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OPEN INNOVATION IN FAMILY SMES: A REVIEW OF THE CURRENT STATE OF THE ART

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Abstract: To date, research on open innovation in family SMEs is in its emerging stages. Although there have been studies immersed in the state of the art of OI, these have focused on large family businesses, creating interesting knowledge gaps around family SMEs. The latter have demonstrated capabilities and skills that favor collaborative innovation. Similarly, there are experiences highlighting how their orientation towards continuity drives relationships and associations within the business ecosystem; however, this knowledge is fragmented and dispersed. Therefore, the main objective of this research is to conduct a critical and systematic review of the state of the art, focusing on the opportunities and challenges that OI offers to family SMEs. The methodology employed was PRISMA 2020 due to the scientific rigor it provides and its replicability for future research. Important insights have been gained for family SME managers, as well as the integration of relevant literature into a single body of study. This research proposes interesting gaps for future studies in the field of OI in family SMEs.

Keywords: Systematic review, Open innovation, Family SMEs, Prisma 2020.

JEL classification: M10, O31, O36.

INTRODUCTION

Open Innovation (OI) is a modern managerial strategy that can be implemented in all types of companies, both large and small to medium-sized enterprises (SMEs) (Arzubiaga et al., 2019a; Chesbrough, 2003; Duran et al., 2014; Mortara et al., 2009; Radicic et al., 2020; Van de Vrande et al., 2009; Vander Schee, 2009; Vanhaverbeke et al., 2018). Its relevance lies in the capacity to generate innovative strategies and solutions in a collaborative format (Chesbrough, 2003), whereby the triggers for new ideas can emerge both within and outside the organization and even cross its boundaries (Chesbrough, 2017; Hinteregger et al., 2019).

For small and medium-sized enterprises (SMEs), this strategy presents a great opportunity to explore and implement the innovative paradigm; it provides access to new knowledge, ideas, and even technologies at a low cost, with shared risks, uncertainties, and responsibilities (Aleksić et al., 2021; Hilkenmeier et al., 2021; Julião et al., 2022; Kriščiūnas & Greblikaitė, 2007; Rodríguez-Ferradas & Alfaro-Tanco, 2016; Salmon & Allman, 2020; Soluk & Kammerlander, 2021; Väyrynen et al., 2017). Unlike large companies, SMEs face changes in the business environment with greater uncertainty and limited resources (Arzubiaga et al., 2019b; Julián et al., 2012; Torchia & Calabrò, 2019; Usman et al., 2018); however, they also possess inherent characteristics that favor the implementation and performance within the innovative paradigm (Guffler et al., 2023; Kammerlander et al., 2015; Lambrechts et al., 2023).

In the context of family SMEs, these companies can perform successfully within innovation ecosystems, playing a key role in the relationships with other actors (Chirico et al., 2022; Rondi et al., 2021). Similarly, their orientation towards continuity favors long-term collaborative relationships and associations (Gjergji et al., 2019; Madanaguli et al., 2023). Many authors have also investigated how this business strategy has enabled family SMEs to overcome various difficulties in a highly turbulent, challenging, and changing environment like the current one (Lambrechts et al., 2017; Leppäaho & Ritala, 2022; Rondi et al., 2019).

Unfortunately, the literature on OI in family SMEs is still in its emerging stages, with multiple dispersed academic contributions and lacking a structured conceptual framework that facilitates the interpretation of the implications in terms of opportunities and challenges of its implementation in family SMEs.

According to De Massis et al. (2019), “... fragmentation is a typical characteristic of research fields experiencing initial enthusiasm and growth,” a perspective that has been discussed by many authors who recognize the emerging state of research on innovation in family businesses (Chirico et al., 2022; Gjergji et al., 2019; Madanaguli et al., 2023; Rondi et al., 2019). To date, the systematic study of OI has mainly focused on large family businesses, creating interesting knowledge gaps regarding family SMEs (Audretsch et al., 2018; Belitski & Rejeb, 2022; Bertello et al., 2022a; Chen et al., 2020; Mortara et al., 2009).

Therefore, the main objective of this research is to identify the state of the art of OI in family SMEs, highlighting the opportunities and challenges of this innovation strategy through a systematic literature review following the PRISMA 2020 model. Articles and academic books published in indexed databases have been considered, with a 20-year time horizon starting from the seminal publication on OI (Chesbrough, 2003).

