# Delineating the Path of Family Firm Innovation: Mapping the Scientific Structure


## Abstract

Research on family firm innovation (FFI) has grown exponentially in recent years, as evidenced by the growing number of authors devoted to its study. However, to date, numerous questions remain unsolved about how family firms are coping with different innovation issues. In this context, this study aims to explore the scientific literature on FFI through performance indicators of scientific production, social networks of collaborations between authors and the intellectual and conceptual structures of the field. To accomplish this goal, bibliometric techniques are conducted, namely co-author, co-citation and co-word analyses. This study is carried out through a review of 975 published documents on FFI retrieved from the Web of Science and Scopus databases during the period 1987–2019. The findings reveal the richness of the FFI field and allows this large body of work to be organized into four theoretical roots and five thematic clusters. Additionally, this study proposes an integrative framework aimed at advancing new knowledge on the available research paths on FFI and identifying new research avenues to further develop the field. Hence, our research enriches the lively debate on FFI by offering a better understanding of the heterogeneous innovation behaviour of family firms.



**Keywords** Innovation, Family Firms, Co-authorship, Co-word analysis, Co-citation, Bibliometrics

## 1. Introduction

Research on innovation in the family firm context is advancing and gaining increasing momentum to the extent that it has become a subject of great popularity among academics, practitioners and consultants (Calabrò et al. 2019; Migliori et al. 2020; Strobl et al. 2020). Nevertheless, the most significant increase in family firm innovation studies has taken place during the last decade (e.g. Filser et al. 2016), and thus, scholarly research on family firm innovation remains a relatively young but expanding phenomenon.

Representing ubiquitous and significant organisational forms, family firms dominate the global economic landscape (De Massis et al. 2018b; La Porta et al. 1999). The latest data compiled by the Family Firm Institute (2018) indicate that family firms comprise two thirds of all businesses operating throughout the world, generate between 70% and 90% of annual global GDP and create around 50% to 80% of jobs in most countries worldwide. Beyond their economic importance, there is also great interest in recognising that family firms have certain particularities that make them behave and innovate differently to other businesses (Carney et al. 2015; De Massis et al. 2013). In this sense, family firms possess a singular ensemble of ownership, management and governance (Matzler et al. 2015), which encourages the enhancement of sustained family-based competitive advantages that may result in the development of unique innovation resources and capabilities (Habbershon and Williams 1999; Sirmon and Hitt 2003). Particularly, family firms are widely recognised for their extraordinary emotional attachment and strong commitment to the firm's survival (Arregle et al. 2007), their long-term orientation (Brigham et al. 2014), their multigenerational involvement (Kellermanns and Eddleston 2004), and their greater resilience in difficult times (Martínez-Romero and Rojo-Ramírez 2016), due to the unique interaction between the family and the firm (Habbershon and Williams 1999). Thereby, family firms are an appealing context within which to analyse the innovation phenomenon (Martínez-Alonso et al. 2018).

Innovation is an essential factor for the long-term firm survival and also for the economic performance of family firms (Hauck and Prügl 2015; Kellermanns et al. 2012). According to the Oslo Manual of the Organisation for Economic Co-operation and Development (2005, p. 46) innovation is defined as *"*the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations*"*. Generally, the implementation of innovations leads to an improvement in family firm performance (Martínez-Alonso et al. 2020b); however, innovation involves substantial risks, such as possible loss of both control and emotional endowment, which often make family firms reluctant to innovate (Chrisman and Patel 2012; Gómez-Mejía et al. 2014).

Given the greater theoretical and practical relevance of this topic in recent years (Calabrò et al. 2019), we detect a need to explore the evolution of the family firm innovation (FFI) path to identify both strengths and weaknesses in the extant literature and to envision future research lines. In view of the foregoing, the research goal of this study is to provide a delineation of the scientific foundation for research on FFI.

To accomplish such a goal, the present study employs bibliometric techniques, which help to discover, organize and examine information regarding a specific research field, based on performance indicators and science mapping (Baier-Fuentes et al. 2019b). Specifically, three different bibliometric methods are used, namely co-author, co-citation and co-word analyses. On the one hand, co-author analysis allows the identification of collaborations between authors and thus, the social structure of FFI research (Acedo et al. 2006). On the other hand, co-citation analysis allows the disclosure of the overall intellectual structure and theoretical foundations of FFI research (Randhawa et al. 2016). Finally, co-word analysis permits the exploration of interactions between research themes and emerging research trends of FFI research (López-Fernández et al. 2016). Given that distinct bibliometric methods have advantages and disadvantages, the combination of various analyses to explore research trends and dynamics within a discipline has become a powerful trend in bibliometrics (Leung et al. 2017).

Hence, this study offers several contributions to previous literature. First, it enriches the ongoing debate on innovation in family firms by means of an extensive bibliometric analysis to better understand antecedents and consequences of FFI, as well as the factors that drive family firm heterogeneity when conducting innovation processes. Second, by examining the linkages between the leading research themes, this study proposes an integrative framework aimed at identifying future research avenues to advance knowledge and further develop the field. Third, the present study goes beyond previous FFI bibliometric analyses covering up to 2017, omitting the years of maximum scientific production, namely 2018 and 2019 (Aparicio et al. 2019; Filser et al. 2016). In this way, we show that the FFI is becoming an increasingly hot topic that will continue to grow in the near future. Fourth, this study is carried out based on the two most commonly used bibliometric data sources (Waltman and Noyons 2018), namely Web of Science and Scopus, covering a substantially larger body of documents than prior FFI bibliometric analyses which only focused on a single

database. Finally, this study provides some valuable managerial insights for family firms' owners and managers, and family members in general, as well as for other stakeholders.

## 2. A synthesis of prior literature review articles on family firm innovation

The FFI field is still a young phenomenon that emerged from the close link between two promising research areas that have attracted the attention of the business world: innovation and family firms (Filser et al. 2016). The first document on the FFI topic was a book entitled "Manufacturing in Kitchener-Waterloo: A Long-term Perspective" by Walker D.F., published in 1987. This book provides an overview of how the creation of new (family) firms in the city of Kitchener (Canada) by German entrepreneurs who had migrated there during the 19th century made possible the development of the city's manufacturing industry, whose firms today are the legacy of that German family entrepreneurial spirit. Nevertheless, it is not until quite recently that more encouraging, and perhaps also more helpful, studies have examined the potential positive (negative) aspects and advantages (disadvantages) of family firms in managing innovation. These studies have led to a growing interest in FFI among scholars, firm managers, and consultants, especially, in the last decade. The expansion of the FFI field has been accompanied with a flourishing number of literature review articles that seek to systematise and integrate extant knowledge on the topic and guide its progress. The objectives of such studies vary substantially from those of our bibliometric review, since they synthesize existing research based on the most important findings, the main theoretical and empirical approaches, or elucidate other related issues to the primary topic.

The first attempt to integrate prior research on FFI was made by De Massis et al. (2013), who reviewed 23 articles on technological innovation in family firms. The authors proposed a framework inspired by the work of Lumpkin et al. (2011), to show direct effects of family involvement on innovation inputs in terms of R&D expenditures, innovation activities such as leadership in new product development projects, and innovation outputs in terms of number of products. De Massis et al. (2013) also revealed the existence of the moderating effects of family involvement on such technological innovation steps. Although limited by the number of studies, but considering that FFI research was in an embryonic stage at that time, the theoretical and practical conclusions of this literature review were very insightful. Padilla-Meléndez et al. (2015) provided a broad overview of the relationships between determinants and dimensions of FFI, using the multidimensional framework of innovation proposed by Crossan and Apaydin (2010). These authors revealed that the environment and the family influence through ownership and generation are potential determinants that impact on innovation outcomes in family firms. Röd's (2016) literature review looked at how family factors affect the various stages of the FFI process. In doing so, Röd et al. (2016) developed a framework based on the concept of familiness and incorporated the family system as an influential context variable, demonstrating that family influence represents a double-edged sword with advantages and disadvantages for FFI processes. Fuetsch and Suess-Reyes (2017) reviewed the literature covering contributions on FFI and its association with firm performance, as well as, the components of family involvement, the essence of family firms, contextual factors, generations and lifecycles. Martínez-Alonso et al. (2018) compiled those articles analysing technological innovation from a socio-emotional wealth viewpoint, proposing a framework with a set of factors, such as performance hazard, CEO risk aversion, or family management that must be taken into account for the successful implementation of FFI strategies in the light of socio-emotional wealth aspects. Finally, Calabrò et al. (2019) developed a conceptual bridge to identify not only the main gaps, but also to reconcile the existing conflicting findings in prior FFI studies. To this end, Calabrò et al. (2019) reviewed the main linkages investigated to date in FFI literature, that is, direct relationships between family involvement and innovation and the moderating effects of family involvement on the link innovation-firm performance, and the theoretical lenses that shape and support such relationships.

The abovementioned literature reviews offer valuable insights into the FFI topic. Nevertheless, other methods and techniques are needed to enrich and complement these review processes and to move FFI field forward (Aparicio et al. 2019; Filser et al. 2016). Furthermore, although the validity of systematic literature reviews has been widely demonstrated (Kraus et al. 2020a), the document selection process in some of these studies is not entirely clear due to the lack of transparency regarding the keywords selected, the subjectivity of the authors, and the way in which the articles are selected, from searches in online databases (e.g. Scopus) to hand searches in the journals closest to the study topic. Hence, bibliometric studies have emerged as important tools for improving the quality of reviews through its remarkably transparent, reproducible and iterative review process, which results in better evaluation and control of documents published in a specific subject area (Zupic and Čater 2015). In addition, bibliometric techniques can be applied to an extensive list of bibliographic references (Alayo et al. 2020), which provides a completely new perspective on the FFI field by complementing prior literature review articles.

## 3. Methodology

In order to identify the key elements of the FFI research field, the bibliometric analysis technique is followed, showing relevant information regarding authors, documents, and keywords (Cobo et al. 2011). As previous bibliometric studies have done (e.g. Terán-Yépez et al. 2020), this study follows five steps: (1) definition of the research field; (2) database selection, (3) research criteria adjustment, (4) codification of recovered material and (5) examination of the information. In this manner, the process gains clarity and is easily reproducible (Figure 1).

The first step is the *identification* of the core focus of this study, that is, FFI, in order to show information regarding scientific production and keywords co-occurrence analysis of this research field.

The second step is the database selection. Taking into account that the results of the analysis could vary depending on the selected database, and in line with Agramunt et al. (2020), the two most commonly employed bibliometric data sources, i.e. Web of Science (WoS, produced by Clarivate Analytics) and Scopus (created by Elsevier) are used in this study. Although Google scholar might offer additional coverage to WoS and Scopus, it has certain associated problems. First, it lists a great deal of non-academic sources including grey literature that is not peer-reviewed (Kraus et al. 2020a). Second, the search algorithm is not reproducible since the results are shown based on prior searches and interactions (Gusenbauer and Haddaway 2020). Third, Google scholar is difficult to use for large-scale analysis (Waltman and Noyons 2018). Thus, the abovementioned limitations have dissuaded us from including it in our analysis.

Once the databases are selected, the next step is the *research criteria adjustment*. In this stage the research criteria is established with Boolean operators in order to obtain an accurate search and to ease large data capture. Accordingly, the parameters used to retrieve the search were: TITLE-ABS-KEY ("innovat*") AND ("famil* firm*" OR "famil* business*" OR "famil* own*" OR "famil* control*" OR "famil* enterprise*" OR "famil* compan*") from the title, abstract and keywords. The search was limited to the period 1987-2019, as the first document on this topic was published in 1987. The search in both databases (WoS + Scopus) was undertaken at the end of March 2020. With regard to the inclusion and exclusion criteria, only articles, reviews, books and book chapters, including open access and non-open access documents were considered (Capobianco-Uriarte et al. 2019). The numbers of documents from WoS were 739 and from Scopus 587, although there were 351 in common. Thus, the final sample consisted of 975 documents (Figure 2).

The fourth step is the codification of recovered material, which was downloaded in csv format and codified using Excel (version 2013) and VOSviewer (version 1.6.9). The data were pre-processed for the subsequent analysis. First, duplicated documents, which were in both databases, were deleted. Second, each document's abstract and title were reviewed to ensure that they met the search criteria. Third, documents with missing information were corrected.

