

**FINANCIAL LITERACY IN SMES: A BIBLIOMETRIC ANALYSIS AND A SYSTEMATIC  
LITERATURE REVIEW OF AN EMERGING RESEARCH FIELD**

*Molina-García, Antonio.*\* Ph.D. Program in Economics and Business. Universidad de Málaga, El Ejido s/n 29071. Málaga, Spain. Email [antoniomolina@uma.es](mailto:antoniomolina@uma.es). Tlf. (34) 951953484. ORCID: 0000-0002-9145-2787.

*Diéguez-Soto, Julio.* Universidad de Málaga, El Ejido s/n 29071. Málaga, Spain. Email [jdieguez@uma.es](mailto:jdieguez@uma.es). Tlf. (34) 952131286. Fax (34) 952132830. ORCID: 0000-0001-5116-5604.

*Galache-Laza, M. Teresa.* Universidad de Málaga, El Ejido s/n 29071. Málaga, Spain. Email [mtgalache@uma.es](mailto:mtgalache@uma.es). Tlf. (34) 952131011. Fax (34) 952132830. ORCID: 0000-0003-1376-5523.

*Campos-Valenzuela, Marta.* Ph.D. Program in Economics and Business. Universidad de Málaga, El Ejido s/n 29071. Málaga, Spain. Email [martacv@uma.es](mailto:martacv@uma.es). ORCID: 0000-0003-3191-8984.

\*Corresponding author: Antonio Molina-García ([antoniomolina@uma.es](mailto:antoniomolina@uma.es)).

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## **Abstract**

Research on financial literacy in small and medium enterprises (SMEs) has raised a significant amount of interest in recent years and has evolved both rapidly and unevenly. This paper is the first to provide a reliable, consistent, and up-to-date review of financial literacy in SMEs through the combination of a bibliometric analysis and a systematic literature review. Specifically, and after identifying the most influential agents involved in this field of research, we carried out a co-occurrence analysis of the authors' keywords, co-citation analysis of the cited references and a subsequent in-depth analysis of a total of 88 documents published between 2005 and 2020. The findings indicate that SME financial literacy research has been primarily analysed regarding the following topics: (1) performance, (2) access to finance, (3) innovation, (4) risk attitude and entrepreneurship, (5) owners-managers, and residual contributions. The theoretical foundations that support this research structure have been (1) the resource-based view, (2) pecking order theory, agency theory and trade-off theory, (3) the entrepreneurial orientation perspective, human capital theory and upper echelon theory, and (4) planned behaviour theory. Subsequently, we developed an integrative framework on which to base proposals of important avenues for future research. Thus, this review offers a thorough and comprehensive overview of this emerging research field.

**Keywords:** Financial literacy, SMEs, Bibliometric analysis, Systematic literature review

**JEL:** I22; A20; A29; M21

## 1. Introduction

Financial literacy has raised a significant amount of academic and professional interest in recent decades. The growth and increased complexity of financial markets due to digitalization, coupled with the financial constraints faced by individuals, has led to the rapid growth of academic literature regarding financial literacy at the consumer level (Goyal and Kumar, 2020; Santini, Ladeira, Mette and Ponchio, 2019). More recently, and from a business perspective, financial literacy has also attracted the attention of small and medium enterprise (SME) scholars (García-Pérez-de-Lema, Ruiz-Palomo and Diéguez-Soto, 2021; Liu, Wang, Chan and Fung, 2020). However, this later line of research on financial literacy in SMEs is in its initial phase and is thus considered an emerging field of research.

The growing interest in financial literacy in SMEs has been mainly motivated by its enabling nature, with its main strength being the reduction of financial restrictions (Nkundabanyanga, Kasozi, Nalukenge and Tauringana, 2014). This quality is of great importance in business given the problems that SMEs face with regard to obtaining financing (Berger and Udell, 2006). Available funding, as a result of adequate financial literacy, has a positive impact on issues such as firm innovation (Tian, Zhou and Hsu, 2020) and performance (Eniola and Entebang, 2017). In addition, this interest has gone beyond the purely financial aspects by providing evidence of the favourable influence that financial literacy exerts on the recognition of opportunities (Anwar, Shuangjie and Ullah, 2020), the attitude and management of corporate risk (Kulathunga, Ye, Sharma and Weerathunga, 2020; Ye and Kulathunga, 2019), and entrepreneurship (Riepe, Rudeloff and Veer, 2020), among other strategic aspects. Likewise, previous research has also analysed the antecedents of financial literacy in SMEs (Damayanti, Al-Shami, Rahim and Marwati, 2018). However, the fast growth of the financial literacy literature in SMEs has led to a very heterogeneous set of issues, theories, and methods, which may ultimately restrict knowledge collection. For example, prior research has drawn on numerous theoretical views, such as the resource-based view, its analogue the knowledge-based view, human capital theory, upper echelon theory or the entrepreneurial orientation perspective, to explain the influence of financial literacy on strategic and business performance aspects (e.g., Adomako, Danso and Damoah, 2016; Eniola and Entebang, 2017; Tian et al., 2020).

As happens upon the commencement of any research field that continually develops until reaching a state of maturity (Gedajlovic, Carney, Chrisman and Kellermanns, 2012; Glinyanova, Bouncken, Tiberius and Cuenca, 2021), it is essential to produce works that collect and organize the growing and heterogeneous literature that the research on financial literacy in SMEs is generating. This type of research is essential for mapping, analysing and integrating the available knowledge in this field of study (Casprini, Dabic, Kotlar and Pucci, 2020) and is viewed as a crucial task in small business research (Kraus, Mahto, & Walsh, 2021). However, the number of works that have pursued this objective is practically nonexistent. Fatoki and Oni (2014a), in an attempt to contribute to this objective, reviewed 15 documents published between 2006 and 2014 with a focus on the financial literacy of individuals, students, and SMEs in South Africa; the authors showed the disparities between the conclusions drawn in the literature as a result of the different measurements used. More recently, Damayanti et al. (2018) studied 25 reviews covering the period 2004-2018 to establish the financial literacy background; the authors classified their findings into four dimensions: financial knowledge, financial attitude, financial awareness and social-demographic factors.

While previous review articles have contributed to the delimitation and accumulation of the existing knowledge in the field of financial literacy in SMEs, their exclusively qualitative approaches have serious

limitations, such as the lack of a transparent and reproducible methodology with consistent results (Zupic and Čater, 2015). These qualitative reviews suffer from subjectivity problems and biases in their results, as they are unable to capture the multiple perspectives from which this topic has been addressed. Furthermore, they are unable to provide quantitative interpretations and evaluations (Donthu, Kumar, Mukherjee, Pandey, and Lim, 2021). These deficiencies have become more acute as the field of research has evolved both rapidly and unevenly (Casprini et al., 2020), as is the case of financial literacy in SMEs. The literature on other research topics (innovation, entrepreneurship, etc.) has shown that the employment of a quantitative approach (i.e., computational methods) may help to overcome such drawbacks. In particular, quantitative techniques are especially useful when one is analysing a vast field of research developed by several academic disciplines (Alayo, Iturralde, Maseda and Aparicio, 2020; Mas-Tur, Kraus, Brandtner, Ewert, and Kürsten, 2020). However, its use is also subject to limitations, such as its inability to perform qualitative evaluations (Donthu et al., 2021). Consequently, this study combines two different review methods to address the aforementioned limitations (e.g., Krey, Picot-Coupey, and Cliquet, 2022; Fernandes and Ferreira, 2021), namely, a bibliometric analysis (quantitative approach) and a systematic literature review (qualitative approach). While a bibliometric analysis applies quantitative techniques to bibliometric data to identify the intellectual structure and emerging trends of a research topic or field (Donthu et al., 2021), a systematic literature review deepens and synthesizes the contents of the literature through a transparent and reproducible methodology (Kraus, Breier, and Dasí-Rodríguez, 2020). First, and after analysing the performance of the SME financial literacy research, we start with co-occurrences and co-citations from bibliometric analysis; then, we use these co-occurrences and co-citations as guides to conduct a systematic literature review to find research themes/theories and the scope. Thus, this review, which analyses 88 documents published between 2005 and 2020, assures a reliable, consistent, and up-to-date review of the research related to financial literacy in SMEs.

Our analysis covers both publication and citation trends and shows a considerable increase in scientific production in the last four years; it also identifies the most influential documents, sources, authors, institutions, and countries within this research. Regarding bibliometric analysis, using a co-occurrence analysis, we delimit the research structure of financial literacy in SME studies by connecting their keywords, thereby identifying two large clusters, i.e., (1) performance and (2) access to finance, along with three subclusters, i.e., (3) innovation, (4) risk attitude and entrepreneurship, and (5) owner-manager, which are considered as the main topics addressed. The co-citation analysis, in turn, helps us to understand the theoretical roots supporting the empirical evidence that is obtained through the study of the references, which is cited as a similarity measure between contributions. This co-citation analysis reports four clusters composed of the main theories used: (1) the resource-based view, (2) pecking order theory, agency theory and trade-off theory, (3) the entrepreneurial orientation perspective, human capital theory and upper echelon theory, and (4) planned behaviour theory. Regarding the systematic literature review, and after a deep examination of the results obtained in the bibliometric analysis, we develop an integrative framework that allows us to identify the analysed research routes and those that require greater attention, in addition to proposing important directions for future research that will help us to advance our theoretical and empirical understanding of financial literacy in SMEs.

The rest of the review is structured as follows. First, a brief overview of the state of the art is provided (Section 2). Second, the methodological strategy applied is explained (Section 3). Then, the results obtained from the review are presented (Section 4), namely, a bibliometric analysis (Subsection 4.1) and a systematic literature

review (Subsection 4.2). While the former focuses on performance, co-occurrence, and co-citation analysis, the latter analyses in depth the results obtained, thereby allowing the development of an integrated framework on which to base future lines of research. Finally, the conclusions are presented (Section 5).

## **2. State of the art: the existing conceptual backgrounds**

Research on financial literacy has been developed from multiple disciplines (e.g., education and economics) and at different levels of analysis. The main research has analysed financial literacy from a consumer perspective, with a focus on the background of financial literacy and its impact on financial planning, financial well-being, investment decisions, debt decisions and financial inclusion aspects, all of which are seen through the lens of different population cohorts (students, families, workers, retirees). Financial literacy has also been addressed from the business sphere, which is fundamentally focused on the owner-manager's financial literacy and its impact on financial, strategic, and business performance issues.

Despite the boom in recent years in the study of financial literacy and the efforts of many academics to unify the concept, there is still no consensus regarding its definition. This lack of consensus has led to disparate results due to the great variety of constructs used in the literature, including their incorrect use as interchangeable concepts (e.g., financial knowledge or education). It is evident that financial literacy goes beyond mere financial knowledge (knowledge dimension), since it also implies the ability and confidence to use such knowledge (application dimension) (Huston, 2010). Consequently, and for the purpose of this review, we consider the following broad and comprehensive definition of financial literacy (OECD, 2018, p.4): “A combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing”.

