





Intellectual capital and SMEs' performance: A structured literature review

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ABSTRACT

The role played by intellectual capital (IC) is crucial in the context of small and medium enterprises (SMEs). Nonetheless, IC literature focusing on SMEs settings is limited and fragmented. This study provides a structured literature review (SLR) of existing evidence related to the effect of IC on SMEs performance. Findings show that strategic outcomes – such as innovation, knowledge management, and core competencies – and corporate performance of SMEs are impacted by IC. Further research could analyze the impact of IC on other determinants of SMEs' performance such as learning organization, conversation management, and invisible assets.

KEYWORDS

Intellectual capital;
structured literature review;
performance

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Introduction

Contemporary economic contexts, and value creation in those contexts, are characterized by extensive use of intangible resources, which may have a greater value compared to tangible assets (Russell, 2017). In the 1990s, the knowledge-based society started to develop based on the idea that, since future society would be increasingly knowledge based, knowledge would be fundamental for economic growth and capital accumulation (Nonaka & Takeuchi, 1995). *Intellectual capital* (IC), defined as the “knowledge that can be converted into value” (Edvinsson & Sullivan, 1996, p. 361), began to be considered as a key factor in a firm's value creation process, performance, competitive advantage, and success (Agostini, Nosella, & Filippini, 2017; Kato, Okamuro, & Honjo, 2015; Razafindrabinina & Anggreni, 2017; Wang & Zatzick, 2018). However, even if it is a topic of great interest, especially for firms whose profits derive from innovation and knowledge-intensive services (Eckardt, Skaggs, & Lepak, 2017), IC has to be effectively managed to provide the intended benefits (Cohen & Kaimenakis, 2007; Street & Cameron, 2007). To explore and understand the roles and benefits of IC, many models have been proposed in the literature, focusing on issues concerning the measurement, management, and reporting of IC (Liebowitz & Suen, 2000; Yu, Garcia-Lorenzo, & Kourti, 2017).

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However, the extant literature in this domain does not always adequately take into consideration differences between types of firms. Previous studies have exploited differences between small and medium enterprises (SMEs) and large firms (Hudson, Smart, & Bourne, 2001; Welsh, White, & Dowell, 1982), and the importance of SMEs in the economy has been proved (for example, Deshpande & Golhar, 1994; Muller, Gagliardi, Caliandro, Bohn, & Klitou, 2014), but important knowledge gaps remain. According to previous studies, SMEs are considered the “engine of economic growth” in the industrialized world since they represent the majority of the firms both in the European Union and the United States (Deshpande & Golhar, 1994; Muller et al., 2014). As of 2016, SMEs in Europe accounted for 99.8 percent of nonfinancial business sector enterprises, 66.6 percent of European employment, and 56.8 percent of value added generated by enterprises in the nonfinancial business sector (European Commission, 2017). Economic growth is now mainly guided by the “generation, application and exploitation of knowledge” (Mertins & Will, 2007, p. 427). To survive in a competitive and dynamic knowledge-based market, large firms and SMEs are affected by this preeminence attributed to knowledge.

Despite the relevance of IC in various markets worldwide, IC has been studied with a particular focus on large firms. Existing literature agrees on the various characteristics that differentiate SMEs from their larger counterparts (Bocconcelli et al., 2018; Greiner, 1998; Haltiwanger, Jarmin, & Miranda, 2013; Hudson et al., 2001; Shrader, Mulford, & Blackburn, 1989; SMEAR, 2012; Welsh et al., 1982). IC can contribute to the growth of SMEs in the following areas. First, SMEs experience severe resource limitations and, given the limited availability of tangible compared to intangible assets, they need to rely more on IC (Inn, Dumay, & Kokubu, 2015; Jardón & Martos, 2012). Second, a more reactive and dynamic mentality and high levels of innovative potential are two distinctive characteristics of SMEs. Given these specificities, IC is seen as a critical factor for SMEs’ success because, to obtain competitive advantage and enhance innovation potential, they need to use knowledge and intangible assets more efficiently (Jardón & Martos, 2012; Massaro, Dumay, & Bagnoli, 2015; Mertins, Alwert, & Will, 2006; Mertins & Will, 2007). Additionally, cumulative growth rates in SMEs can be explained by IC (González-Loureiro & Figueroa Dorrego, 2012). Third, informal strategies and flat and flexible structures tend to characterize SMEs, in which larger investments in human capital (HC) are detected (Sekhar, Patwardhan, & Vyas, 2015).

As such, IC management in SMEs is much more heterogeneous compared to that in larger firms (Durst & Edvardsson, 2012) and, therefore, it is widely accepted that SMEs cannot be considered as a smaller version of large firms (Marzo & Scarpino, 2016). Despite the growing attention to this topic, especially from the management perspective (InCaS, 2010; MERITUM, 2002; Mertins, Will, & Meyer, 2009; Steenkamp & Kashyap, 2010; Yitmen, 2011), there is still a gap

between the importance played by SMEs in the global economy, and the attention given to them by IC scholars (Dumay, 2014; Guthrie, Ricceri, & Dumay, 2012; Marzo & Scarpino, 2016). Given that prior studies have concluded that SMEs “need appropriate and up-to-date knowledge to compete” since they are exposed to “knowledge leakage” (Nunes, Annansingh, Eaglestone, & Wakefield, 2013, p. 103), more research is required to address the issue of how SMEs use IC in practice (Coyte, Ricceri, & Guthrie, 2012), to clarify the role of IC in affecting SMEs’ performance (Guthrie et al., 2012; Massaro et al., 2015; Yu et al., 2017), and to exploit the importance of IC management in SMEs (Cohen & Kaimenakis, 2007). Literature focusing on the analysis of IC in SMEs is fragmented, but its relevance is growing (for example, Abeysekera, 2017; Perrigot, López-Fernández, & Eroglu, 2013). Importantly, previous studies have tended to pursue analyses of IC components and their effects on performance, rather than providing a holistic view of the integrated management of IC (for example, Hormiga, Batista-Canino, & Sánchez-Medina, 2011; Kato et al., 2015; Khoshmaram, Shiri, Shinnar, & Savari, 2018; Molina-Morales & Martínez-Fernández, 2010). To advance knowledge in this research area, this study offers a structured literature review (SLR) (Massaro et al. 2016) providing a comprehensive overview of relevant studies in the field so as to crystalize and emphasize the state of the art and identify salient directions for future research.

To this end, studies published between 1996 and 2017 on the effect of IC in SMEs performance are analyzed. In particular, this study aims at adding new knowledge on the dynamics of IC management in practice (Dumay & Garanina, 2013; Massaro et al., 2015), and to thus move the debate on IC in SMEs to the third stage of research. While the *first stage* of IC research was aimed at increasing awareness and developing a framework for IC, and the *second stage* involved the analysis of how IC can be measured, managed, and reported, the *third stage* of IC research is defined as the step at which research is conducted by “critically examining IC in practice, devoted to the managerial implications of how to use IC in managing a company” (Dumay & Garanina, 2013, p. 12). Meeting this aim is important so as to shed light on the managerial implications of IC exploitation, pursuant of successfully managing SMEs.

The results from this study extend the prior literature regarding the role of IC in a particular and underresearched type of firm, SMEs (Massaro et al., 2015), by enabling the identification of how different performance types are affected by IC. Finally, future research priorities are demarcated in terms of sectors, location, and research methods.

From a practical perspective, entrepreneurs could gain new insights from this study into how to acquire, develop, and exploit the IC of their SMEs, based on the settings in which they are operating. SMEs could also benefit from this study because the most relevant aspects of IC that impact SMEs’ performance are identified.

In terms of policy implications, governmental decision-makers are provided with a set of recommendations on how to support SMEs in enhancing their performance through IC.

