983; Lumpkin and Dess, 1996).

Considering the abovementioned, it would be considered that there are a positive relationship between entrepreneurial orientation and product innovation. The fundamental premise of Resource Based View theory is that firms´ resources and capabilities are those that determining firm's capacity to innovate. Firms´ resources can be tangible or intangible (Hall, 1992; Amit and Schoemaker, 1993). Tangible resources include capital, access to capital and location. Intangible resources consist of knowledge, reputation, skills, entrepreneurial orientation, etc. (Runyan et al., 2006). The considerations of entrepreneurial orientation like a strategy or process contribute to the creation of opportunities and advantages, convert it into intangible resource and an important dimension of Resource Based View theory, which have impact in growth (Ferreira et al., 2011) and innovation (Poazi et al., 2017) of firms. From the strategic point of view, intangible resources may be more important, as soon as they are able to encourage the requirements for produce sustainable advantages which are more valuable, rare and inimitated by competitors (Bettis and Hitt, 1995; Barney, 1991), what mean that high stock of intangible resources, including entrepreneurial orientation, increases the probability of firm innovation (Nonaka, 1994).

In fact, Miller and Frisen (1982), just like more recently studies have been confirmed (Nasution et al., 2010), argued that more enterprising companies innovate more frequently.

In the same way, other authors confirm the positive relationship between entrepreneurial orientation and product innovation (Zhou et al., 2005), as well as with radical innovation (Zhou, Yim, and Tse, 2005). Similarly, Salavou and Lioukas (2003), in their study of Greek SMEs on the strategic sources of radical innovations in products, have concluded that entrepreneurial orientation has a positive effect on product innovations. In addition, more recent study of Boso et al. (2013), also confirmed the positive relationship between entrepreneurial orientation and product innovation. Likewise Avlonitisa and Salavoub (2007) showed that entrepreneurial companies, being more proactive and risky, develop and introduce more innovative products.

Adding more relevance to the foregoing, the following hypotheses are proposed:

H11: Firm Entrepreneurial Orientation has a positive effect on Product Innovation.

H12: Firm Entrepreneurial Orientation has a positive effect on Incremental innovation.

H13: Firm Entrepreneurial Orientation has a positive effect on Radical Innovation.

**Family management**

The qualification of Family Firms exists due to the determination of a vision and control mechanisms of the company by a family, and its contribution to the creation of resources and unique capabilities within them (Sharma, 2004; Chrisman, Chua and Linz, 2003). Astrachan, Klein and Smyrnios (2002) developed a system of

scales that differentiate the degree of family involvement into a company, these are:

- The experience, which measures the involvement of a family through the number of members and generations of the family with an active participation into the company;
- Culture, which measures the involvement of a family in the values of the company, as well as the commitment to it;
- Control, which measures the influence of a family on the ownership, management, and governance of the company.

Villalonga and Amit (2006) also differentiate three ways in which families can be involved in a company, this is through management, ownership and control.

In Europe, the national associations of family businesses have adopted as a formal definition, the proposal made by the European Family Business Group (GEEF) in 2008 considers a family business to be one in which:

- Most of the votes are owned by the person or persons of the family that founded or acquired the company;
- Most votes can be direct or indirect;
- At least one representative of the family participates in the management or governance of the company;
- Listed companies are considered a family business if the person who founded or acquired the company, or their family members or descendants own 25% of the voting rights to which the share capital is entitled.

In the same way, it can be indicated that the family involvement in a company can be carried out in different ways, and in the present work it is understood by the family management, the participation of the family members in the management activities of a family firm, measured by the family participation in the management of the organization and the structure of the company (Zahra 2005).

In the context of entrepreneurship, family firms are an unique and relevant context to analyse, either by the configuration of resources and capabilities they have and their relationship with entrepreneurial behaviour (Sirmon and Hitt, 2003; Dyer, 2006; Eddleston, Kellermanns, and Sarathy, 2008) or the relevant effect of family management in the process of decision making (Nordqvist, Habbershon, and Melin, 2008).

In general, family-managed firms are characterized by their greater ability to develop an entrepreneurial performance, since their survival depends on their ability to enter new markets in which they can offer innovative products and services (Zahra, Hayton, and Salvato, 2004). This is due to a series of characteristics present in this type of company (Casillas and Moreno, 2010), such as: (i) its greater long-term orientation, which allows it to develop better long-term business strategies (Ward, 1997), including innovation strategies, since in this situation, they are more likely to support innovation as a source of growth and wealth (Zahra, Hayton and Salvato, 2004) and as a survival mechanism to protect their competitiveness over time; (ii) its greater degree of centralization, which makes the process of decision-making faster, and therefore, the implementation and development of innovation too; (iii) and the strength of the interests between the owners and the managers, since the greater degree of concentration between ownership and management, the innovation projects proposed by the family are more defended, and consequently, the allocation of the resources for its development is faster and more efficient, in addition to having greater control over the measures taken by management (Donckels and Fröhlich, 1991).

However, the resources available to the company are small, and considering their aversion to debt at the time of making capital investments (Galve Gorriz and Salas Fumas, 1996), family-managed firms have difficulties to develop proactive strategies. It may be noted that not only risk aversion affects the resources available to the family business, but also capital restrictions, which jointly limit the possibility of initiating costly innovation projects. For fear of losing control in decision making, family managed firms are slightly inclined to access capital markets (Kets de Vries 1993), what causes that they are restricted regarding their financial resources and thus, their opportunities to finance innovation activities as well as proactive projects.

Furthermore, family managed firms have a greater aversion to risk as a result of the superposition of the objective of survival of the company, the fortune and social reputation of the family, against the profitability objective (Zahra 2005, Gómez-Mejía et al., 2007), and its more conservative character of business assets, which represents the personal wealth of the family (Gómez-Mejía et al., 2007). Therefore, its aversion to indebtedness (Galve Gorriz and Salas Fumas, 1996) which reduces the availability of financial resources, that causes firstly, family managed firms have limited financial resources, and secondly, aim for safer projects (Wright et al., 2002).

The Resource Based View theory suggests that resources and capabilities are drivers in innovation of firms (Poazi et al., 2017). Rather, these resources must also be managed effectively and appropriately (Hitt, Ireland, and Hoskisson, 2001) in order to produce value and archive the proposed results. As it is said before, family managed firms rarely have all of the needed resources, particularly financial resources, since these firms avoid sharing equity with nonfamily members and also, they have some limitation to manage them, due to the prioritization of their particular goals, the retaining of interfamily relatedness and the superposition of the objective of survival of the company. This causes a loss of efficiency of the process of strategic decision-making, including those related to innovation (Le Breton-Miller and Miller, 2009), and a greater difficulty in developing proactive projects, what, as we have suggested, decreases the positive relationship between entrepreneurial orientation and product innovation (Choi et al., 2015).

In order to emphasise aforementioned and considering that entrepreneurial orientation is a resource-consuming strategy orientation (Covin and Slevin, 1991) which enhance to make large resource contributions, the following hypotheses are proposed:

H21: Family Management weakness the effect of the Firm Entrepreneurial Orientation on Product Innovation.

H22: Family Management weakness the effect of the Firm Entrepreneurial Orientation on Incremental Innovation.

H23: Family Management weakness the effect of the Firm Entrepreneurial Orientation on Radical innovation.

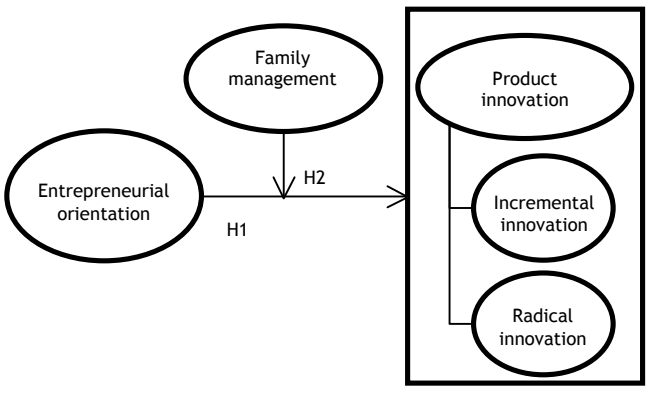


**Figure 1** Hypotheses.

## Methodology

### Data collection and sample

The data collection for the realization of the study has been carried out through a questionnaire made to a total of 634 managers of companies located in the Region of Murcia (Spain), as a part of 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*[1].

The Region of Murcia is a fairly representative territory of the national panorama, since, in relation to the Spanish national average (99,90%), it is composed of a total of 99,92% of micro, small and medium enterprises (SMEs). In this sense, SMEs are defined, according to Recommendation 2003/361/CE, to micro, small and medium enterprises that have less than 250 employees and whose annual turnover does not exceed 50 million euros or whose balance sheet annual does not exceed 43 million euros.