Finally, the last step is the examination of the information. This phase is conducted using two bibliometric analysis techniques: performance analysis and science mapping (Cobo et al. 2011). First, following previous studies (Baier-Fuentes et al. 2020; Terán-Yépez et al. 2019), the performance analysis is based on productivity, taking into account the number of publications as the main indicator. Besides, the number of citations and the h-index are used to enrich the performance analysis, at the level of journals, authors and institutions. Its main purpose is to provide an updated picture of the research field by identifying the works that constitute its intellectual base (Alayo et al. 2020). Second, science mapping aims to unveil the structure and dynamics of scientific fields (Zupic and Čater 2015). It is a spatial depiction of how disciplines, fields, authors, or papers relate to each other. This methodological approach is adapted to the purposes of the present study. Therefore, to examine different interesting aspects of the research field, we conduct scientific mapping based on co-author, co-citation and co-word analyses. First, co-author analysis enables the social network of a research field to be identified through the linkages between its most relevant authors and the sub-groups emerging from the collaborations (Acedo et al. 2006). This technique captures stronger social links than other relatedness measures, making it ideal for examining social networks (Zupic and Čater 2015). Second, co-citation analysis allows the intellectual structure and theoretical foundations of the research field to be revealed (Randhawa et al. 2016). Co-citation is defined as two publications which are cited together in one article (Mas-Tur et al. 2020). Accordingly, the co-cited references are thought to have similar or related concepts (Kraus et al. 2020b), showing the invisible development, relationships and influences of research (Ramos-Rodríguez and Ruíz-Navarro 2004). Third, co-word or co-occurrence analysis of keywords allows the conceptual structure of a scientific field to be established by generating a set of clusters that could be considered as conglomerations of semantic or conceptual bundles of topics addressed by a research field (Alayo et al. 2020). In other terms, the co-occurrence of keywords makes it possible to identify a research domain through the specific connections made between its keywords (Callon

et al. 1983; López-Fernández et al. 2016). The keywords of an article reflect its main content, and the frequency of their occurrence and co-occurrence represent the most significant themes addressed by papers in a research area and how they are linked to each other (Zong et al. 2013). The combined use of these bibliometric methods yields to better and more robust results in the analysis of a research field (Randhawa et al. 2016), as they are considered complementary (Leung et al. 2017) and thus will reveal a bigger picture of the FFI domain. Finally, this study provides an integrative framework aimed at advancing new knowledge on the available research paths into FFI and identifying new and important research avenues to further develop the field.

**Fig. 1** Five-step bibliometric methodology flowchart

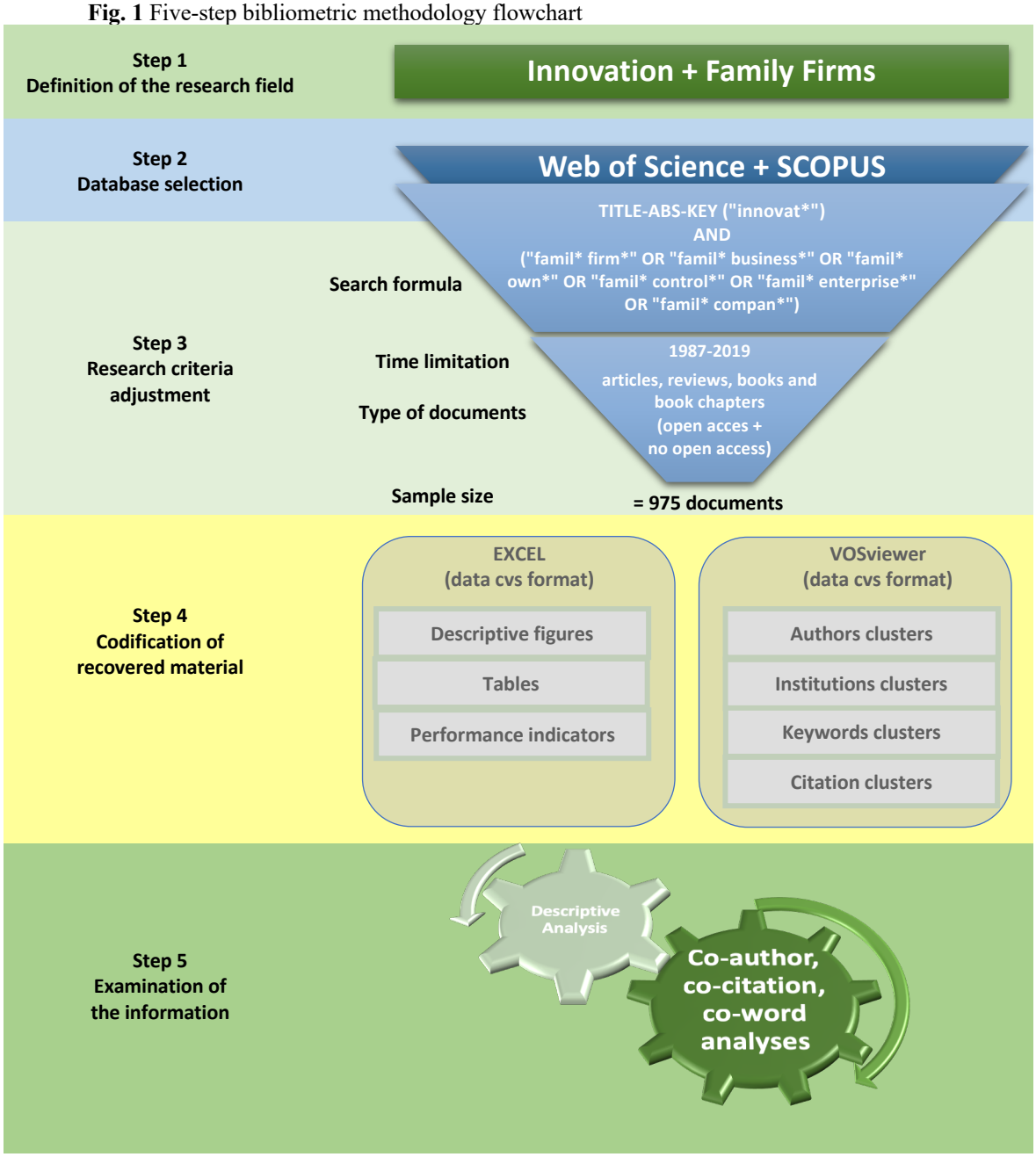
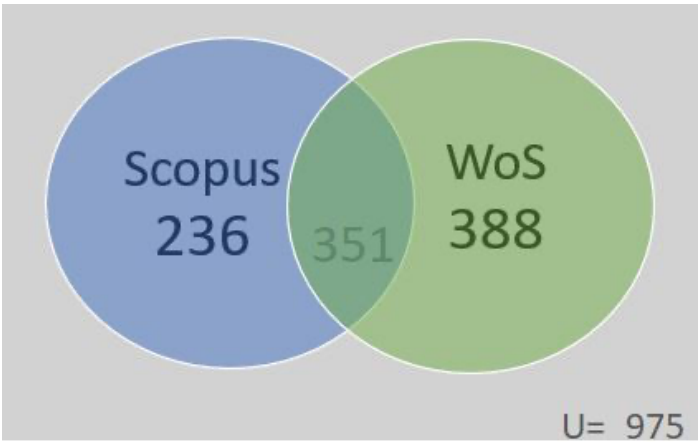


**Fig. 2** Final sample of documents




## 4. Results

The results are described and interpreted in three sub-sections. First, we show the descriptive analysis based on the examination of the scientific production and collaborations using performance and co-author analyses. Second, we present the co-citation analysis by examining publications that are frequently co-cited by other articles. Third, we show the co-word analysis through the investigation of keywords co-occurrence and their temporal evolution.

### 4.1. Descriptive and Performance Analyses

The summary of the coded data is shown in Table 1, which constitutes the data used to develop this bibliometric study. This represents a total of 975 documents by 2,507 authors affiliated with institutions in 72 countries and published in 458 journals, cited 16,635 times and using 69,748 references.

**Table 1** Summary of data used

| Data | FFI research |
|---|---|
| Number of documents | 975 |
| Number of journals | 458 |
| Number of authors | 2,507 |
| Number of countries | 72 |
| Number of citations | 16,635 |
| Number of references | 69,748 |

Table 2 shows some of the main productive indicators of published documents per year such as number of documents, average citations, number of authors, average number of authors per articles, number of journals and countries that published at least 1 article in a specific year. Regarding the number of articles, an increasing trend can be observed, with the last years 2018 and 2019 being the most productive during the period with 133 and 162 published articles, respectively. Furthermore, the analysis of the number of citations revealed that 2007 is the year with the highest number of citations (1,620) and an average ratio of citations per article of 95.29, although 2005 stands out for the highest average citations per article (118.46) with a total of citations of 1,540. What is more, the number of authors has increased exponentially with 476 authors involved in 2019, showing a growing interest and an increasing number of collaborations among authors in the FFI field. Moreover, this widespread research field has been accompanied by constant growth in the number of journals and countries publishing articles. In the last decade, 2009 accounted for 17 different journals and 12 different countries, whereas in 2019 there were 114 different journals and 43 different countries that published at least one article related to this research topic.

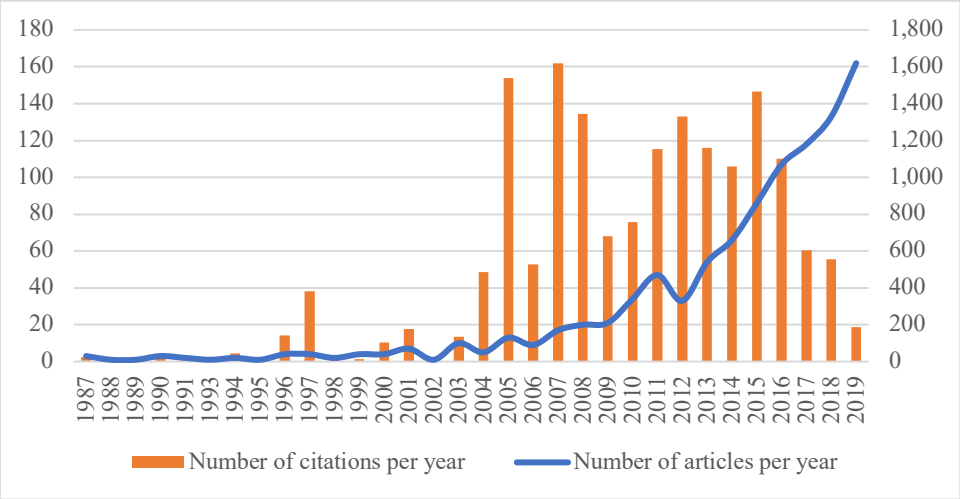
**Table 2** Main characteristics of the data used

| Year | A | C | C/A | AU | AUA | JA | COA |
|---|---|---|---|---|---|---|---|
| 1987 | 3 | 25 | 8.33 | 7 | 2.33 | 3 | 2 |
| 1988 | 1 | 0 | 0.00 | 1 | 1.00 | 1 | 1 |
| 1989 | 1 | 0 | 0.00 | 1 | 1.00 | 1 | 1 |
| 1990 | 3 | 20 | 6.67 | 7 | 2.33 | 3 | 1 |
| 1991 | 2 | 8 | 4.00 | 4 | 2.00 | 2 | 1 |
| 1993 | 1 | 0 | 0.00 | 4 | 4.00 | 1 | 1 |
| 1994 | 2 | 46 | 23.00 | 3 | 1.50 | 2 | 2 |
| 1995 | 1 | 0 | 0.00 | 1 | 1.00 | 1 | 1 |
| 1996 | 4 | 142 | 35.50 | 6 | 1.50 | 4 | 3 |
| 1997 | 4 | 383 | 95.75 | 7 | 1.75 | 4 | 2 |
| 1998 | 2 | 11 | 5.50 | 3 | 1.50 | 2 | 1 |
| 1999 | 4 | 13 | 3.25 | 4 | 1.00 | 4 | 1 |
| 2000 | 4 | 103 | 25.75 | 4 | 1.00 | 4 | 4 |
| 2001 | 7 | 178 | 25.43 | 12 | 1.71 | 7 | 4 |
| 2002 | 1 | 0 | 0.00 | 4 | 4.00 | 1 | 1 |
| 2003 | 10 | 136 | 13.60 | 14 | 1.40 | 10 | 5 |
| 2004 | 5 | 485 | 97.00 | 8 | 1.60 | 5 | 2 |
| 2005 | 13 | 1,540 | 118.46 | 31 | 2.38 | 9 | 8 |
| 2006 | 9 | 527 | 58.56 | 15 | 1.67 | 6 | 5 |
| 2007 | 17 | 1,620 | 95.29 | 42 | 2.47 | 16 | 8 |
| 2008 | 20 | 1,344 | 67.20 | 50 | 2.50 | 19 | 10 |
| 2009 | 21 | 679 | 32.33 | 45 | 2.14 | 17 | 12 |
| 2010 | 34 | 756 | 22.24 | 70 | 2.06 | 25 | 14 |
| 2011 | 47 | 1,154 | 24.55 | 109 | 2.32 | 38 | 21 |
| 2012 | 33 | 1,331 | 40.33 | 80 | 2.42 | 27 | 14 |
| 2013 | 54 | 1,160 | 21.48 | 146 | 2.70 | 41 | 18 |
| 2014 | 66 | 1,058 | 16.03 | 156 | 2.36 | 59 | 22 |
| 2015 | 86 | 1,466 | 17.05 | 233 | 2.71 | 53 | 31 |
| 2016 | 107 | 1,102 | 10.30 | 298 | 2.79 | 73 | 33 |
| 2017 | 118 | 605 | 5.13 | 309 | 2.62 | 82 | 38 |
| 2018 | 133 | 555 | 4.17 | 357 | 2.68 | 101 | 43 |
| 2019 | 162 | 188 | 1.16 | 476 | 2.94 | 114 | 43 |

A: Number of published articles per year; C: Number of citations per year; C/A: Average number of citations per article; AU: Number of authors per year; AUA: Number of authors that published at least 1 article in a specific year; JA: Number of journals that published at least 1 article in a specific year; COA: Number of countries that published at least 1 article in a specific year.