The remainder of this article is organized as follows. In the next section, we present the SLR methodology. Then, we discuss the results of the SLR, After that, we highlight the insights derived from the review, We then discuss and critique previous studies and address future research directions. Finally, we put forward conclusions, implications, and limitations. 125

Methodology 130

Q6 We chose an SLR (Massaro et al. 2016) to gauge, explore, and understand the extant body of research into IC in SMEs as a precursor to offering guided suggestions for future research in this domain. SLRs have been employed in prior studies to offer insights, critiques, and the formulation of agendas for future research (Bisogno, Dumay, Manes Rossi, & Tartaglia Polcini, 2018; Castilla-Polo & Ruiz-Rodríguez, 2017; Cuzzo, Dumay, Palmaccio, & Lombardi, 2017). 135

Q7 Denyer and Tranfield (2006, p. 216) affirm that “the most common technique in management research is the traditional literature review in which the researcher summarises and interprets previous contributions in a subjective and narrative fashion.” Therefore, traditional reviews are valuable because of “the fact that they are written by someone with a detailed and well-grounded knowledge of the issue” (Petticrew & Roberts, 2008, p. 10). However, three important limitations are associated with the traditional literature review (Cook & Leviton, 1980; Light & Smith, 1971): potential lack of inclusiveness of all the available and relevant information, potential bias in terms of sample selection, and potential gaps in the identification of valuable interactions. To overcome these limitations, literature review techniques are constantly evolving. As such there is a growing number of approaches that can be used to perform a literature review, ranging from a rapid review to a methodology with more rigid rules that allows for the systematic classification of different studies (Bisogno et al., 2018; Massaro et al. 2016). In particular, the SLR is a transparent research methodology, with explicit steps, that goes beyond the synthetization and interpretation of previous knowledge (Massaro et al. 2016). 140 145 150

Q8 The first step of an SLR is to define the boundaries of the field of research and limit the period of analysis (Massaro et al. 2016). Therefore, a review protocol has to be defined to provide enough details to ensure the replicability of the research (Tranfield, Denyer, & Smart, 2003) and the reliability of its findings (Massaro et al. 2016). The inclusion and exclusion criteria adopted to define the conceptual boundaries of this study are provided in Table 1. 155 160

Table 1. Rationale for inclusion/exclusion criteria.

	Inclusion/exclusion criteria	Rationale
Selection of articles	Academic journal articles. English language.	Books, working papers, and conference proceedings were excluded because of the insufficient peer review process.
Selection of databases	Emerald Insight; Google Scholar; Springer; Web of Science; Scopus; Econlit. Business and management discipline.	In addition, this choice was driven by the increased accessibility, dissemination, and impact of academic journal articles compared with other output types. To maximize journal coverage and thus ensure that all relevant articles within the conceptual boundaries of the research were included, different databases were considered. The search was focused on the business and management discipline to detect articles that are most relevant to the purposes of the research.
Selection of time period	1996–2017	The time period investigated ranges from 1996, the year in which the first relevant study was published (“Conceptualization of a model for managing intellectual capital”; Edvinsson & Sullivan, 1996), through to 2017.
Selection of keywords	“Intellectual Capital”; “IC”; “Performance”; “SME(s)”; “Small-Medium enterprises”; “Small Medium enterprises”	Title, Keywords, and Abstract fields were searched using Boolean operators. The keywords used were carefully selected to ensure inclusion of all relevant articles.
Exclusion criteria	Duplications; errors in records; title and/or abstract out of scope.	Only articles within the set conceptual boundaries were considered during the analysis. To robustly exclude irrelevant articles from the sample, exclusion criteria have been applied. In particular, articles were excluded when duplications between different databases were detected, results for queries included errors, and when titles and/or abstracts did not primarily concern intellectual capital (IC) in small and medium enterprises (SMEs).

Q12 The second step of an SLR requires defining the questions that the literature review is setting out to answer (Massaro et al. 2016). The purpose of undertaking an SLR is to map and assess existing knowledge to define the needs for future development (Dixon-Woods, 2009). Thus, the aim of this research is to understand how IC impacts the performance of SMEs on the one hand while identifying gaps in understanding that represent fruitful terrain for future research. Prior studies have pointed out that the SMEs' context is underresearched (Massaro et al., 2015) and that more attention is needed since SMEs are not simply "little big firms" (Coyte et al., 2012, p. 803). To this end, the protocol document identified the following research question: What are the main effects of IC on SMEs performance? In the following sections, we seek to answer this question on the basis of the state of the art of collective knowledge. 165

Q13 The third step of an SLR aims at determining the types of studies that have been undertaken and at carrying out a comprehensive literature search (Massaro et al. 2016). Researchers need to carefully select the relevant materials to include in the analysis (Dixon-Woods, 2009) because not all evidence has the same validity or relevance (Petticrew & Roberts, 2008). Figure 1 presents a flow diagram that illustrates the study selection procedures. The initial study search retrieved 615 articles. To identify and isolate only the relevant studies in the field, 170 175 180

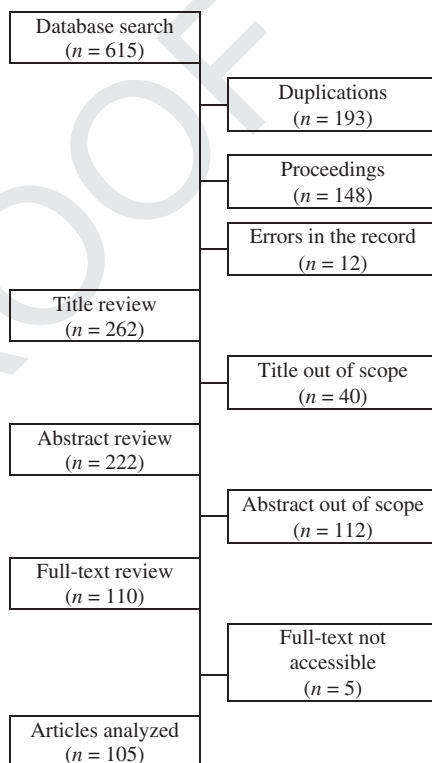


Figure 1. Flow diagram of study selection procedures.

articles were omitted according to the exclusion criteria identified in [Table 1](#). The final sample was composed of 105 articles.

Q14 The fourth step of an SLR involves measuring the impact of articles (Massaro et al. 2016). It can be argued that “citations measure the impact of an article within the literature” (Massaro et al. 2016, pp. 780–781) and that they are thus a proxy for the quality of articles. Google Scholar has become the leading database of academic publications. It provides comprehensive coverage of journals and thus articles, and it has been used for measuring the quality of articles in previous studies in accounting (Dumay, 2014; Massaro et al. 2016). However, a problem related to determining the impact of articles according to the number of citations is that older articles have had more time to accumulate citations (Dumay & Dai, 2017). Therefore, to overcome the bias introduced by the use of a time-dependent measure, citations per year (CPY) can be used as an alternative metric (Dumay, 2014). [Tables A](#) and [B](#) in the Appendix compare the results of ranking the top 10 articles by total citations versus by CPY. Results show that both the order of articles within the lists and their importance are sensitive to the choice of quality metric. While six articles are common to both rankings (Chen, James Lin, & Chang, 2006; Chen, 2008; Cohen & Kaimenakis, 2007; Hsu & Fang, 2009; Kujansivu & Lönnqvist, 2007; Steenkamp & Kashyap, 2010), when focusing on CPY four relatively recent articles also appear in the top 10 list. This suggests that there is particular interest in citing the latest articles on IC in SMEs and, thus, that the state of the art in this field is a dynamic phenomenon rather than newer studies simply offering similar results to older studies. Finally, an array of different authors appear in the rankings, rather than dominance by a few authors; this is indicative of the breadth and diversity of researchers and institutions engaged in research in this domain (Massaro et al., 2015).

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The fifth step of an SLR requires defining the analytical framework (Massaro et al. 2016). To pursue an SLR, the units of analysis and how they are observed should be defined by the researchers (Massaro et al. 2016). The primary unit of analysis operationalized in this study is the article. This is in line with other studies in the field (for example, Cuzzo et al., 2017; Massaro et al., 2015). For consistency with the extant literature, the observation of the unit of analysis is based on previous classification systems that have been proposed (Broadbent & Guthrie, 2008; Orlitzky, Schmidt, & Rynes, 2003; Roos, Edvinsson, & Dragonetti, 1997). However, particular changes were required to suit the purposes of this study. To detect differences between sectors, jurisdictions, and methodologies, the classification system introduced by Broadbent and Guthrie (2008) was adopted. In addition, based on Roos et al. (1997) and Orlitzky et al. (2003), typology of performance is also considered ([Figure 2](#)).