Until now, and as far as we know, the vast majority of prior reviews on financial literacy have taken the consumer as the central axis of analysis (Goyal and Kumar, 2021; Santini et al., 2019), while the number of reviews that analyse financial literacy in SMEs has been very limited. First, Fatoki and Oni (2014a) analysed the literature on financial literacy in South Africa, focused on individuals, students, and SMEs, and concluded that the use of different financial literacy measurements leads to mixed results. This review examined 15 documents covering the period 2006-2014, without specifying the applied database or methodology. Second, Damayanti et al. (2018) analysed the background of financial literacy in SMEs and classified their findings into four categories: financial knowledge, financial attitude, financial awareness, and social-demographic factors. This analysis included 25 documents ranging in date from 2004 to 2018. Third, the study by Abad-Segura and González-Zamar (2019), although it was not focused on SMEs, offered a broad view of the relationship between financial literacy, financial education, and creative entrepreneurship; using bibliometric techniques, 665 articles ranging in date between 1990 to 2018 were analysed.

Despite the above reviews providing their respective contributions, they fall short in regard to their adopted methodologies. Two of the three reviews (Fatoki and Oni, 2014a; Damayanti et al., 2018) applied qualitative techniques for their literature review, which were subject to their aforementioned weaknesses. These former review works do not examine the main studied research topics in conjunction with their respective theoretical foundations, thereby making it impossible to achieve an integrative framework that serves as a guide for policy-makers, professionals, and academics. Furthermore, only one of the three existing reviews takes the SME as the only study object.

Therefore, and despite the economic weight of SMEs in most of the world's economies and the important role that financial literacy plays in them, none of the existing reviews effectively captures the research on financial literacy in SMEs. The need for a rigorous review of the SME financial literacy literature is emphasized by the fact that the growth of this emerging field has been rather heterogeneous, both empirically and theoretically, thereby restricting the possibility for future development (Vogel and Güttel, 2012). To accomplish this task, the current study offers a comprehensive review and assessment that collects, organizes, and analyses in depth this emerging research field. To provide a pioneering and consistent overview, this review combines both the use of bibliometric techniques and a systematic literature review through which an integrative framework for the study of financial literacy in SMEs is developed and on which relevant lines of future research are grounded. Thus, this study identifies publication and citation trends and the most influential agents involved, it unravels the research structure and the theoretical foundations on which they are based, and it also provide paths for the future development of SME financial literacy research. By doing so, this study contributes to the SME financial literacy literature, which is highly relevant not only for academics but also for professionals and policy-makers (Kumar, Pandey, Lim, Chatterjee, and Pandey, 2021).

Consequently, the following research questions (RQs) guide our analysis:

RQ1. What are the publication and citation trends of SME financial literacy research?

RQ2. What are the most influential agents (documents, sources, authors, institutions and countries) in SME financial literacy research?

RQ3. What are the main topics (research structure) of SMEs' financial literacy research?

RQ4. What are the theoretical foundations (theoretical roots) on which SME financial literacy research is based?

RQ5. How is the structure of research related to the theoretical foundations on which it is based?

RQ6. What future research opportunities does this emerging research field offer?

### **3. Methodology**

To map, analyse and integrate the knowledge available regarding SME financial literacy research, this review chose to combine two different review methods to address the proposed RQs, namely, a bibliometric analysis and a systematic literature review (e.g., Krey et al., 2022; Alayo et al., 2020). Both methods present a series of disadvantages when used alone; while a bibliometric analysis is unable to provide qualitative evaluations, a systematic literature review cannot evaluate and interpret quantitatively and thus may suffer from the interpretation bias of scholars (Donthu et al., 2021). Therefore, using both review methods integrates both quantitative and qualitative evaluation and interpretation to offer a deep and adequate understanding of SME financial literacy research. The following explains the utilized search and filtration strategy, as well as the bibliometric analysis and systematic literature review configuration used, thereby making the process transparent, reproducible and iterative for future research (Zupic and Čater, 2015).

#### *3.1. Search and filtration strategy*

The starting point of any bibliometric analysis and systematic review is finding the documents to be reviewed. Thus, we set up a search and filtration strategy for our review consisting of three stages (e.g., Kumar et al., 2021), namely, the database search, database filtration and the exclusion of unrelated documents (see Fig. 1).

[INSERT FIGURE 1]

Stage 1 is the *database search*. First, we selected the databases in which to search for documents. There are several databases, namely, the ISI Web of Science, Scopus, PubMed, and Dimensions databases. As our topic falls outside the scope of studies covered by the two last databases, we only had to choose between ISI WoS and Scopus. Both databases are accepted for carrying out bibliometric analysis (Donthu et al., 2021; Torres-Salinas, Lopez-Cózar and Jiménez-Contreras, 2009), since the correlation between their measurements is high (Archambault, Campbell, Gingras, and Larivière, 2009). We opted for Scopus since this database covers a greater number of journals and titles (Gavel and Iselid, 2008; Mongeon and Paul, 2015) and is recognized as a source of high-quality data (Baas, Schotten, Plume, Côté, and Karimi, 2020). Second, we set up an appropriate keyword search strategy that covered all the financial literacy literature on SMEs. The inclusion/exclusion of a keyword can lead to ignoring or considering documents that may invalidate conclusions. We should not overlook the heterogeneous definition of financial literacy, including concepts that have been discussed in previous sections. Hence, the researchers decided to include two additional keywords to which financial literacy is frequently and erroneously referred, namely, “financial knowledge” and “financial education”. Following the recommendations of Donthu et al. (2021), the authors discussed which synonyms are commonly used to refer to SMEs based on the previous literature. As a result, we executed a broad Boolean search chain of the *titles*, *abstracts*, and *keywords*, combining the three keywords commonly used to refer to financial literacy (“financial literacy” OR “financial knowledge” OR “financial education”) and a long chain of keywords resulting from the combined size of the enterprise (“micro\*”, “small\*” and “medium\*”), along with the different terminology used to refer to such an establishment (“business\*”, “firm\*”, “enterprise\*” and “company\*”). The database search returned an initial result of 124 documents.

Stage 2 is *database filtration*. A series of inclusion and exclusion filters were applied to the initial search. First, we chose to include in the search only “articles”, “conference papers” and “reviews”, as these works go through a rigorous peer review process and are evaluated according to their degree of novelty (Kumar et al., 2021). Second, we chose to exclude the research areas of “psychology”, “pharmacology”, “toxicology and pharmaceuticals” and “medicine” and keep the remaining areas since we realized that many of the published documents on financial literacy were outside the expected areas, i.e., those related to “business”. Third, we chose to include documents published between 2005 and December 2020 to eliminate three publications from 1989, 1998 and 2000 that were not related to the subject matter of the study. This database filtration process excluded 21 documents.

Stage 3 is the *exclusion of unrelated documents*. We carried out an independent and manual review of the documents to discard studies that did not match the aims of this bibliometric analysis and systematic review (Krey et al., 2022; Casprini et al., 2020). Thus, this stage excluded 15 contributions that were not related to financial literacy in SMEs.

A total of 36 documents were excluded. The rest of the documents (i.e., a final sample of 88 documents) were processed for a bibliometric analysis and systematic literature review.

### 3.2. Bibliometric analysis and systematic literature review

This review performed a bibliometric analysis and a systematic literature review to respond to the proposed RQs. Specifically, the 88 documents (2005-December 2020) obtained in the process outlined in the previous section were included. Following Kumar et al. (2021) and Krey et al. (2022), the analysis strategy is presented herein (see Fig. 2).

[INSERT FIGURE 2]

A bibliometric analysis can be divided into two analysis categories, namely, performance analysis and science mapping (Donthu et al., 2021). While performance analysis descriptively examines the contribution of the components or agents involved in a research field, science mapping examines their intellectual relationships and structural connections (Cobo, López-Herrera, Herrera-Viedma, and Herrera, 2011; Zupic and Čater, 2015). In this review, we used both types of analyses (e.g., Kumar et al. 2021; Baker, Kumar, and Pandey, 2021). First, we conducted a performance analysis to describe the publication and citation trends (RQ1), in addition to identifying the most influential documents, sources, authors, institutions, and countries present in SME financial literacy research (RQ2). Second, the use of author keyword co-occurrence analysis and cited reference co-citation analysis were chosen as the main scientific mapping techniques. Thus, we distinguished the main research topics to be analysed (RQ3) and their theoretical foundations (RQ4). For this, we used *VOSviewer 1.6.15* because of its versatility in terms of the variety of file formats and databases it supports. This software, which was developed by Van Eck and Waltman (2010) to create, view and explore maps based on bibliographic data, is highly recommended for bibliometrics (Donthu et al., 2021)<sup>1</sup>.

Systematic literature reviews can be classified according to their topic area (research theme or research method) and their scope (narrow or broad) (Gaur and Kumar, 2018). In this review, we carried out a content analysis focused on research themes with a narrow scope based on the bibliometric analysis results (e.g., Krey et al., 2022; Alayo et al., 2020). Specifically, we carried out a (i) domain-based literature review of the clusters and subclusters obtained in the keyword co-occurrence analysis and a (ii) theory-based literature review of the clusters obtained from the cited reference co-citation analysis (Palmatier, Houston and Hulland, 2018). In the first case, we followed some of the coding categories suggested by Gaur and Kumar (2018), such as the primary variables used (independent, dependent, moderators and mediators' variables), the context of the country analysed (developed or emerging), the theory(ies) employed in each case, and the key findings (RQ3). In regard to the second case, we only focused on knowing in depth the theoretical roots that support the findings obtained, as well as their explanation mechanism (RQ4). This systematic literature review, based on the bibliometric analysis results, allowed us to generate thematic groups regarding the link between the research structure and its theoretical foundations, which resulted in an integrative framework on SMEs' financial literacy (RQ5) that can be used as the basis of important avenues for future research (RQ6).

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<sup>1</sup> Consult the Appendix to learn more about *VOSviewer* and the normalization, mapping, and clustering techniques it applies.

## 4. Mapping what we know regarding financial literacy in SMEs

### 4.1. Bibliometric analysis results

#### 4.1.1. Publication and citation trends

The number of documents per year and citation trends are presented in Fig. 3 (RQ1), which shows that most documents have been published in the last decade, with the number of studies having grown exponentially in the last four years. The most productive years were 2020 (26 documents), 2019 (23 documents), 2018 (14 documents) and 2017 (6 documents). Similarly, the trend of citations has grown in step with the rate of publication. This growth rate is expected to have continued in 2021 and in 2022, as it is evident that SME financial literacy research is an emerging research field that is raising considerable levels of interest for business academics.

[INSERT FIGURE 3]

#### 4.1.2. Most influential documents in SMEs financial literacy research

The most influential documents according to total citations received are presented in Table 1 (RQ2). Halabi, Barrett, and Dyt (2010) is the document with the highest number of citations in Scopus (51 citations); this study qualitatively analyses the poor return that small business owners extract from the financial information provided by their accountants. According to Halabi and colleagues' findings, small business owners are unable to read and understand this financial information, which raises the following interesting dilemma: should the accountants translate this financial information or should the owner-managers improve their financial ability in order to understand it? One way or another, the authors state that the usefulness of financial information depends on the financial ability of the owner-manager and his or her relationship with the accountant.