Figure 3 shows the chronological distribution of the number of published articles on the subject. As can be seen, Figure 3 reveals an increase from 1987 to 2019 in both number of articles and citations. The period could be divided in three sub-periods. First, from 1987 to 2004 is the initial phase where the number of publications was scarce and no year exceeded ten articles. In terms of citations, the most relevant years are 1997, 2001 and 2004 with a number of citations of 383, 178 and 485, respectively. Second, from 2005 to 2014 a take-off phase can be observed, in which it is evident that the field has attracted the attention of the research community. From 2005 to 2014, the number of published articles has exponentially increased from 13 to 66. Of particular relevance are 2005 and 2007 for the number of citations received by the articles published in each year (1,540 and 1,620, respectively). Third, the last period encompasses from 2015 onwards and is a flourishing productive period, dubbed as the splendour phase, where there is an increasing trend with around a hundred documents per year.

**Fig. 3** Evolution of published articles and citations from 1987 to 2019




#### 4.1.1. Scientific production

With regard to the journals, Table 3 presents additional bibliometric indicators, such as citations, average citations per article, year of first publication, year of last publication and the h-Index. The most relevant journal is indisputably *Family Business Review* with 34 articles and 2,546 citations during the 1990-2019 period, years of the first and the last published articles, respectively. In second position, the *Journal of Family Business Strategy* and the *Journal of Family Business Management* stand out with 31 articles, followed by *Entrepreneurship Theory and Practice* with 21. *Family business Review* is also the most influential journal according to the number the citations (2,546), followed in second place by *Entrepreneurship Theory and Practice* (1,581) and, in third place by *Journal of Business Venturing*, which despite not being listed in Table 3 because of its low article production on the subject, is the third most influential journal with a number of citations of 812 (results of the ten most influential journals according to the number of citations are available upon request from the authors). *Entrepreneurship Theory and Practice* becomes the first journal regarding the average number of citations per article (75.29). Furthermore, *Entrepreneurship Theory and Practice* also occupies the first position regarding the average number of citations per article since the year of the first published article, an indicator which tries to mitigate the impact of the year of publication, with a rate of 105.40. Moreover, the h-Index, as a quality index representing a balance between the number of publications and citations received by these publications, reveals that *Family Business Review* (23) ranks first, *Entrepreneurship Theory and Practice* (14) holds the second place and the *Journal of Family Business Strategy* (12) takes the third position. This indicator also shows that although *Entrepreneurship Theory and Practice* is ranked below the *Journal of Family Business Management* (7), it can be asserted that the former has exerted a greater influence on the FFI subject than the latter. Finally, the country of origin of the journals is worthy of mention. The journals are equally distributed between the United States, the United Kingdom and the Netherlands with three journals corresponding to each one. Germany also appears with one journal. This indicates that Europe is the region at the forefront of FFI.

**Table 3** Ten most productive journals

| Journal | A | COU | C | C/A | 1st A | Last A | C/Y | h-index |
|---|---|---|---|---|---|---|---|---|
| Family Business Review | 34 | United States | 2,546 | 74.88 | 1990 | 2019 | 87.79 | 23 |
| Journal of Family Business Strategy | 31 | Netherlands | 428 | 13.81 | 2010 | 2019 | 47.56 | 12 |
| Journal of Family Business Management | 31 | United Kingdom | 113 | 3.65 | 2011 | 2019 | 14.13 | 7 |
| Entrepreneurship Theory and Practice | 21 | United States | 1,581 | 75.29 | 2004 | 2019 | 105.40 | 14 |
| Journal of Business Research | 21 | Netherlands | 332 | 15.81 | 2000 | 2019 | 17.47 | 11 |
| Small Business Economics | 19 | Netherlands | 728 | 38.32 | 2000 | 2019 | 38.32 | 11 |
| International Journal of Entrepreneurial Behavior & Research | 19 | United Kingdom | 281 | 14.79 | 2008 | 2019 | 25.55 | 10 |
| Asia Pacific Journal of Management | 18 | United States | 311 | 17.28 | 2003 | 2019 | 19.44 | 9 |
| Journal of Product Innovation Management | 13 | United Kingdom | 571 | 43.92 | 1994 | 2018 | 23.79 | 10 |
| International Entrepreneurship and Management Journal | 13 | Germany | 103 | 7.92 | 2015 | 2018 | 34.33 | 6 |

A: Number of total articles; COU: Countries; C: Number of citations per year; C/A: Average citation per article; 1st A: Year of first published article; Last A: Year of last published article; C/Y: Average number of citations per year since the 1st A.

Table 4 shows the top twenty most cited articles published during the last decade taking into account the year of publication. The fact of considering the year of publication is a common practice to overcome the limitation that newer articles may experience when only the total number of citations is regarded (Zupic and Čater 2015). De Massis et al. (2018a) is indisputably the leading article in the FFI subject with the highest number of citations per year (47.00). Exploring more specifically the research areas of these most influential articles, it is important to note that all of them have a common interest in innovation, in some cases analysing it from a resource-based view, and in others with particular emphasis on issues related to the ability and willingness paradox, family firms' heterogeneity and entrepreneurship. De Massis et al. (2018a) use the resource-based view foundations to explore innovative Mittelstand firms and identify six distinctive but highly interdependent features (e.g. preference for self-financing), which enable such firms to efficiently orchestrate their resources to innovate and outperform their competitors in the global market. In a similar way, Duran et al. (2016), the second most influential article (43.33 citations per year), reveal that although family firms invest less in innovation, they achieve a higher conversion rate of innovation inputs into innovation outputs, and therefore, have higher innovation outputs than non-family firms. Jaskiewicz et al. (2015) introduce the concept of entrepreneurial legacy and theorize that it motivates current and next generation family owners to engage in strategic activities, such as innovation, which foster transgenerational entrepreneurship. Finally, it is also worth mentioning the article of Chua et al. (2012), who provide a more comprehensive understanding of family firms' heterogeneity and point out that the particular vision and goals of the family influence strategic decisions, including that of innovation.

**Table 4** Twenty most cited articles published in the last decade taking into consideration the year of publication

| Title | Authors | Journal | Year | TC | C/Y |
|---|---|---|---|---|---|
| Innovation with Limited Resources: Management Lessons from the German Mittelstand | De Massis, A; Audretsch, D; Uhlaner, L; Kammerlander, N | JPIM | 2018 | 47 | 47.00 |
| Doing more with less: Innovation input and output in family firms | Duran, P; Kammerlander, N; van Essen, M; Zellweger, T | AMJ | 2016 | 130 | 43.33 |
| Entrepreneurial legacy: Toward a theory of how some family firms nurture transgenerational entrepreneurship | Jaskiewicz, P; Combs, JG; Rau, SB | JBV | 2015 | 146 | 36.50 |
| Sources of Heterogeneity in Family Firms: An Introduction | Chua, JH; Chrisman, JJ; Steier, LP; Rau, SB | ETP | 2012 | 242 | 34.57 |
| The Ability and Willingness Paradox in Family Firm Innovation | Chrisman, JJ; Chua, JH; De Massis, A; Frattini, F; Wright, M | JPIM | 2015 | 118 | 29.50 |
| Research on Technological Innovation in Family Firms: Present Debates and Future Directions | De Massis, A; Frattini, F; Lichtenthaler, U | FBR | 2013 | 172 | 28.67 |
| Product Innovation in Family versus Nonfamily Firms: An Exploratory Analysis | De Massis, A; Frattini, F; Pizzurno, E; Cassia, L | JSBM | 2015 | 106 | 26.50 |
| R&D investments in family and founder firms: An agency perspective | Block, JH | JBV | 2012 | 174 | 24.86 |
| Should I stay or should I go? Career choice intentions of students with family business background | Zellweger, T; Sieger, P; Halter, F | JBV | 2011 | 191 | 23.88 |
| Risk abatement as a strategy for R&D investments in family firms | Patel, PC; Chrisman, JJ | SMJ | 2014 | 119 | 23.80 |
| Socioemotional Wealth as a Mixed Gamble: Revisiting Family Firm R&D Investments With the Behavioral Agency Model | Gomez-Mejia, LR; Campbell, JT; Martin, G; Hoskisson, RE; Makri, M; Sirmon, DG | ETP | 2014 | 114 | 22.80 |
| Innovation and performance in latin-american small family firms | Maldonado-Guzmán G., Marín-Aguilar J.T., García-Vidales M. | AEFR | 2018 | 22 | 22.00 |
| An analysis of the interplay between organizational sustainability, knowledge management, and open innovation | Lopes, CM; Scavarda, A; Hofmeister, LF; Thome, AMT; Vaccaro, GLR | JCP | 2017 | 41 | 20.50 |
| Innovation through tradition: Lessons from innovative family businesses and directions for future research | De Massis, A; Frattini, F; Kotlar, J; Petruzzelli, AM; Wright, M | AMP | 2016 | 61 | 20.33 |
| Tradition and innovation in Italian wine family businesses | Vrontis, D; Bresciani, S; Giacosa, E | BFJ | 2016 | 60 | 20.00 |
| Tracing the Roots of Innovativeness in Family SMEs: The Effect of Family Functionality and Socioemotional Wealth | Filser, M; De Massis, A; Gast, J; Kraus, S; Niemand, T | JPIM | 2018 | 18 | 18.00 |
| Innovativeness in family firms: a family influence perspective | Kellermanns, FW; Eddleston, KA; Sarathy, R; Murphy, F | SBE | 2012 | 123 | 17.57 |
| Firm Innovation in Emerging Markets: The Role of Finance, Governance, and Competition | Ayyagari, M; Demirguc-Kunt, A; Maksimovic, V | JFQA | 2011 | 136 | 17.00 |
| Psychological ownership, knowledge sharing and entrepreneurial orientation in family firms: The moderating role of governance heterogeneity | Pittino, D; Martinez, AB; Chirico, F; Galvan, RS | JBR | 2018 | 17 | 17.00 |
| The Agile Innovation Pendulum: A Strategic Marketing Multicultural Model for Family Businesses | Thrassou A., Vrontis D., Bresciani S. | ISMO | 2018 | 17 | 17.00 |

TC: Total cites; C/Y: Average number of citations per year from the publication date of the article; JPIM: Journal of Product Innovation Management; AMJ: Academy of Management Journal; JBV: Journal of Business Venturing; ETP: Entrepreneurship Theory and Practice; FBR: Family Business Review; JSBM: Journal of Small Business Management; SMJ: Strategic Management Journal; AEFR: Asian Economic and Financial Review; JCP: Journal of Cleaner Production; AMP: Academy of Management Perspectives; BFJ: British Food Journal; SBE: Small Business Economics; JFQA: Journal of Financial and Quantitative Analysis; JBR: Journal of Business Research; ISMO: International Studies of Management and Organizations.

#### 4.1.2. Scientific collaborations

In this section, co-author analyses are applied to establish a structure of the social networks based on collaborations between authors, which enables an analysis at the level of institutions (Zupic and Čater 2015).

The ten most productive authors on FFI are displayed in Table 5. The ten authors represent eleven institutions, seven countries and two regions, Europe and North America. It is worth mentioning that the affiliation indicated in Table 5 belongs to the last year (2019) and three authors are affiliated to two different institutions, namely, De Massis A., Kotlar J., and Chrisman J.J. De Massis A. belongs to the Free University of Bozen-Bolzano (Italy) and is also affiliated to Lancaster University (United Kingdom). In the same vein, Kotlar J. is affiliated to both Lancaster University (United Kingdom) and the Politecnico of Milan (Italy). Likewise, Chrisman J.J. is affiliated to Mississippi State University (United States) and also with the University of Alberta (Canada). The double affiliation is shown in the network of institutions (Figure 4), forming a strong network of collaborations between such institutions.
With regard to number of articles, the main author is De Massis A. with a total of 30 articles on the topic and 1,050 citations since 2012. He is followed by Kotlar J. and Kraus S., both of whom have 14 articles. However, when the number of citations is considered, the second most cited author is Frattini F. with a total of 695 citations since 2013 and the third most cited is Nordqvist M. with 682 citations since 2007. In this vein, Nordqvist M. stands as the author with the highest ratio of citations per article (97.43), followed by Kammerlander N. (58.33) and Frattini F. (51.82). Moreover, concerning the h-index, the three most influential authors are De Massis, A (30), Kraus, S (17), and Frattini, F (10). Finally, it is worth mentioning that six of these ten authors have started publishing on this topic in the last eight years, from 2012 onwards, this being an indicator of the growing popularity of the FFI field among academics.