In addition to the introduction, this document is structured as follows: the next section details the applied methodological process and presents the proposed process diagram according to the PRISMA 2020 Declaration. The following sections present the results obtained, followed by a discussion of the analysis. Finally, the conclusions and proposals for future work are presented.

METHODOLOGY

This research has been conducted following the protocol proposed in the PRISMA 2020 methodology, due to its relevance for the objective selection of the literature considered in the analysis, as well as its potential for future replication and verification (Kraus et al., 2022; Page et al., 2021). This systematic review employs sections from books and scientific articles from academic databases, as detailed

in Table No. 1. The study period spans from 2003, with the first publication on open innovation (Chesbrough, 2003), to July 2023.

Database Name	Clarivate Web Of Science, Elsevier Science Direct, Scielo, Ebsco Host.
Records	Only open access records.
Web Sites	Only official websites of the specified databases.
DOI	Only the identifying code of the paper recorded in the official database of the search engine will be registered.
Date of retrieval	The date of retrieval/data capture for the reviews in each database will be recorded.

Table N°1.- Information Sources

In Figure 1, the flowchart of the article selection process is presented, following the guidelines of the Prisma 2020 framework. It is important to highlight that, as part of the preliminary process, one academic book was considered as the basis to establish the motivations and prior knowledge gaps for the development of this work (Vanhaverbeke et al., 2018). Additionally, 18 articles were included by the researchers through a non-systematic process permitted within the protocol of the method itself.

Table 2 presents the inclusion and exclusion criteria considered for this study. Additionally, Table 3 shows the Boolean operators used in the main search equation and the secondary equations. It is important to note that both equations were employed with minimal variations across each academic database.

Inclusion criteria	1) Only journal papers and/or books. 2) Languages: English. 3) Only indexed journals. 4) Publications from 2003 to 2023 (first half). 5) Only research areas in Administration, Innovation, Business Management, or related fields.
Exclusion criteria	1) Duplicate papers. 2) Papers published before 2003.