The sample selection process (design process) was designed in accordance with the objectives of the study and the characteristic structure of the region following the stratified sampling principles in finite populations. The population of firms was segmented by size and industry. The number of firms in each stratum was implemented according to the information contained in the Companies Registration Office following the criteria of the ''Instituto Nacional de Estadística'' (Spanish Statistical Office).

The resulting sample is formed by 634 family businesses. In turn, within the family businesses, there are family businesses managed by family members, 571 (90,06%), and companies managed by non-family members, 63 (9,94%), a similar proportion to other studies carried out (Huybrechts et al., 2013). On the other hand, family businesses have been classified, firstly, according to the sector in which they carry out their business activity, thus differentiating between the Industry (51,42%), Construction (10,88%) and Services ( 37,70%); and secondly, depending on their size, taking into account the number of employees working in them, differentiating between Small (83,75%), Medium (14,36%) and Large (1,89%).

The table 1 collects the final distribution of the sample.

[1] The Instituto de Fomento de la Región de Murcia is the development agency of the Murcia's region. It is a public institution that belongs to the Manufacturing, Firm and Innovation Office.

**Table 1** Descriptive statistics of the sample.

| | N | % |
|---|---|---|
| Family-Managed firms | 571 | 90,06% |
| Non-Family Managed firms | 63 | 9,94% |
| Manufacturing | 326 | 51,42% |
| Construction | 69 | 10,88% |
| Services | 239 | 37,70% |
| Small firm (up to 50 employees) | 531 | 83,75% |
| Medium firm (from 50 to 250 employees) | 91 | 14,36% |
| Large firm (more than 250 employees) | 12 | 1,89% |
| Total | 634 | 100,00% |

The estimation of the sample considers in the worst case (relative frequency of answers in a specific item is p = q = 0.5), to a maximum error of 4,06% at a confidence level of 95%. Companies that chose to not participate in the project were replaced with similar (random election) firms in the same industry and geographic area. Information was collected through personal interviews with firm managers during April 2010 and July 2010, using a self-managed questionnaire addressed to firm's CEO. SME's 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). Control tests were carried out during the elaboration process of the survey. To test the validity of the survey, the bias of non-response was analyzed. Due to the nature of the data, it is possible that the relations between the variables were inflated as a consequence of the common method variance, since the same source is used to gather data for both the independent and dependent variable. This is why the bias of potential problem of the variance of the common method was also analyzed. To test for non-response bias, we used late respondents as surrogates for non-respondents Nwachukw et al., 1997), as well as the responses of the companies that responded to the first round of interviews (81% of the sample) were contrasted with those late responses (19% of the sample), and the results obtained showed no significant differences between the two groups, taking into account the Student t and chi-squared statistics. Considering these outcomes, non-response and industry bias were not found. Likewise, to test the bias of potential problem of the variance of the common method, we used the Harman's single-factor test suggested by Podsakoff and Organ (1986). In this way, we have realized a factorial analysis including all the dependent variables and independent variables, achieving to explain a high amount of the variance (Christmann, 2000). In the factorial analysis executed in our study, three factors were obtained (KMO: 0.841; Bartlett sphericity test Sig. 0.000) which explained a 58,430% of the total variance. Between these factors, the first one collects the dependents variables explained a 25,174% of the variance. These results suggested that the bias of the common method variance was not relevant in our study (Podsakoff y Organ, 1986).

## Variables definition

*Product innovation*

A company is innovative in products when it introduces a new or significantly improved good or service with respect to its characteristics or previous uses (Manual de Oslo, 2005; Laursen y Salter, 2006).

There are two types of product innovation: (i) on the one hand, radical innovation, which consists of the contribution of goods and services that differ significantly in their characteristics or intended uses with respect to the products previously produced by the company; and (ii) on the other, incremental innovation, which consist of a series of minor changes in the technical specifications of the products already existing in the company (Oslo Manual, 2005).

Product innovation can be measured through two approaches, first, an objective approach, and secondly, one subjective approach. The objective approach is used to measure the innovation from quantitative data (number of patents, number of new products, investments cost), while the subjective approach is based on the firm's manager or owner's perception about the innovative activity of the firm. In this work, we have opted for the subjective approach because it is the most appropriate for the case of SMEs and avoids underestimating the innovative activity of SMEs, in particular incremental activity, which the objective approach may overlook (Hughes, 2001). Subjective measures were highly correlated with objective measures of innovation and allowed comparisons among firms (Frishammar and Hörte, 2005). Also, subjective measures are valid to identifying and monitoring obstacles that decrease innovation among SMEs (Kalantaridis and Pheby, 1999). Furthermore, the results of Denison and Mishra (1995, pp. 219) supported that "subjective measures of effectiveness are better suited for the comparison of a disparate set of firms than are the objective measures of effectiveness"

*Entrepreneurial Orientation*

Based on the conceptualization of Miller (1983), and other previous studies (Naman and Slevin, 1993; Wiklund and Shepherd, 2005), three dimensions of entrepreneurial orientation have been used in the present work to measure the entrepreneurial orientations, which are innovativeness, risk-taking, proactiveness. The dimension of innovativeness refers to the predisposition of the company to support research and technological development activities via R&D; the risk-taking dimension

implies keeping an active position in situations of uncertainty and carrying out risky projects; and the dimension of proactivity implies the maintenance of a prospective position in front of the competition, identifying new business opportunities in the market and carrying out actions in advance that are later imitated by the competition.

Considering a combination of three dimensions of entrepreneurial orientation, we obtained this variable through a factor analysis. The result obtained with the combination of the three dimensions can be seen in table 2.

*Family management*

The family management has been measured through the participation of family members in the management of the company. In this sense, family involvement is represented by the variable called Family Management, which has been measured as a binary variable, which takes value 1 when family members hold mostly the management positions (Vanderkerkhof et al., 2015), and the value 0 when the management positions are hold mostly by professionals from outside the family.

Table 2 summarizes the contents relating to the definition of the variables in the models

**Table 2** Variables definition.

| Variable | Definition | Measure |
|---|---|---|
| Family Management | Family versus non-family management | 1: Family members. 0: Non – family members. |
| Entrepreneurial Orientation | Entrepreneurial orientation of the company | This variable has been obtained through a factorial analysis of the different questions of the survey related to the firm entrepreneurial orientation.<br>The questions were:<br>Please indicate the degree of agreement with the following statements (1: very unfavorable; 5: very favorable):<br>1- The managers of my company support research and technological development activities<br>2- My company is very inclined to take on risky projects with a lot of market potential<br>3- The actions carried out in my company are soon imitated by the competition<br>4- My company has a great ability to identify new business opportunities<br>5- My company adopts an active position in uncertainty situations<br>The results were:<br>- Explained variance: 48,5%;<br>- $x^2$ (10) = 849,43;<br>- Prob>$x^2$ < 0,000;<br>- KMO: 0,772;<br>- Cronbach α: 0,729. |
| Product innovation<br>- Incremental innovation<br>- Radical innovation | Existence and importance of Product innovation into the company | With a range 0-5, this variable was built as the average of two sets of dummy and complementary licker variable, where 0: no innovation; 1-5: the higher of the value, the higher the importance of the innovation. The questions were: Has the firm made any changes or improvements in its products in the past year considering (a): incremental innovation; (b): radical innovation? If so, indicate the degree of importance of these changes for your business. |
| Performance | Evolution of certain aspects of performance in the company. | This variable has been obtained through a factorial analysis of the different questions of the survey related to the performance of a company.<br>The questions were: Please indicate how has the evolution been of the following aspects of your business in the last two years (1: very unfavorable; 5: very favorable):<br>1- Improvements in market share;<br>2- Improvements in profitability;<br>3- Improvements in productivity.<br>The results were:<br>- Explained variance: 78,9%;<br>- $x^2$ (3) = 1314,49;<br>- Prob> $x^2$ < 0,000;<br>- KMO: 0,728;<br>- Cronbach α: 0,867. |
| Financial Position | Financial aspects in the company | This variable has been obtained through a factorial analysis of the different questions of the survey related to financial position of the company.<br>The questions were: Please indicate how has the evolution been of the following aspects of your business in the last two years (1: very unfavorable; 5: very favorable):<br>1- Liquidity and cash;<br>2- Leverage --- indebtedness;<br>3- Debt service capacity;<br>4- Cost of debt;<br>5- Self-financing capability (to retain earnings).<br>The results were:<br>- Explained variance: 63,2%;<br>- $x^2$ (10) = 1877,13;<br>- Prob> $x^2$ < 0,.000;<br>- KMO: 0,838;<br>- Cronbach α: 0,853. |
| Size | Number of employees | Logarithm (ln) of the number of employees of the company |
| Age | The number of years since the firm started the business | Number of years since the firm was created |
| Industry | Sector of the activity | 1. Manufacturing.<br>2. Construction.<br>3. Services. |

## Results

Table 3 summarizes the main descriptive statistics of the variables and reports the means, standart desviations, as well as minimum and maximum values of the variables for the sample. Beside, table 4 gathers the bivariate correlations between variables.