IC and strategy are strictly connected since the latter represents the objectives of the company and IC may help achieving set goals (Roos et al.,

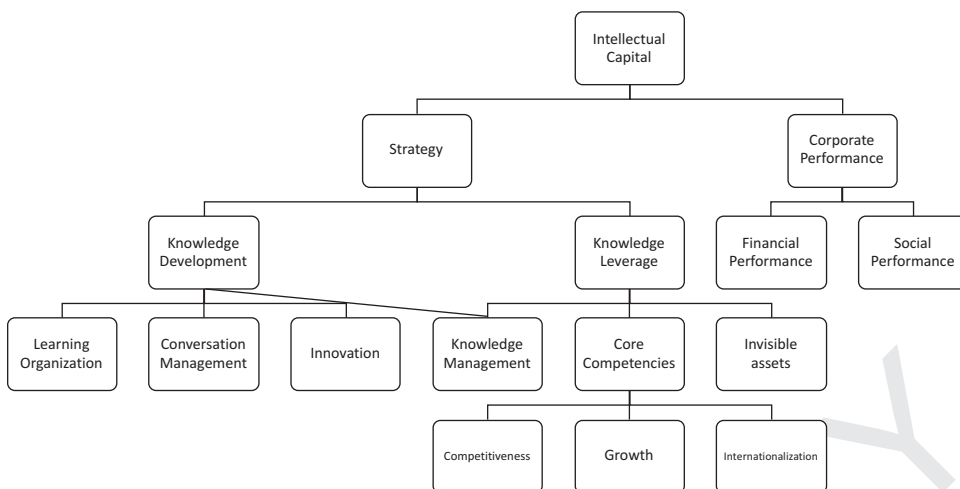


Figure 2. Typology of performance adopted in the classification system.

1997). From a strategic perspective, therefore, IC can be implemented for the 225
 development and leverage of knowledge that, in turn, can enhance the value
 of the firm (Petty & Guthrie, 2000). Despite knowledge development and
 leverage being considered separately in the classification system, their compo-
 nents are strictly connected and easily overlapping. *Knowledge develop-* 230
ment refers to internal or external acquisition of knowledge to accomplish
 the strategy of the firm (Roos et al., 1997). First, according to previous
 studies, organizational learning institutions are those that show the highest
 levels of IC (Bontis, 1998) and which, by virtue of optimized organizational
 structures, can more adequately support and exploit benefits associated with
 IC (Vargas-Hernández & Noruzi, 2010). Second, Baker, Jensen, and Kolb 235
 (2002) state that knowledge can be generated through conversational learn-
 ing, and IC can contribute to accelerating the process. Third, previous studies
 agree on the relevance of IC in affecting the capability of the firm to innovate
 (Subramaniam & Youndt, 2005). Fourth, IC and knowledge should be
 coordinated to improve organizational performance (Wiig, 1997). More 240
 specifically, successful management of knowledge and IC are strictly con-
 nected (Marr, Gupta, Pike, & Roos, 2003). Robust knowledge manage-
 ment not only supports the development of new knowledge, but also its leverage.
Knowledge leverage refers to the application of knowledge to the operations
 of the firm to create value (Roos et al., 1997). Additionally to knowledge 245
 management, according to Prahalad and Hamel (1994), the value of the
 company not only depends on its products or services, but also on the
 optimal utilization of its core competencies. These *competencies* mainly
 refer to a “combination of intangible assets” (Andriessen, 2001, p. 6) and,
 in this context, IC can be considered as a practice to operationalize the 250
 strategy of the firm (Taking Intellectual Capital, 1998). In particular, three

different core competencies are expected to be impacted by IC. First, competitiveness can be enhanced through appropriate management of the abundant knowledge resources that characterize SMEs (Chen, 2008; Khalique, 2011; Khalique, Isa, Shaari, Abdul, & Ageel, 2011; Ng & Kee, 2012; Pappa, Giakoumis, Voxaki, & Glykas, 2013; Vazquez-Avila, Sanchez-Gutierrez, & Rodriguez-Camacho, 2012), by including IC management as part of SMEs competitive strategies (Khalique, 2011). Second, according to previous studies, IC is an asset that can be used by firms to achieve sustainable growth performance (Gomezelj Omerzel & Smolčić Jurdana, 2016; Rastogi, 2003). Third, internationalization of SMEs is expected to be enhanced by IC since knowledge represents a key asset for internationalization processes for both businesses and individuals (Korsakienė et al., 2017). Finally, there is agreement in the literature that sound management of invisible assets can enhance the leverage of knowledge which, in turn, may develop the competitive advantage of the firm (Kamukama, 2013).

Previous studies have also identified a strong relationship between IC and corporate performance (for example, Firer & Mitchell Williams, 2003). Orlitzky et al. (2003) differentiate between two different categories of corporate performance: Traditional financial performance is complemented with social performance, intended as the configuration of principles related to firms' societal relationships (Orlitzky et al., 2003; Wood, 1991). As for financial performance, according to previous studies, it can be positively impacted by IC in large corporations (for example, Ismail & Kareem, 2011; Kamath, 2007). The relevance of this relationship in the SMEs' settings is justified by their need to face different challenges for ensuring firm's survival (Lee, Kelley, Lee, & Lee, 2012). In this context, IC can be used to create awareness and to boost financial performance of SMEs (Khalique, Isa, Bin Shaari, & Hassan, 2014). In terms of social performance, instead, recent literature is giving much more attention to the allocation of scarce resources in activities associated with social issues (Waddock & Graves, 1997). This can be translated in SMEs into larger investments in IC to sustain environmental, social, and governance performance (for example, Aseanty, 2016; Jardim & Dasilva, 2017).

Thus, both categories of performance delineated by Roos et al. (1997) and Orlitzky et al. (2003) are considered and the final classification system adopted in this study is presented in Table 2.

In the sixth step of an SLR, the reliability of the literature review has to be ensured (Massaro et al. 2016). As such, different forms of control and triangulation should be adopted (Yin, 2009). Only by minimizing biases can the coding and analytical framework be considered reliable (Massaro et al. 2016). For this purpose, we widely and systematically discussed the appropriateness of the inclusion and exclusion criteria, as well as the classification system. The classification of the first 10 articles was carried out independently by each of us to validate the classification system. During

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Table 2. Classification system.

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- A. Location
 - a. Americas
 - b. Oceania
 - c. Asia
 - d. Europe
 - e. Other
 - f. Not applicable
 - B. Sector
 - a. Banking
 - b. ICT
 - c. Electricity/electronics
 - d. Design, fashion, and creative industries
 - e. Manufacturing and services
 - f. Food
 - g Other
 - C. Research methods
 - a. Case/field study/interviews
 - b. Content analysis/historical analysis
 - c. Survey/questionnaire/other empirical
 - d. Commentary/normative/policy
 - e. Theoretical
 - D. Typology of performance
 - a. Knowledge development – Learning organization
 - b. Knowledge development – Conversation management
 - c. Knowledge development – Innovation
 - d. Knowledge development and leverage – Knowledge management
 - e. Knowledge leverage – Core competencies (competitiveness)
 - f. Knowledge leverage – Core competencies (growth)
 - g. Knowledge leverage – Core competencies (internationalization)
 - h. Knowledge leverage – Invisible assets
 - i. Corporate performance – Financial performance
 - j. Corporate performance – Social performance
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Note: Adapted from Broadbent and Guthrie (2008), Roos et al. (1997), and Orlitzky et al. (2003).

this process, all decisions made were agreed on by both of us. In terms of coding practices, a formal reliability check can be conducted. Since coding is a form of content analysis, the reliability measure we selected was Krippendorff's alpha (Hayes & Krippendorff, 2007; Krippendorff, 2004). Quantifying reliability in this way resulted in a Krippendorff's alpha score above 0.8, thus reliability of the results was confirmed (Krippendorff, 2013). The use of multiple sources allowed us to obtain more data and, in turn, to have a better understanding of published realities by enhancing the quality of synthesis (Onwuegbuzie, Leech, & Collins, 2012). This also enhances the legitimation of the study. Between-source triangulation can be used to analyze the level of convergence and to corroborate the results of different data sources (Greene, Caracelli, & Graham, 1989). For this reason, we discussed and articulated results by considering all the available data to allow for the emergence of coherent (incoherent) trends across data sources.