Table N°2.- Eligibility criteria

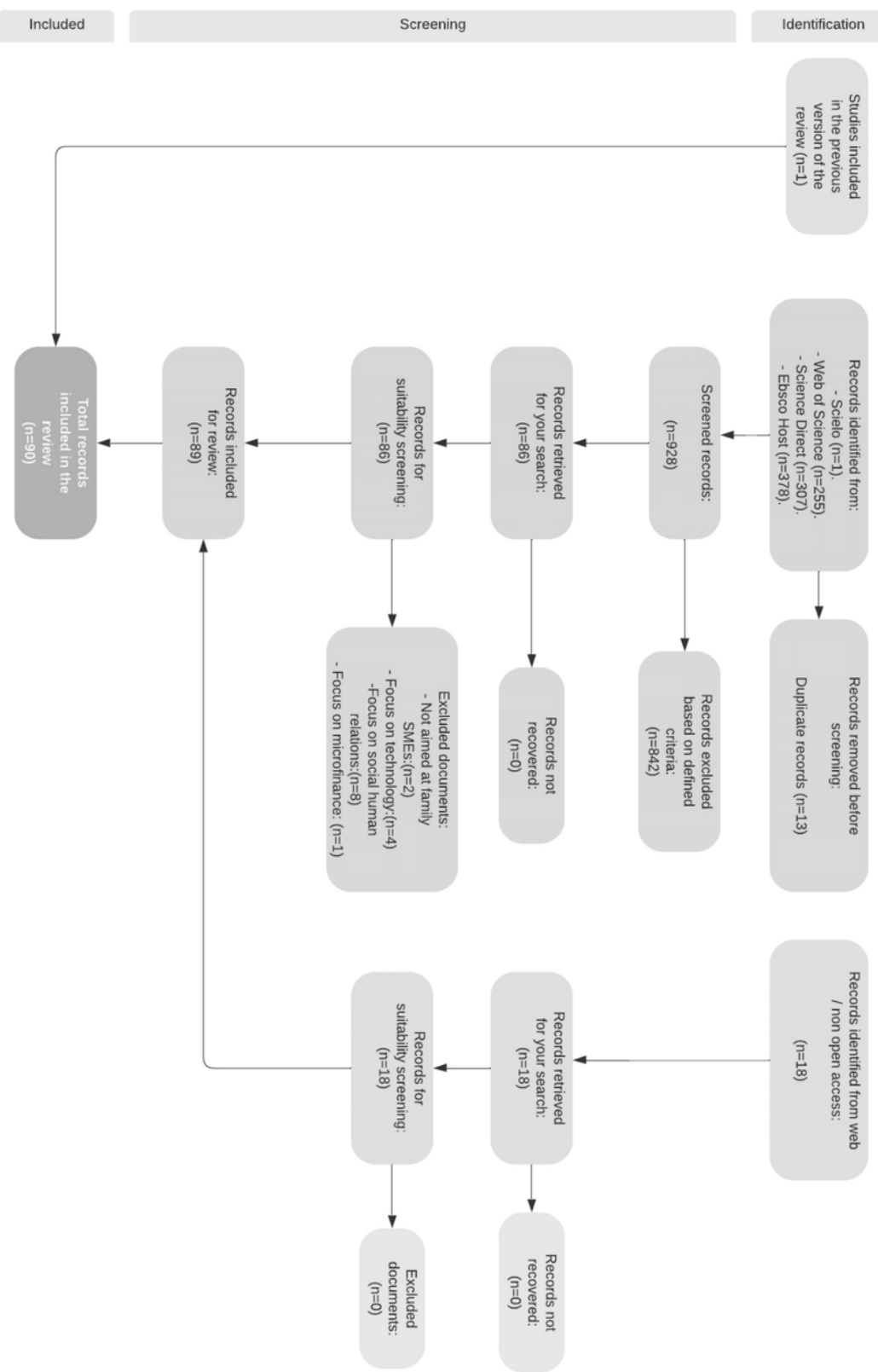


Figure N°1.-Prisma 2020 flow chart.

<i>Specify search strategies</i>	In each database search, the same search equation will be established, and then the same filters will be applied for the inclusion screening. If necessary, and if more than one search is conducted in each database, for instance, when segmenting keywords into specific study categories, the same searches will be replicated in each database. Additionally, language-specific searches will also be replicated in each database.
<i>Keywords</i>	Innovation, Open innovation, Openness, Family -firms, SMEs, collaborative SMEs, family SME, innovative ecosystems SMEs, Open collaborative innovation, Collaboration modes.
<i>Filters on each page</i>	According to inclusion criteria.
<i>Search query</i>	Main equation: (ALL= (open innovation)) AND ALL=(family SMEs).
	Secondary equations: ((ALL=(innovative)) AND ALL=(ecosystems)) AND ALL=(SMEs); (ALL=(collaborative)) AND ALL= (family SMEs); (ALL=(open collaborative)) AND ALL=(family business); (ALL=(inbound innovation)) AND ALL=(family business); ((ALL=(patents)) AND ALL=(innovation)) AND ALL=(SMEs); (ALL=(collaboration modes)) AND ALL=(family business); ((ALL=(innovation)) AND ALL=(socio emotional wealth)) AND ALL=(family business)

Table N°3.- Search Strategies

In the appendices, you will find details of the protocol used for the selection of articles and the extraction of data from them, based on the Prisma guidelines.

ANALYSIS OF THE SELECTED LITERATURE

First, a descriptive analysis of the data is performed using tables and graphs that summarize the metadata of the selected articles. This analysis was conducted using Microsoft Excel for the organization and presentation of the results.

Second, a content analysis from an exploratory perspective is conducted using Atlas.ti software for an initial inductive analysis of the selected sample. This detailed and replicable process identifies categories and research interests, as detailed in Table 4. Subsequently, following a thorough review of the sample and

in accordance with the previous exploratory analysis, a deductive analysis and discussion are presented on topics of interest related to open innovation in family SMEs.

1	Load 90 selected articles into the software.
2	Generate codes based on Boolean operators.
3	Conduct inductive coding using the program's search engine.
4	Generate strength and co-occurrence analyses.
5	Identify emerging study relationships and categories.
6	Create a semantic map of the emerging categories.

Table N°4.- The sequence of steps for exploratory analysis in Atlas.ti

RESULTS

In this section, we present the results of our systematic review of 90 selected articles, which include 88 scientific articles and 2 book chapters on open innovation. We will begin with a descriptive analysis of the data, followed by a content analysis.