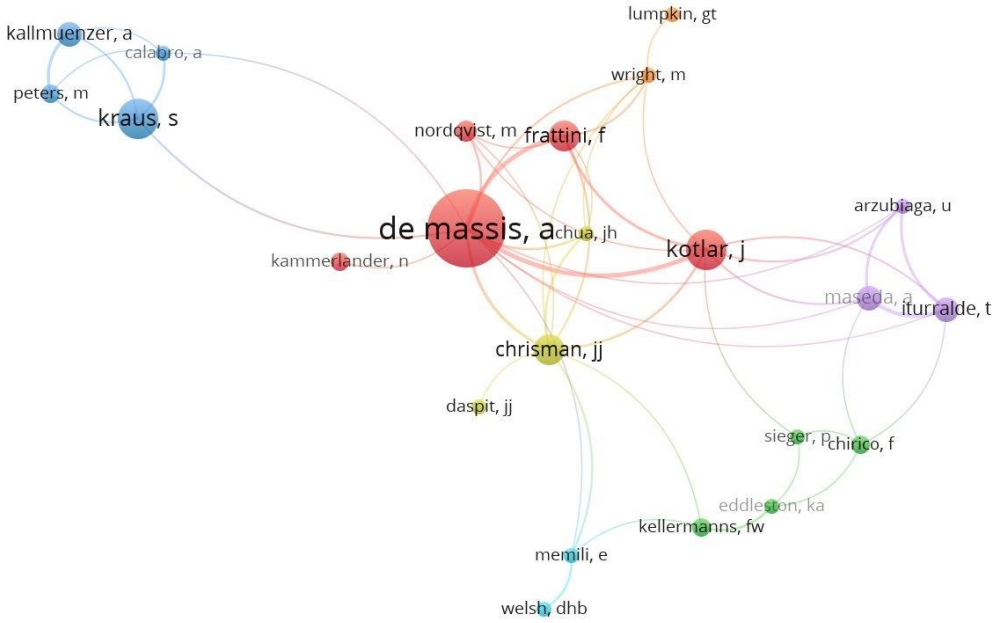
**Table 5** The top ten most productive authors on FFI

| Author | A | C | C/A | 1st A | Last A | h-Index | Country | Affiliation |
|---|---|---|---|---|---|---|---|---|
| De Massis, A | 30 | 1,050 | 30.38 | 2012 | 2019 | 30 | Italy/ United Kingdom | Free University of Bozen-Bolzano/ Lancaster University |
| Kotlar, J | 14 | 341 | 16.27 | 2012 | 2019 | 9 | Italy/ United Kingdom | Politecnico Milan/ University of Lancaster |
| Kraus, S | 14 | 159 | 8.90 | 2010 | 2019 | 17 | Italy | Free University of Bozen-Bolzano |
| Frattini, F | 11 | 695 | 51.82 | 2013 | 2019 | 10 | Italy | Politecnico Milan |
| Giacosa, E | 11 | 84 | 5.30 | 2014 | 2019 | 4 | Italy | University Turin |
| Chrisman, J.J | 10 | 619 | 45.89 | 2011 | 2019 | 8 | United States/ Canada | Mississippi State University/ University of Alberta |
| Kallmuenzer, A. | 8 | 56 | 1.75 | 2016 | 2019 | 6 | France | La Rochelle Business School |
| Craig, J. | 8 | 416 | 1.75 | 2006 | 2017 | 8 | United States | Northwestern University |
| Nordqvist, M | 7 | 682 | 97.43 | 2007 | 2018 | 7 | Sweden | Jönköping International Business School |
| Kammerlander, N. | 6 | 350 | 58.33 | 2013 | 2018 | 6 | Germany | WHU - Otto Beisheim School of Management |

A: Number of published articles per year; C: Number of citations per year; C/A: Average number of citations per article; 1st A: Year of first published article; Last A: Year of last published article.

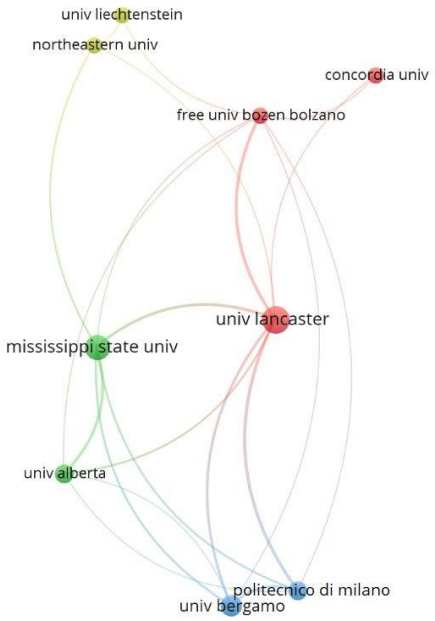
Figure 4 shows seven clusters of collaborations between authors that have a minimum of five documents in common. The first cluster (red) is led by De Massis A., who is considered the most productive author according to the number of published articles and total citations. He could be considered the leader of the main European network having relationships with Kotlar J., Frattini F., Nordqvist M., and Kammerlander N. The second cluster is led by Chirico F. and Kellermanss F.W. with collaborations with Eddleston K.A. and Sieger S. The third cluster (blue) is led by Kraus S., one of the most productive authors who collaborates with Calabrò A., Kallmuenzer A. and Peters M. The fourth cluster (yellow) is led by Chrisman J.J., who works together with Chua J.H. and Daspit J.J. The fifth cluster (purple) is the Spanish cluster made up of Iturralde T., Arzubiaga U. and Masseda A. belonging to the University of Basque Country. The sixth cluster (light blue) is from the University of North Carolina composed by Welsh D.H.B. and Memili E. The last cluster (orange) is formed by Wright M. and Lumpkin G.T. from Syracuse University (USA) and the University of Ghent (Belgium).

**Fig. 4** Network collaborations between authors from 1987 to 2019




Collaborations between authors give rise to international networks among different institutions. Figure 5 shows such networks, which take into account ten or more common scientific studies among researchers, with four clusters identified. The main cluster (red) is the most productive inasmuch as it includes three universities, Lancaster University (United Kingdom), the Free University of Bozen-Bolzano (Italy) and Concordia University (Canada), which are linked with the other three clusters. The green cluster is led by Mississippi State University (United States) and the University of Alberta (Canada). The yellow cluster is made up of the Northeastern University (United States) and the University of Liechenstein (Liechenstein). Finally, the blue cluster is the Italian network, including Bergamo University and the Politecnico de Milan. Thus, there are two intracontinental (green and blue) and two international (red and yellow) networks. As can be seen, the Italian institutions show strong connections between them and with the most proactive institutions, namely Lancaster University (United Kingdom).

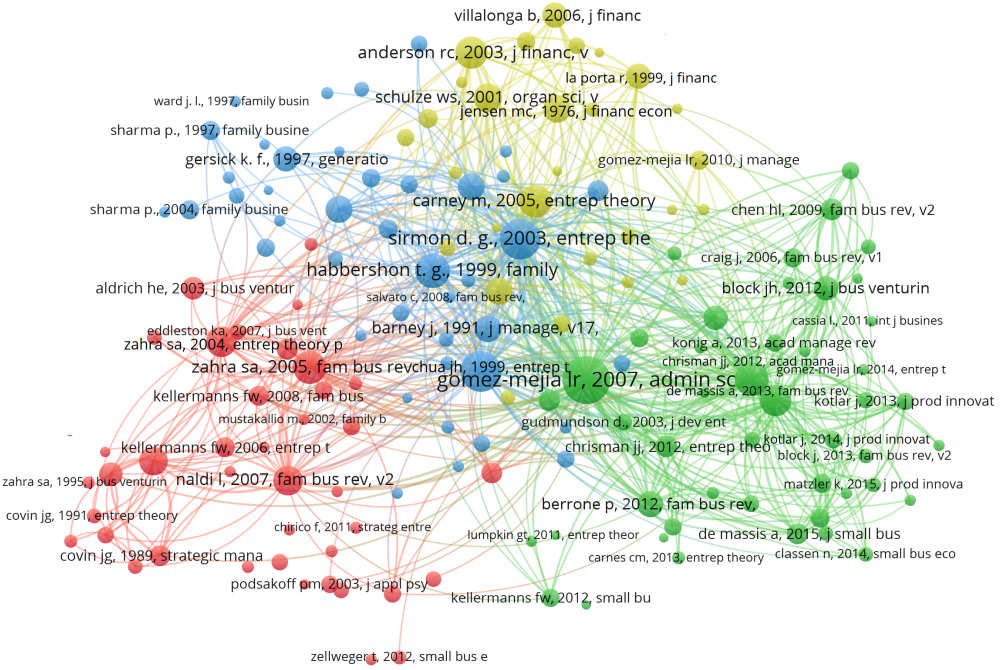
**Fig. 5** Network of co-authorship-based cooperation between institutions from 1987 to 2019



### 4.2. Co-citation Analysis

The next step in our bibliometric analysis is to reveal the intellectual structure and theoretical foundations of FFI research. The co-citation networks of the references in FFI are displayed in Figure 6. The conducted analysis discloses the key theories and seminal papers that form the core of FFI foundations. The FFI co-citation network establishes four clusters.

**Fig. 6** Co-citation network in the FFI research field from 1987 to 2019




The first cluster (red) is composed of 50 papers, covering the period from 1977 to 2015. The main contributors are Zahra (2005), Naldi et al. (2007) and Zahra et al. (2004). The core element characterizing the cluster is entrepreneurship, with a specific focus on entrepreneurial orientation (Lumpkin and Dess 1996), of which innovativeness is one of its main dimensions. This set of studies mainly focuses on analysing how distinct characteristics of the firm (e.g. organizational culture or financial control), the family (e.g. CEO founder tenure or family ownership) and external factors (e.g. environment dynamism or technological opportunities) affect family firms' entrepreneurial behaviour, and, in turn, their performance outcomes compared to non-family firms. Additionally, the cluster also proposes extending entrepreneurial orientation scales to provide a more detailed description of corporate entrepreneurship in long-lived family firms (Zellweger and Sieger 2012).

The second cluster (green) is composed of 47 papers, spanning from 2003 to 2016. The top cited articles are those by Gómez-Mejía et al. (2007), Chrisman and Patel (2012) and De Massis et al. (2013). This cluster mainly relies on behavioural agency theory, as well as on the most recent socioemotional wealth and mixed gamble perspectives. The heart of the cluster is made up of papers seeking to better understand how family firms cope with socioemotional factors when undertaking risk-taking strategic choices, such as technological external acquisitions (Kotlar et al. 2013) or adoption of discontinuous technologies (König et al. 2013). This cluster also includes articles trying to identify mechanisms and factors that explain how family firms 'do more with less' in their technological innovation processes (Duran et al. 2016). The seminal paper on socio-emotional wealth by Gómez-Mejía et al. (2007) deserves recognition as a key article explaining how family firms can be both risk willing and risk averse when conducting their decision-making processes.

The third cluster (blue) is composed of 44 papers, ranging from 1987 to 2012. The most cited articles are those of Sirmon and Hitt (2003), Chua et al. (1999) and Habbershon and Williams (1999). This cluster appears to rely on strategic management, focusing mainly on the resource-based view. The contributions of this cluster highlight the ways in which family goals, relationships and resources need to be managed to

create competitive advantages that will enable more successful innovations and subsequent improvements in firm performance. In particular, studies from this cluster focus on the study of social capital (e.g. Arregle et al. 2007), which as a highly valuable resource derived from relationships between individuals and businesses, has the potential to affect many firms' activities, such as innovation (Sirmon and Hitt 2003). Moreover, this cluster stands out for including the seminal papers of Barney (1991) concerning the resource-based view, Habbershon and Williams (1999) on the concept of familiness, and that of Chua et al. (1999) on the classic definition of a family firm.