To verify the proposed hypotheses Ordinary Least Squares (OLS) general linear regression models were used. Nine models were estimated. Table 5 displays the resulting regression models.

**Table 3** Descriptive statistics.

| | Mean | Standart desviation | Min | Max |
|---|---|---|---|---|
| Product innovation | 3,039 | 3,321 | 0,000 | 10,00 |
| Incremental innovation | 1,702 | 1,918 | 0,000 | 5,000 |
| Radical innovation | 1,338 | 1,836 | 0,000 | 5,000 |
| Entrepreneurial Orientation | 0,000 | 1,000 | -2,776 | 2,417 |
| Family management | 0,901 | 0,299 | 0,000 | 1,000 |
| Performance | 0,000 | 1,000 | -2,074 | 2,270 |
| Financial Position | 0,000 | 1,000 | -2,189 | 2,182 |
| Age | 22,98 | 16,505 | 0,000 | 159,0 |
| Size | 14,566 | 1,527 | 8,854 | 18,891 |
| Industry | 1,863 | 0,935 | 1,000 | 3,000 |

Before describing the results of each model, it is necessary to indicate that in all of them the existence of multicollinearity has been contrasted through the variance inflation factor (VIF), obtaining values between 1,12 and 3,45, depending on the estimated model. Therefore, we discarded the presence of multicollinearity. Also, all the models have been estimated applying the robust estimator of White, for which consistent standard errors have been obtained, and, in accordance with that, we ruled out the problem of the heteroscedasticity. Finally, the obtained statistically significant F values confirm the overall validity of the estimated models and the joint significance of the estimated parameters.

In order to make the estimations of the regression models, we have obtained different models of direct relationship between the Entrepreneurial Orientation and Family Management and Product Innovation (Models 1 and 2), Incremental Innovation (Models 4 and 5) and Radical Innovation (Models 7 and 8), adding in turn, to the previous models, a moderating variable, this is the Family Management, in order to estimate the possible effect of interaction of family involvement on the effect of the Entrepreneurial Orientation on Product Innovation (Model 3), Incremental Innovation (Model 6) and Radical Innovation (Model 9). Thus, the following steps have been followed to estimate each model: at first, Models 1, 4 and 7, took only the control variables into consideration; then, Models 2, 5 and 8, incorporated the direct relationship variables; and finally, Models 3, 6 and 9, incorporated the interaction effect variable.

**Table 4** Correlations matrix.

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Product innovation | 1 | | | | | | | | | |
| 2 | Incremental innovation | 0,8898*** | 1 | | | | | | | | |
| 3 | Radical innovation | 0,8791*** | 0,5647*** | 1 | | | | | | | |
| 4 | Entrepreneurial Orientation | 0,3120*** | 0,2525*** | 0,3002*** | 1 | | | | | | |
| 5 | Family management | -0,1422*** | -0,1232*** | -0,1286*** | -0,0916** | 1 | | | | | |
| 6 | Performance | 0,1400*** | 0,1320*** | 0,1152*** | 0,3165*** | -0,0847** | 1 | | | | |
| 7 | Financial Position | 0,1929*** | 0,2015*** | 0,1381*** | 0,2227*** | -0,0861** | 0,3950*** | 1 | | | |
| 8 | Age | 0,0959** | 0,0983** | 0,0708* | 0,0379 | -0,0867** | 0,0188 | 0,1348*** | 1 | | |
| 9 | Size | 0,1553*** | 0,1289*** | 0,1459*** | 0,1079** | -0,1954*** | 0,1461*** | 0,1691*** | 0,1841*** | 1 | |
| 10 | Industry | -0,1560*** | -0,1127*** | -0,1644*** | -0,0901** | 0,0246 | 0,0428 | -0,0330 | -0,1749*** | -0,059 | 1 |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

*P*earson's bivariate correlations ***p<0.01 **p<0.05 *p<0.10

**Table 5** Regressions.

| | Product innovation | | | Incremental innovation | | | Radical innovation | | |
|---|---|---|---|---|---|---|---|---|---|
| | MODEL 1 | MODEL 2 | MODEL 3 | MODEL 4 | MODEL 5 | MODEL 6 | MODEL 7 | MODEL 8 | MODEL 9 |
| Entrepreneurial Orientation (EO) | | 0.897 | 1,738 | | 0,398 | 0,766 | | 0,498 | 0,971 |
| | | (0.141)*** | (0,337)*** | | (0,086)*** | (0,201)*** | | (0,078)*** | (0,199)*** |
| Family management | | -1.014 | -0,879 | | -0,505 | -0,446 | | -0,509 | -0,433 |
| | | (0.441)** | (0,423)** | | (0,263)* | (0,258)* | | (0,242)** | (0,233)* |
| EO x Family management | | | -0,942 | | | -0,412 | | | -0,530 |
| | | | (0,370)** | | | (0,220)* | | | (0,216)** |
| Performance | 0,265 | 0,006 | 0,027 | 0,103 | -0,015 | -0,006 | 0,162 | 0,021 | 0,033 |
| | (0,145)* | (0,144) | (0,144) | (0,086) | (0,087) | (0,087) | (0,082)** | (0,081) | (0,081) |
| Financial position | 0,419 | 0,330 | 0,350 | 0,303 | 0,264 | 0,272 | 0,116 | 0,066 | 0,077 |
| | (0,151)*** | (0,139)** | (0,139)** | (0,088)*** | (0,085)*** | (0,085)*** | (0,084) | (0,078) | (0,078) |
| Age | 0,007 | 0,005 | 0,005 | 0,005 | 0,005 | 0,004 | 0,002 | 0,001 | 0,000 |
| | (0,010) | (0,009) | (0,009) | (0,005) | (0,005) | (0,005) | (0,005) | (0,005) | (0,005) |
| Size | 0,233 | 0,177 | 0,166 | 0,098 | 0,071 | 0,067 | 0,135 | 0,105 | 0,099 |
| | (0,094)** | (0,093)* | (0,093)* | (0,055)* | (0,054) | (0,055) | (0,053)** | (0,052)** | (0,052)* |
| Industry | -0,494 | -0,429 | -0,431 | -0,188 | -0,162 | -0,163 | -0,305 | -0,267 | -0,268 |
| | (0,150)*** | (0,146)*** | (0,145)*** | (0,089)** | (0,087)* | (0,087)* | (0,082)*** | (0,080)*** | (0,080)*** |
| Constant | 0,443 | 2,111 | 2,142 | 0,533 | 1,348 | 1,362 | -0,090 | 0,763 | 0,781 |
| | -1,411 | -1,559 | -1,550 | (0,818) | (0,883) | (0,878) | (0,792) | (0,864) | (0,861) |
| F | 9,90*** | 16,37*** | 15,70*** | 8,49*** | 12,04*** | 11,13*** | 7,99*** | 14,16*** | 13,74*** |
| $R^2$ | 0,08 | 0,15 | 0,16 | 0,06 | 0,11 | 0,11 | 0,06 | 0,14 | 0,14 |
| VIF | 1,12 | 1,14 | 3,45 | 1,12 | 1,14 | 3,45 | 1,12 | 1,14 | 3,45 |

Ordinary Least Squares regressions, No standardized OLS coefficients reported (Robust standard errors in parentheses), ***p<0,01; **p<0,05; *p<0,10.

Firstly, as we indicated, in order to measure the direct effect of Entrepreneurial Orientation and Family Management on Product Innovation, Models 2, 5 and 8 were estimated.

Yi = Ƀ0 + Ƀ1 EO +Ƀ2 Family management + Ƀ3 Performance + Ƀ4 Financial position + Ƀ5 Age + Ƀ6 lnsize + Ƀ7 Sector + εi

These models not only measure the influence of Entrepreneurial Orientation and Family Management in Product Innovation (Model 2), but also differentiate such influence into Radical innovation (Model 5) and Incremental innovation (Model 8). In Model 2, the dependent variable (Yi) is Product Innovation, and in Models 5 and 8, the dependent variables are Incremental Innovation and Radical Innovation respectively. The global validity of the models was confirmed because the F value was significant (F=16,37**; F=12,04**; F=14,16**). In all models we found a positive and significant Beta associated with Entrepreneurial Orientation (Ƀ1=0,897***; Ƀ1=0,398***; Ƀ1=0,498***) and a negative and significant Beta associated with Family Management (Ƀ2=-1,014**; Ƀ2=-0,5045*; Ƀ2=-0,509**). These results imply, on the one hand, that Entrepreneurial Orientation positively affects Product Innovation, Incremental innovation and Radical Innovation, verifying H11, H12, H13, and, on the other hand, that Family Management has a negative effect on Product Innovation, Incremental innovation and Radical Innovation.