The seventh step of an SLR aims at testing the validity of the literature review (Massaro et al. 2016). One of the main limitations of traditional

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literature reviews is that researchers may jump to easy conclusions based on little evidence in their results (Silverman, 2015). Therefore, within this study, we performed internal, external, and construct validity tests to quantify the robustness of the findings (Franklin, Cody, & Ballan, 2010). To ensure internal validity, the SLR commenced with a small subset of articles to test the adopted classification system, before expanding the framework to all articles in the sample. In addition, we clearly defined the start and end points of the study, as recommended by Massaro et al. (2016). In terms of the start point, 1996 was a natural choice since it was in that year that the first relevant study appeared in the literature. Time series analysis has been conducted by comparing the number of published articles and their citation impact to analyze the development of the available literature between 1996 and 2017 (Yin, 2009). *External validity* can be defined as the extent to which the results of the study can be generalized (McBurney & White, 2009). Given that we analyzed all of the articles that passed the various selection criteria, rather than sampling from those articles, generalization in this sense could be viewed in terms of the application of the study's findings to output types excluded from our analysis such as books, working papers, and conference proceedings. To this end, both of us endeavored to maximize external validity through detailed and accurate reading of titles, abstracts, and full papers to select only those articles that could be considered appropriate. Finally, construct validity analyzes the quality of utilized measures (McBurney & White, 2009). To ensure construct validity, we used multiple data sources of evidence, and considered total citations to analyze the quality of articles in the sample.

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In the eighth step of an SLR, the data are coded using the developed framework (Massaro et al. 2016) and the coding regime also seeks to identify important characteristics of the studies (Stanley, 2001). We initially coded articles using NVivo text search queries to ensure the validity of the results. We then subsequently used manual coding to exploit relevant information within the coded text. In addition, to optimally adapt the classification system as and where necessary, we pursued an open coding approach (Dumay & Cai, 2015). Following the coding process, we completed the ninth and tenth step of the SLR; these involved analysis of the results to develop insights and critiques, address the research question, and develop suggestions for future research paths. Figure 3 provides a summary of the SLR process.

Results

Results from the SLR show that 45 percent of the analyzed studies were conducted in Europe (Figure 4), where there is a strong emphasis on IC (Petty & Guthrie, 2000) and SMEs are the “backbone” of the European

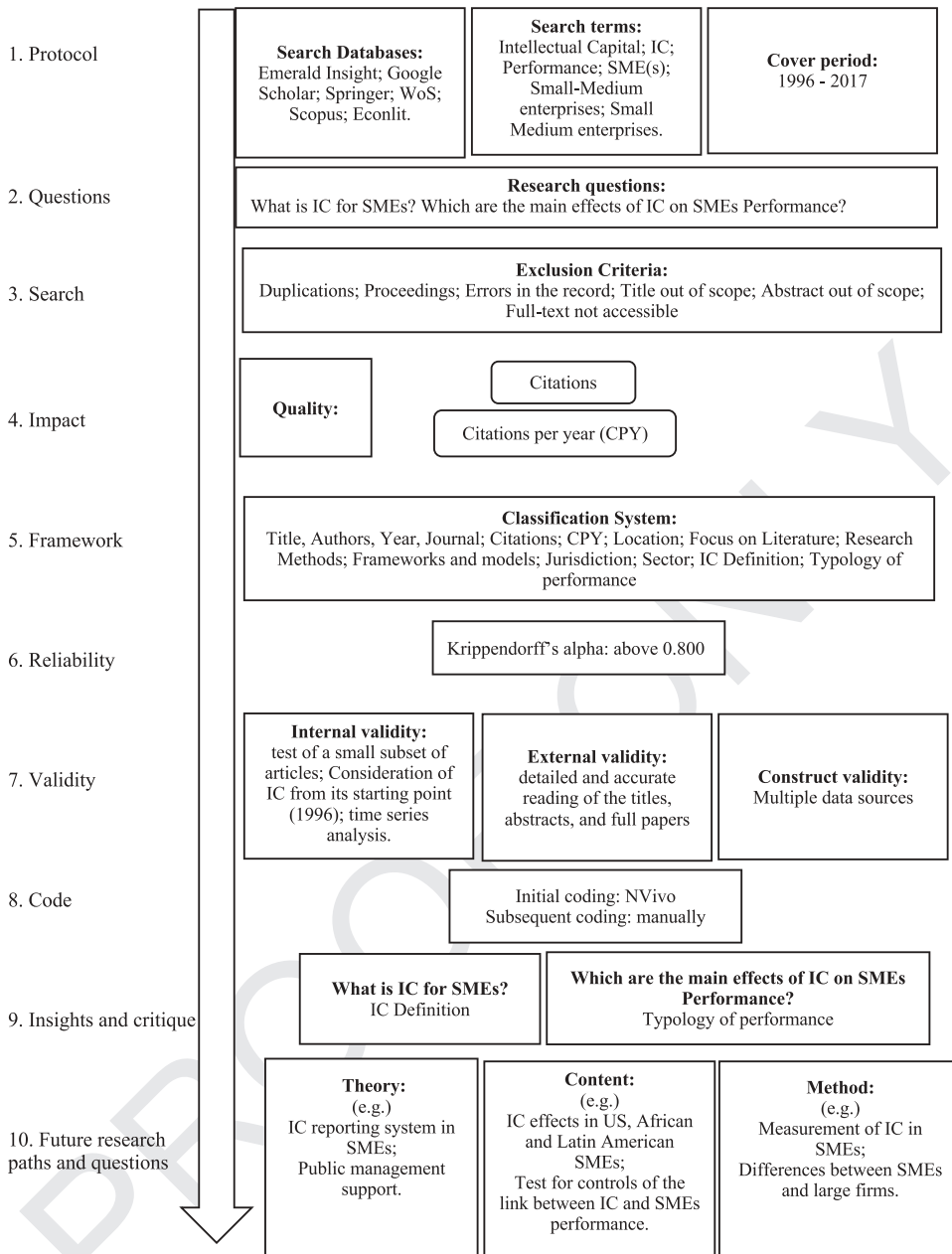


Figure 3. Summary of the structured literature review (SLR) process.

economy (European Commission, 2017). Italy in particular is observed to play a leading role in this field (Table C in the Appendix). Scholars have also undertaken valuable research into the role of IC in SMEs in Asia, with Malaysia being the most investigated country therein. By contrast, Africa and the United States are lagging behind with two and one studies, respectively.

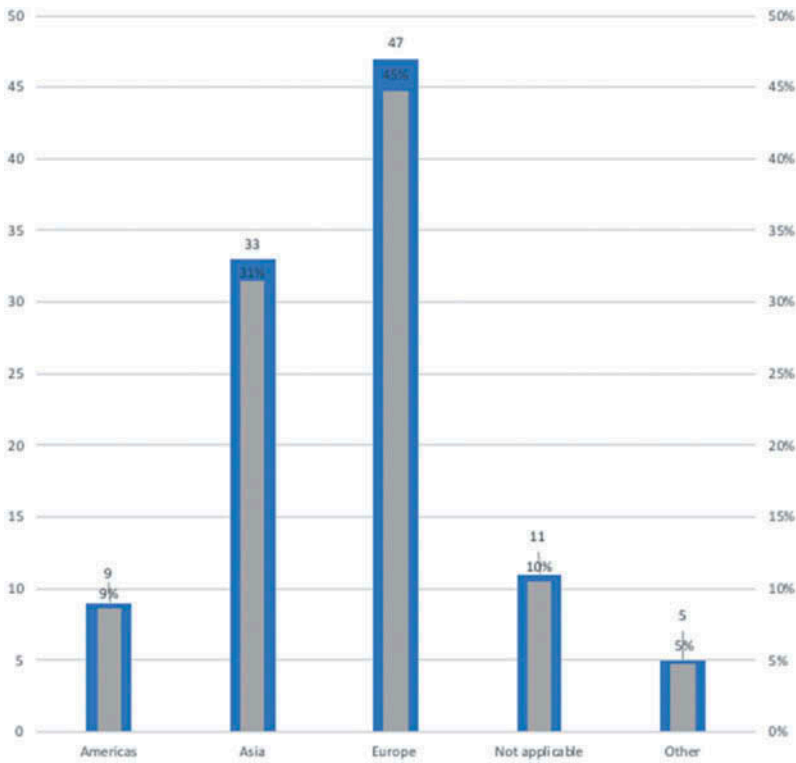


Figure 4. Distribution of studies by location.