The fourth cluster (yellow) is composed of 37 papers, spanning from 1963 to 2012. The main contributors are Carney (2005), Schulze et al. (2001) and Anderson et al. (2003). This cluster encompasses studies that, under the agency theory (Jensen and Meckling 1976), try to understand the effect of family corporate governance on value creation, firm growth or financial performance. Namely, the studies making up this cluster seek to identify the repercussions of the existence or of the non-existence of agency costs on family firms' outcomes (e.g. Gómez-Mejía et al. 2001). Some core elements in this cluster are family ownership, control and management (Villalonga and Amit 2006), family dynamics and altruism (Schulze et al. 2001), and founding family ownership (Anderson et al. 2003). It is worth noting the most cited paper in this cluster, Carney (2005), which emphasizes that family firms' competitive advantage stems from their system of corporate governance.

A synthesis of the main features of the clusters is presented in Table 6.

**Table 6** Identified clusters in co-citation analysis

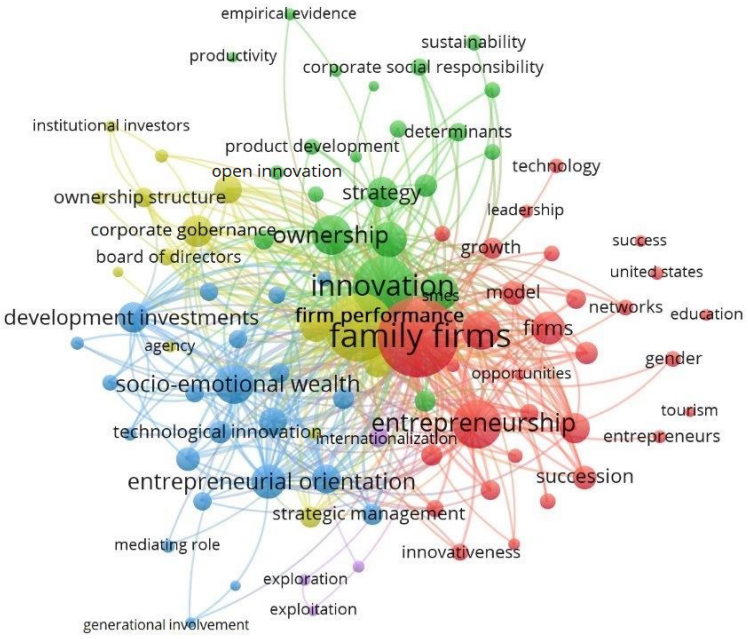
| Cluster | Colour in the network | Number of papers | Time spam | Top cited papers |
|---|---|---|---|---|
| 1 | Red | 50 | 1977-2015 | Zahra (2005), Naldi et al. (2007), Zahra et al. (2004) |
| 2 | Green | 47 | 2003-2016 | Gómez-Mejía et al. (2007), Chrisman and Patel (2012), De Massis et al. (2013) |
| 3 | Blue | 44 | 1987-2012 | Sirmon and Hitt (2003), Chua et al. (1999), Habbershon and Williams (1999) |
| 4 | Yellow | 37 | 1963-2012 | Carney (2005), Schulze et al. (2001), Anderson et al. (2003) |

### 4.3. Co-word Analysis

#### 4.3.1. Identification and comprehensive analysis of semantic clusters

An examination of the content of the articles enables the main trends in FFI research to be recognised and potential research avenues to be identified. Figure 7 shows the network with the recognition of five thematic clusters that group together the principal keywords. The main clusters identified are: "family firms" (red), "innovation" (green), "socio-emotional wealth" (blue), "firm performance" (yellow), and "internationalization" (purple). We determine the cluster name according to the keyword that is in the main node and thus, is better connected with the rest of the cluster keywords (López-Fernández et al. 2016). Figure 7 is of great value for future researchers who want to explore a specific topic within the FFI field, to the extent that these keywords and their associated relationships will help them to identify the most important themes on the subject. Drawing on the cluster identification, the main co-words will be discussed in an attempt to re-organize and consolidate the extant literature.

**Fig. 7** Network of keywords used from 1987 to 2019




The first cluster is the red one, dubbed "Family Firms" since it is the main node in the cluster (López-Fernández et al. 2016). Family firms are ubiquitous and significant organizational forms or *businesses* of economies worldwide (La Porta et al. 1999), which, as previously commented, contribute to boosting the gross domestic product and to employment generation on a global scale (De Massis et al. 2018b).

Until now, there has been no consensus regarding the conceptualization of family firms, either in the economic (Ariza et al. 2005) or in the legal field (Rodríguez 2006). Indeed, nowadays there is no universally accepted definition of family firm (Martínez-Romero 2018; Zellweger 2017), with more than ninety different definitions having been identified in Europe (Mandl 2008). However, it is true that most studies dealing with family firm issues take the definition of Chua et al. (1999) as reference. These authors stated that a family firm is a business *"*governed and/or managed with the intention to shape and pursue the vision of the business held by a dominant coalition controlled by members of the same family or a small number of families in a manner that is potentially sustainable across generations of the family or families*"* (Chua et al. 1999, p. 25).

The lack of a distinct definition of the family firm has made it difficult to draw comparisons between studies and to integrate theories (Hernández-Linares et al. 2018; Kellermanns et al. 2012), which in turn, converts the family firm research field into a still growing area of investigation (Benavides-Velasco et al. 2013; Xi et al. 2015).

Specifically, a recent research stream highlights the interest of analysing the existing heterogeneity within the pool of family firms (Chua et al. 2012; Jaskiewicz and Dyer 2017). In this regard, it is widely accepted that family firms are highly heterogeneous in goals (Chrisman et al. 2012), governance structures (Carney 2005), or *resources* (Habbershon et al. 2003), which could substantially affect the *behaviour* and outcomes of some family firms in relation to others (Jaskiewicz and Dyer 2017). In this vein, research has endeavoured to illustrate the relevance of family in innovative *behaviour* and how the search for innovative solutions could lead to competitive advantage and success in family firms (Pitchayadol et al. 2018).

Taking into account other relevant nodes in this cluster, *entrepreneurship* and *entrepreneur* stand out as relevant and connected keywords. *Entrepreneurship* is a prominent topic since it has been widely recognized as a critical aspect for the survival and *growth* of family firms (Acs and Armington 2004; Classen et al. 2012), and is regarded as a driver of innovation (Bhaskaran 2004). Previous studies have often referred to *entrepreneurship* as the ability and willingness to undertake, arrange and manage a business venture along with any of the accompanying risks in order to obtain benefits and have also recognized that families are the source of oxygen that fuels the fire of *entrepreneurship* (López-Fernández et al. 2016; Rogoff and Heck 2003). In this respect, several authors (e.g. Casillas et al. 2010) posit that family firms offer a unique context for *entrepreneurship* as these firms intrinsically own a unique bundle

of *resources* and capabilities, namely *familiness* (Habbershon and Williams 1999), which encourage the ability to seize *opportunities* and the development of *investment*s. In this vein, the figure of the *entrepreneur* is highlighted in research, depicted according to their *leadership* style. Moreover, some academic studies have highlighted training and *education* in entrepreneurial skills for young generations as relevant in the family *organization* (Looi and Khoo-Lattimore 2015; Umirzakova et al. 2016), with a lack of *education* or training being a hindrance to innovativeness (Hausman 2005).

What is more, literature has revealed that *culture* has a radical effect on firm *innovativeness* (Çakar 2006; Herbig and Dunphy 1998). Thus, family *culture* is one of the categories of the innovation capability model (Lawson and Samson 2001) due to the fact that family *culture* improves the ability of families to be strategically flexible, which in turn, positively impacts on firm innovativeness and performance (Craig et al. 2014; Duréndez et al. 2011). Some authors have stated that family *culture* might lead to firm innovativeness through the creation of an *environment* and by sharing the firm vision and strategy, thereby fostering innovation (Bhaskaran 2004; Pitchayadol et al. 2018).

In addition, one of the main keywords is *networks.* Opening the doors to potential stakeholders such as suppliers, customers or universities to develop technological collaborations or *networks* is considered a means through which the *family firms'* innovative potential is unlocked (Calabrò et al. 2019). In this regard, networking relationships are known as *social capital*. Studies have investigated the role of family *social capital* to develop innovations (Letonja and Duh 2015; Pucci et al. 2020). Certain studies have analysed the impact of social capital on different types of innovation strategies, namely, radical or incremental (Alrubaishi and Robson 2019) whereas others have delved into the impact of different forms of *social capital*, distinguishing between external or internal (Lazzarotti et al. 2017; Sanchez-Famoso et al. 2014) or by differentiating according to geographical dimensions (Basco and Calabrò 2016; Ombrosi et al. 2019), finding inconclusive results.

Furthermore, closeness between customers and firm managers in family firms may ease the process of identifying unmet needs and thus enable the impetus for innovation. Accordingly, the inter-organizational *trust*, generated by such closeness, together with communication and cooperative competency become factors that instigate innovation (Hausman 2005; Sivadas and Dwyer 2000).

Finally, although *succession* is considered a subtle stage in a firm's lifecycle (Leiss and Zehrer 2018), it brings an ideal opportunity to achieve new innovative postures (Rondi et al. 2019). Research has been based on the notion that family firms tend to become less entrepreneurial across generations (De Massis et al. 2013; Kotlar and Sieger 2019). Namely, the abovementioned studies have focused on the relationship between predecessors and successors to maintain family firms' innovativeness, highlighting some factors that impact on the successors' innovative posture, such as entrepreneurialism, *knowledge* creation and transfer, and *social capital* (Letonja and Duh 2015). Moreover, recent studies have analysed the effects of intra-family *succession* on the typology of innovation (Rondi et al. 2019).

The second cluster is built around the keyword "Innovation". Innovation is considered one of the greatest challenges faced by family firms, since it is the engine that drives these businesses to survive and to remain competitive in the long-term (Kellermanns et al. 2012; Manzaneque et al. 2018). Studies analysing the innovative behaviour of family firms often emphasize the ability and willingness paradox (e.g. Chrisman et al. 2015), as a means of explaining the unusual patterns of family firms when developing innovations. This paradox demonstrates that family firms are less willing to innovate because they are risk-averse in order to maintain family control over the firm. Nevertheless, when family firms decide to innovate, they show an exceptional ability to obtain better innovative results compared to their non-family counterparts. Prior literature has made endless efforts to unravel this paradox and to shed light on the issue. In this respect, a set of articles (e.g. Kotlar et al. 2013) have focused on analysing the effect of family involvement in management, ownership and/or governance, in different innovation *strategies* (i.e. research and development investments, external *technology* acquisition) and outcomes (i.e. number of product innovations). Several papers (e.g. Kellermanns et al. 2012; Memili et al. 2015) examine the moderating role of different family and innovation variables in the achievement of organisational outcomes. An important part of these studies (e.g. Hatak et al. 2016) have focused on analysing when and to what extent certain family variables (e.g. family *involvement* in management and/or ownership) reinforce or weaken the effect that distinct innovation forms (e.g. innovative culture) exert on firm performance.

On the other hand, whereas most family firm literature has merely focused on directly linking different innovation inputs and innovation outputs to organizational outcomes, very recent fresh research (Manzaneque et al. 2020; Martínez-Alonso et al. 2020a) is giving increasing importance to the assumption that the efficiency with which innovation inputs are transformed into innovation outputs is a key to improving *financial performance* (Cruz-Cázares et al. 2013). Thus, if family members are aware of the

possibility of maximizing their innovation outputs by investing a certain amount in research and development, they will not be so reluctant to innovate, thereby fostering a culture of efficiency through which they will obtain higher performance outcomes.

Another important keyword which stands out in this cluster is small and medium enterprises (*SMEs). SMEs* are the backbone of regional economies, have an indisputable importance worldwide (Ahluwalia et al. 2017; Kraiczy 2013) and most of them are family firms (Mura and Mazák 2018). Although *SMEs* might lack financial resources, human capital, and suffer from over-involvement of owners and managers in decision-making, their flexibility to respond to changing environmental needs and the operational expertise of owners, may encourage them to seek innovation solutions (Hausman 2005). Thus, academic research has tried to link the characteristics of family *SMEs* to innovativeness and explain the importance of innovation for them. In such a way, innovativeness is regarded as one of the core elements affecting SME performance (Pitchayadol et al. 2018), being considered as the key for thriving and competing (Hausman 2005). Moreover, innovation in SMEs has pushed firms to become leaders in their niches, being deemed as the force for innovation in some regions (Kraiczy 2013). Academic studies have tried to elucidate whether the driver of innovation success may be the family influence within *SMEs.* Some of the results emphasize characteristics such as family power, experience and culture as enablers of innovativeness in family SMEs (Pitchayadol et al. 2018).