Also, Models 3, 6 and 9 have measured the moderating effect of Family Management on the relationship between Entrepreneurial Orientation and Product Innovation, Incremental innovation and Radical Innovation.

Yi = Ƀ0 + Ƀ1 EO + Ƀ2 Family management + Ƀ3 EO*Family management + Ƀ4 Performance + Ƀ5 Financial position + Ƀ6 Age + Ƀ7 lnsize + Ƀ8 sector + εi

In these models, the dependent variable (Yi) is Product Innovation (Model 3), Incremental Innovation (Model 6) and Radical Innovation (Model 9). The global validity of the models was confirmed because the F value was significant (F=15,70**; F=11,13**; F=13,74**). Furthermore, in all models we found a positive and significant Beta (Ƀ3=-0,942**; Ƀ3=-0,412*; Ƀ3=-0,530**), what indicates that Family Management

moderate the effect of Entrepreneurial Orientation on Product Innovation, Incremental innovation and Radical Innovation and verify the hypotheses H21, H22 y H23.

In addition, once the hypotheses H21, H22 y H23 were verified, we propose some graphics in figure 2 in order to better visualize and interpret the moderating effect of Family Management on the relationship between Entrepreneurial Orientation and Product Innovation, Incremental innovation and Radical Innovation.

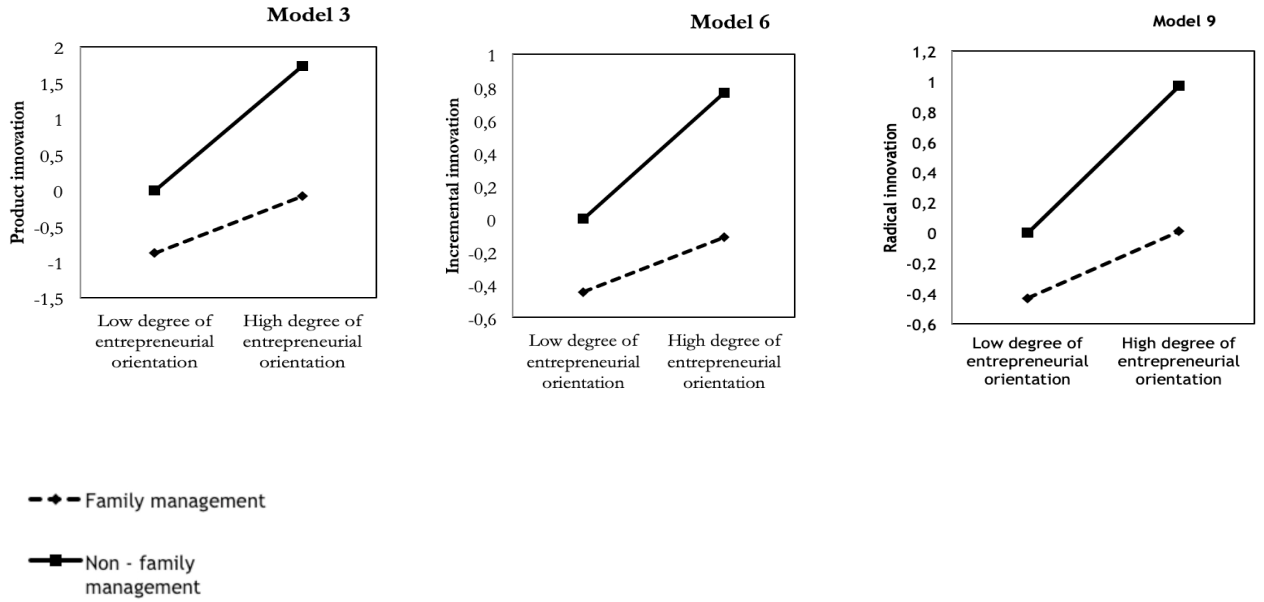


**Figure 2** Moderating effects.

In the graphics shown in figure 2 it can be seen that in family-managed firms, the positive effect of Entrepreneurial Orientation on Product Innovation, Incremental Innovation and Radical Innovation is lower in non-family managed firms. The table 6 gathers the quantitative marginal effects of the analyzed moderating effect.

**Table 6** Marginal effects of Entrepreneurial Orientation on Innovation depending on the family involvement in the management of the company.

| | Marginal effects of Entrepreneurial Orientation $(\frac{\partial \hat{Y}_i}{\partial OREMP_i})$ | | |
|---|---|---|---|
| | Product innovation | Incremental innovation | Radical innovation |
| Family management | 0,796 | 0,354 | 0,441 |
| Non - family management | 1,738 | 0,766 | 0,971 |

Some of concerning control variables were resulted statistically significant in the estimated models and, consequently, have an effect on Entrepreneurial Orientation and / or Product innovation.

## Discussion and Conclusions

The entrepreneurial orientation can be considered as practice, philosophy or strategic process that leads companies to innovation (Miller and Friesen, 1982; Wiklund and Shepherd, 2005). Innovation is a relevant factor of economic progress (Nelson, 1991) and it is an important aspect for the sustained performance (Blundell et al., 1993), survival (Dyer and Song, 1998), profitability (Ali et al., 1993), growth and expansion (Danneels and Kleinschmidt, 2001) of the company. This is also true that family firm context presents big interest in the field of entrepreneurial orientation (Zahra et al., 2004; Steier, 2007; Steier, 2009) and innovation (Craig and Moores, 2006; Pittino and Visintin, 2009). Thus, there are many researches that analyse the relationship between the abovementioned variables in different ways, but, unfortunately, the study of the relationship between entrepreneurial innovation and product innovation distinguishing between incremental and radical innovation has been practically non-existent as far as we know.

Additionally, to complete our research, we also analysed the moderating effect of family managed firms on the abovementioned relationship.

To achieve our objective, we firstly studied the relationship between entrepreneurial orientation and product innovation, including radical innovation and incremental innovation. Using Miller´s (1983) three original dimensions characteristic of entrepreneurial orientation (Naman and Slevin, 1993; Wiklund and Shepherd, 2005), the obtained results supported the positive association between entrepreneurship and product innovation (Zhou et al., 2005; Nasution et al. 2010; Fernández-Mesa et al., 2012), and radical innovation (Avlonitisa and Salavoub, 2007; Zhou, Yim, and Tse, 2005; Salavou and Lioukas, 2003), as well as indicated a favourable influence of entrepreneurial orientation on incremental innovation. After these results, we could reaffirm and reinforce that entrepreneurial orientation has a positive effect on the product innovation, including incremental innovation and radical innovation.

Secondly, considering the importance that product innovation has for family firms (De Massis et al., 2013), we analysed the influence of the family involvement in the management of the firm on the relationship between entrepreneurial orientation and product innovation, also distinguishing between radical innovation and incremental innovation. Our findings showed that family managed firms weaken the relationship between entrepreneurial orientation and product innovation.

These results are consistent with the work of Chen and Hsu (2009) and the traditional vision of family forms as more conservative organizations (Sharma, Chrisman, and Chua, 1997), less keen to change (Kets de Vries, 1993; Ward, 1997), more risk-averse (Naldi et al., 2007), and with greater difficulty to get access to capital markets (Kets de Vries, 1993). Therefore, the obtained results reveal that family involvement in firms' management debilities the positive effect of entrepreneurial orientation on product innovation, including radical and incremental innovation.

Nevertheless, the above not mean that family managed firms do not innovate. Analysing the effect of family management on radical and incremental innovation, our results showed, not very deeply, how the family management has a major moderating effect on radical innovation versus incremental innovation. The aforementioned difference is due to the fact that incremental innovation is derived from exploiting current resources and capabilities and searching of continuous improvements of the firm and has less impacts on processes and methods of operating of the company (March, 1991), and it is not as risky and does not require as much financial resources as radical innovation (Bessant, Birkinshaw and Delbridge 2004; Sorescu and Spanjol, 2008).

In conclusion, our study provides a new contribution in the literature of family business, particularly with the analysis how the family management moderates the effect of the entrepreneurial orientation on product innovation relationship, as far as we know, the previous literature has not analysed yet. The study´s findings suggest that high level of family management reduces the effect of entrepreneurial orientation on product innovation, specifically in radical innovation. On the contrary, when family involvement on manager is low, the entrepreneurial orientation effect on product innovation, radical innovation and incremental innovation is higher. Therefore, the family management should be taken into account in the field of family firms due to its importance in innovation, since that creates wealth and opens up new business opportunities, and entrepreneurship, as they are central figures of economic growth and development (Schumpeter, 1961).