DESCRIPTIVE ANALYSIS

Figure 2 shows the annual distribution of the articles selected for the systematic review. The study of open innovation in family SMEs is an emerging topic that gained momentum in 2017. It is noteworthy that, in previous years, publications primarily focused on collaborative innovation in family businesses, especially in large companies (Mortara et al., 2009). It was only in 2017 that we observed a takeoff and an increase in academic interest in the study of open innovation in SMEs (Bertello et al., 2022; Gjergji et al., 2019).

Table 5 presents the top 10 articles, ranked by the number of citations. Open innovation has been explored from various perspectives, both quantitative and qualitative, and through different approaches, including ecosystem participation, academic collaboration, and management models. The diversity of the authors underscores the broad interest in open innovation across multiple fields within the administrative sciences.

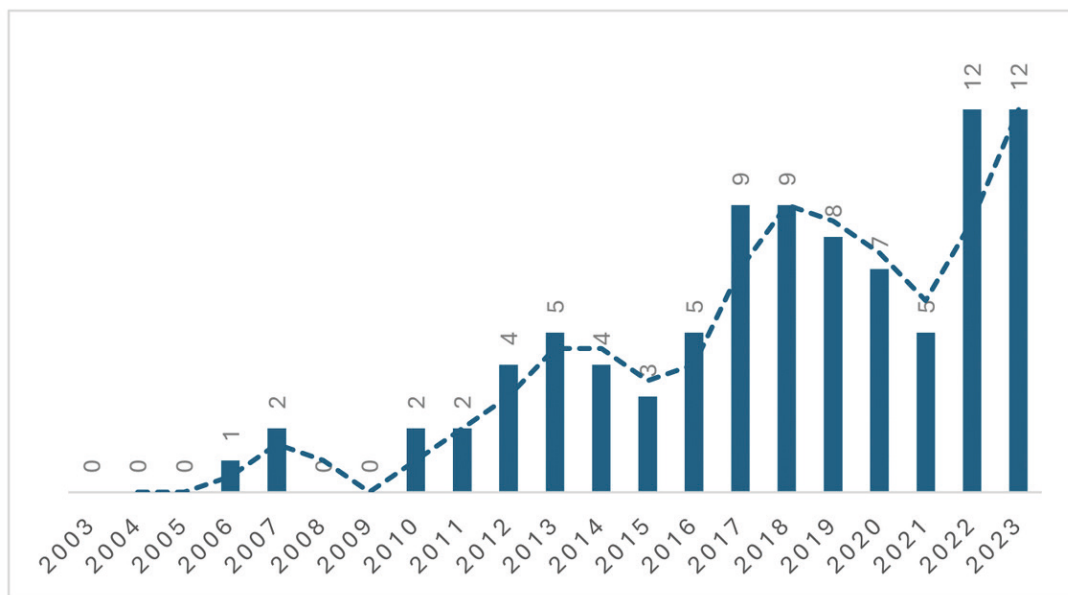


Figure N°2.-Distribution of selected records over the research timeframe.

Item	Authors	Article Title	Source Title	Cites Count
1	Emanuela Rondi, Alfredo De Massis, Josip Kotlar	Unlocking innovation potential: A typology of family business innovation postures and the critical role of the family system	Journal of Family Business Strategy	202
2	Feranita, Feranita; Kotlar, Josip; De Massis, Alfredo	Collaborative innovation in family firms: Past research, current debates, and agenda for future research	Journal of Family Business Strategy	102
3	Alberto Bertello & Alberto Ferraris & Paola De Bernardi & Bernardo Bertoldi	Challenges to open innovation in traditional SMEs: an analysis of pre-competitive projects in university-industry-government collaboration	International Entrepreneurship and Management Journal	94
4	Frank Lambrechts, Wim Voordeckers, Nadine Roijakkers, Wim Vanhaverbeke	Exploring open innovation in entrepreneurial private family firms in low- and medium-technology industries	Organizational Dynamics	80
5	Casprini, Elena; De Massis, Alfredo; Di Minin, Alberto; Frattini, Federico; Piccaluga, Andrea	How family firms execute open innovation strategies: the Loccioni case	Journal of Knowledge Management	74
6	Dragana Radicic, Geoffrey Pugh, David Douglas	Promoting cooperation in innovation ecosystems: evidence from European traditional manufacturing SMEs	Small Business Economy	70
7	Denicolai, Stefano; Ramirez, Matias; Tidd, Joe	Creating and capturing value from external knowledge: the moderating role of knowledge intensity	R&D Management	58
8	Tanja Leppa äho, Paavo Ritala	Surviving the coronavirus pandemic and beyond: Unlocking family firms' innovation potential across crises	Journal of Family Business Strategy	58
9	Blind, Knut; Mangelsdorf, Axel	Alliance Formation of SMEs: Empirical Evidence From Standardization Committees	IEEE Transactions on engineering management	53
10	Radziwon, Agnieszka; Bogers, Marcel; Bilberg, Arne	Creating and capturing value in a regional innovation ecosystem: a study of how manufacturing SMEs develop collaborative solutions	International Journal of Technology Management	42