In addition, other words included in this cluster are *sustainability, sustainable development* and *corporate social responsibility.* Although the debate concerning whether family firms have a greater commitment to sustainability than their non-family counterparts is ongoing (Adomako et al. 2019), family firms are less likely than other firms to implement sustainable innovations (Cuadrado-Ballesteros et al. 2017; Doluca et al. 2018). Nevertheless, the premise of achieving *sustainable development* and the requirement of proactive actions to tackle environmental and social challenges is a general concern at all levels (Casado-Belmonte et al. 2020). In this vein, innovation is part of the decision-making process that enhances growth and *sustainability*. Thus, innovative activities should be pursued to integrate sustainable activities into the *strategy* of the firm. In such a context, innovation is deemed as the driving force behind *sustainable development*, and is becoming a key for survival in a competitive environment (Mura and Mazák 2018).

Furthermore, *corporate social responsibility* refers to sustainability reporting and is regarded as a way of communicating *sustainability* issues, connecting environmental and social responsibility with *financial performance* (Terán-Yépez et al. 2020). Research in this line has focused on the analysis of the relationship between sustainable activities and innovation (Wagner 2010), grounded on the potentiality of innovation to achieve sustainability without counteracting profitability, and the effect of family involvement on such a relationship (Adomako et al. 2019; Wagner 2010). Although some studies state that the implementation of environmental-related activities by family firms could differentiate them from their non-family counterparts in certain phases of the firm life cycle (Doluca et al. 2018), results are not conclusive.

Finally, another main word included in this cluster is *systems*. Research has emphasized the importance of an appropriate established management *system* in order to promote creativity and innovation (Ince 2018). Studies have shown that management control *systems* have a positive influence on family firm performance (Duréndez et al. 2011). Similarly, family managed firms that utilize management control *systems* and produce technological innovation are much more prone to generate better performance (Ruiz-Palomo et al. 2019). In this way, the conjunction of the use of formal management control *systems* with technological innovation could lead to obtain better performance outcomes.

The third cluster is labelled "Socio-emotional Wealth". This approach has become the most potential dominant paradigm in the family firm research field (Gómez-Mejía et al. 2007; Martínez-Romero and Rojo-Ramírez 2016). By Socio-emotional Wealth (hereafter, SEW), Gómez-Mejía et al. (2007, p. 106) referred to "non-financial aspects of the firm that meet the family's affective needs, such as identity, the ability to exercise family influence, and the perpetuation of the family dynasty*"*. These nonfinancial aspects have been stated to be the drivers of family firms' strategic behaviours (Martínez-Romero et al. 2020b), as decisions are taken with the ultimate goal of SEW preservation (Fitz-Koch and Nordqvist 2017). In other words, SEW preservation is the reference point for family firms' organizational behaviours and decisions (Sciascia et al. 2015). This implies that family firms tend to operate once they have evaluated how strategic decisions might impact on their SEW endowment (Berrone et al. 2010; Gómez-Mejía et al. 2011). Generally speaking, some authors have considered that SEW may act as a constraint on innovation inasmuch as family members would invest less in innovation to avoid a loss of family control (Alonso-Dos-Santos and Llanos-Contreras 2019; Block 2012). Due to SEW concerns, family firms have a lower innovative orientation than non-family firms.

Another topic included in this cluster is *Entrepreneurial Orientation (EO).* EO constitutes one of the most analysed terms within the entrepreneurship literature (Casillas and Moreno 2010; Wiklund 1999). EO has been defined as a strategic posture that implies a willingness to be proactive, risk-taking and innovative (Covin and Slevin 1989; Schepers et al. 2014). That is, EO depicts those practices and policies that provide the foundations for entrepreneurial behaviours, decisions and activities (Garcés-Galdeano et al. 2016). As mentioned above, family firms are usually reluctant to undertake entrepreneurial activities (Garcés-Galdeano et al. 2016; Martínez-Alonso et al. 2018), due to the fact that they often give higher priority to preserving their SEW endowment. Despite the long-lasting relevance of the topic in the entrepreneurship literature, in the family firm research field the EO research stream has received increased attention in the last decade, being mostly related to performance estimates, studying the *mediating* or *moderating role* of SEW in this relationship (Andrade-Valbuena et al. 2019; Schepers et al. 2014). In this vein, the positive relationship EO-performance is found to be particularly important when family ownership is combined with active family management and control (Lee and Chu 2017), suggesting the potential advantages of EO when active family governance alleviates agency problems and enables stewardship behaviours. In addition, other studies have found that when performance is below expectations, family firms show an increased innovative orientation (Alonso-Dos-Santos and Llanos-Contreras 2019; Patel and Chrisman 2014).

In addition, *absorptive capacity*, *competitive advantage* and *dynamic capabilities* are keywords included in this cluster. In this regard, familiness deemed as the unique bundle of resources linked to family involvement, may impact on the firm's *dynamic capabilit*ies, namely on the *absorptive capacity* by which innovation outcomes are altered (Daspit et al. 2019). Although the *dynamic capability* perspective is widely used in management, in the family firm field it is scarce. Therefore, taking into account the relevance of *knowledge*-related capabilities on the *long-term orientation* of family firms, much remains to be clarified regarding family influence on dynamic capabilities, uncovering if this influence is a help or a hindrance.

Additionally, the understanding on how firms develop *dynamic capabilities* through innovation, has drawn attention from the research community. Family firms use *technological innovation* to nurture their *competitive advantage*. Regarding *technological innovation* two types are distinguished: product and process innovation (Utterback and Abernathy 1975). Research has shown that the particularities of family firms differ from non-family firms with regards to *product innovation orientation* and organization of the innovation process (De Massis et al. 2015). In such a way, the combination of *technological innovation* with innovative capability and high levels of EO in *top management teams* (innovation decisions should be approved and authorized by firm managers) could help to transform innovation inputs into profits (Joshi and Srivastava 2015). Nevertheless, the investigation dealing with process innovation is scarce and further research is required (Diéguez-Soto et al. 2018).

The cluster "Firm performance" encompasses those studies where innovation strategy is explored in relation to performance in family firms. In this vein, the decision of a family firm to partake in innovative behaviour can be quite complex, since family firms often serve two, sometimes competing goals: that of economic efficiency and that of family social interests (Kellermanns et al. 2012). In this vein, the firm is expected to achieve financial and market success, while the family demands employment, identity, and wealth with long-term aspirations (Sun et al. 2019).

The extant research grounded in the potentiality of family firms to 'do more with less' (Duran et al. 2016; Martínez-Alonso et al. 2020a) makes it necessary to focus on firm performance. Although literature has shown that there exist complex arrays of systemic features that influence firm performance (Habbershon et al. 2003), a co-alignment of multiple factors is required to increase firm performance (Chirico et al. 2011). Nevertheless, academic research has exalted innovativeness as one of the core components affecting performance (Moreno-Gómez and Lafuente 2020; Pitchayadol et al. 2018).

Therefore, there exists a flourishing field of research exploring how innovativeness interacts with family influence to affect firm performance (Cliff and Jennings 2005). On the one hand, some studies often analyse the moderating effect of the different *governance* forms*,* namely the involvement in management, *ownership* and the characteristics of the *board of directors* in the relationship between innovation and performance (Diéguez-Soto et al. 2016; Hatak et al. 2016). On the other hand, other studies deal with the direct impact of family involvement on firm performance, with innovativeness acting as either a moderator (Kellermanns et al. 2012) or a mediator (Chong et al. 2013) in the relationship.

In this vein, the concept of involvement has been widely studied. Family involvement in management or the participation of family members on the *board of directors* might be a double-edged sword due to *agency* threats. However, research has highlighted that firms with greater family involvement in management experience superior performance or firm value (Dyer 2006; Kellermanns et al. 2012). Furthermore,

performance offers relevant feedback to managers that lead them to improvements in their innovation decisions (Lv et al. 2019). In addition, family involvement in ownership is studied through *ownership structure,* deemed as a proxy for the developmental stage of the firm (Gersick et al. 1997; Holy 2006). While the ownership is concentrated in the early stages of its life cycle, the generational ownership dispersion in later stages is considered to impact negatively on firm performance due to the increasing discord and competing interest (Gersick et al. 1997). Finally, external involvement, such as institutional involvement of private equity and banks has been analysed as elements that could moderate the relationship between family involvement and innovation investment (Cirillo et al. 2019; Gómez-Mejía et al. 2014). In this regard, *institutional investors* can modify the impact of family ownership on *research and development* decisions, encouraging managers to undertake risky investments, and subsequently benefit firm performance. Accordingly, Cirillo et al. (2019) have shown that the impact on innovation strategies may be different depending on the type of institutional investors.

While research has traditionally focused on the *agency* problems of non-family managers, literature on *stewardship* theory has highlighted the natural incentives of managers to act in the interest of the firm and its owners. Thus, an unresolved dialectic has persisted, focusing on opportunism and overlooking the drivers of non-family managers' behaviour (Kotlar and Sieger 2019). In this vein, the combination of *agency* and *stewardship* mechanisms requires further research to enrich the understanding of entrepreneurial gaps between family and non-family managers (Kotlar and Sieger 2019).

The fifth cluster is labelled "Internationalization". In this group, studies try to bridge three major concepts: innovation, internationalization and sustainable competitive advantage (Vătămănescu et al. 2019). Motivated by the resource-based view stating that family firms are naturally entrepreneurial and innovative, some studies show that family firms are more innovative and internationalized than nonfamily firms (Singh and Gaur 2013; Singh and Kota 2017) partly due to their social capital (Mzid et al. 2019). Additionally, there are studies that analyse the impact of international activities on innovation and firm performance with the moderating or mediating role of family governance (Tsao and Lien 2013) and there are also studies investigating the relationship between research and development investments and the degree of internationalization (Lin and Wang 2019; Ossorio 2018).

With regards to the strategy of expanding overseas, international activities might bring about both advantages and agency problems. Notwithstanding the above, family involvement in management alleviates agency problems associated with internationalization due to family firms experiencing positive benefits from internationalization in terms of innovation and performance (Ossorio 2018; Tsao and Lien 2013).

Other concepts included is this cluster are *exploration* and *exploitation*. Family firms can take an *exploration* or *exploitation* approach to incorporate innovation as part of their internationalization process (Ratten and Tajeddini 2017). In this vein, research has focused on strategies of *exploration* or *exploitation* as common accepted ways to categorize learning processes and innovation (Gupta et al. 2006; Strobl et al. 2020). While *exploration* focuses on developing new knowledge and building competences associated with changes and experimentation that enable the formation of new relationships, products and methods (Goel and Jones 2016), *exploitation* is associated with value creation through existing or slightly modified competences, built on existing knowledge and is something which allows organizations to realize the advantages of improvements. *Exploitation* is regarded as the steps taken after an opportunity has been explored and is commercially viable. Both *exploration* and *exploitation* are part of the opportunity identification process that affects firm performance (Gupta et al. 2006) and literature has studied the concept of organizational ambidexterity, i.e. the ability in family firms to balance *exploring* and *exploiting* activities at the same time (Allison et al. 2014; Hiebl 2015).

In addition, another keyword included in this cluster is *controlled firms.* This topic depicts the diverse risk preferences of different owner categories towards internationalization, namely family owners and institutional investors. In this way, the interaction between institutional investors and controlling family ownership structure has been recently studied. Results are inconclusive and the supportive or refractive behaviour of institutional investors in family *controlled firms* seems to be depend on the type of institutional investors (Panicker et al. 2019).

#### 4.3.2. Research trends

For a better analysis of the evolution of the keyword analysis, the period must be divided in sub-periods. The temporal evolution has been examined by considering the keywords timelines and the frequencies were normalized by the total number of keywords in each time sub-period (Agramunt et al. 2020). Table 7 shows the evolution of keywords in the whole period and the three sub-periods. The first sub-period encompasses 1987-2004 and is considered the initial phase, where the number of articles per year does not exceed 10.

The three keywords with higher co-occurrence are *innovation*, *company information* and *sales*. It is worth noting that there is only one article that includes *family firms* as a keyword. Specifically, family firm is included as a keyword in "Internationalisation of the family business: a longitudinal perspective" by Graves and Thomas (2004), which empirically shows that innovation commitment in family firms is associated with higher export intensity. This fact shows that previous studies in this sub-period included the concept of family but only in the title or in the abstract.

The second sub-period encompasses 2005 to 2014 and is dubbed as take-off phase as during this period the number of articles increased slowly but steadily. The three words with highest co-occurrence are *family firms*, *firm performance* and *innovation.* It is surprising that *firm performance* is even more used as a keyword than *innovation,* despite the latter being one of the keywords used in the search formula. This finding reveals that research has traditionally analysed innovation efforts under the lens of performance. Other relevant emergent words in this sub-period are *entrepreneurship*, *SMEs*, *ownership*, *management* and *agency*. The construct of *entrepreneurship* gains interest in this sub-period as a motor theme with which to achieve an innovation commitment. *SMEs* stands out as a common type of business within family firms and is other relevant keyword used in the studies of this sub-period. In addition, the relevance of the keywords *ownership*, *management* and *agency* epitomize the unresolved problems of agency between ownership and managers. Finally, *entrepreneurial orientation* is an emerging issue that has recently started to be included in the documents.