This conclusion is important for family managed firms due to (i) it could help stakeholders and policy-makers to make decisions about subsidies, investments, training, etc, which would help firms to improve their efforts on product innovation. In this sense, this negative moderator effect of family management could be corrected by the participation of non-family members in firms' management or with the professionalization and teaching of their own managers. Also, public institutions should facilitate family managed firms greater resources so that they can innovate more, what will not only improve the development of family businesses, but also national economy. Furthermore, due to that Product Innovation is a key factor of industrial competitiveness and national development, being an important determinant of sustained yield (Blundell et al., 1999).

This study is not free from limitations. Firstly, the little research exists on the innovation behaviour of family firms. Secondly, the study is limited to analyzing Spanish companies, specifically in Murcia, so their results might not be generalizable to companies from other regions or countries. Thirdly, this study treats family firms as a homogeneous category instead of taking into account the differences that exist between various types of family firms.

Several research extensions can be derived from this article. Firstly, future research should also theoretically and empirically study if our findings apply to other types of innovations, for example in (i) Process innovation, (ii) Organizational innovation or (iii) Marketing innovation.

Secondly, the relationship between entrepreneurial orientation and innovation also could be analysed considering other forms of family involvement, such as in ownership or governance. Similarly, the role of new generations should be considered, as each generation will bring different management styles and objectives to the family firm. Finally, the expansion of the sample to the international arena would allow the generalization of these conclusions.

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# Private Equity focused on Family Firms & Small and Medium Sized Companies: Review and Science Mapping Analysis of the Recent Scientific Field.

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**Abstract** Private equity ("PE") is mostly invested in established firms, of which family firms ("FFs") are the dominant form. This article reports the recent evolution of the scientific research on the PE focused on FFs and small and medium-sized enterprises ("SMEs" or "the middle-market"). The purpose is to identify the main themes related to the field between 1992 and 2018 and to identify and analyze the major thematic areas throughout the period. The methodology applied is the science mapping analysis, which shows that: (i) published research on the field is concentrated in two main thematic areas: corporate governance-entrepreneurship and innovation-management, and; (ii) there has been an atomization of the research field during the last six years. Throughout this article, the authors develop a more complete understanding of the PE scientific field focused on family owned SMEs and provide suggestions for those looking for alternatives to traditional bank financing.

**CÓDIGOS JEL**
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**PALABRAS CLAVE**
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**Capital privado centrado en empresas familiares y pequeñas y medianas empresas: revisión y análisis de mapeo científico del campo científico reciente.**

**Resumen** El capital inversión (*private equity)* se invierte principalmente en empresas establecidas, de las cuales las empresas familiares son la forma dominante. Este artículo analiza la reciente evolución de la investigación científica sobre *private equity* centrada en las Empresas Familiares y las pequeñas y medianas empresas (PYME). El propósito es identificar los temas principales relacionados entre 1992 y 2018 y analizar las principales áreas temáticas a lo largo del período. La metodología aplicada es *science mapping analysis*, que muestra que: 1. la investigación publicada en el campo se concentra en dos áreas temáticas principales: gobierno corporativo-emprendimiento y gestión de la innovación, y; 2. ha habido una atomización del campo de investigación durante los últimos seis años. La investigación realiza un análisis en profundidad para entender la literatura sobre *private equity*, centrandose en las PYME familiares, ofreciéndose indicaciones para aquellos que buscan alternativas al financiamiento bancario tradicional.

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## Introduction

The middle-market sector plays an important role in our financial system provided that, and according the European Commission, "SMEs are the backbone of Europe's economy: they represent 99% of all businesses in the region". In addition, SMEs have strong difficulties to obtain external funds for growth. The diversification of their financing sources is a key issue to allow room for growth and internationalization today and the PE is, in some cases, the main source of long term financing for them that has lots of advantages against other sources of financing. PE is an effective alternative to traditional financing for private SME as it provides with solid and sustainable business models to better deal with economic cycles. Many FFs are facing succession around the world (Shanker and Astrachan, 1996; Upton and Petty, 2000) and the challenge of ensuring succession of the business is a pressing global phenomenon (PWC, 2012); but PE has largely been ignored as a possible solution (Higashide & Birley, 2002; Howorth, Westhead and Wright, 2004).

FFs are of particular significance for the global economy (IFERA, 2003; Anderson and Reeb, 2003; Morck and Yeung, 2003; Astrachan and Shanker, 2003; Klein, 2000). With more than 14 million family businesses in Europe, their importance to the economy cannot be overestimated. In some countries, they represent anywhere from 55 to 90 percent of all businesses ("European Family Business Barometer", KPMG and EFB, 2017).

FFs are a heterogeneous group with varying degrees of family influence, differences in size, industry and geography (Chua, Chrisman, Steier and Rau, 2012; Chrisman, Chua, Pearson and Barnett, 2012; Tsang, 2002). Nowadays, ownership and management succession are one of the biggest challenges for FF. However, "many of them do not have the necessary resources and capabilities to grow or to manage generational succession" (Howorth et al., 2004; Shanker and Astrachan, 1996; Sirmon and Hitt, 2003; Upton and Petty, 2000). Succession is the most frequently studied topic in the family business literature (Chua, Chrisman and Sharma, 2003) but the exploration of nonfamily route to succession has not received much attention in the academic literature (Birley and Westhead, 1990; Howorth et al., 2004). According to the PwC Global Family Business Survey 2018, succession and access to financing are between the key challenges for FF over the next two years.

Despite the abovementioned, according to the European Central Bank (November of 2017) "banking products are the main source of financing for European SMEs, while other sources available in the market such as equity (which includes the PE) are hardly considered as a potential source of funds." But PE represents an alternative source to finance investment opportunities for a wide variety of firms (Martí, Menéndez-Requejo and Rottke, 2013). One possible solution to the succession problems is to open up the family firm's capital to PE investors (Dawson, 2011).

Several authors like Benavides-Velasco, Quintana-García and Guzmán-Parra (2013) and Voordeckers, Le Breton-Miller and Miller (2014) have shown that finance is not only one of the top areas in family business research but also a growing area. The importance is warrantied since the availability of sufficient financial resources is of critical importance for the FF's survival and growth (Koropp, Kellermanns, Grichnik and Stanley, 2014).

Simultaneously, the PE activity has become a major focus of study since the late 90s because of the increasing evidence on high performance PE funds, among other reasons. The positive effect generated by PE has been widely studied and demonstrated in the existing literature (Kaplan and Schoar, 2005; Metrick, and Yasuda, 2011; Haro De Rosario, 2013)

Given this evidence, the authors question whether, indeed, PE is a real alternative to bank financing for family owned SMEs and that, in addition, it offers great advantages over other sources of financing.

To solve this question, the authors first consider knowing what the historical evolution of the scientific field of PE focused on this type of companies has been. In order to understand what the most impactful and relevant topics in the field have been in the past and are nowadays, the authors develop in this research paper an empirical analysis of the field through a bibliometric analysis based on the analysis of scientific maps, developing a more complete understanding of the field and discovering current and future research areas relevant to both PEs and family owned SMEs.

This study aims also at making the family owned SMEs aware of the existence and advantages of the use of PE as an alternative to traditional financing and to promote it in the next years. This type of study was suggested by Michiels and Molly (2017).

in their review of Financing Decisions in Family Businesses. As described below, a high level of funds has been raised by middle-market PEs in 2017 and new fundraisings are expected to be closed in 2018, what results in an attractive opportunity for the family owned SMEs looking for speeding up growth in the next years.

## Evolution of the scientific PE field focused on FFS and the middle-market between 1992 and 2018

The word "PE" can mean risk capital invested in a wide range of companies and industries: from funds provided to start-ups and privately-owned SMEs to acquisitions of multinational companies and even entire mature publicly-traded companies (Gilligan and Wright, 2010). The scientific study of the PE sector with activity in the FFs SMEs market segment belongs to a relatively recent past: the first article indexed in the Web of Science ("WoS") appeared in year 1992 and significant volumes of high impact research did not appear until year 2007 (Cumming, Siegel and Wright, 2007; Cumming, 2007; Renneboog, Simons and Wright, 2007). Until then, years 2000 and 2001 were especially productive for the PE due to the boom of both the high-tech and the mergers and acquisitions sectors. Between 2001 and 2006, the European PE houses raised 193,786 million Euros in funds, being 2005 the peak year with 71,771 million Euros raised. The high level of activity of the period occurred in many nations (Wright, Amess, Weir and Girma, 2009a; Strömberg, 2008), culminating in a peak worldwide in 2007.