Figure 5 shows that nearly one in three studies focuses on a specific (set of) sector(s). High-tech industries have been investigated in 10 cases, whereas the banking (Mubaraq & Haji, 2014; van Liempd, Haug, & Zachariassen, 2014; Wang, Lu, & Wang, 2013), design and fashion (Baños, Wandosell, & Parra, 2016; Chen et al., 2012; Hsu & Fang, 2009; Khalique, 2014), and food (Supeno,

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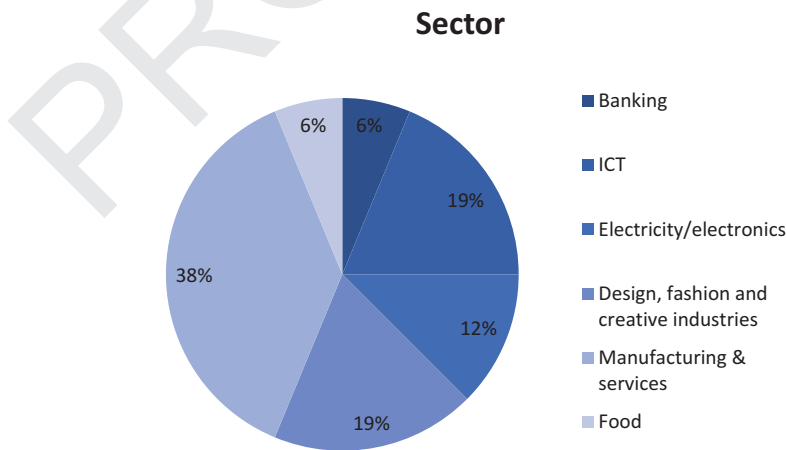


Figure 5. Distribution of studies by sector.

Sudharma, Laksmana, & Aisjah, 2015) industries have received less research attention. The extant literature on IC in SMEs is still primarily focused on traditional sectors, such as manufacturing and services (Agostini & Nosella, 2017; Agostini et al., 2017; Crema & Nosella, 2014; Crema & Verbano, 2016; Marzo & Scarpino, 2016), where the majority of gross domestic product (GDP) is produced (European Commission, 2017). In analyzing differences across industries, the value of IC is higher in knowledge-intensive industries. In the electronics industry and business services, the value of IC is higher than the value of tangible assets. By contrast, the value of IC is lower in primary production industries such as electricity, gas, water supply, metal refining, and wood products (Kujansivu & Lönnqvist, 2007).

Figure 6 shows that studies on IC in SMEs tend to be empirical rather than theoretical with a diverse array of research methodologies being employed.

In terms of quantitative approaches, survey instruments are by far the most preferred choice of data collection methodology. In terms of analytical methodologies structural equation modeling (SEM), including partial least squares structural equation modeling (PLS-SEM), is the most popular choice, being represented in 22 studies (Table 3). Simple and multiple linear regression

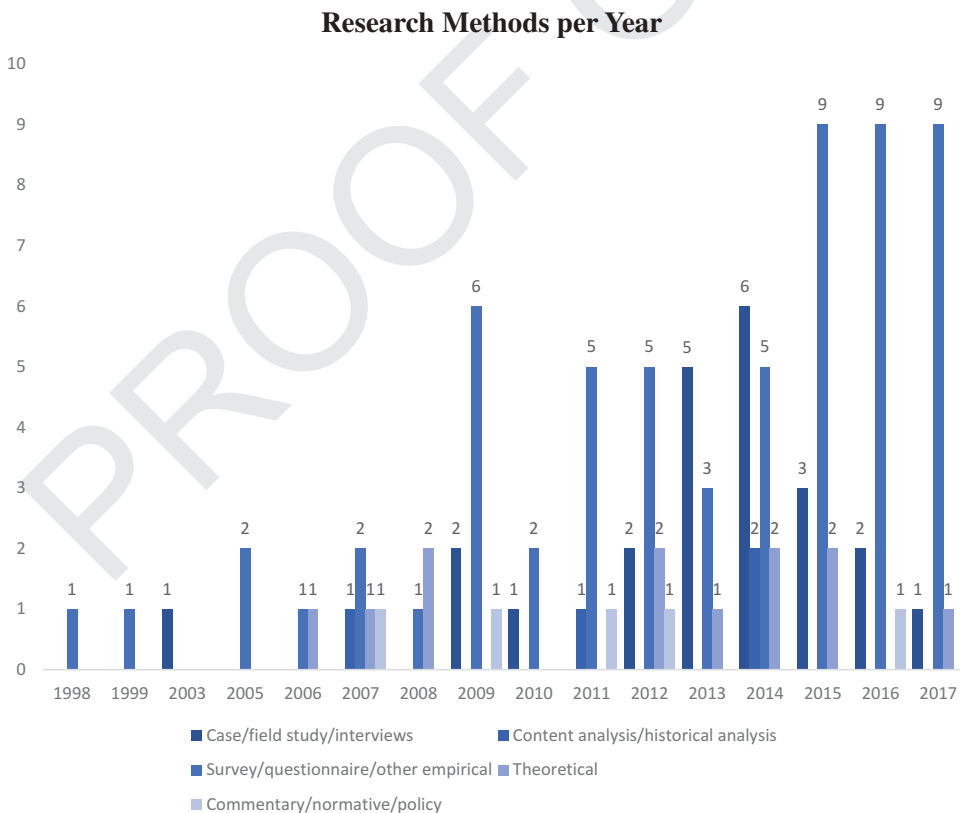


Figure 6. Distribution of studies by research methods over time.

Table 3. Distribution of studies by research methods.

Type	Method	Number of studies	Description and examples
Empirical – Quantitative	SEM-PLS	22	Consistent with the extant literature on IC more generally (Bontis, 2001 2003), PLS has been used for its robustness properties in terms of small samples, non-normal data, formative latent variables, and problems regarding the paucity of available theoretical literature (Chin, 1998). Small sample issues, for example, are commonly encountered because the response rate of surveys administered to SMEs is usually low (Newby et al., 2003).
	Regression analysis	20	Scholars have tested direct and moderated regression models. For instance, Ling (2013) tested the relationship between IC (and its components) and the global performance of SMEs, with knowledge management as the moderating variable. Moreover, Chen et al. (2012) tested a two-level model by means of a hierarchical regression, analyzing for individual-level predictors first and organizational-level determinants afterward (Chen et al., 2012). Logistic regression was used in three cases. Ileanu et al. (2015) tested the effects of the components of IC on a binary variable representing SMEs' performance compared to the previous year (1 = better, 0 = not better). Leitner (2011) used a logistic model to evaluate the effect of HC and SC, and their moderated effect, on product innovativeness. Link and Ruhm (2011) assessed whether entrepreneurs' innovative behaviors are dependent on a set of HC determinants through both a probit and a binomial model. (Kitching & Blackburn, 1998; Mironescu et al., 2014; Rohana, 2009; Steenkamp & Kashyap, 2010) (Cohen et al. 2014; Salazar-Elena et al., 2016)
Q26 Q27 Q28 Q29	Univariate analysis	4	(Mertins et al., 2009)
	Nonparametric tests	2	(Patalas-Maliszewska & Werthner, 2010) (Shariatmadari & Azadi, 2013)
	Mean difference	1	(Korsakienė et al., 2017)
	Neural systems	1	(Wang et al., 2013)
	Evidential reasoning	1	(Agostini & Nosella, 2017; Baños et al., 2016; Bormemann & Alwert, 2007; Cleary & Quinn, 2016; Kujansivu & Lönnqvist, 2007; McLarty, 1999; Molodchik & Jardon, 2017; Nasir et al., 2015; Ngah & Ibrahim, 2009; St-Pierre & Audet, 2011)
	Concordance coefficient	1	
	Data envelopment analysis	1	
	Other	10	

(Continued)

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Table 3. (Continued).