Table N°5.- Top of papers organized per number of cites

Item	Source Title	Number of papers	Impact factor	Quartile
1	Journal of Knowledge Management	2	13.5	Q1
2	Technovation	3	12.5	Q1
3	Technological Forecasting and Social Change	3	12	Q1
4	Journal of Business Research	4	11.3	Q1
5	Journal of Open Innovation	2	7.5	Q1
6	Small Business Economics	3	7.4	Q1
7	Journal of Family Business Strategy	3	7.2	Q1
8	IEEE Transactions on engineering management	2	5.8	Q1
9	Employee Relations	2	5.2	Q1
10	Journal of Family Business Management	2	4.6	Q2

Table N°6.- Top journals

Item	Authors	Scopus H-index	Total cites	Affiliation
1	Alfredo De Massis	56	18580	Free University of Bozen-Bolzano
2	Paavo Ritala	43	13798	LUT kauppakorkeakoulu
3	Alberto Ferraris	42	7231	Università degli Studi di Torino
4	Federico Frattini	40	12749	Politecnico di Milano
5	Wim Vanhaverbeke	37	29339	University of Antwerp
6	Josip Kotlar	30	6798	Politecnico di Milano
7	Wim Voordeckers	29	5241	Universiteit Hasselt
8	Alberto Di Minin	26	4703	Sant'Anna Scuola Universitaria Superiore Pisa
9	Nadine Roijakkers	20	3804	Open Universiteit
10	Joe Tidd	18	33917	University of Sussex

Table N°7.- Top of Authors

Table 6 presents the leading journals, organized by their impact factor over the past five years, along with the number of articles from the systematic review in each journal. Two main categories are distinguished: journals on innovation and journals on family business management. This information is valuable for future research and for academics interested in these areas.

Additionally, Table 7 presents the authors of the top 10 articles in this review, organized by their Scopus indicator, along with the total number of citations received and their academic affiliations. Notably, Italian academics with extensive experience in family business management are prominently featured, even when innovation is not their primary focus.

This demonstrates how open innovation is emerging as an area of interest in the management of family businesses (Brinkerink et al., 2017; Gjergji et al., 2019).

As a summary of the descriptive analysis, the emerging phase of research on open innovation in family SMEs is highlighted. Academics in family business management have focused their attention on this topic, with interest in technological innovation, family relationships and their impact, collaboration ecosystems, and sustainability. These findings will be further explored in the following sections.

CONTENT ANALYSIS

The content was analyzed using Atlas.Ti, which allowed for the coding and identification of key categories. Figure 3 shows the relationships and strengths between the codes, highlighting the influence of open innovation in family businesses, internal and external innovation, and patents.

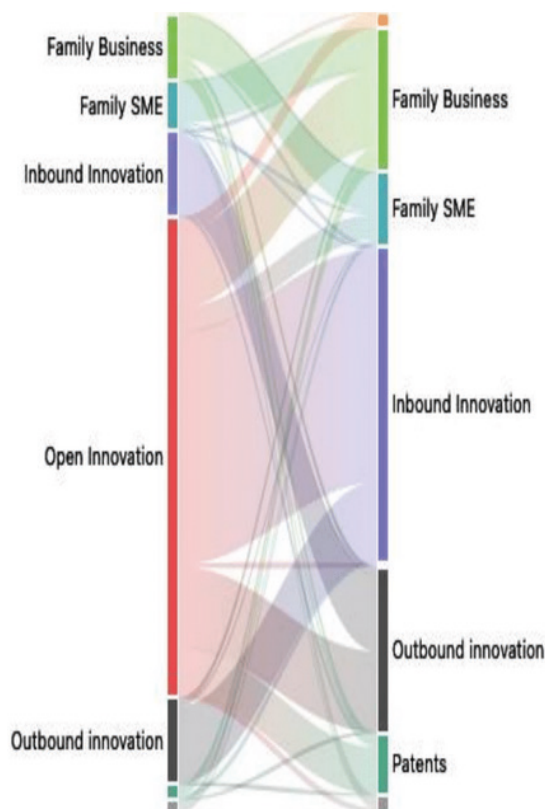


Figure N°3. - Sankey diagram of codes and their co-occurrences.