The onset of the financial crisis from 2008 resulted in a massive fall in deal value worldwide in 2009 as debt markets closed and PE firms set about restructuring troubled and overleveraged portfolio companies. Nevertheless, PE was not just a transitory phenomenon and PE firms have adapted to begin to build a new future (Wright, Jackson and Frobisher, 2010). Since 2010, worldwide PE showed signs of recovery, as the third quarter provided the strongest showing of the market since the financial crisis at an aggregate value of 66.7 billion US$ (Preqin, 2010).

In the following years, there are signs that indicate that fundraising and deal making will be strong in the Europe, the Middle East and Africa region: leading European middle-market PE funds are right now in the process of fundraising. In the last few years fundraising among PE firms has hit record levels and most of surveys suggests this trend is to continue in 2018. The sector is, in addition, under a globalization process.

## The methodology: science mapping bibliometrics analysis through scimat software tool

In bibliometrics, science mapping analysis ("SMA") is designed to display the structural and dynamic aspects of scientific research, to determine the scope of a research field and to quantify and visualize the detected subfields by means of co-word analysis or document co-citation analysis. It is focused on monitoring a scientific field and delimiting research areas to determine its conceptual structure and scientific evolution (Cobo, López-Herrera, Herrera-Viedma, and Herrera, 2011b; Noyons, Moed, and van Rann, 1999b). In this article, the SMA is performed using the software Science Mapping Analysis Software Tool ("SciMAT") (Cobo, López-Herrera, Herrera-Viedma and Herrera, 2012b), designed and developed by the SECABA Laboratory at the University of Granada (Spain). SciMAT is based (Cobo, López-Herrera, Herrera-Viedma and Herrera, 2011a) on a co-word analysis (Callon, Courtial, Turner and Bauin, 1983) and the h-index (Hirsch, 2005), which are applied in a longitudinal framework.

### Data Sources

To obtain the publications of the journals and their citations, the bibliographic database WoS (property of Clarivate Analytics) is used. WoS is the world's leading scholarly literature database in the sciences and social sciences: it is a reference database that provides with the most complete current and retrospective quality coverage in the sciences and social sciences, going back to 1900 (Harzing and van der Wal, 2008). A database with this property is appropriate for developing a rigorous SMA of the PE field focused on SMEs with a longitudinal perspective.

### Sample

We focus on this analysis on articles dealing with all types of family businesses within the middle-market, meaning that they can imply family involvement in various ways, and can be private or public firms. The sample for this study consists of 252 documents (and their citations) published in the WoS core collection during the 1992–2018 period. It was extracted with an advanced search as follows: ("private equit*" OR "venture capita*") AND ("small and medium-sized" OR "small and medium sized" OR "SME*" OR "middle market" OR "middle-market") AND ("family owned" OR "family-owned" OR "FF*" OR "family business*" OR "family compan*" OR "family enterprise*"). The sample includes 186 journals. The distributions of the documents by years, together with their aggregated number of citations and the list of core economic journals are shown in Figure 1 and Table 1, respectively. Table 1 shows the year of the first article included in the sample and the aggregated number of citations corresponding to the articles included in the sample. For each document, the complete information provided by the WoS was retrieved, that is, authors, affiliations, title, abstract, keywords, references, citations, source, and so on.

**Table 1** List of Top 20 Journals in the PE Field within FFs & SMEs between 1992 and 2018.

| Journal | First Year Included | N° of Documents Included | Total Citations |
|---|---|---|---|
| Small Business Economics | 1997 | 11 | 296 |
| Journal of Business Venturing | 1992 | 5 | 251 |
| Research Policy | 2003 | 5 | 187 |
| Journal of Management | 2005 | 1 | 171 |
| Organization Science | 2003 | 1 | 129 |
| Academy of Management Perspectives | 2012 | 1 | 98 |
| Journal of Economic Geography | 2002 | 2 | 72 |
| Regional Studies | 2001 | 2 | 60 |
| International Small Business Journal | 2006 | 5 | 55 |
| Entrepreneurship Theory and Practice | 2011 | 3 | 55 |
| Corporate Governance - An International Review | 2005 | 4 | 52 |
| Environment and Planning C-Government Policy | 2001 | 4 | 47 |
| Journal of Cleaner Production | 2015 | 1 | 32 |
| Applied Soft Computing | 2013 | 1 | 31 |
| Venture Capital | 2015 | 6 | 21 |
| Strategic Entrepreneurship Journal | 2013 | 1 | 17 |
| Journal of Family Business Strategy | 2012 | 2 | 17 |
| Journal of Small Business Management | 2013 | 4 | 14 |
| Journal of Banking & Finance | 2014 | 1 | 7 |
| Journal of Small Business and Enterprise Development | 2016 | 4 | 4 |

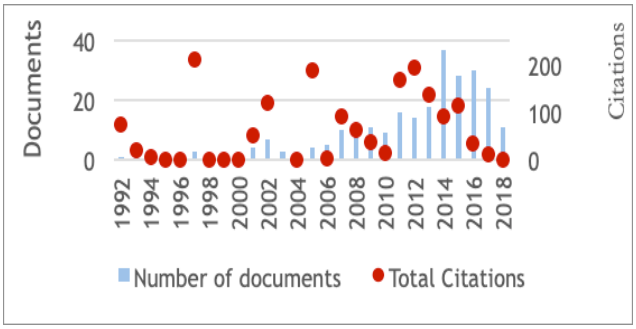


**Figure 1** *Distribution of documents included in the research by years and aggregated annual number of citations.*

**Procedure and Sample's Processing**

The documents were downloaded from WoS as plain text and added to SciMAT in ISIWoS format. They are the knowledge base for further SMA. Thus, it contains the bibliographic information stored by WoS per each research document. To improve the data quality, a deduplicating process was applied: the most repeated keywords and words representing the same concept were grouped as unit of analysis. A total of 872 word groups were created: 10 top word groups ("VC", "SME", "PE", "Firm", "FFs", "Investments", "Market", "Finance", "Industries" and "Models") appearing in the majority of the documents were classified as "stop" groups (words with a very broad and general meaning) in the tool. Table 2 shows the top 20 keywords that were not classified as stop groups.

**Table 2** Top 20 Keywords of the PE Field within FFs & SMEs between 1992 and 2018.

| Keywords | Number of documents | Keywords | Number of documents |
|---|---|---|---|
| Performance | 35 | Ownership Structure | 15 |
| Innovation | 29 | IPOs | 13 |
| Corporate Governance | 27 | Strategies | 12 |
| R&D | 18 | Information | 12 |
| Growth | 18 | Financing | 11 |
| Agency Costs | 17 | Firm Performance | 10 |
| Ownership | 17 | United Kingdom | 10 |
| Management | 15 | Start-Up | 9 |
| Entrepreneurship | 15 | Investor | 9 |
| Leveraged Buyouts | 15 | Management Buyouts | 9 |

Next, using the period manager of SciMAT, the periods of time of the longitudinal analysis were established. The whole time frame (1992–2018) was divided into three consecutive periods of time: 1992–2006, 2007–2012 and 2013–2018. In these periods of time, 33, 71 and 148 documents indexed in the WoS were found, respectively. The first period encompasses a greater number of years compared to the last two periods, but it was decided to make this distribution of years because: (i) in the early years of research there were few documents per year and, in order to detect correctly the themes of a discipline, it is necessary to define more or less homogeneous periods of time with respect to the number of documents (Cobo, López-Herrera, Herrera and

Herrera-Viedma, 2012a; Cobo et al., 2012b; López-Herrera, Herrera-Viedma, Cobo, Martínez, Kou and Shi, 2012), and; (ii) the experience from previous studies of SMA (Cobo, Chiclana, Collop, de Oña, and Herrera-Viedma, In Press, 2014; Cobo et al., 2011a, 2011b, 2012a, 2012b) indicates that an excessive number of periods of time hampers the mapping and interpretation of thematic areas.

The next step is to configure the analysis. To perform it, the following configuration in SciMAT was established: author's, source's and added words as the unit of analysis (all with a threshold of 2 times as minimum frequency), co-occurrence analysis as the tool to build the networks (again with an edge value reduction of 2 times as minimum), equivalence index as the similarity measure to normalize the networks, and the simple centers algorithm as the clustering algorithm to detect the clusters or themes (with a network size range of between 3 and 12 times). The bibliometric measures chosen were the h-index and the sum of citations calculated for the documents that were mapped to each theme. Measures used for the longitudinal maps were: (i) the inclusion index to detect conceptual nexus between research themes of different periods of time through the evolution maps, and; (ii) the *Jaccard's Index* (Peters and van Raan, 1993), which is a common similarity measure for the normalization process needed in bibliometrics, for the overlapping of the different detected clusters.