The remaining most cited documents reveal that financial literacy is particularly relevant in aspects such as budgeting (Maes, Sels, and Roodhooft, 2005), effective credit risk management (Belas, Smrcka, Gavurova and Dvorsky, 2018), attitude towards debt and access to financing (Koropp, Grichnik, and Kellermanns, 2013; Nkundabanyanga et al., 2014; Osei-Assibey, Bokpin, and Twerefou, 2012; Hussain, Salia, and Karim, 2018), the acquisition of rare and inimitable resources (Ying, Hassan, and Ahmad, 2019), intellectual capital (Aymen, Alhamzah, and Bilal, 2019), and performance (Ngek, 2016; Adomako et al., 2016; Eniola and Entebang, 2017). In addition, in an angle more oriented towards engineering, several works have tried to develop an intelligent dashboard to help owner-managers interpret the economic-financial information of their businesses (Korczak, Dudycz, and Dyczkowski, 2013, 2012; Dyczkowski, Korczak, and Dudycz, 2014).

[INSERT TABLE 1]

#### 4.1.3. Most influential sources in SME financial literacy research

The most influential sources by total citations received are presented in Table 2 (RQ2). *Qualitative Research in Accounting & Management* (52 citations), *Small Business Economics* (46 citations), *Federated Conference on Computer Science and Information Systems* (42 citations), and the *Journal of Small Business Management* (30 citations) lead in regard to the total citations received from SMEs' financial literacy research. However, only the

latter two are among those that have published the majority of papers on the subject (4 documents)<sup>2</sup>. Continuing with the remaining influential sources, all of them have received less than 30 citations and have published a maximum of 3 documents. In this sense, the next source to lead according to the number of citations received is *Sustainability (Switzerland)* (29 citations), while that according to the number of published documents it is *Lecture Notes in Business Information Processing* (3 documents). Finally, it is notable that there are sources with an SJR above 1 (and even 2) and some which are classified as “A” according to the quality ranking established by ABDC. This suggests that high-quality journals are interested in SME financial literacy research, which leads us to foresee an increase in the scientific production of this emerging research field due to the interest that this research will generate among academics (Goodell, Kumar, Lim, and Pattnaik, 2021; Baker, Kumar, and Pattnaik, 2021).

[INSERT TABLE 2]

#### 4.1.4. Most influential authors, institutions, and countries in SMEs financial literacy research

The most influential authors, institutions, and countries by total citations received are presented in Table 3 (RQ2). The leading authors of SMEs’ financial literacy research in terms of citations are Dudyecz (54 citations), Korczak (53 citations), Barret (52 citations), and Dyt (54 citations). However, only the first two authors lead in terms of published documents (7 and 6, respectively), followed by Dyczkowski (3 documents) and Hussain (3 documents). Regarding institutions, Wroclaw University of Economics (54 citations), University of the Witwatersrand (52 citations), Edith Cowan University (52 citations), and Katholieke Universiteit Leuven (46 citations) have received the most citations. The first institution also stands out in regard to the number of published documents (8 documents), followed by Birmingham City University (3 documents). Among countries, while the United Kingdom (79 citations) has been the most influential at the citation level, Indonesia (19 documents) has been the most prolific based in terms of the number of published documents<sup>3</sup>.

[INSERT TABLE 3]

#### 4.1.5. Co-occurrence analysis

An author’s keyword co-occurrence analysis was conducted using *VOSviewer 1.6.15* (Van Eck and Waltman, 2010) (see Fig. 4). The objective of this type of analysis lies in establishing the research structure of a given scientific field through the consideration of the generated thematic clusters (Alayo et al., 2020; Casado-Belmonte, Capobianco-Uriarte, Martínez-Alonso, and Martínez-Romero, 2021) (RQ3). Since the keywords of each contribution reflect its content, it is assumed that the words that appear together are related thematically (Donthu et al., 2021). Hence, knowing each time that keywords appear in different contributions (occurrence), as well as the frequency with which they appear next to other keywords (co-occurrence), allows us to determine not only the main topics addressed but also the existing links between them (Callon, Courtial, and Laville, 1991; Zong et al., 2013). Considering the 163 author keywords found in our 88 documents, *VOSviewer* reported two thematic

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<sup>2</sup> There are two additional sources that, although they do not appear on Table 2 due to the few citations received, also lead in terms of published documents, namely, *International Journal of Innovation, Creativity & Change* (4 documents) and *International Journal of Scientific & Technology Research* (4 documents).

<sup>3</sup> There are two authors who and an institution that, although they do not appear in Table 3 due to the few citations received, also lead in terms of published documents, namely, Mabula (3 documents) and Ping (3 documents) and the Harbin Institute of Technology (3 documents).

clusters<sup>4</sup>, which were labelled by the largest nodes after “smes” and “financial literacy”: (1) the green cluster, i.e., performance and (2) the blue cluster, i.e., access to finance. Furthermore, we identified three thematic subclusters, which were labelled by the largest nodes after “performance” and “access to finance”: (3) the green subcluster, i.e., innovation, (4) the blue subcluster, i.e., risk attitude and entrepreneurship, (5) and the blue subcluster, i.e., owners-managers; finally, we identified residual contributions. *VOSviewer* merges subclusters into clusters because of the small size of the subclusters; it does so by locating each subcluster within the cluster with which it shares the most keywords (i.e., co-occurrences)<sup>5</sup>. These subclusters have their place in the literature, thereby making their specific analysis as necessary as if they were clusters.

The green cluster—*performance*—is primarily focused on the performance consequences of financial literacy in regard to business and notoriously captures the attention of academics. The blue cluster—*access to finance*—focuses its attention on the ability of financial literacy to facilitate and enhance access to credit for SMEs. The green subcluster—*innovation*—reveals financial literacy as an element that empowers SMEs to either innovate or make use of new innovation forms. The blue subcluster—*risk attitude and entrepreneurship*—analyses the impact of financial literacy on the owner-manager’s propensity to take risks, with all the implications that this entails, such as greater entrepreneurship. The blue subcluster—*owners-managers*—is a cross-sectioning issue of great relevance, given that owner-managers of SMEs are a main subject of analysis when studying financial literacy in SMEs. Finally, there are two interesting lines of research whose marginal character requires the identification of them as residual contributions, namely, the financial literacy-religion relationship and the design of an intelligent dashboard for financial knowledge related to SMEs.

The temporal mapping of the identified topics allows us to establish a chronological order of the progress that SME financial literacy research has experienced. Fig. 5 shows the average time of publication of each of the topics addressed. Thus, the progression of SME financial literacy research, depending on the moment in which each of the identified topics was developed, is as follows: first, owners-managers (between 2014-2016)<sup>6</sup>; second, access to finance (between 2016-2017); third, risk attitude and entrepreneurship (between 2017-2018); fourth, performance (between 2018-2019); and fifth, innovation (approximately 2020).

All the topics obtained in this section will be analysed in depth later in order to identify their structure more fully. This is the reason that this review opted to perform a domain-based literature review of the clusters and subclusters obtained in the author’s keyword co-occurrence analysis (see Section 4.2.1).

[INSERT FIGURE 4]

[INSERT FIGURE 5]

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<sup>4</sup> After simulating different scenarios, we adopted a resolution value of 2, a minimum cluster size of 40 and random start values by default in 10, iterations equal to 10 and random seed in 0, without a minimum number of occurrences.

<sup>5</sup> For example, the *innovation* subcluster is merged with the *performance* cluster since some documents have dealt with both topics together, e.g., by including the terms “innovation” and “performance” among their keywords (e.g., Wahyono and Hutahayan, 2020). This does not mean that the *performance* cluster does not share keywords with the *access to finance* cluster (there are many connections, as shown in Fig. 4), only that the *innovation* cluster shares more with the *performance* cluster, which causes *VOSviewer* to merge innovation with performance. The same occurs with the *risk attitude and entrepreneurship* and *owners-managers* subclusters, which are merged into the *access to finance* cluster (e.g., Ye and Kulathunga, 2019; Kláčmer Čalopa, 2017, respectively).

<sup>6</sup> In the case of the owner-manager topic, as it is a cross-sectioning theme, it ceased to appear in the keywords of the most recent documents because it was an obvious subject, although it is a topic that has accompanied this field of research to date. This aspect will be examined more deeply in the systematic literature review (see Section 4.2.1).

#### 4.1.6. Co-citation analysis

A co-citation analysis of the cited references was conducted using *VOSviewer 1.6.15* (Van Eck and Waltman, 2010) (see Fig. 6). The objective of such an analysis lies in revealing the theoretical roots of a field of research (Randhawa, Wilden and Hohberger, 2016) through the clusters that are generated from the similarities found between the contributions (Appio, Martini, Massa and Testa, 2017) (RQ4). Therefore, when two documents are cited in the same references list of another document, co-citation occurs (Mas-Tur et al., 2020). Thus, we can reveal the knowledge foundations of this emerging field of research (Donthu et al., 2021). Out of the 4,399 references cited by our 88 documents, VOSviewer reported four thematic clusters<sup>7</sup>, which contain different theoretical approaches to explain the financial literacy outcomes and will be analysed in depth in the next section: (1) the red cluster, (2) the green cluster, (3) the blue cluster, and (4) the yellow cluster.

The red cluster includes 37 contributions published throughout 1986-2018 in the *Journal of Small Business Management* (3), the *Journal of Management* (3), the *Journal of Small Business and Enterprise Development* (2), the *Journal of Business Venturing* (2), and the *Journal of Pension Economics and Finance* (2), among others. The main contributions are Barney (1991), Wise (2013), and Lusardi and Mitchell (2014). The green cluster includes 31 contributions published throughout 1981-2015 in the *Journal of Management Information Systems* (2) and the *Journal of the Academy Marketing Science* (2), among others. The main contributions are Dahmen and Rodriguez (2014), Eresia-Eke and Raath (2013), and (Fatoki and Oni, 2014b)<sup>8</sup>. The blue cluster includes 28 contributions published between 1977 and 2017. The main reviews are from the *Academy of Management Review* (3), the *Journal of Consumer Affairs* (3), and the *Journal of Personality and Social Psychology* (2). The principal contributions are Huston (2010), Remund (2010) and Kojo Oseifuah (2010). Finally, the yellow cluster involves 27 contributions published throughout 1986-2015 in the *Journal of Business Venturing* (3), among others. The rest of the sources have only published one document. The overall main contributions are Drexler, Fischer, and Schoar (2014), Fraser, Bhaumik, and Wright (2015), and Van Rooij, Lusardi and Alessie (2011).

Despite the clusters identified in this section, it is difficult to know the theory/theories on which these clusters rely to explain financial literacy. Most of the documents do not explicitly cite the theory used; rather, this information is implicit in the theoretical framework. Therefore, to explain the different theoretical mechanisms that can explain financial literacy outcomes, this study conducted a theory-based literature review considering the clusters obtained in the cited references co-citation analysis (see Section 4.2.2).