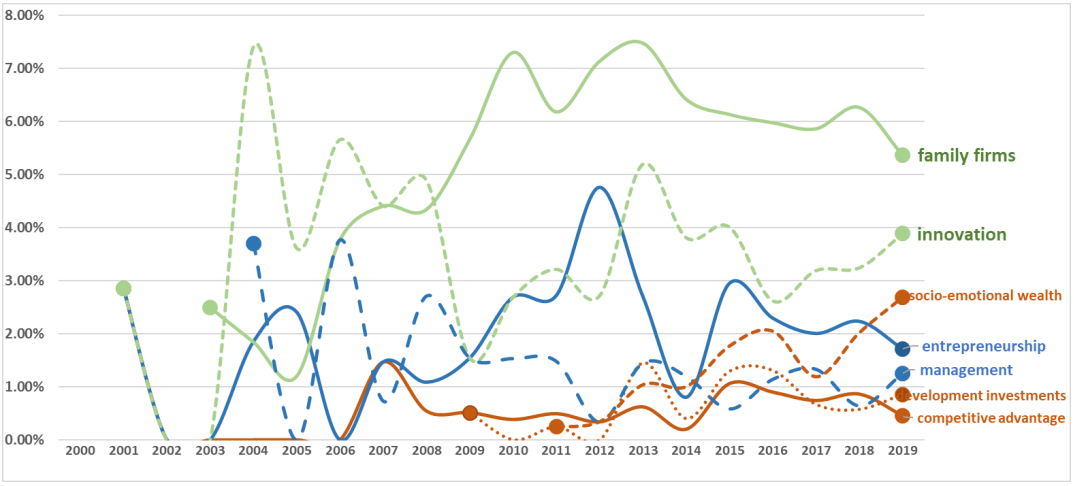
The third sub-period depicts the splendour phase encompassing 2015 to 2019. In this sub-period the number of articles is around a hundred and increased constantly up to 163 in 2019. The analysis of the co-occurrence keywords suggests several important aspects in this sub-period. First, *family firms, firm performance* and *innovation* continue to be basic and consolidated themes. Similarly, *entrepreneurship* and *entrepreneurial orientation* remain as basic topics as part of the innovation process in family firms. It is worth noting that *socio-emotional wealth* is an emergent keyword that did not appear in previous sub-periods. In this vein, the pursuance of innovation is connected to the socio-emotional endowment inherent to family firms. What is more, *competitive advantage* appears as an incipient concept, showing the emerging interest for discovering innovation postures that lead to competitive advantages.

**Table 7** Evolution of the most used keywords

| Rank | 1987-2019 | | | 1987-2004 | | | 2005-2014 | | | 2015-2019 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Keywords | A | % | Keywords | A | % | Keywords | A | % | Keywords | A | % |
| 1 | **family firms** | 547 | 18.83% | **innovation** | 5 | 2.26% | **family firms** | 161 | 6.22% | **family firms** | 385 | 5.88% |
| 2 | firm performance | 408 | 14.04% | company information | 4 | 1.81% | firm performance | 104 | 4.02% | firm performance | 303 | 4.63% |
| 3 | **innovation** | 323 | 11.12% | sales | 4 | 1.81% | **innovation** | 96 | 3.71% | **innovation** | 222 | 3.39% |
| 4 | entrepreneurship | 201 | 6.92% | marketing | 3 | 1.36% | entrepreneurship | 58 | 2.24% | entrepreneurship | 141 | 2.15% |
| 5 | socio-emotional wealth | 144 | 4.96% | australia | 2 | 0.90% | smes | 40 | 1.55% | socio-emotional wealth | 132 | 2.02% |
| 6 | ownership | 130 | 4.48% | customer satisfaction | 2 | 0.90% | ownership | 39 | 1.51% | business | 97 | 1.48% |
| 7 | smes | 125 | 4.30% | entrepreneurs | 2 | 0.90% | management | 35 | 1.35% | ownership | 90 | 1.37% |
| 8 | business | 121 | 4.17% | entrepreneurship | 2 | 0.90% | agency theory | 30 | 1.16% | smes | 84 | 1.28% |
| 9 | management | 105 | 3.61% | growth | 2 | 0.90% | firms | 27 | 1.04% | entrepreneurial orientation | 82 | 1.25% |
| 10 | agency theory | 102 | 3.51% | investments | 2 | 0.90% | business | 24 | 0.93% | agency theory | 72 | 1.10% |
| 11 | entrepreneurial orientation | 102 | 3.51% | leadership | 2 | 0.90% | corporate governance | 24 | 0.93% | management | 68 | 1.04% |
| 12 | firms | 88 | 3.03% | management | 2 | 0.90% | strategy | 24 | 0.93% | corporate governance | 60 | 0.92% |
| 13 | corporate governance | 85 | 2.93% | manufacturer | 2 | 0.90% | perspective | 22 | 0.85% | development investments | 60 | 0.92% |
| 14 | perspective | 76 | 2.62% | personnel | 2 | 0.90% | entrepreneurial orientation | 20 | 0.77% | firms | 60 | 0.92% |
| 15 | strategy | 73 | 2.51% | precast concrete | 2 | 0.90% | risk-taking | 20 | 0.77% | perspective | 54 | 0.82% |
| 16 | risk-taking | 72 | 2.48% | raw materials | 2 | 0.90% | research and development | 19 | 0.73% | risk-taking | 52 | 0.79% |
| 17 | development investments | 71 | 2.44% | strategic management | 2 | 0.90% | governance | 18 | 0.70% | governance | 51 | 0.78% |
| 18 | governance | 70 | 2.41% | technology | 2 | 0.90% | knowledge | 15 | 0.58% | competitive advantage | 50 | 0.76% |
| 19 | competitive advantage | 63 | 2.17% | **family firms** | 1 | 0.45% | model | 15 | 0.58% | strategy | 49 | 0.75% |

Figure 8 shows the temporal evolution of keywords. The motor themes, represented in green, are *family firms* and *innovation.* They can be considered consolidated terms that stand out as the main keywords throughout the period. The terms *entrepreneurship* and *management* are represented in blue and these are also basic issues related to the FFI field since they appear in all sub-periods as the most cited keywords. Finally, the topics that appear in brown, namely *socio-emotional wealth*¸ *development investments* and *competitive advantage,* are emerging subjects that have appeared in the last sub-period. Despite being cited in previous sub-periods, it is not until the last sub-period that these keywords appear as the most cited.

**Fig. 8** Normalized frequency of occurrence for each keyword among papers published in the considered period

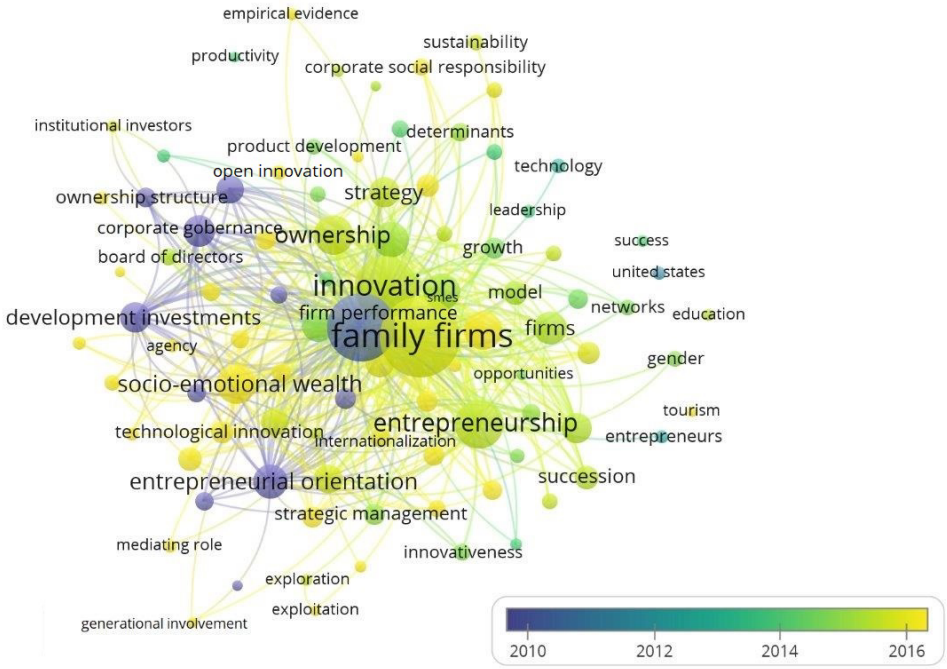



### 4.3.3. Challenging opportunities

The analysis of the keyword tendency, as can be seen in Figure 8, allows the detection of the most used keywords in the last years and the ensuing challenging opportunities. Figure 9 shows the overlay of keywords tendency, where the emergent topics are represented in yellow. As stated earlier, the network of *socio-emotional wealth* stands as a core concept on FFI. Moreover, *technological innovation* and *open innovation* appear as strategies for acquiring innovative capabilities in family firms.

In addition, the sustainability topic has gained interest and relevance. In this vein, related topics such as *corporate social responsibility* and *sustainable development* appear in yellow. This shows the growing awareness in family firms that achievement of sustainability and innovation go hand in hand. Finally, the network of *internationalization* together with the strategies of *exploration* and *exploitation* appear in yellow, showing the current challenge in family firm research to obtain competitive advantages based on an innovation posture through expanding overseas.

**Fig. 9** Temporal evolution of keywords network




## 5. General overview of identified clusters, research trends, and challenging opportunities: detection of future research avenues

After conducting a thorough evaluation of each cluster, analysing the research trends, and the challenging opportunities, we have organized the five clusters into a framework, which is shown in Figure 10, in order

to provide more information on the relationships between the different clusters. The aim of this framework is to shed new light on future research avenues that might be further explored in an effort to advance FFI research. These research lines and gaps are not intended to be exhaustive, but to serve as a framework to guide future studies on the subject.

The examination of the link between "Family Firms" and "Innovation" clusters is at the heart of this bibliometric analysis. Although family firm scholars have increasingly acknowledged that family firms are a very heterogeneous group of entities (Jaskiewicz and Dyer 2017), little is known about the ways in which such heterogeneity affects the ability and willingness of family firms to innovate, as the results remain inconclusive (Calabrò et al. 2019). This is because the sources of heterogeneity within family firms are quite diverse (e.g. Chua et al. 2012), ranging from their resources (i.e. familiness) or governance mechanisms (i.e. family ownership and/or management), to their values or their culture, and thus, determining which ones are most likely to affect the way innovation is conducted is a rather complex issue.

Moreover, innovation is considered to be a multidimensional phenomenon (Rosenbusch et al. 2011) and therefore, the particularities of each innovation type (e.g. organizational innovation) can lead to different challenges for the pool of family firms and in turn, cause them to behave in very different ways (Li and Daspit 2016). Accordingly, we call for more research on the heterogeneous innovation behaviour of family firms, to better understand how these firms shape the strategic decision-making process related to innovation. Specifically, an interesting research avenue could relate to the study of how the internal composition of the family firms' management, ownership or board of directors (in terms of generations represented, family branches, gender, tenure and educational diversity) (Barkema and Shvyrkov 2007) affects decisions to adopt and implement innovations. Furthermore, literature should focus on analysing some unexplored innovation issues such as open innovation (Gjergji et al. 2019), and technological innovation efficiency (Martínez-Alonso et al. 2020a), which may help family firms resolve the paradox in the manner they carry out distinct aspects of the innovation process.

With regards to the "Socio-emotional wealth" cluster, it can be argued that although SEW has become a hot topic in family firm research, with an emerging body of theoretical and empirical applications (Sanguino et al. 2020), its links with FFI remain an underdeveloped subject, representing a good opportunity for future research. Most of the seminal studies on the impact of SEW on FFI show that family firms invest less in innovation and prefer innovation projects that imply less of a threat to family control (e.g. Block et al. 2013). Similarly, other studies analysing the moderating role of SEW find that it weakens the benefits derived from family firms' entrepreneurial efforts to obtain firm performance (e.g. Schepers et al. 2014).

Nevertheless, more recent research questions this negative view, suggesting that SEW also has a bright side that can be conducive to innovation (Miller and Le Breton-Miller 2014). For example, Hauck and Prügl (2015) demonstrate that family adaptability and family members' closeness to the firm are positively related to the perception of the succession phase as an opportunity for innovation, while the opposite applies to intergenerational authority and the history of family ties. Therefore, more research is needed on this bright side of SEW, to unravel its hidden power to promote FFI.