## SMA'S results through SCIMAT

**Detection of Research Themes: The PE Field within the Family Owned SMEs Market Segment**

In order to analyze the most highlighted themes of the recent PE field focused on family owned SMEs for each period of time, a strategic diagram is provided. In each diagram, the sphere size is proportional to the number of citations associated with each research theme.

**First period (1992-2006).**

According to the strategic diagram presented in Figure 2, the PE research activity pivots on 5 themes during this period, with entrepreneurship, corporate governance, management, decision-making and innovation as key motor themes. The performance measures of the motor themes are given in Table 3. Entrepreneurship is the major motor theme in terms of performance measures: 300 citations and h-index 2.

Corporate governance is a system of structures and processes to direct and control the functions of an organization by setting up rules, procedures and formats for managing decisions within an organization (Palaniappan, 2017). Management of corporate governance was identified together with other themes by Kaplan as one of the main sources for PEs' value enhancement (Jensen, Kaplan, Ferenbach, Feldberg, Moon and Davis, 2006); it was also suggested as a corner stone in value creation by many studies (e.g., Jensen et al., 2006; Millson and Ward, 2005; Nisar, 2005). It is accepted that, on average, PE backing exerts a positive effect on investee firms. But little attention has been paid in the literature to the effect of PE involvement in FFs. PE financing is regularly promoted to meet the need for finance and, in addition, provide managerial expertise to help businesses overcome some of the challenges associated with growth. However, to retain ownership and control over the family business, owner managers often rely on internally generated funds (Berger and Udell, 1998; Poutziouris, 2001; Romano, Tanewski and Smyrnios, 2001). FFs that avoid external influences may be reluctant to take on any form of external finance, including PE (Poutziouris, 2001; Upton and Petty, 2000) but this could constrain their ability to grow.

In this period, Kellermanns and Eddleston (2006) investigated how generational involvement, willingness to change, and the ability to recognize technological opportunities impact corporate entrepreneurship in FFs. Their findings suggest that willingness to change and technological opportunity recognition are positively related to corporate entrepreneurship in FFs.

Several studies focus on the use of PE and VC by FFs between 1992 and 2006. These sources may be preferred in many cases because of the opportunity it offers to fund the FF transition (Upton and Petty, 2000).

The low use of external equity financing by FFs has been a focus of research in the past. This is usually due to a higher preference for internally generated funds rather than external sources, or debt financing rather than external equity financing. These preferences are linked to approaches done by several theories, like the stewardship theory (Davis, Schoorman and Donaldson, 1997). In FFs, financing has been linked to strategic decisions such as the timing of succession (Kimhi, 1997) and the sale of family business (Bhattacharya and Ravikumar, 2001).

Innovation emerges as a key motor theme yet in this period with studies about the important role in the process of creative destruction of SMEs (Acs, Morck, Shaver and Yeung, 1997), with focus on the international diffusion of SMEs innovations.

**Table 3** Performance Measures for the Motor Themes (1992-2006).

| Motor Themes | Documents | Citations | h-Index |
|---|---|---|---|
| Entrepreneurship | 2 | 300 | 2 |
| Management | 1 | 129 | 1 |
| Corporate Governance | 2 | 113 | 2 |
| Decision-Making | 2 | 102 | 2 |
| Innovation | 4 | 90 | 1 |

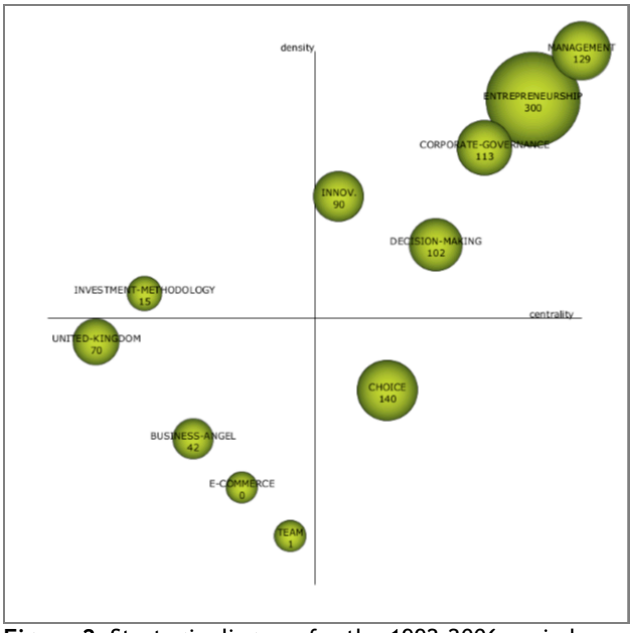


**Figure 2** Strategic diagram for the 1992-2006 period.

**Second period (2007-2012).**

The research was focused on 5 themes (see Figure 3). In this case, 3 major themes can be identified (motor themes plus basic themes): corporate governance, innovation and empirical-analysis. Performance measures of the motor themes are shown in Table 4.

Corporate governance is closely linked to the use of investor funds to change corporate governance arrangements through buyouts of firms by PE firms in this period (Gilligan and Wright, 2010). PE professionals take into account family-specific criteria when selecting FFs to invest in, including human resources and opportunities to reduce agency costs. Furthermore, PE professionals prefer FFs that are already professionalized (Dawson, 2011).

Innovation appears as motor theme in this period. Bruque and Moyano (2007) studied the factors behind the intensity and speed of adoption of information technology in SMEs in which family or cooperative character play an important role. Their results indicate that there are a number of internal factors that influence the success of the adoption decision, on the one hand, and the implementation process, on the other hand. Puig and Perez (2009) studied innovation related to internationalization: the dominant role played by large FFs in the internationalization of the Spanish economy. In contrast with other countries, foreign capital and technology and collective action at regional, national and international levels play a far more important role in the internationalization of large FFs.

Several studies indicate that family involvement appears to result in lower use of external equity. In general, the distance between family businesses and external investors is large, mainly due to the "empathy gap" between owners and investors (Poutziouris, 2011) or because of the preferred retention of control rather than firm's growth and development (Wu, Chua and Chrisman, 2007).

Studies of the use of PE and VC by FFs in this period suggest that these sources may be preferred in many cases because of the nonfinancial benefits that these types of investors can bring to the family such as managerial support, expertise, and contacts (Tappeiner, Howorth, Achleitner and Schraml, 2012; Martí, Menéndez-Requjo and Rottke, 2013).

In general, FF owners balance financial and non-financial resources of PE with the need to cede control rights: non-financial resources are valued more highly when resolving family issues (Tappeiner et al., 2012).


**Figure 3** Strategic diagram for the 2008-2012 period.

**Table 4** Performance Measures for the Motor Themes (2007-2012).

| Motor Themes | Documents | Citations | h-Index |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Corporate Governance | 11 | 257 | 8 |
| Innovation | 9 | 128 | 5 |

**Third period (2013-2018).**
The research conducted in this period is distributed in 12 PE themes (see Figure 4), with a clear atomization if compared to previous years. The performance measures of the main motor themes of the period are shown in Table 5.

**Table 5** Performance Measures for the main Motor Themes (2013-2018).

| Motor Themes | Documents | Citations | h-Index |
|---|---|---|---|
| Agency Theory | 12 | 55 | 2 |
| Research & Development | 9 | 44 | 2 |
| Earnings-Management | 6 | 43 | 4 |
| Management Buyouts | 15 | 13 | 2 |

Management buyouts ("MBOs") are a motor theme when they became phenomena of the 1980s: when no suitable family successor can be identified, FFs' owners may select an MBO exit route. Some studies suggest that a PE buyout is a governance mechanism that may sustain an entrepreneurial transition by realigning family interests and goals (Di Toma and Montarani, 2017). Secondary buyouts (leveraged sales from one PE fund to another) have been the fastest growing segment of PE deals in last decade and therefore highly studied (Degeorge, Martin and Phalippou, 2016).
Despite more and more FFs open their capital for outside investors, existing studies mainly conclude that family companies are more reluctant that others to hand over control to outside investors. Exploratory evidence from a sample of Belgian FFs is supportive of the hypothesis that family members who identify strongly with their firms are less willing to cede control to outside investors and, if they do cede control, have a stronger preference for investors who may readily identify with FFs, like family offices or high net worth individuals (like business angels), rather than investors who may not fit well with a familial identity, such as PE or VC sponsors (Neckebrouck, Manigart an Meuleman, 2017).
Relevant literature about the PE's positive effects on corporate governance and value creation has been developed in the last period (Acharya, Gottschalg, Hahn and Kehoe, 2013). The impact of PE on FFs' performance was studied thought the analysis of the productivity growth in a sample of PE-backed family companies in 2016. The study found that FFs accessing PE showed lower productivity growth before the initial PE round, which was driven by an imbalance between inputs and output, especially in founder-controlled firms. This analysis also confirmed the positive impact of PE involvement on productivity growth in founder-controlled firms (Croce and Martí, 2016).