[INSERT FIGURE 6]

## 4.2. Systematic literature review

### 4.2.1. SMEs financial literacy research structure

Once the bibliometric analysis was carried out, we proceeded to the systematic literature review. An adequate domain-based literature review of the different clusters and subclusters described in the keyword co-occurrence analysis allowed us to delve into the research structure of SMEs' financial literacy (RQ3).

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<sup>7</sup> After simulating different scenarios, we adopted a resolution value of 1, a minimum cluster size of 20 and random start values by default in 10, iterations equal to 10 and random seed in 0, fixing 2 as the minimum number for a cited reference.

<sup>8</sup> Actually, the main contributions in the green cluster are Dahmen and Rodriguez (2014), Fornell (1981) and Podsakoff (2003). However, the Fornell and Podsakoff articles are only cited because of methodology issues; thus, they are not related to financial literacy topic.

First, regarding the green cluster, i.e., *performance*, most of the empirical evidence (e.g., Eresia-Eke and Raath, 2013) sustains the idea that financial literacy has a direct and positive impact on firm performance. This finding was obtained using numerous and different measurements of the variables involved and through diverse samples of SMEs (Engström and McKelvie, 2017; Eniola and Entebang, 2017). Prior literature confirms not only a direct relationship between both concepts but also an indirect effect through various mediating variables, such as the recognition of opportunities (Anwar et al., 2020), financial practices (Ismanto, Widiastuti, Muharam and Pangestuti, 2020), enterprise risk management (ERM) (Kulathunga et al., 2020), sources of investment decisions (Hendrawaty, Widiyanti and Sadalia, 2020), business growth (Resmi, Pahlevi and Sayekti, 2019), capital structure (Nohong, Ali, Sohilauw, Sobarsyah and Munir, 2019), access to financing and attitude towards financial risk (Hussain et al., 2018; Ye and Kulathunga, 2019). Furthermore, the relationship between financial literacy and performance has also been shown to be positively moderated by both the availability of financial capital (Ngek, 2016) and the support of private organizations regarding information and training (Hossain, 2020). Finally, some studies have examined the moderating role of financial literacy regarding the influence of both access to finance (Junoha, Bin Hidthiir, and Basheer, 2019) and intellectual capital (Aymen et al., 2019) on firm performance. Regarding the context of the studies observed, approximately 86% of the research on the financial literacy–performance relationship has been carried out in developing countries<sup>9</sup>.

Second, the blue cluster—*access to finance*—comprises, among others, various studies that indicate that financial literacy positively impacts SMEs' access to financing (Kim, 2019; Mabula and Ping, 2018a). Owner-manager's financial literacy improves the efficiency with which they prepare financial information, thus improving the ability of SMEs to access financing (Mutezo, 2013). Some authors have specified that financial literacy must be accompanied by certain conditions, such as favourable interest rates, to enhance access to financing (Nkundabanyanga et al., 2014). Likewise, financial literacy helps to achieve the financial well-being of SMEs (Agyei, Adam and Agyemang, 2019; Sisharini, Hardiani and Ratnaningsih, 2019) by accelerating and making the financial decision-making process more effective (Hussain et al., 2018; Kláčmer, 2017). There is evidence that the owner-manager's financing preferences are influenced by financial literacy (Osei-Assibey et al., 2012), thereby showing that the greater the financial literacy is, the greater the use of external financing by SMEs is (Koropp et al., 2013; Sandhu, Hussain and Matlay, 2012). Additionally, financial literacy reduces the use of harmful alternative financing, such as high-cost short-term payday loans (Nitani, Riding and Orser, 2020), and positively impacts savings behaviour (Abebe, Tekle, and Mano, 2018). Regarding the economy setting, 78% of these papers examined SMEs located in developing countries, with half of them focused on microenterprises.

Third, regarding the green subcluster, i.e., *innovation*, very recent articles have demonstrated the positive effect of financial literacy on innovation (Györi, Czako and Horzsa, 2019; Wahyono and Hutahayan, 2020). Financial literacy has been shown to promote firm innovation by creating higher levels of risk tolerance (Liu et al., 2020), thereby reducing financial constraints and improving risk management (Tian et al., 2020). This explanation sounds plausible, since this cluster includes contributions pointing to the positive influence that financial literacy exerts on risk management (Mabula and Ping, 2018b; Nohong et al., 2019). It should be noted that, to the best of our knowledge, the influence of financial literacy on innovation in SMEs has not been the subject of research interest in developed countries thus far.

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<sup>9</sup> The criterion used to distinguish between developing and developed countries is the one adopted by The World Bank (World Bank, 2021).

Fourth, the blue subcluster—*risk attitude and entrepreneurship*—includes studies that examine how preferences for risk and entrepreneurship are closely related to financial literacy. It has been demonstrated, for example, that financial literacy exerts a moderating effect on the relationship between risk preferences and becoming an entrepreneur (Riepe et al., 2020). There is also evidence of the positive impact of financial literacy on financial risk attitudes (Ye and Kulathunga, 2019). With respect to business context and the type of SME in this subcluster, 75% of the studies were undertaken in developing countries, and 67% of the papers focus on microenterprises.

Fifth, the blue subcluster—*owner-manager*—arises from the fact that all the papers analysed measure the owner-manager's financial literacy. Organization financial literacy can be measured either at different levels (CEO, top management team, board of directors, accountancy department, employees) or as a whole. However, since the owner-manager is considered the success factor of the firm (Damayanti et al., 2018) and is often the only ultimate decision-maker (Miller and Dröge, 1986), it is generally accepted to measure the financial literacy of the firm on the basis of the owner-manager's financial literacy.

Finally, there are two interesting lines of research that have been classified as residual contributions. The first line joins some studies on business intelligence that analyse the creation and implementation of an intelligent dashboard focused on financial literacy to increase the quality and efficiency in SME decision-making (e.g., Dudycz, Nita, and Oleksyk, 2019). The second line addresses how religion mediates or moderates the effect of financial literacy on different economic and financial outcomes (e.g., Agyei et al., 2019). Both topics have only been studied in developing countries.

#### 4.2.2. SMEs' financial literacy theoretical foundations

An adequate theory-based literature review of the different clusters described in the cited references co-citation analysis allowed us to recognize the theoretical foundations of SMEs' financial literacy (RQ4). Thus, in this section, we focus on identifying the main theories and the mechanisms that explain financial literacy based on these foundations.

First, the red cluster relies mainly on *the resource base view* (RBV), according to which valuable, rare, inimitable and nonsubstitutable resources may be sources of business performance and competitive advantage (Barney, 1991; Burks, Carpenter, Goette and Rustichini, 2009; Das, 2000). Here, financial literacy can be cast as a form of investment in human capital and an indispensable source of competitive advantage (Adomako et al., 2016; Lusardi and Mitchell, 2014; Songling, Ishtiaq and Anwar, 2018) and survival (Wise, 2013).

Second, the green cluster is based on *pecking order theory*, *agency theory*, and *trade-off theory*. According to *pecking order theory*, firms prefer internal to external funds and debt to equity if external funds are required (Myers and Majluf, 1984; Myers, 1984). In the case of SMEs, these preferences are motivated, among other issues, by the asymmetric information problems they face (e.g., adverse selection and moral hazard) and the risks involved, which give rise to numerous financial restrictions (López-Gracia and Sogorb-Mira, 2008). Financial literacy emerges, in this sense, as an important determinant of SME owner-manager financial preferences (Osei-Assibey et al., 2012), which provides him or her with greater knowledge regarding a wide range of existing debt options, which should decrease the firm's dependence on internal funding (Gallo, Tapies and Cappuyns, 2004). Thus, financial literacy can modify the hierarchical order in the choice of capital structure (Koropp et al., 2013). *Agency theory* argues that there are divergences between an agent's decisions and those decisions that maximize

the welfare of the principal (Jensen and Meckling, 1976), with the relation between borrowers (e.g., firms) and lenders (e.g., financial institutions) being a good example (Chua, Chrisman, Kellermanns, and Wu, 2011). These divergences are partly the result of information asymmetry because the cost of searching for reliable financial information is not the same for lenders and borrowers (Stigler, 1961). Here, financial literacy can mitigate agency problems related to risk and control (Jensen and Meckling, 1976) and be considered a possible solution to overcome information asymmetries and improve information flows (Bayrakdaroglu and Şan, 2014; Poonpatpibul and Limthammahisorn, 2005). Drawing on *trade-off theory*<sup>10</sup>, firms seek to obtain an optimal capital structure and off-set the advantages (e.g., tax savings from deductibility of interest payments to debt holders) and disadvantages (e.g., potential cost of financial distress or bankruptcy risk) that the use of debt implies (Modigliani and Miller, 1963; Kraus and Litzenberger, 1973; Myers, 1984). In this sense, a financially literate SME owner-manager is more likely to opt for the most suitable sources of financing by analysing the debt benefits (tax savings), costs (financial distress) and risks involved (bankruptcy) (Mabula and Ping, 2018a).

Third, the yellow cluster is established based on *entrepreneurial orientation* (EO), *upper echelon theory*, and *human capital theory*. The *EO perspective* refers to firms' strategic orientation and, as such, manifests itself through a firm's tendency to mainly engage in innovativeness, undertake risky ventures, and display proactive behaviour (Lumpkin and Dess, 1996; Matsuno et al., 2002). In this theoretical context, financial literacy plays a role as an antecedent of the dimensions that make up the EO, thereby enabling its increase (e.g., Junoha et al., 2019). According to *upper echelon theory*, a firm's choice of strategy and therefore its performance is partially determined by the managerial background characteristics (Hambrick and Mason, 1984). In this sense, financial literacy, as one of SME owner-manager's upper echelon attributes, can ultimately influence their strategic decisions and impact major organizational outcomes (e.g., Tian et al., 2020). Based on *human capital theory*, people with high levels of human capital (knowledge, talent, abilities, and capacities) are more productive and perform better at the tasks at hand (Becker, 1975). As owner-managers are key in their SMEs, their level of human capital is essential to the firm (Jansen, Curşeu, Vermeulen, Geurts, and Gibcus, 2013; Zhao and Thompson, 2019). Here, financial literacy is seen as a way by which to enhance human capital endowment (Liu et al., 2020).

Fourth, the blue cluster is built on *planned behaviour theory*. According to this theory, behaviour is determined by intentions, attitudes and subjective norms (Ajzen, 1991). Hence, financial literacy can be considered an aspect that influences the attitudes and intentions of SME owners-managers and their future behaviour (Citradika, Atahau, and Satrio, 2019).

#### 4.2.3. SMEs financial literacy integrative framework

In this section, we analyse the link between the clusters and subclusters identified by the keyword co-occurrence analysis and those that emerged when we performed the co-citation analysis. Our aim is to relate the SME financial literacy research structure to its theoretical foundations (RQ5) to build an integrative framework (see Fig. 7) on which to base proposed future lines of research (see Section 4.2.4).