Type	Method	Number of studies	Description and examples
Empirical – Qualitative	Case study	20	Almost half of the studies focus on a single case study. Semistructured interviews are the most used method of data collection (Durst & Wilhelm, 2013; Henry, 2013; Khadir-Poggi & Keating, 2015; Marzo & Scarpino, 2015; (Inn et al., 2015; van Liempd et al., 2014). Inn et al. (2015) adopted a semistructured approach to interview employees and owners of SMEs who participated in the process of IC statement preparation. Similarly, Durst and Wilhelm (2013) carried out semistructured interviews with employees of German SMEs to provide data for generating a knowledge map while Marzo and Scarpino (2016) investigated the acquisition and development of knowledge in Italian SMEs. An interesting research design was adopted by Roos and O'Connor (2015), who interviewed employees from a sample of SMEs after a set of interventions, which were video-filmed and reviewed (Roos and O'Connor 2015). Patalas-Maliszewska and Werthner (2010) applied an indicator matrix to assess the efficacy and efficiency of investments in knowledge in 10 SMEs. Systematic coding using computer-assisted qualitative data analysis software (CAQDAS) was adopted in relatively few studies (Daou et al., 2013; Henry 2013). Data triangulation also has not been reported particularly frequently (Coyte et al., 2012; Daou et al., 2013; Gresty, 2013; Khadir-Poggi & Keating, 2015). In terms of the latter, Gresty (2013), for example, adopted a case study design and collected data through documentary analysis, observations, and interviews.
	Content analysis	3	Galván and Palacios (2014) compared different IC models to provide SMEs with a set of guidelines for developing statements. Khalique et al. (2011) performed a narrative literature review on the role of IC in Malaysian SMEs. A similar approach was adopted by Yu and Humphreys (2008) to report how SMEs can improve their collaborative decision-making by means of IC.
	Literature review	2	Mason et al. (2008) reviewed the literature on communities of enterprise (CoE) and virtual communities of enterprise in SMEs (VCoE).
Mixed-methods approach		2	Crema and Nosella (2014) as well as Migliarese and Corvello (2014) conducted interviews and administered questionnaires to gather data.
Theoretical		12	(Aureli, 2007; Darus et al., 2017; Durst, 2012; Feraru, 2013; Montequín et al., 2006; Nasir et al., 2015; Ng & Kee, 2012; Nga et al., 2015; Sekhar et al., 2015; Tobora, 2014; Tsai et al., 2009; Yasir et al., 2014)
Commentary/normative/policy		5	(Kaliq, 2011; Mertins & Will, 2007; Osman & Ngah, 2016; Tsai et al., 2009; Vokurka et al., 2012)

Note: The sum of studies exceeds 105 since some papers have been placed in two methodological categories (for example, empirical – quantitative and mixed methods). SEM-PLS = structural equation modeling-partial least squares; SMEs = small and medium enterprises; IC = intellectual capital; HC = human capital; SC = .

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analysis are also popular choices, being adopted in 19 percent of the cases. Nonparametric tests are adopted in some studies as are less complex statistical approaches such as univariate models and analysis of mean differences. Other quantitative methods employed include neural systems, the evidential reasoning approach, the concordance coefficient approach, and data envelopment analysis (DEA). 385

As for qualitative research methods, 20 studies adopted a case study approach and semistructured interviews were the most commonly used method of data collection with, on average, 17 employees or entrepreneurs being interviewed. Three studies performed a content analysis. Two studies conducted a literature review while 12 studies opted for a theoretical approach to the analysis of IC in SMEs. 390

Insights

Grounding on the analytical framework described in the Methodology section, and on the performance typologies drawn from prior studies (Orlitzky et al., 2003; Roos et al., 1997), we discuss results from the SLR. Empirical findings stress that IC impacts on SMEs performance. More specifically, prior literature provides evidence that IC has an effect on SMEs' strategic outcomes, such as knowledge development and knowledge leverage, and SMEs' corporate performance, including financial and nonfinancial components of performance. In the following subsections, we present the results for each category of performance. 395
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Strategy – knowledge development

Knowledge development is regarded as a strategic outcome of IC management (Edvinsson & Sullivan, 1996; Roos et al., 1997). According to Roos et al. (1997), IC contributes to the development of knowledge in three different ways. First, IC enables the creation of a learning organization (Mella, 2012; Senge, 1990); that is, a firm that develops double loop learning (Argyris & Schön, 1978), and is able to acquire, create, and transfer knowledge (Garvin, Edmondson, & Gino, 2008). Second, IC fosters conversation management by encouraging the sharing of ideas and interactions, which ultimately leads to knowledge sharing (Roos et al., 1997). Third, and linked to the previous two ways, IC enhances innovation performance through exploration and exploitation of knowledge (Roos et al., 1997). Prior studies on the role of IC on knowledge development in SMEs are illustrated in Figure 7. 405
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Learning Organization

A limited number of studies specifically address whether and how IC affects organizational learning capabilities in SMEs. In particular, human, social, 415

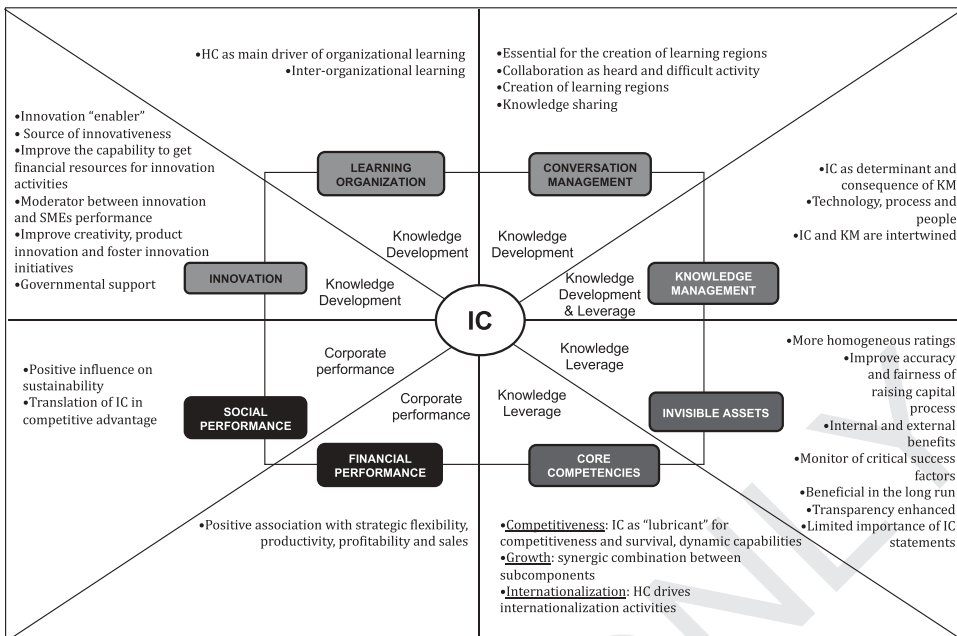


Figure 7. Summary of empirical results.

and organizational capital positively impacts on organizational learning capabilities (Bornemann & Alwert, 2007; Migliarese & Corvello, 2014), especially in the integrated circuit industry (Hsu & Fang, 2009). Moreover, since most organizational knowledge is embedded in pivotal members of the organization, such as the controlling owner, the management of HC in SMEs is one of the main drivers of organizational learning (Durst & Wilhelm, 2013). Similarly, IC exploits the effectiveness of interorganizational learning, although this process is not linear as it depends on the exploration and exploitation of knowledge among partners developed by the company (Cagarra-Navarro 2005). Although prior literature represents a first step in the analysis of SMEs as learning organizations, there is important scope for further developments in this respect because organizational learning promotes entrepreneurial orientation, hence growth (Altinay, Madanoglu, De Vita, Arasli, & Ekinci, 2016), as well as innovation and internationalization performance in SMEs (Freixanet, Rialp, & Churakova, 2019). Thus, future studies could unravel how the management of IC supports the development of organizational learning in SMEs.

Conversation management

According to the reviewed literature, IC can be effectively used to share knowledge in SMEs. IC has been found to be essential in collaborative SMEs (Mason, Castleman, & Parker, 2008; Vokurka, Richards, & Humphreys, 2012; Yu &

Humphreys, 2008). More specifically, Cappellin (2003, p. 303) argues that territorial knowledge management – that is, “the generation of a system of procedures and incentives to convert tacit and localised knowledge into explicit knowledge available to all companies and employees in a region” – fosters innovation in a cluster of SMEs. Further, IC is important for the creation of learning regions where a virtual community of enterprise can coexist and an innovative culture can be exploited (Mason et al., 2008). Similarly, it has been found that different IC components contribute to knowledge sharing within Romanian SMEs (Feraru et al., 2014). Given the interest in IC by SME clusters, a tool for group communication in decision support has been conceptualized for SMEs to support the management of collective IC while considering a wide range of needs (Vokurka et al., 2012). This allows SMEs to overcome some of the limitations previously identified by Yu and Humphreys (2008), who raise concerns that collaborative decision-making in SME clusters represents a difficult challenge. HC positively affects relational capital (RC), which in turn positively contributes to the sharing of knowledge in Malaysian SMEs (Nghah & Ibrahim, 2011). However, the role of IC in fostering conversation management as well as knowledge sharing could be further investigated. In particular, more research is needed to understand how and why IC can be used to transfer and share knowledge to foster, for instance, leadership by young women (McGowan, Cooper, Durkin, & O’Kane, 2015), enhance product innovation frequency (Taura & Radicic, 2018), and promote entrepreneurial behaviors (Khoshmaram et al., 2018).