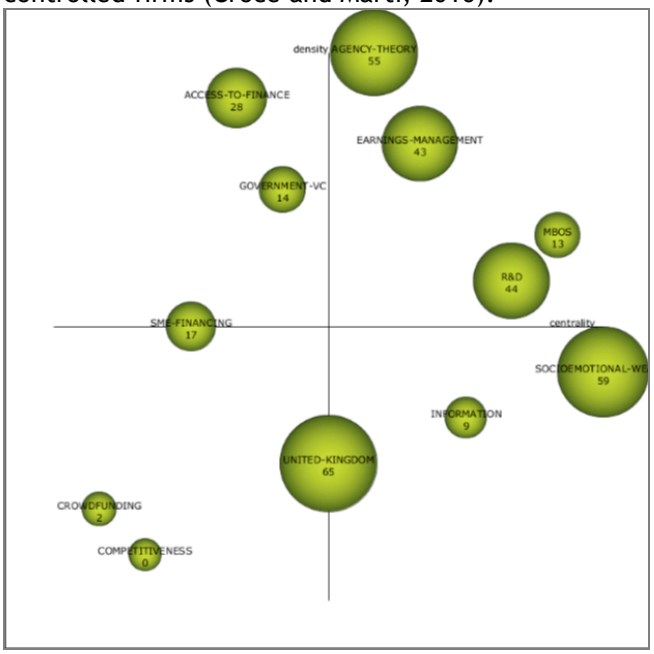


**Figure 4** Strategic diagram for the 2013-2018 period.

**Thematic Evolution of the PE Scientific Field focused on FFs & SMEs (1992-2018)**
**Structural analysis of the evolution of the PE scientific field focused on FFs and SMEs between 1992 and 2018.**
According to Figure 5, the research developed in the PE activity field presents a high cohesion level in the cases of the thematic areas "corporate governance-entrepreneurship" and "innovation-management".
The two main thematic areas present a growth pattern, because they have been growing in the number of themes discussed since their origin. However, the PE scientific community is dynamic and relatively recent as the number of scientific documents starts growing in the second period, only twelve years ago. MBOs and the UK are new scientific areas that emerge between 2013 and 2018 and that lead to new research areas related to the study of the role of information asymmetries (Dehlen, Zellweger, Kammerlander and Halter, 2014) and the value of FFs for PE investors (Ahlers, Hack and Kelleermanns, 2014), in the case of MBOs.
And also related to the UK market (Mason and Pierrakis, 2013; Mason and Harrison, 2015), in the case of the UK. The two main thematic areas are constant between the first and second periods and then they go through an atomization process since year 2013. Therefore, the scientific communication has resulted in a specialization of

the big historical thematic areas in niche research themes that become basic and transversal themes.

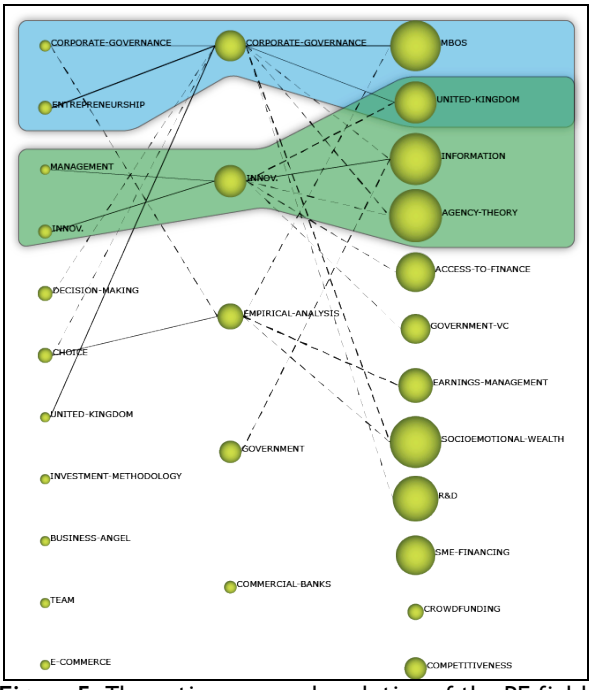


**Figure 5** Thematic areas and evolution of the PE field focused on FFs & SMEs (1992-2018).

**Performance analysis of the evolution of the PE scientific field focused on FFs and SMEs (1992-2018).**

In Table 6, performance measures of the main thematic areas are provided. Corporate governance-entrepreneurship area stands out over the rest in terms of citations: 893 citations across the 1992-2018 period. Relevant research in corporate governance started in 2003, with a study of the primary rationalities governing the exchange relationships in family investment decisions during the early stages of new venture creation (Steier, 2003).

In the second period, corporate governance-entrepreneurship has high impact papers about management practices (Bloom, Genakos, Sadun and Van Reenen, 2012), where relevant findings about the relation between ownership and management were done. In the case of entrepreneurship, studies about the internationalization processes (George, Wiklund and Zahra, 2005) and owners' succession (Wasserman, 2003) are the ones with the highest impact in the first period, with 171 and 129 citations, respectively,

**Table 6** Performance Measures of the PE Field's Main Thematic Areas (1992-2018).

| Main Thematic Areas | Documents | Citations | h-Index |
|---|---|---|---|
| Corporate Governance - Entrepreneurship | 78 | 893 | 15 |
| Innovation - Management | 97 | 715 | 14 |

## Discussion and applications

This study aims at giving continuity and increase family owned SMEs' consciousness of the positive effects and the increasing availability of the PE as an alternative to traditional growth funding, which has been widely demonstrated in past scientific research (Paglia and Harjoto, 2014). The coding phase of the analysis led to three interesting findings:

1.The quantity of PE scientific publications within the FFs and SMEs has an exponential increase across the last two decades thought the highest impact articles majority belong to the 1992-2012 period of the analysis. There has been an increase in the number of themes over time and, thus, an emergence of a more diverse and complex PE scientific discipline within field.

2.The thematic evolution analysis performed in this paper shows that corporate governance-entrepreneurship and innovation-management are the two big thematic areas of the recent PE research field. Therefore, it would be recommendable for family owned SMEs to promote corporate governance measures effectively.

3.The PE field presented a continuous, consistent, and cohesive growth, because there are no gaps in the main thematic areas. However, several research themes do not constitute a conceptual nexus with the classical themes and do not belong to any thematic area. Further scientific research on the field can be done for example to measure the PE's board members contribution to the acquired company's strategy: the Team Production Theory (Blair and Scout, 2001) shows that members must have knowledge of the firm to make decisions that create value (Kaufman and Englander, 2005).

The research done enables to access and assess key data of the discipline to make decisions in different frameworks:

*Family owned SMEs*: they might use this analysis to understand and become familiar with PE funds historical activity and the value they can add to their growth plans. In addition, the use of PE to execute internationalization plans can have additional benefits different to the mere financing and performance improvement: recent studies have demonstrated that a high degree of geographic international diversification enables multinational companies to improve its social

performance (Aguilera-Caracuel, Guerrero-Villegas and García-Sánchez, 2017).

*Private Equity funds focused on the middle-market*: in the past decade there has been an increasing role of the PE industry in the financing of enterprises what can boost economic growth. PE funds can identify new market niches within the family owned SMEs segment for their acquisitions.

*Academic centers:* scientists could identify new and relevant challenges in their field for future research, as well as the emerging themes.
This study opens up new possibilities for discovering important research areas in the PE field within the family owned middle-market. It provides empirical analysis that can benefit from a further development of this subject as a discipline.

## Limitations and further research

This research has several limitations, which in turn, reveal the path for future lines of research. The first limitation is related to the scope of our results and their implications. Since the study was performed on a recent sample, the results cannot be transferred to the entire scientific PE field focused on the middle-market. Future research could develop the study defined here: scientific research prior to year 1992 could be analyzed and also a new research with other keywords might result in new findings.
To choose the information sources for our analysis, we have used the WoS database: an alternative selection of databases would likely produce different results. Other limitations relate to our methodology since we use only those documents published in the most important journals indexed in WoS in the PE category. Therefore, we are missing the PE research published primarily outside of those journals that are not indexed in WoS. Other methodological bias was introduced in the co-words analysis: further research could be done by using other bibliometric techniques that complement this study and provide a systematic description of the structure of the field.

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