The *first group* arises from the close relationship between the performance topic and the RBV. There is a broad consensus when considering financial literacy as an intangible resource that allows the undertaking of

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<sup>10</sup> Actually, trade-off theory was initially included in the blue cluster, since some documents cited it alongside planned behaviour theory. However, these documents do not rely on the latter to explain the capital structure of the firm, but rather use it for other reasons (e.g., to justify the inclusion of certain behavioural variables in the study (Koropp et al., 2013). Therefore, we decided to include it along with the rest of the theories regarding capital.

activities that generate higher performance levels (Resmi et al., 2019). Thus, financial literacy empowers a firm to attract new tangible and intangible resources, thereby enhancing its performance (Ying et al., 2019), such as a greater availability of financing, a better use of business risk management practices and a greater recognition of opportunities (Agyei, 2018; Hussain et al., 2018; Shah, Anwar and Hussain, 2020). In summary, financial literacy constitutes a unique intangible resource that enables a firm to acquire and manage other distinctive resources, thereby resulting in a greater competitive capacity and, in turn, superior earnings (Eniola and Entebang, 2017).

The topic of access to finance depends highly on agency, pecking-order and trade-off theories, which emerge as the *second group*. Taking into consideration agency theory, financial literacy usually diminishes the owner-manager's prejudices against debt (Koropp et al., 2013) and improves the effectiveness of SMEs to elaborate financial information, which, in turn, increases their possibilities of obtaining financing (Hussain et al., 2018). Consistent with pecking order theory, financial literacy increases owner-manager efficiency to make financial decisions as a result of a greater comprehension of debt alternatives, thereby decreasing the constraints that they often cope with when attempting to access financing (Adomako et al., 2016; Sandhu et al., 2012). Finally, drawing on trade-off theory, financial literacy favours knowledge of the advantages and disadvantages of debt, which eases difficulties in achieving a balanced financial capital structure in the firm, thereby enhancing lenders' trust and becoming a very useful instrument in combating financial constraints (Carbó, Gardener, and Molyneux, 2005; Ye and Kulathunga, 2019).

The topic of innovation clearly draws on upper echelon theory and human capital theory, which gives rise to the *third group*. Upper echelon theory illustrates how the attributes of top executives, such as their financial literacy, directly affect their innovation performance (Liu et al., 2020) because top managers' financial literacy improves corporate investments and financial activities that are directly related to innovation (Tian et al., 2020). Top executives' financial literacy makes possible intentional, appropriate financial planning, the right mindset towards financing management, and the implementation of new funding alternatives, which are relevant driving factors of innovation (Györi et al., 2019). CEOs' financial literacy enhances financial awareness, improves expenses and income management, and promotes a greater long-term financial perspective, which in turn improves firms' level of innovation (Illmeyer, Grosch, Kittler, and Priess, 2017). According to human capital theory, the acquisition of human capital in the form of financial literacy is essential to increase innovation capacity, insofar as financial literacy has been suggested to be an essential lever acting upon innovation at the firm level (Liu et al., 2020). Financially literate owners-managers will adopt more well-founded decisions with regard to the trade-off between risk and returns from the projects under study and will be able to identify greater financial payoffs of risky R&D investments (Liu et al., 2020).

Risk attitude and entrepreneurship topics are closely linked to the EO perspective, which constitutes the *fourth group*. Thus, accessing financial resources, for instance, has been demonstrated to be essential for EO (Covin Green and Slevin, 2006). Previous research has shown how access to finance mediates the relationship between EO and SME performance and how financial literacy moderates the link between access to finance and SME performance (Junoha et al., 2019). In relation to taking risks, prior literature has confirmed the positive relationship between financial literacy and financial risk attitude (Ye and Kulathunga, 2019) and the role of this relationship in reducing risk aversion related to becoming an entrepreneur (Riepe et al., 2020). Financial literacy impacts individuals' willingness to take risks since they can make better rational decisions when evaluating an

investment project (Liu et al., 2020). Some studies have also demonstrated that financial literacy improves risk management through capital structure policies (Nohong et al., 2019).

Residual contributions, particularly those identified with religion, are mainly related to planned behaviour theory, which forms the *fifth group*. In this regard, some studies have addressed how religion moderates the impact of financial literacy on financial wellbeing (Agyei et al., 2019) and mediates the relationship between financial literacy and firm performance (Agyei, 2018). Moreover, previous works have shown how the awareness of financial literacy can increase the likelihood of adopting Islamic financial decision-making in SMEs (Al Balushi, Locke, and Boulanouar, 2019). This residual contribution also includes some research based on the building of business intelligence systems for SME managers to support decision-makers regarding the study, examination, and interpretation of economic and financial data (Dudycz et al., 2019; Korczak, Dudycz and Dyczkowski, 2012), which has no theoretical foundations given its mainly practical nature.

Finally, the reader should note that the topic of the owner-manager is related to all the theories in general and none in particular. All the documents analysed measure the financial literacy of the firm on the basis of the owner-manager's financial literacy (as explained in Section 4.2.1). Since owner-managers are a cross-cutting issue, they are not considered an independent group within the SME financial literacy integrative framework.

[INSERT FIGURE 7]

#### 4.2.4. Future important avenues of research

In this section, we propose important avenues for future research to further develop this emerging research field (RQ6) (see Fig. 8).

Before undertaking this goal, we must address the controversy that surrounds the concept of financial literacy, which hinders researchers from forming a clear image of this field of study. The great variety of constructs that measure financial literacy and the previously mentioned incorrect interchangeability of concepts (e.g., financial knowledge vs. financial education) have led to disparate findings for the same research goal (Eresia-Eke and Raath, 2013; Fatoki and Oni, 2014a; Huston, 2010). There is a certain type of evolution that occurs since research is inclined to include within the financial literacy construct dimensions that go beyond mere financial knowledge, such as financial attitude, financial behaviour or financial awareness (Eniola and Entebang, 2017; Mabula and Ping, 2018c). Additionally, some studies have expanded this construct by considering actual and perceived financial knowledge (Rostamkalaei, Nitani and Riding, 2019) to analyse the effects of overconfidence. However, despite this brief rebound in consensus regarding the multidimensional measurement of financial literacy, the aforementioned problems still persist. A possible solution is the use and adaptation of the OECD (2018) proposal to the case of the SME owner-manager, since the proposal covers those dimensions that are most used in the previous literature (financial knowledge, financial attitude and financial behaviour) and offers a guide measurement for each. In short, the conceptual problem posed thus far by the definition and measurement of financial literacy continues to be a pending challenge and is an important line for future research.

We continue by offering possible future research lines. Human capital is recognized in the literature as being an essential factor in the internationalization of SMEs (Audretsch, Lehmann, and Schenkenhofer, 2018; Ruzzier, Hisrich and Antoncic, 2007). This influence has been explained through the RBV (Oviatt and McDougall, 1994; Casado-Belmonte, Marín-Carrillo, Terán-Yépez, and Capobianco-Uriarte, 2020). In this sense, some studies have

indicated the need to improve our understanding of how the further development of human capital increases the likelihood of successful SME internationalization (Dabić, Maley, Dana, Novak, Pellegrini, and Caputo, 2020). Financial literacy can be considered an intangible resource related to human capital, thanks to its valuable, rare, inimitable and nonsubstitutable nature; in addition, it may constitute an important antecedent of internationalization (Ying et al., 2019). First, previous research has recognized that the lack of financial resources is an important barrier to SME internationalization (Fayos Gardó, Calderón García, and Mollá Descals, 2015), thereby conditioning not only the probability that SMEs will export but also the number of destinations to which they will export (e.g., El-Said, Al-Said and Zaki, 2015). Therefore, financial literacy, through its positive influence on access to finance (Nkundabanyanga et al., 2014), may lead to greater levels of internationalization. Second, there is a large volume of research on exports (Haddoud, Onjewu, Nowiński, and Jones, 2021) as this concept is seen as the most basic path and the one that implies the least amount of risk for SMEs regarding internationalization (Child, Karmowska, and Shenkar, 2022; Stoian, Dimitratos and Plakoyiannaki, 2018). Risk perception and management are also crucial aspects of SME internationalization (Paul and Rosado-Serrano, 2019; Ribau, Moreira and Raposo, 2018). Hence, financial literacy may promote new forms of international entry for SMEs by helping to improve risk management and the risk-taking attitude of decision-makers (Kulathunga et al., 2020; Ye and Kulathunga, 2019). Third, the importance of owner-managers in the SME internationalization process is evident, especially in the search for and recognition of international opportunities (Ribau et al., 2018). Financial literacy might foster a greater recognition of opportunities by the owner-manager (Anwar et al., 2020) and increase the possibilities of SME internationalization. In fact, financial literacy has been considered an important determinant of knowing how to take advantage of the opportunities that arise from globalization and, relatedly, how to promote internationalization (Anand, 2015).

*Research gap 1: How does financial literacy facilitate SME internationalization through the mediating effect of access to finance?*

*Research gap 2: How does financial literacy promote new forms of international entry for SMEs through the mediating effect of risk-taking propensity and risk management?*

*Research gap 3: How does financial literacy facilitate SME internationalization through the mediating effect of opportunity recognition?*

The concept of innovation, drawing basically from the upper echelon and human capital theories, has been scarcely analysed (only some research has been done in developing countries); thus, the concept offers enormous possibilities for further research. Empirical evidence has confirmed that more innovative firms perform better, i.e., by obtaining larger returns (Verdu, Tamayo and Ruiz-Moreno, 2012) or improving their future profitability (Liu et al., 2020). As R&D investment increases, the requirement of financially literate managers to face successfully risky and uncertain situations turns out to be more necessary. More financially literate managers are more tolerant of ambiguity and more willing to accept failure in uncertain innovative processes (Talke, Salomo, and Rost, 2010); thus, they are better trained to transform innovation into performance (Li and Huang, 2019). As innovation levels increase, the role of financially literate executives becomes more relevant for conducting sound financial planning, implementing innovative banking products or becoming more aware of convex financial payoffs from increased R&D investments, which are key drivers for turning innovation into performance more

efficiently (Liu et al., 2020). Consequently, we propose to analyse the moderating effect of financial literacy on the innovation-performance relationship.

Likewise, the term “open innovation” was originally used by Chesbrough (2003) to define the use of “internal and external knowledge to accelerate internal innovation and expand markets for the external use of such innovation”. Since then, while much research has focused on this topic, few studies have examined open innovation in SMEs (Odrizola-Fernández, Berbegal-Mirabent and Merigó-Lindahl, 2019). Furthermore, as far as we know, there is no study that has empirically tested the relationship between financial literacy and open innovation.