Innovation

Studies report that IC supports innovation in SMEs, in terms of both innovativeness and new product development (NPD), in several ways. First, with regard to innovativeness, some authors have stated that social, organizational, and HC are directly related to innovativeness (Gomezelj Omerzel & Smolčić Jurdana, 2016; Jardon, 2015; Link & Ruhm, 2011). On the other hand, the cause and effect direction is not completely clear since others have reported that HC positively impacts innovativeness, which in turn has an effect on process capital, and then RC (Alzuod & Isa, 2017; Pappa et al., 2013; St-Pierre & Audet, 2011). St-Pierre and Audet (2011) stress that the effect of IC on innovativeness in SMEs is strategy dependent, with a higher impact for prospectors rather than defenders (St-Pierre & Audet, 2011). Moreover, it is important to consider product innovativeness to differentiate between firms and to clearly define the role played by HC on performance (Leitner, 2015). From a different perspective, Osman and Nghah (2016) argue that IC is a source of innovativeness, especially in women-owned SMEs in developing countries. They claim that female entrepreneurs face more challenges than their male counterparts and need to leverage more IC since it translates into

knowledge management, which in turn promotes innovativeness that eventually enhances sustainable competitive advantage. Thus, IC can be conceived of as an innovation “enabler” (Durst, 2012). However, it is important to exercise caution in implementing innovation and IC practices in developing countries if those practices are in fact suitable to only developed country contexts (Osman & Ngah, 2016). 480

More specifically, it has been revealed that the disclosure of IC and IC statements improves the capability of SMEs to capture financial resources for the funding of innovation activities (Salazar-Elena, Sánchez, & Otamendi, 2016). Durst (2012) explains that IC, together with financial and physical capital, fosters innovation initiatives. Ngah et al. (2015, p. 1326) discuss the concept of innovative intelligence – that is, the “the capability to gain insights into complex problems or opportunities and discover new and unforeseen solutions that can be implemented” – and how IC contributes to the development of such intelligence in SMEs. In particular, those authors develop a framework through which risks associated with innovation activities in SMEs can be mitigated via the effective management of IC. In a similar vein, there is evidence to suggest that customer capital positively impacts innovative performance (Alzuod & Isa, 2017). IC has also been analyzed as a moderator in the relationship between innovation and SMEs performance (Nasir, Mansor, & Abu, 2015). Moreover, the adoption of IC practices in SMEs can be supported by national governments with programs aimed at funding infrastructures, such as incubators, where firms can benefit from an innovative environment and exploit innovation resources (Ileanu et al. 2009; Khalique, 2011; Tsai, Hsieh, Fang, & Lin, 2009). This is particularly true in developing countries such as Malaysia and Pakistan where SMEs have to manage their HC to avail themselves of beneficial outcomes, such as superior innovation and creativity performance (Khalique, 2011), and also in Nigeria, where a stable economic environment could positively contribute to the financial credit assessment of SMEs (Steenkamp & Kashyap, 2010). Similarly, Malaysian SMEs benefit from governmental support to develop innovative low-risk initiatives (Ngah & Ibrahim, 2009, 2011). 485 490 495 500

Moving on, several studies agree on the positive effect of HC on NPD (Chen et al., 2006; Hsu & Fang, 2009; Leitner, 2015). Results from the study by Costa et al. (2014) highlight that HC and RC positively impact SC, which in turn positively affects product innovation performance. Similarly, it has been reported that RC enhances NPD with HC (moderated by SC) playing a pivotal role in product innovation in Russian firms (Portuguese firms) (Chen et al., 2006; Molodchik & Jardon, 2017). Hsu and Fang (2009) address the mediating role of organizational learning in the relationship between RC and NPD. Leitner (2011) Leitner, 2015) explains that SC in Austrian SMEs has a negative impact on product innovation, while in Taiwan there is a positive relationship between SC and NPD (Chen et al., 2006). By analyzing different 505 510 520

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types of innovation management approaches, it has been suggested that “high intellectual capital” SMEs are more likely to adopt an appropriability regime (intellectual property rights) and a fast time-to-market approach to innovation management, with higher radical and incremental innovation performance, compared to “medium intellectual capital” firms (Agostini et al., 2017; Kitching & Blackburn, 1998). The hypothesis that HC, RC, and organizational capital are associated with radical innovation performance (with RC and organizational capital as mediators of the link between HC and radical innovation, and organizational capital as moderator of the link between RC and radical innovation) has also hitherto found support in the literature (Agostini et al., 2017).

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Knowledge management

The literature confirms that IC and knowledge management (KM) are strongly intertwined. IC has been investigated as either a determinant of KM or a consequence of it. With regard to IC as a determinant of KM, a tool has been developed to distinguish which members of the organization are pivotal in knowledge generation, and thus how to effectively manage HC to boost KM (Durst & Wilhelm, 2013). Marzo and Scarpino (2016) conclude that both formal and informal IC are used to enhance KM. Moreover, they point out that KM and IC cannot be thought of as separate concepts since they largely influence each other. Furthermore, prior research has indicated that different IC components affect different dimensions of KM (Khadir-Poggi & Keating, 2015). In particular, RC positively impacts knowledge sharing (Nghah & Ibrahim, 2011).

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By analyzing IC as a consequence of KM, the literature has revealed particular factors that SMEs need to manage to effectively implement an IC measurement strategy. These can be clustered into three categories: technology, process, and people (Gresty, 2013; Montequín, Fernández, Cabal, & Gutierrez, 2006). SMEs within a cluster share KM and IC practices. RC is indeed a strong IC component in this setting, where routines that govern the cluster are stronger compared to those in place within a specific firm, thereby generating social capital (Cappellin, 2003). Similarly, it has been stated that, due to their limited size, SMEs are not able to internally produce IC, and thus produce substantial RC through knowledge development processes (Coyte et al., 2012; Migliarese & Corvello, 2012). SMEs use formal and informal control systems, with the former supporting core operating procedures and the latter facilitating knowledge development and harvesting (Coyte et al., 2012).

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SMEs’ requirements from an IC perspective have been analyzed in previous studies at the individual and the organizational level (Chen et al., 2012; McLarty, 1999; Odunayo & Tobora, 2014; Patalas-Maliszewska & Werthner, 2010). From an individual perspective, SMEs require experienced people

within the organization. However, since it has been clearly found that the skills of graduates rarely meet the requirements of SMEs (McLarty, 1999), IC could become a barrier for SMEs' performance. 565

Strategy – knowledge leverage

The analyzed articles reveal that knowledge leverage is an additional strategic outcome of IC management in SMEs since the application of knowledge to the operations of the firm enables value creation (Roos et al., 1997). Within this category of performance, prior literature has focused on the relationship between IC and knowledge management (as discussed above), the impact of IC on SMEs' core competencies such as competitiveness, growth, internationalization, and the development of invisible assets. The following subsections address specific analyses of each of these relationships (Figure 7). 570 575

Core competencies

IC has been found to be beneficial in fostering a set of core competencies capable of providing SMEs with a sustainable competitive advantage. In particular, IC either directly or indirectly impacts on competitiveness, growth performance, and internationalization. 580

Competitiveness

In contemporary economic contexts, knowledge resources are sources of competition (Darus, Yunus, & Rahman, 2017; Khalique, 2011; Osman & Ngah, 2016). With regard to competitiveness, IC has been conceptualized as a “lubricant” in both advanced knowledge-based economies (Khalique et al., 2011), and emerging countries such as Malaysia (Ng & Kee, 2012), Pakistan (Khalique, 2011), Taiwan (Chen, 2008), and Mexico (Pappa et al., 2013; Sanchez Gutierrez et al., 2015; Vazquez-Avila et al., 2012). Since knowledge resources are abundant in SMEs, the maximization of their IC can be transformed into competitive advantage (Osman & Ngah, 2016; Vazquez-Avila et al., 2012). From this perspective, IC is conceived of as an investment option for SMEs, where expected benefits in terms of competitive advantage should offset costs (Pappa et al., 2013; Patalas-Maliszewska & Werthner, 2010). IC management represents one of the most important strategic approaches to develop dynamic capabilities, which drives sustainable competitive advantage of Mexican SMEs (Daou, Karuranga, & Su, 2013, p. 2014). Among a range of sources of competitive advantage to invest in, managers of high-tech SMEs identified HC, a learning approach, and social capital of employees as the most relevant (Gajowiak, 2016). Consequently, there is increasing demand for knowledge/intellectual workers, and therefore 585 590 595 600