Moreover, some authors (e.g. Martínez-Alonso et al. 2018) have recently highlighted the necessity to further investigate how the different SEW dimensions (i.e. family control and influence, identification of family members with the firm, binding social ties, emotional attachment and renewal of family bonds through dynastic succession) identified by Berrone et al. (2012) influence FFI. Up to now, the scarce research on the subject has focused merely on analysing how such SEW dimensions affect innovativeness (Filser et al. 2018; Lazzarotti et al. 2020) and technological innovation capabilities (Fitz-Koch and Nordqvist 2017). Hence, more research on how SEW dimensions might have an impact across different family contexts (family firms with varying levels of family involvement in management, ownership and board of directors) and types of innovation (e.g. product, process, organizational, and service innovation) is urgently needed.

The identification of "Firm performance" as a cluster, highlights that investigating the influence of innovation on performance outcomes continues to be a recurring theme within the family firm area (Fuetsch and Suess-Reyes 2017; Martínez-Alonso et al. 2018). This is because FFI is increasingly seen as the engine that enables family firms to perform better, and therefore ensuring their long-term survival (Manzaneque et al. 2018). However, despite numerous efforts to shed light on this prominent relationship, there are still important emerging gaps in the extant literature that need to be filled. For example, current knowledge on the way in which innovation inputs convert into innovation outputs (i.e. technological innovation efficiency) drives family firm performance is still at an embryonic stage. In this regard, Martínez-Alonso et al. (2020b) reveal a positive effect of technological innovation efficiency on a specific indicator of firm performance, namely firm growth, and show that such effect is greater in family managed firms than in

non-family managed firms. However, as performance is a complex construct with different dimensions that might not be necessarily related (Casillas et al. 2010), more research is required for the abovementioned results to be extrapolated. Accordingly, future studies based on the effect of innovation variables on firm performance should include multidimensional measures covering different financial, as well as emotional, performance indicators (Yeniaras et al. 2017). Going further, alternative performance indicators such as measures related to corporate social responsibility, sustainable development or sustainable performance could be analysed in relation to innovation (Székely and Knirsch 2005).

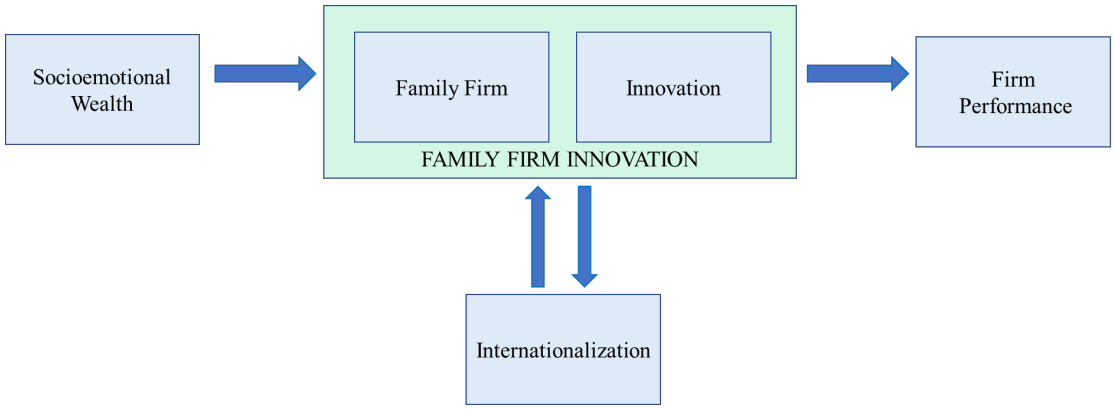
It would also be interesting to increase the understanding of the effect of open innovation on family firm performance (Gjergji et al. 2019). Open innovation can provide firms with significant resources and knowledge to encourage efficiency and the novelty of innovation performance (Lazzarotti et al. 2017), and therefore lead to better firm performance. However, in the family firm context, the implications of open innovation on firm performance remain largely overlooked. The paucity of studies in this area provides significant possibilities for future research, such as analysing the impact of collaborations with external partners on firm performance, while considering certain family characteristics as potential moderators or mediators, such as family commitment, internal and external social capital, or generational diversity.

Finally, the recognition of the cluster "Internationalization" reveals that despite the great importance of this research trend during the last years (e.g. Casprini et al. 2020), existing studies dealing with both innovation and internationalization are scarce within the family firm field (e.g. Purkayastha et al. 2018).

In this vein, very recent research has investigated the internationalization-innovation relationship focusing exclusively on family firms to further extend the concept of family firm heterogeneity (Sánchez-Marín et al. 2020). Sanchez Marín et al. (2020) analyse the moderating effect that family involvement in management and the generational stage has on the link between export activity and product innovation. Inspired by Sánchez Marín et al. (2020), we proposed that not only family involvement in management nor the generational stage can act as moderators in the internationalization-innovation relationship. On the contrary, other family characteristics such as family involvement in ownership, the presence of family vs. professional CEO or founder vs. post-founder CEO, or family presence on the board of directors, might moderate the link between internationalization and innovation.

On the other hand, the international business literature insinuates that the innovation-internationalization relationship can be multidirectional as they can be considered as complementary strategies (Golovko and Valentini 2011). In other words, innovation might influence internationalization (Lin and Wang 2019) and vice versa, internationalization may exert an impact on innovation (Sánchez-Marín et al. 2020) in family firms. Thereby, given the inconclusiveness of the innovation-internationalization relationship, different calls for further research on the topic have been made (e.g. Alayo et al. 2020).

**Fig. 10** Integrative framework on family firm innovation research




## 6. Discussion and Conclusion

The aim of this bibliometric study was to offer an overview of the FFI field, to detect and synthesize key topics and outline future research opportunities. The present study is based on performance analysis and scientific mapping by co-author, co-citation and co-word analyses. It includes a total of 975 documents published in 458 journals by a total of 2,507 authors and encompasses the 1987-2019 period.

The performance analysis evidences the growing interest in the FFI research field around the word, with a total of 72 countries publishing articles dealing with innovation issues in family firms. The analysed period can be divided in three sub-periods, which have been identified as initial phase (1987-2004), take-off phase (2005-2014) and the splendour phase (2015-2019). The last sub-period shows an exponential increase of

the number of publications and number of citations, suggesting that FFI research is in a developing stream that is expected to continue increasing in the future. Focusing on researchers, the three most productive authors are De Massis A., Kotlar J., and Kraus S. In this regard, the most productive author is also the author of the most influential article on the field, i.e. Innovation with limited resources: management lessons from the German Mittelstand. Concerning journals, the three specific journals on family firms, namely *Family Business Review*, *Journal of Family Business Strategy* and *Journal of Family Business Management* are the most productive. Nevertheless, taking into consideration the most influential journals, *Family Business Review* continues to occupy the first position while *Entrepreneurship Theory and Practice* and *Journal of Business Venturing* appear in second and third position, respectively.

The co-author analysis identified clusters of social networks between authors of different institutions, who collaborate directly or indirectly, to advance the knowledge in this field. The obtained findings highlight the strength of the international relationships engendered by co-authorship.

The co-citation analysis recognised four clusters mainly based on (1) entrepreneurship, (2) behavioural agency theory, (3) resource-based view and (4) agency theory, which constitute the pillars of the theoretical foundations and intellectual structure in the FFI research field.

With regards to the co-word analysis, five thematic clusters have been identified, led by the following keywords: (1) family firms, (2) innovation, (3) socio-emotional wealth, (4) firm performance and (5) internationalization. The establishment of the clusters enables the organization of the literature regarding these motor thematic sub-areas within FFI research and the identification of the main developed topics. The family firms cluster encompasses topics that try to identify or help to clarify the understanding of how the particular features of family firms may affect their potential to innovate. The innovation cluster focuses on the peculiarities of family firms' innovative behaviour. The third cluster around socio-emotional wealth highlights its consideration as the driver of family firms' strategic diagrams as well as its contingent role in various relationships involving different innovation issues. The fourth thematic cluster, led by firm performance, shows the well-developed subfield exploring how innovativeness interacts with family influence to affect firm performance. Finally, the fifth cluster epitomized those studies that have tried to underscore the role of internationalization in terms of innovation.

This study makes several contributions to the extant literature. First, it allows the consolidation of FFI as a solid and powerful research field by means of the interplay of two different investigation domains that have prevailed within management research in recent years: innovation and family firms. In doing so, this study complements the lively debate on FFI (e.g. Calabrò et al. 2019) by providing a broad understanding of the background and consequences of FFI and how the idiosyncratic and heterogeneous behaviour of family firms may have a determining influence on the way innovation processes are carried out. Therefore, the present article delves into the underpinnings of FFI research and unveils its main trends and its challenging opportunities.

Second, and coupled with the above, an integrative framework is provided to open up an agenda to guide future researchers into this promising research field. This framework points out, among other issues, the urgent need to better understand the heterogeneous innovation behaviour of family firms, the way in which different SEW dimensions have an impact on emerging innovation forms, such as technological innovation efficiency and open innovation, or the freshly discovered two-way relationship between FFI and internationalization. Similarly, this framework also encourages future research to analyse how the abovementioned emerging innovation forms might influence performance indicators that go beyond purely financial measures, such as sustainability indicators.

Third, to the best of the authors' knowledge, this study is the first FFI bibliometric review to include the years of maximum scientific production, namely 2018 and 2019. This continuous increase in scientific production is a faithful reflection of the growing interest in the field, which might be explained by different reasons: on the one hand, the clear importance of family firms as ubiquitous entities in economies throughout the world and their proven importance as leaders in their market niches due to their unique idiosyncrasies for innovation (Duran et al. 2016); and, on the other hand, the embeddedness of their innovative commitment as a way to achieve competitive advantages, which are fundamental for ensuring their long-term survival and transgenerational wealth creation (Martínez-Alonso et al. 2018).

Finally, this study carries out a bibliometric analysis covering two major databases, namely WoS and Scopus. The interaction of the two databases permits a substantially larger body of documents to be covered in comparison to previous FFI bibliometrics (e.g. Aparicio et al. 2019), enabling the inclusion of the most relevant documents on this topic. Of the 975 analysed documents, only 351 were in both databases, meanwhile 388 were exclusively in WoS and 236 solely in Scopus. These numbers emphasize the importance of considering both databases. Besides, by covering documents from WoS and Scopus, we

overcome the limitations of those bibliometric studies which focus exclusively on one data source (Alayo et al. 2020). In this manner, this study addresses a broader spectrum of FFI issues with the aim of generating a more holistic and robust understanding of the FFI research field.

Regarding the managerial insights derived from this bibliometric study, family firms' owners, managers, and directors, and family firm members in general, could benefit from a complete overview of the academic actors (authors and institutions) who are steadily cultivating the FFI domain. The identification of FFI researchers, their institutions and countries, and therefore, their most influential publications, allow family firm members to comprehend how the FFI research field operates. Furthermore, family firm members may also benefit from an approximation to various current research trends that are of managerial interest. Accordingly, family firm members could ascertain how academic actors are attempting to support firms by comprehending diverse phenomena related to innovation issues. For instance, family managers must be aware of the need to develop an innovative culture and mentality within the family firm to promote the generation of new ideas and exploit their innovation potential (Matzler et al. 2015). Or for example, they should learn how to balance emotional and financial considerations when dealing with innovative strategic decisions (Martínez-Romero et al. 2020a). In this regard, consultants and practitioners must also be able to recognize those factors that might influence strategic choices to adequately implement innovative projects (Martínez-Alonso et al. 2018). Finally, the identification of the ongoing research trends in the FFI domain, enables family firm members to keep in touch with controversial topics that might help them to overcome certain barriers in their firms.

This study is not exempt of limitations, which lie in the constraints of bibliometric techniques. First, despite the advantages of using WoS and Scopus databases, there is the possibility that other relevant documents, only available in alternative databases (e.g. ABI Inform/ProQuest), have been excluded. Needless to say, this is an endemic problem to all bibliometric studies (Jacsó 2008). Second, documents such as national journals, conference proceedings, and editorial material are excluded from the search formula, despite perhaps being equally influential in FFI research (Baier-Fuentes et al. 2019a). Third, some documents from the WoS database did not contain any keywords, and hence, the assigned keywords by WoS were utilised to conduct the co-word analysis. These keywords, despite being less exhaustive than the authors' keywords, have been proved to be as effective as the latter when investigating the knowledge structure of a scientific field (Zhang et al. 2016). Finally, this study has been developed under the co-author, co-citation, co-word analyses, eschewing other bibliometric techniques such as bibliographic coupling (e.g. Tiberius et al. 2020). The use of alternative bibliometric techniques may be a valuable complement to our findings. In any case, the abovementioned limitations provide directions to how future bibliometric studies can be strengthened or improved.

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