*Research Gap 4: Does financial literacy moderate the relationship between innovation and firm performance?*

*Research Gap 5: How does financial literacy influence open innovation?*

On the one hand, research is increasingly highlighting the relevance of sustainable business, which is where the concepts of creating economic and social value and protecting the natural environment are in harmony (Sharma & Sharma, 2019). As shown in former epigraphs, previous literature has addressed the relationship between financial literacy and economic performance (Kulathunga et al., 2020). However, to the best of our knowledge, research on the financial literacy-sustainable business relationship is nonexistent. Financial literacy is a key driver of managing financial instruments that allow the transfer of climate-related risks (European Central Bank, 2021) and sustainable corporate funding instruments, such as green bonds (European Commission, 2021). Financial literacy eases the improvement of SMEs’ financing conditions through the use of funds that are devoted to investing in companies’ developing projects with a significant social and/or environmental and circular economy impact (Harrison and Muething, 2021; Instituto de Crédito Oficial, 2021). This financing also permits SMEs to increase their investment base, decrease their issuance of equity instruments and enhance their reputation. From an investor’s perspective, SMEs may acquire sustainable funds to adapt to potential regulations that penalise exposure to carbon-intensive activities and allow participating in the issuer’s sustainability strategy (AECA, 2020). Financial literacy enables SMEs to label sustainable financial products more reliably and not only elaborate on but also to get more out of both sustainability reports (European Union, 2014) and specific information with regard to climate-related risks and opportunities (Task Force on Climate related Financial Disclosures, 2017).

*Research Gap 6: How does financial literacy influence SMEs’ sustainable investing and financing?*

We continue by making recommendations for future research on transversal themes that may focus on context, gender, and family firms. The importance of context in financial literacy research is essential, as context-sensitive literature addresses what factors surround the phenomena under research (contextualizing research) and how the factors constrain and shape these phenomena (context theorizing) (Bamberger, 2008). Consequently, institutional, cultural, historical, and geographical contextual circumstances may offer different and unique angles by which to comprehend financial literacy in SMEs worldwide. As some authors have recently done in the family firm literature (Krueger, Bogers, Labaki and Basco, 2020), we suggest that researchers follow different research strategies to introduce context into the financial literacy field of knowledge (Whetten, 2009). For instance, future research should carry out explorative and replication studies. Likewise, future studies should check the fit of

specific theories that are usually applied in a particular context, as well as take the opportunity to defy or reformulate these views themselves. Researchers may also investigate how and when context limits financial literacy itself. To this end, academics could delve into how three main contextual layers, namely, the micro, meso- and macrocontext layers, determine firm financial literacy. The microcontext refers to the organization as an environment in which financial literature is generated and implemented, and it is required to know how aspects such as organizational vision, mission or strategy influence financial literacy (e.g., to what extent the way firms plan their corporate governance and ownership structure affects financial literacy) (Di Giuli, Caselly and Gatti, 2011). The mesocontext includes different subenvironments, such as industry, clients, suppliers or competitors, and it relates to how different “market forces” impact firm financial literacy (e.g., how staying closer to customers and competitors in the market is relevant for firm financial literacy) (Waldman, Javidan, and Varella, 2004). Finally, the macrocontext is formed by sociocultural factors, economic contexts, demographic features, politics, technological developments or geographic localization, and it is concerned with how “global forces” may shape financial literacy (e.g., what and how local characteristics, such as cultural and economic setting, are key factors in the understanding of firm financial literacy) (Huston, 2010). In this vein, and related to this last contextual layer, most of the research on SME financial literacy comes from developing economies. However, it seems naïve to assume that what we know about financial literacy in developing SMEs can be applied to SMEs located in developed countries. Finally, future research should address how distinct levels of context (micro, meso-, and macrocontexts) interact to more comprehensively determine which factors are the most relevant in shaping the organization’s financial literacy. Given the myriad research possibilities offered by greater attention to context in the literature on financial literacy and the limitations in manuscript word count, we have opted to highlight the potential of the concept as a whole rather than provide literature that supports each and every one of the lines of study outlined above. Therefore, and by way of illustration but not limitation, the following research gaps are proposed:

*Research Gap 7: Are owners/managers/workers more or less financially literate in SMEs depending on the industrial sector, business environment or social network?*

*Research Gap 8: Are owners/managers/workers more or less financially literate in SMEs depending on the environment characterized by formal (i.e., rule of law) and informal (i.e., culture) institutions?*

Researchers have produced little work that analyses the role of women in financial literacy in SMEs (Al Balushi et al., 2019; Nitani et al., 2020), as this topic is in its infancy. This scarce research has found a significant difference between male and female individuals in adopting Islamic finance characteristics (Al Balushi et al., 2019) and that the gender gap in financial knowledge is smaller among self-employed workers than among employees (Nitani et al., 2020). Despite the scant prior literature that has identified gender dissimilarities in financial knowledge (Xu and Zia, 2012; OECD, 2016), as far as we know, research has neglected the differences between male and female financial literacy in SMEs. Women show more risk aversion in regard to financial decision-making (Agnew, Balduzzi and Sunden, 2003), are less relaxed when addressing financial risk (Barsky, Juster, Kimball, and Shapiro 1997) and are more prudent in carrying out investment decisions (Bernasek and Shwiff, 2001) than are men. Thus, the existing gender gap in regard to financial behaviour is partially determined by women’s attitude towards risk (Lusardi and Mitchell, 2014). However, although gender is an important

antecedent of financial literacy at the consumer level (Chen and Volpe, 2002; Goyal and Kumar, 2021), the issue of how financial literacy may interact with gender to affect risk attitude or other possible outcomes has not been analysed in the context of SMEs.

*Research Gap 9: Are female owners/managers/workers more or less financially literate than male owners/managers/workers in SMEs?*

*Research Gap 10: How does gender influence SMEs' financial literacy and/or its relationships with different outcomes (performance, access to finance...)?*

Despite the growing level of interest in financial literacy in SMEs, limited attention has been devoted to examining this issue within the context of family firms. One notable exception is the study by Koropp et al. (2013), which found that family commitment to the business moderates the relationship between financial knowledge and financial attitude towards debt. Sandhu et al. (2012) demonstrated how financial education is a prerequisite for small Indian agricultural family firms' growth. Molina-García, Florido-Ruiz, Campos Valenzuela, and Diéguez-Soto (2020) highlighted the role of family ownership and generation on family SMEs' financial literacy. As studies in this field remain scarce, we recommend discussing and showing whether family SMEs are different from their nonfamily counterparts in terms of financial literacy. Furthermore, given that family firms are heterogeneous regarding their behaviour and performance (Chua, Chrisman, Steier and Rau, 2012), future research should advance the understanding of the influence of family firm heterogeneity on financial literacy using different sources of heterogeneity, such as governance structures (Carney, 2005), resources and capabilities (Arregle, Hitt, Sirmon and Very, 2007), goals and values (Chrisman, Chua, Pearson and Barnett, 2012), among others.

*Research Gap 11: Are family SMEs more or less financially literate than nonfamily SMEs?*

*Research Gap 12: How does family ownership/management heterogeneity influence financial literacy and/or its relationships with different outcomes (e.g., performance, access to finance, etc.)?*

*Research Gap 13: How does socioemotional wealth influence family SMEs' financial literacy and/or its relationships with different outcomes (e.g., performance, access to finance, etc.)?*

[INSERT FIGURE 8]

## **5. Conclusions**

This paper is the first to provide a reliable, consistent, and up-to-date review of SME financial literacy research through the combination of a bibliometric analysis and a systematic literature review. Specifically, we carried out a co-occurrence analysis of author keywords and a co-citation analysis of cited references, followed by an in-depth analysis of a total of 88 documents published between 2005 and 2020. Thus, this review offers a thorough and comprehensive overview of this emerging research field by identifying the main research topics and the theoretical foundations on which it is based, thus developing an integrative framework on which to base important future lines of research. The findings indicate that SME financial literacy research has been primarily analysed regarding the following topics: (1) *performance*, (2) *access to finance*, (3) *innovation*, (4) *risk attitude and*

*entrepreneurship*, and (5) *owner-managers and residual contributions*. The theoretical foundations that support this research structure are (1) *the resource-based view*, (2) *pecking order theory*, *agency theory* and *trade-off theory*, (3) *the entrepreneurial orientation perspective*, *human capital theory* and *upper echelon theory* and (4) *planned behaviour theory*. Furthermore, it is remarkable that approximately 80% of the documents published in the field of SME financial literacy research have been produced in developing countries.

This review makes three contributions. First, our study provides an organized collection of the increasing and diverse studies of financial literacy in SMEs, thereby enhancing the time window taken into account in the prior scant reviews and bringing up to date the overview of this research field. Second, we combine bibliometric techniques with a systematic literature review, thereby addressing the limitations that arise from using only one method. Thus, we try to minimize the bias and subjectivity problems that derive from using purely qualitative techniques without renouncing the depth they offer. Third, through the combination of the main topics investigated together with their theoretical foundations, we propose an integrative framework for SME financial literacy research on which to base research avenues for future studies.

However, this work has some limitations. Although the use of bibliometric techniques considerably reduces subjectivity, we cannot ignore the fact that the in-depth review of the results (i.e., the systematic literature review) is subject to the authors' interpretation. Second, although we have tried to consider all possible combinations, the methodology used in the analysis could be extended using more keywords associated with financial literacy in SMEs. Finally, we only used the Scopus database, and there are more databases that may have provided interesting documents. Nevertheless, Scopus covers a larger number of journals than other databases (e.g., WoS, ABI Inform/Proquest) (Gavel and Iselid, 2008; Mongeon and Paul, 2015). These limitations may serve as a guide for improving future reviews on SME financial literacy research.

Therefore, our review provides a guide for scholars who wish to research in the field of financial literacy in SMEs by advising them about its most interesting aspects, its research structure and its theoretical foundations. With this work, we hope to contribute to the proper development of this emerging research field, as well as to encourage SME scholars to pursue new research topics.

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## Appendix: VOSviewer.

VOSviewer (<https://www.vosviewer.com>) is a free tool developed by Van Eck & Waltman (2010) that is focused on creating, viewing and exploring maps based on networks, bibliographic and text data. In this appendix, we briefly introduce the VOSviewer terminology and the steps that were followed in the construction of the map.

First, it is important to know the terminology generally used by VOSviewer. Each map is made up of a series of *items/nodes* (keywords, authors, organizations, sources or countries) of different *weights* (the size of the item denotes its importance on the map). Items can appear connected to each other through *links* (co-authorship, co-occurrence, citation, bibliographic coupling or co-citation), which have a *strength* (degree of relationship between two items depending on the bibliometric tool selected). The set of items connected by links forms a *network*. Items can also be grouped into *clusters* (based on their similarity).

Second, we can briefly discuss how VOSviewer builds the map based on a *co-occurrence matrix*. This process consists of three steps (Van Eck & Waltman, 2014):

- *Normalization*: As a consequence of the differences that may exist between items and therefore in their connections with other items, it is necessary to normalize the co-occurrence matrix to obtain a *similarity matrix*. VOSviewer, by default, uses the *association strength* as a normalization measure for the co-occurrence data (Van Eck & Waltman, 2010; Van Eck & Waltman, 2009):

$$s_{ij} = c_{ij}w_iw_j$$

where  $c_{ij}$  is the number of co-occurrences of Items  $i$  and  $j$ , and  $w_i$  and  $w_j$  are the total number of occurrences of Items  $i$  and  $j$ . Hence,  $s_{ij}$  is the similarity between Items  $i$  and  $j$ .