The Sankey diagram identified the main and most relevant themes from the inductive analysis. Using this information and the review of the sample, we present the opportunities and challenges of open innovation in family SMEs.

OPPORTUNITIES

Capability-Willingness Paradox

The literature indicates that family SMEs possess unique capabilities that enhance their innovative performance (Heider et al., 2022; Kammerlander et al., 2015; Werner et al., 2018). However, these firms are less inclined to innovate compared to non-family businesses due to factors such as risk aversion, family conflicts, cost control, and socioemotional wealth (Arzubiaga et al., 2019b; Feranita et al., 2017; Rondi et al., 2019). Once these barriers are overcome, they can adopt and create innovations with great flexibility and a focus on change (Ran et al., 2020; Rondi et al., 2019; Sekliuckiene et al., 2016). Gómez-Mejía et al. (2007) refer to this situation as the “capability-willingness paradox,” highlighting the lack of innovative drive despite their technical capabilities. Various scholars study how these firms can “do more with less” (Duran et al., 2014). This topic will be detailed in the next section: Challenges of Open Innovation for Family SMEs.

Low-Cost Innovation

Family SMEs also explore open innovation for the benefits of reduced costs. Leppäaho & Ritala (2022) note that “their limited resources, high flexibility, timely responsiveness, and resilience allow them to explore collaborative innovation more than larger firms.” Thus, open innovation provides family SMEs access to low-cost innovations, especially in technology and technological transformation (Casprini et al., 2017; De Massis et al., 2015; Feranita et al., 2017).

Risk Reduction and Financing

The literature shows that family SMEs mainly collaborate in technological development and digitalization, primarily in later stages. Their limited financial resources restrict their participation in prolonged research and development collaborations (Bertello et al., 2022; Leppäaho & Ritala, 2022; Suh & Kim, 2012; Vander Schee, 2009). However, this situation is often overcome when collaborating in early stages or basic research in partnership with universities or research organizations, leveraging the academic funding these institutions can access (Soler Porta, 2020). Thus, family SMEs benefit from the financial support of these collaborations. Similarly, other risks such as legal, operational, and patent risks are shared among all co-creation participants (Benitez et al., 2020). This provides family SMEs with shared protection, benefiting from the coverage of larger entities such as universities, large companies, and governments.

Ecosystems and Knowledge Management

Innovation ecosystems offer family SMEs opportunities for learning and access to innovation (Bierly & Daly, 2007; Cloutier & Amara, 2018; Hervás-Oliver et al., 2020; Iqbal & Suzianti, 2021), provided they are designed to facilitate value creation, delivery, and capture (Denicolai et al., 2014; Radziwon et al., 2017). Siebold et al. (2023) emphasized during the COVID-19 pandemic the need for ecosystems that promote dialogue and give voice to SMEs, avoiding centralizing decisions among large players. In crises, family SMEs benefit from collaborations and innovation ecosystems. The COVID-19 pandemic underscored the importance of agile response, long-term orientation, and the desire for longevity for family SME innovation (Ahmad et al., 2023; Bürgel et al., 2023; Leppäaho & Ritala, 2022). Participation in collaborative ecosystems and effective knowledge management enable

SMEs to assimilate tools such as process digitalization, agile management, and collaboration tools with customers (User Experience, Design Thinking) (Blind & Mangelsdorf, 2013; Radicic et al., 2020; Radziwon et al., 2017; Torchia & Calabrò, 2019). Efficient knowledge management in the ecosystem is crucial. Radziwon et al. (2017) highlight family SMEs' ability to do this in innovation ecosystems. Lambrechts et al. (2017) emphasize "orchestration" in these firms, promoting an equitable distribution of value among all actors, fostering the ecosystem's stability and sustainability (Blind & Mangelsdorf, 2013; Kim & Kim, 2018; Ojasalo, 2012; Piñero et al., 2010).