- *Mapping*: Based on the similarity matrix obtained in the previous step, VOSviewer builds a two-dimensional map using what it calls the “*VOS mapping technique*”. The distance between items shows their high or low relationship. To do so, VOSviewer minimizes the following function (Nees Jan Van Eck & Waltman, 2010):

$$V(x_1, \dots, x_n) = \sum_{i < j} s_{ij} \|x_i - x_j\|^2$$

subject to the following restriction:

$$\frac{2}{n(n-1)} \sum_{i < j} \|x_i - x_j\| = 1$$

where  $n$  is the number of items in a network,  $x_i$  and  $x_j$  are the locations of Items  $i$  and  $j$  in a two-dimensional map, and  $\|x_i - x_j\|$  is the Euclidean distance between them. VOSviewer makes use of a variant of the SMACOF algorithm for the minimization problem subject to the described restriction (Borg & Groenen, 2005). Since the optimization problem described does not offer a single solution, it is necessary to transform it to ensure the consistency of the results (*translation, rotation, and reflection*) (Van Eck and Waltman, 2010).

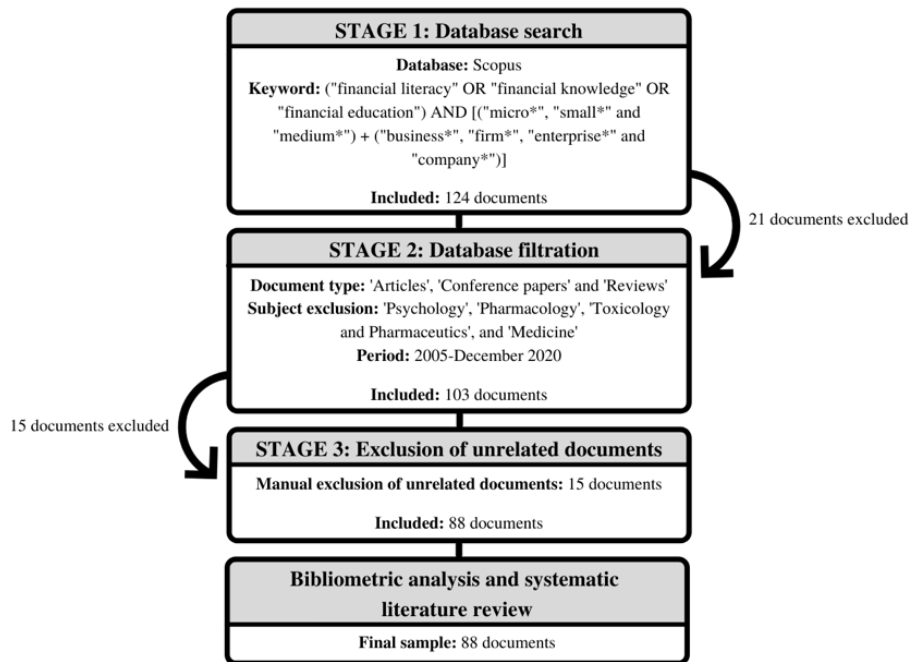
- *Clustering*: Finally, to group the items into clusters, the *VOSviewer clustering technique* consists of maximizing the following function (Van Eck & Waltman, 2010):

$$V(c_1, \dots, c_n) = \sum_{i < j} \delta(c_i, c_j)(s_{ij} - \gamma)$$

where  $c_i$  is the cluster to which Item  $i$  has been assigned,  $\delta(c_i, c_j)$  is a function that is equal to 1 if  $c_i = c_j$  and 0 otherwise and  $\gamma$  is the resolution parameter (level of detail of the clustering).

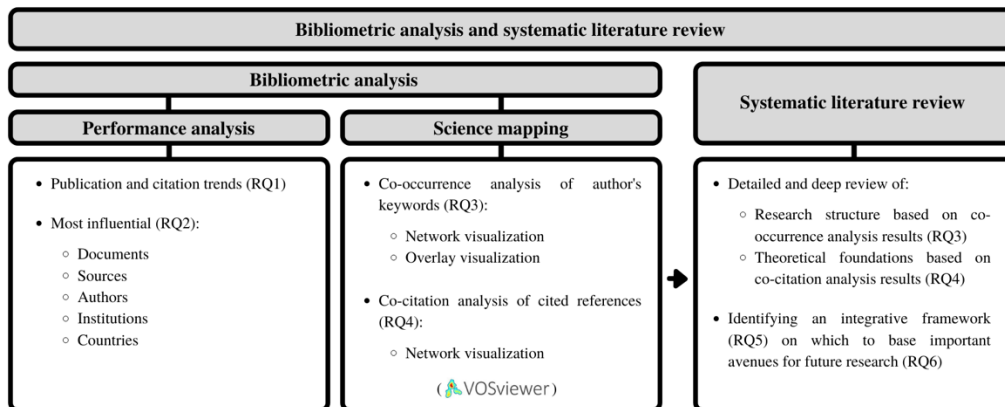
**FIGURE 1:**

**Fig. 1.** Search and filtration strategy for bibliometric analysis and systematic literature review (source: authors).



**FIGURE 2:**

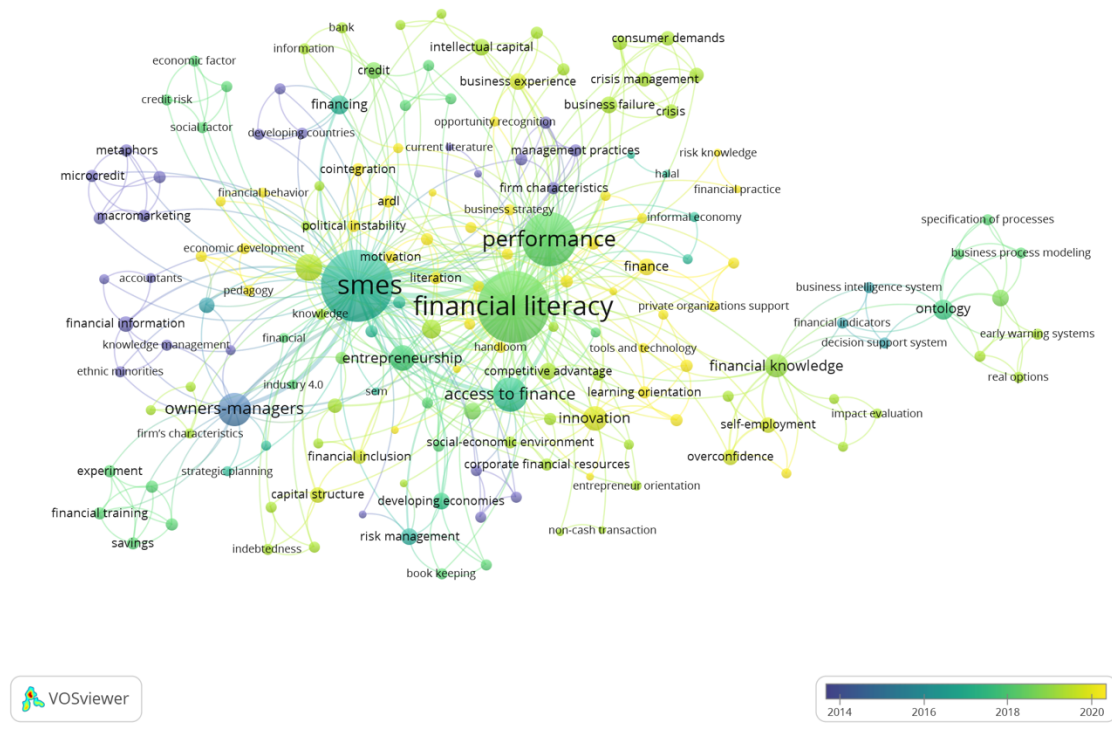
**Fig. 2.** Analysis strategy for bibliometric analysis and systematic literature review (source: authors).





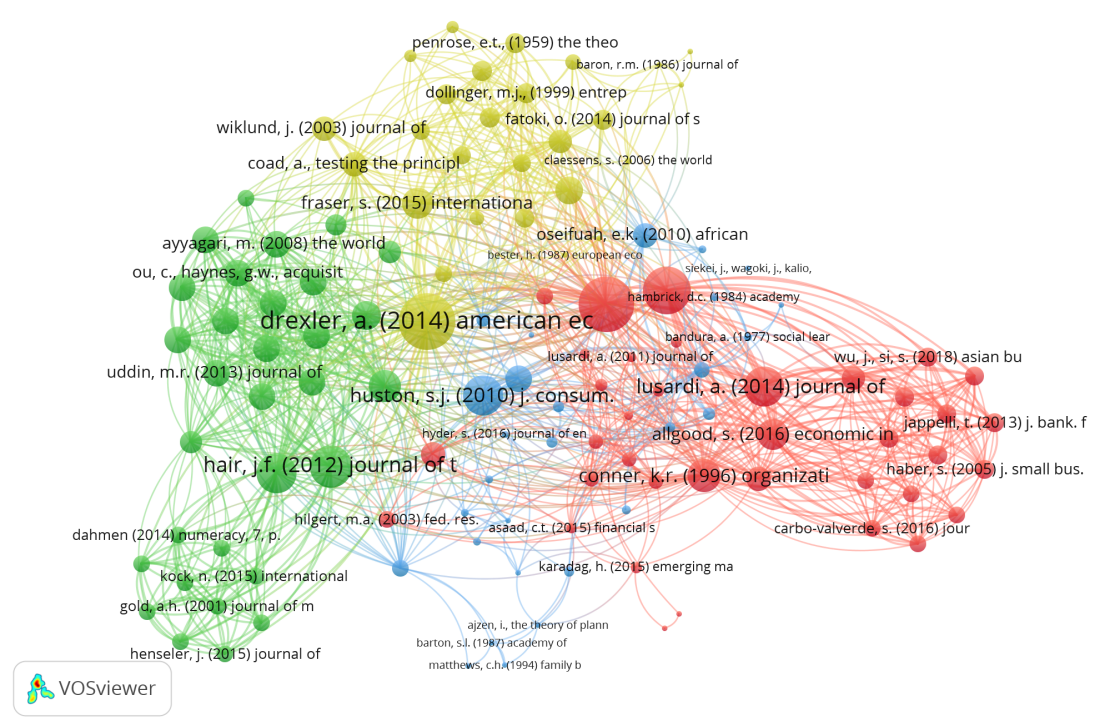
**FIGURE 5:**

**Fig. 5.** Overlay visualization of author's keywords co-occurrence analysis. Node size: total link strength (source: authors through VOSviewer).



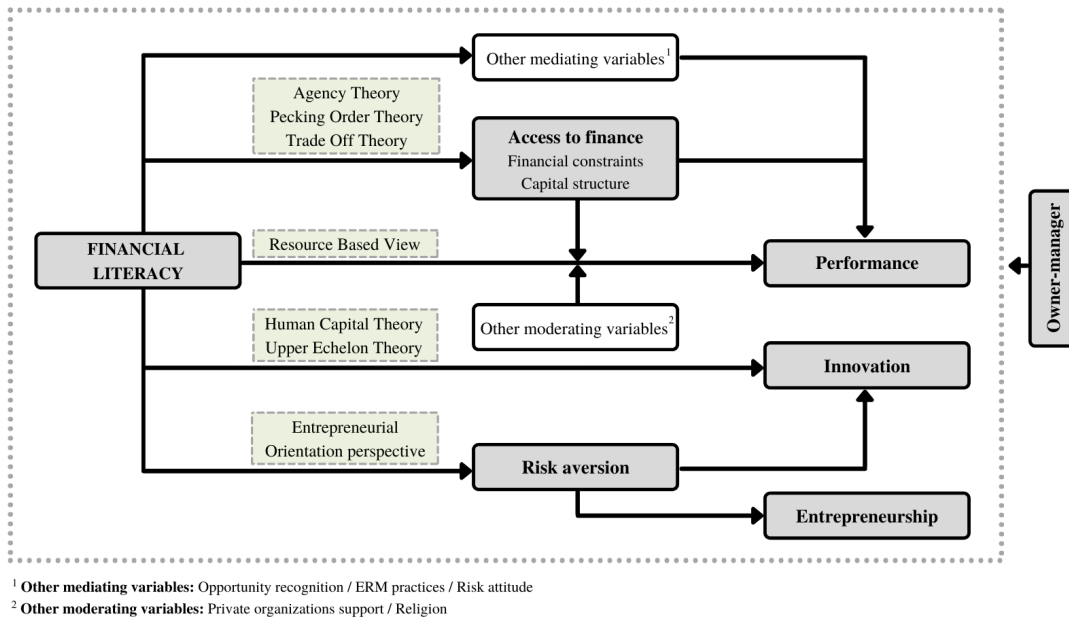
**FIGURE 6:**

**Fig. 6.** Network visualization of cited references co-citation analysis. Node size: total link strength (source: authors through VOSviewer).



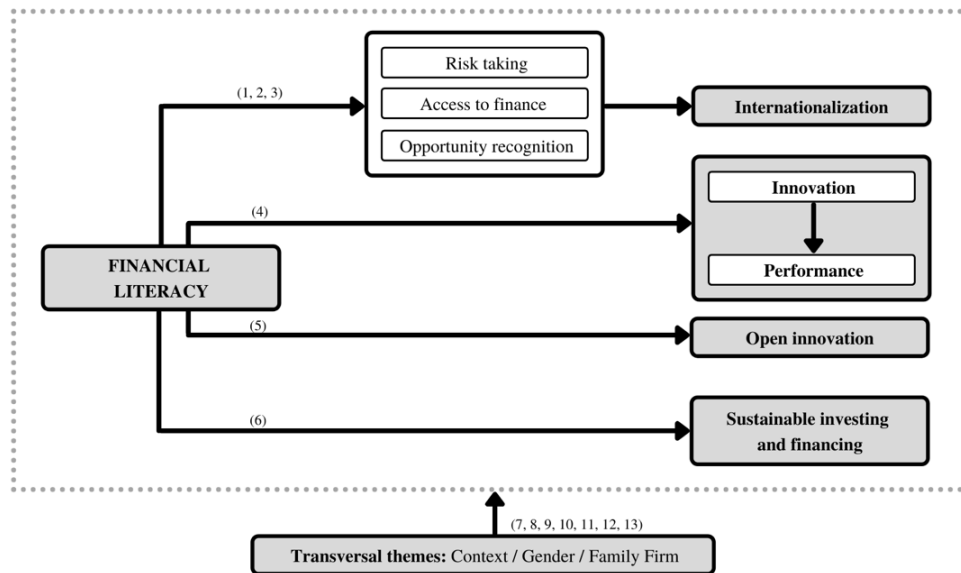
**FIGURE 7:**

**Fig. 7.** Integrative framework of financial literacy in SMEs (source: authors).



**FIGURE 8:**

**Fig. 8.** Future avenues of research on financial literacy in SMEs. Research gaps are shown in parentheses (source: authors).



**TABLE 1:****Table 1.** Most influential documents in SMEs financial literacy research.

Document title	Author(s)	TC
Understanding financial information used to assess small firm performance: An Australian qualitative study.	Halabi et al. (2010)	52
Modelling the link between management practices and financial performance. Evidence from small construction companies.	Maes et al. (2005)	46
Financial Attitudes in Family Firms: The Moderating Role of Family Commitment.	Koropp et al. (2013)	29
The impact of social and economic factors in the credit risk management of sme.	Belas et al. (2018)	27
The role of a manager's intangible capabilities in resource acquisition and sustainable competitive performance.	Ying et al. (2019)	21
The moderating influence of financial literacy on the relationship between access to finance and firm growth in Ghana.	Adomako et al. (2016)	20
Lending terms, financial literacy and formal credit accessibility.	Nkundabanyanga et al. (2014)	19
SME Managers and Financial Literacy.	Eniola & Entebang (2017)	16
Microenterprise financing preference: Testing POH within the context of Ghana's rural financial market.	Osei-Assibey et al. (2012)	15
Performance implications of financial capital availability on the financial literacy - Performance nexus in South Africa.	Ngek (2016)	12
Design of financial knowledge in dashboard for SME managers.	Korczak et al. (2013)	12
Intelligent Dashboard for SME Managers. Architecture and functions.	Korczak et al. (2012)	12
A multi-level study of influence financial knowledge management small and medium enterprises.	Aymen et al. (2019)	11
Is knowledge that powerful? Financial literacy and access to finance: An analysis of enterprises in the UK.	Hussain et al. (2018)	11
Multi-criteria evaluation of the intelligent dashboard for SME managers based on scorecard framework.	Dyczkowski et al. (2014)	10

**Note(s):** TC = total citations in Scopus. The documents are ordered according to the total number of citations.

**TABLE 2:****Table 2.** Most influential sources in SMEs financial literacy research.

Title	TC	TD	Year (n)	SJR <sup>(ABDC)</sup>
Qualitative Research in Accounting & Management	52	1	2010 (1)	0.46 <sup>(A)</sup>
Small Business Economics	46	1	2005 (1)	2.20 <sup>(A)</sup>
Federated Conference on Computer Science and Information Systems	42	4	2012 (1) 2013 (1) 2014 (1) 2015 (1)	.
Journal of Small Business Management	30	4	2020 (2) 2019 (1) 2013 (1)	1.68 <sup>(A)</sup>
Sustainability (Switzerland)	29	2	2019 (2)	0.33
Technological and Economic Development of Economy	27	1	2018 (1)	0.63
Venture Capital	20	1	2016 (1)	0.80 <sup>(B)</sup>
International Journal of Social Economics	19	1	2014 (1)	0.29 <sup>(B)</sup>
Global Business Review	18	2	2020 (1) 2017 (1)	0.42 <sup>(C)</sup>
Education and Training	16	2	2012 (1) 2008 (1)	0.74
Journal of Economic Studies	15	1	2012 (1)	0.56 <sup>(B)</sup>
Investment Management and Financial Innovations	14	2	2019 (1) 2016 (1)	0.21 <sup>(B)</sup>
Lecture Notes in Business Information Processing	12	3	2019 (1) 2018 (1) 2016 (1)	0.21
Mediterranean Journal of Social Sciences	12	2	2014 (1) 2013 (1)	0.14 <sup>1</sup>
Journal of Small Business and Enterprise Development	11	1	2018 (1)	0.73 <sup>(C)</sup>
Polish Journal of Management Studies	11	1	2019 (1)	0.32
Cogent Economics and Finance	9	1	2018 (1)	0.39 <sup>(B)</sup>
Corporate Ownership and Control	8	1	2013 (1)	0.15 <sup>2</sup>
International Small Business Journal: Researching Entrepreneurship	5	2	2020 (1) 2017 (1)	2.08 <sup>(A)</sup>
Accounting Forum	5	1	2006 (1)	0.94 <sup>(B)</sup>
International Journal of Entrepreneurial Behaviour and Research	5	1	2017 (1)	1.24 <sup>(B)</sup>
Review of International Business and Strategy	5	1	2020 (1)	0.56 <sup>(C)</sup>

**Note(s):** TC = total citations in Scopus. TD = total documents. SJR = SCImago Journal Rank of 2020. (ABDC) = Australian Business Deans Council Journal Quality List of 2019. <sup>1</sup>Latest SJR available: 2018. <sup>2</sup>Latest SJR available: 2019. (·) = Varies depending on the year of the conference. The sources are ordered according to the total number of citations.

**TABLE 3:****Table 3.** Most influential authors, institutions and countries in SMEs financial literacy research.

Author	TC	TD	Institution	TC	TD	Country	TC	TD
Dudycz H.	54	7	Wroclaw University of Economics, Poland	54	8	United Kingdom	79	8
Korcak J.	53	6	University of the Witwatersrand, Australia	52	1	Ghana	57	6
Barrett R.	52	1	Edith Cowan University, Australia	52	1	Poland	54	7
Dyt R.	52	1	Katholieke Universiteit Leuven, Belgium	46	1	Australia	53	2
Halabi A.K.	52	1	WHU - Otto Beisheim School of Management, Germany	29	1	Belgium	46	1
Maes J.	46	1	University of Tennessee, United States	29	1	United States	37	4
Roodhooft F.	46	1	University of St. Gallen, Switzerland	29	1	South Africa	32	4
Sels L.	46	1	Prague University of Economics, Czech Republic	27	1	China	31	9
Dyczkowski M.	34	3	Thomas Bata University, Czech Republic	27	1	Germany	30	3
Grichnik D.	29	1	Technical University of Košice, Slovakia	27	1	Switzerland	29	1
Kellermanns F.	29	1	Birmingham City University, United Kingdom	27	3	Czech Republic	27	1
Koropp C.	29	1	University of Ghana, Ghana	26	2	Slovakia	27	1
Hussain J.	27	3	Makerere University Business School, Uganda	24	2	Uganda	24	2
Belas J.	27	1	Sichuan University, China	21	2	Pakistan	21	3
Dvorsky J.	27	1	Hamdard University, Pakistan	21	1	Malaysia	20	7
Gavurova B.	27	1	University of York, United Kingdom	20	1	Japan	17	2
Smrcka L.	27	1	University of Warwick, United Kingdom	20	1	Iraq	11	2
Ahmad H.	21	1	Central University College, Ghana	20	1	Jordan	11	1
Hassan H.	21	1	Bournemouth University, United Kingdom	19	1	Indonesia	9	19
Ying Q.	21	1	Universiti Malaysia Sarawak, Malaysia	16	1	Sri Lanka	8	2

**Note(s):** TC = total citations in Scopus. TD = total documents. The authors, institutions, and countries are ordered according to the total number of citations.