CHALLENGES

Internal Professional Structure

The main challenges of open innovation for family SMEs focus on their internal capabilities and external performance (Bertello et al., 2022; Guenther et al., 2023; Leppäaho & Ritala, 2022). Internally, they need to professionalize their capabilities to be agile, collaborative, and continuity-oriented. Moreover, it is crucial to formalize and professionalize their knowledge management processes, both internal and external (Del Vecchio et al., 2020; Ferrari, 2019; García-Vidales et al., 2019; Lambrechts et al., 2023; Marzi et al., 2023; Rondi et al., 2019; Schmieder, 2014; Yin et al., 2023).

Intellectual Property

The inherent characteristic of limited resources in family SMEs (Costa et al., 2023; de Carvalho et al., 2018; Loufrani-Fedida & Aldebert, 2021) undermines their position in registering and patenting co-creations (Agostini & Nosella, 2017; Bertello et al., 2022; Grimsdottir & Edvardsson, 2018; Lawson, 2013; Soltysova & Modrak, 2020). Participation in collaborative networks and the exploration of

their outbound initiatives can improve intellectual property management, typically dominated by large firms in the collaboration ecosystem (Del Carmen Vásquez Torres et al., 2018; Dodourova & Bevis, 2014; Handoko et al., 2014; Hochleitner et al., 2017; Radicic et al., 2020; van Hemert et al., 2013).

Family-Business Management Challenges

The capability-willingness paradox causes family SMEs to be slow in adopting innovation due to their conservative culture. However, once they decide to innovate, they react quickly, as seen in the implementation of radical technologies (Feranita et al., 2017; Rondi et al., 2019). The limited professionalization of processes and R&D management hinders efficient innovation implementation; likewise, the absence of a professional family-business governance structure (Lambrechts et al., 2017).

Roles and Functions of Government and Large Enterprises

Government-promoted innovation ecosystems often fail to foster cooperation among competitors, selecting non-competitive actors and creating a forced harmony between consumers, suppliers, and stakeholders. This hinders radical or profitable innovations for SMEs (Falahat et al., 2023; Radicic et al., 2020; Rupeika-Apoga & Petrovska, 2022). The lack of strategy in these ecosystems can disadvantage SMEs in intellectual property distribution, especially when the orchestrator is a large company with high bargaining power (Bertello et al., 2022; Radziwon et al., 2017).

DISCUSSION

Conceptual Framework of Open Innovation in Family SMEs.

Figure 5 presents the mind map constructed as a result of the systematic review conducted. This map helps visualize the relationships between the main themes in the literature, enhancing the understanding of the state of the art of our research subject.

This study has highlighted the following results from the descriptive analysis: the emerging state of research on open innovation in family SMEs. This characteristic, typical of topics in their initial stages, underscores the synergy and research interests of academics specialized in family business management. This suggests that interest in this field is not transient but is relevant to management and innovation science, supported by the time frame of the case studies selected for this systematic review.

The content analysis has revealed interesting results regarding the capabilities and characteristics of family businesses. When efficiently managed and developed, they can significantly contribute to the performance of family SMEs in collaborative initiatives. However, as Lambrechts et al. (2023) point out, these capabilities can be an obstacle to innovation depending on their level of professionalization and traditional leadership. Thus, the development of innovation in family SMEs suggests special attention to the implementation of modern management systems, oriented, for example, towards customers, such as design thinking, user experience, and agile management.

Previous systematic reviews, such as Gjergji et al. (2019), have explored open innovation in family businesses but focused on large corporations and family relationships within corporate governance structures. Similarly, Vanhaverbeke et al. (2018) investigated the state of the art of open innovation in SMEs but did



Figure 5: Mind Map of Open Innovation in Family SMEs

Figure 5: Mind Map of Open Innovation in Family SMEs

not specifically address ownership composition, such as family-owned SMEs. Therefore, our work distinguishes itself from previous studies by focusing and delimiting the literature review on family SMEs, identifying and analyzing the opportunities and challenges related to their unique characteristics, such as ownership composition, size, limited resources, and agility.

CONCLUSIONS AND FUTURE WORK

This study provides a systematic review of open innovation in family SMEs, filling a gap in the literature. It highlights the importance of understanding and analyzing open innovation strategies in this specific business context, identifying and analyzing the opportunities and challenges related to their unique characteristics, such as ownership composition, size, limited resources, and agility.

IMPLICATIONS FOR ACADEMIA

This study identifies opportunities and challenges in the implementation of open innovation in family SMEs. These companies, due to their size, innovate differently, taking on more risk than large companies (Allocca & Kessler, 2006; Biazio et al., 2013; Ervits & Zmuda, 2018; Ghezzi et al., 2022). The lack of resources drives collaborative innovation but limits intellectual property management. It is crucial to develop specific managerial frameworks and tools.

Additionally, family SMEs must overcome the capability-willingness paradox to leverage innovation ecosystems (Feranita et al., 2017; Guffler et al., 2023; Röd, 2019). Professionalizing processes and knowledge management is vital, considering socioemotional aspects in strategic decision-making.

IMPLICATIONS FOR PUBLIC MANAGERS

It is crucial to highlight the role of government and academia as facilitators in collaborative environments for SMEs. An open innovation ecosystem should include assistance programs for SMEs, encouraging the participation of family businesses that possess valuable skills for managing long-term relationships. These programs should aim to capture value and manage learning throughout the ecosystem. This work is essential for managers, owners, or consultants of family businesses seeking open innovation strategies in SMEs and for those managing innovation and economic development policies in developing economies.

FUTURE WORK

We will explore open innovation in family SMEs through a case study in a Latin American country to create an implementation framework. This framework, based on our findings and input from the businesses, will address the identified opportunities and challenges.

SUGGESTIONS FOR FUTURE RESEARCH

Family SMEs seeking to improve through open innovation should strengthen their internal capabilities, professionalize management, and excel in innovation ecosystems (Gjergji et al., 2019; Rondi et al., 2021; Usman et al., 2018). Although their importance is recognized, more studies are needed on the role of protocol and family succession in open innovation. It would be interesting to investigate the structure and professionalization of family business dynamics.

It is crucial to expand research on dynamic capabilities in succession. Although there are studies on leadership, human resources, and dynamic capabilities in family SMEs with open innovation (Abdulmuhsin & Tarhini, 2022; Buisson et al., 2021; Hinteregger et al.,

2019; Rehman et al., 2021), there is a lack of focus on succession dynamics, and we lack cases on managing generational asymmetries under an innovative model.

We call on academia to continue researching open innovation in family SMEs, proposing implementation models tailored to these types of companies.

RESEARCH LIMITATIONS

Being aware of the existence of paid literature, the main limitation of this study is related to articles that might have been excluded from the selected sample due to not being publicly accessible.

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APPENDICES

<i>Specify methods used for selection to determine if an article meets the inclusion criteria.</i>	Once the database for the systematic review is generated, the selection process will be carried out in compliance with the process proposed by the PRISMA 2020 guidelines, as well as considering the inclusion and exclusion criteria outlined. To screen for suitability, the abstracts of each article were read.
<i>Include the number of authors who screened each record or whether the screening was conducted independently.</i>	The screening will be independently conducted by one of the researchers, and the second researcher will perform the verification and assessment of compliance with the process.
<i>Detail the use of automation tools employed in the process.</i>	In the initial stage, the tools and filters provided by the database search engines will be used. After the initial screening, a comprehensive database from all search engines will be created, which will be processed using Microsoft Excel. We will rely on this database for subsequent screenings.

Table N° 4.- “Study selection process”

<i>Specify methods used for data extraction.</i>	The data analysis will be both descriptive and content based. Descriptive analysis will be carried out through tabulation of data obtained from the papers themselves, as well as from the search engine consulted. Data extraction for content analysis will be conducted using a deductive method supported by qualitative analysis software with predefined coding by the researchers. After an initial analysis with the software, the researchers will delve into the analysis and extraction of content through an exhaustive reading of the 90 selected articles.
<i>Include the number of authors who extracted the data or whether they worked independently.</i>	The coding and data extraction with software support will be carried out by one researcher, and the second researcher will review the compliance and appropriateness of the process. The content analysis will be conducted jointly by both researchers.
<i>Specify the use of automation tools employed in the process.</i>	Microsoft Excel will be used for the tabulation, analysis, and presentation of extracted data for the descriptive analysis. For content analysis, both Microsoft Excel and Atlas.ti will be employed to facilitate coding and the creation of semantic maps of the state of the art.

Table N° 5.- Data extraction process