IC has to be fully understood and incorporated into SMEs' competitive strategies (Khalique, 2011). In addition, according to Chen et al. (2012), personal HC and organizational intellectual capital are influenced by organizational commitment which, in turn, is determined by personal assets and organizational investments. Similarly, it has been posited that HC, SC, and RC positively affect key elements of virtual organizations; namely, ICTs (Baños et al., 2016), trust, coordination, and geographical location (Yasir, Majid, Ahmad, & Tabassum, 2011). In a similar vein, it has been found that RC and internal knowledge management support innovativeness, which is a source of competitive advantage for SMEs (Jardon, 2015). Indeed, the competitiveness of a firm is mainly influenced by its knowledge management capabilities (Patalas-Maliszewska & Werthner, 2010). Hence, only robust knowledge management allows an organization to achieve higher competitiveness (Patalas-Maliszewska & Werthner, 2010).

Osman and Ngah (2016) discuss the role of IC and knowledge management in supporting women-owned SMEs, arguing that female entrepreneurs have to use IC as a way of overcoming the challenges they face and thus to survive in the competitive arena. In terms of the link between IC and corporate strategy, Massa and Testa (2009) found that HC is pivotal for the execution of any type of strategy set by SMEs, whereas RC and SC are more relevant for prospector and defender SMEs, respectively, with analyzers having to deal with both RC and SC.

Growth

The growth performance of SMEs is also positively affected by IC, directly and indirectly. In particular, customer capital and SC have been addressed as determinants of growth in SMEs in Kenya (Ngugi, 2012). Dorrego and González-Loureiro (2012) tested the IC components that explain most of the growth in innovative Spanish SMEs, pointing out that HC is a leading indicator for SC. They also found that RC does not support the growth of SMEs in isolation, but rather augments the rate of growth if combined with HC and SC (Dorrego & González-Loureiro, 2012). Gomezelj Omerzel and Smolčić Jurdana (2016) analyzed the indirect relationships between IC components and the growth of SMEs, arguing that social and organizational capital and HC directly influence SMEs innovativeness which, in turn, affects their growth performance. IC also positively affects initial public offerings of SMEs (Bonardo, Paleari, & Vismara, 2010).

Internationalization

Moe, Šmite, Hanssen, and Barney (2014) found that one of the main reasons why outsourcing relationships terminate is due to inability to accumulate IC

(Moe et al., 2014). A slightly different approach to internationalization is provided by Korsakienė et al. (2017), who suggest that knowledge is the key asset for both businesses and individuals. According to those authors, the value of the firm is driven by the knowledge, abilities, and skills of its employees, which also drive its internationalization activities. The work histories of employees and the ability of managers to transmit experience and international orientation are among the major forces behind the internationalization of SMEs. The link between IC and the internationalization of SMEs seems to be dominated by their capability to acquire and retain HC.

Invisible assets

Q69 IC has also been found to support the management of invisible assets (Crema & Nosella, 2014), associated with knowledge assets that are sometimes difficult to capture in traditional financial reporting (Aureli, 2007; Shariatmadari & Azadi, 2013). Indeed, the preparation of IC statements is not an easy task for SMEs, which require nontrivial guidelines and procedural details so as to complete these statements adequately (Mertins & Will, 2007). Hence, the development of guidelines for the preparation of IC statements by SMEs is a line of research that is expected to be pursued in future (Bornemann & Alwert, 2007; Cruceru, 2014). Prior studies investigating the role of IC reporting in enhancing SMEs' relationship with financial institutions and supporting the concession of financing from banks have yielded different results (Alwert, Bornemann, & Will, 2009; van Liempd et al., 2014). According to Alwert et al. (2009), more homogeneous ratings can be obtained when IC reports are disclosed since transparency is enhanced (Alwert et al., 2009). This implies that IC reports could contribute to improve the accuracy and fairness of the process of raising capital for SMEs and banks (Alwert et al., 2009). By contrast, the importance of IC statements in credit assessments may be limited (van Liempd et al., 2014). Thus, even if the preparation of such statements is useful in describing the company, the process of credit assessments does not consider IC statements (van Liempd et al., 2014).

Among the models that have been applied to SMEs, the intellectual capital statement (ICS) has been adopted in different studies as a comprehensive instrument aimed at realizing internal and external benefits and at monitoring critical success factors (Galván & Palacios, 2014; Inn et al., 2015; Mertins et al., 2009). Previous studies agree that ICSs can be beneficial in the long run (Inn et al., 2015; Lei, Kohl, & Xu, 2014; Mertins et al., 2009). However, according to Lei et al. (2014), the ICS is not applicable in contexts in which SMEs do not have a clear development strategy and that, therefore, adaptation of the model is problematic (Lei et al., 2014). This has also been confirmed in the European context, in which further standardization is needed (Mertins et al., 2009).

Corporate performance

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Following the analytical framework adopted in this study, a firm's performance can be classified in terms of financial and social metrics (Orlitzky et al., 2003). Extant research on SMEs has addressed the pivotal role of IC with respect to both of these performance types. The following subsections delineate the literature on this topic (Figure 7).

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Financial performance

Many studies have analyzed the effects of IC on the performance of firms, in different geographic areas, and considering different sectors. Higher IC has been found to be associated with superior financial performance in Mexican (Vazquez-Avila et al., 2012), East Asian (W.-K. Wang et al., 2013), and Italian SMEs (Crema & Verbano, 2016). IC also mediates the relationship between strategic alliances and organizational performance in Portuguese high-tech SMEs (Ferreira & Franco, 2017b). Similarly, IC positively influences strategic flexibility, which then boosts profitability and sales of Indonesian SMEs (Aisjah, 2017). While a positive statistically significant relationship has been found between internal IC and a firm's ROA, external IC does not contribute to the relationship (Mubaraq & Haji, 2014). Many findings show that HC can directly, indirectly, or both have a positive effect on organizational performance. In particular, HC management has been found to maintain and enhance profitability (ROA) and productivity of Indian SMEs (Mondal, 2016). The same study also found that physical capital, together with HC, is the major determinant of SMEs' profitability. In addition, HC can also perform a mediating role between KM processes and organizational performance (Daud & Yusoff, 2011). Given the positive impact that HC can have on a firm's performance, it is considered the major source of IC (Jardón & Martos, 2009, 2012). This implies that investment in HC can improve a firm's performance; therefore, activities aimed at enhancing the competitive attitudes of staff are welcome (Jardón & Martos, 2012). Divergent results have been reported by other scholars, who found no statistically significant relationship between HC and a broad range of financial, market-based, and nonfinancial performance metrics (Jardón & Martos, 2009; Khalique et al., 2014, 2015).

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When accounting for strategic approach, results show that IC differentially contributes to SMEs' performance (Cohen et al., 2014; St-Pierre & Audet, 2011). In defender firms, RC is expressed by the possibility of meeting customer needs through less expensive products, rather than with innovative products, to foster growth and ROA instead of productivity. By contrast, in prospector firms, RC is translated into innovative products, or parts of them, to achieve a better technological position (St-Pierre & Audet, 2011). While

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many studies recognize the positive association between RC and a firm's financial performance (Aisjah, 2017; Cleary & Quinn, 2016; Ferreira & Franco, 2017a; Ling, 2013), according to Jardón and Martos (2009) RC does not have any effect on a firm's performance (Jardón & Martos, 2009). 720

Q72 RC is strongly interrelated to the other two IC components and is one of the main drivers of financial performance in UK SMEs working in the engineering industry (Henry, 2013). Given the increasing involvement of firms in social activities, the reputation of SMEs has to be managed; hence, IC mediates the relationship between corporate social responsibility performance, increasing profit margin, and increasing sales (Jain, Jain, Vyas, & Roy, 2017). SMEs can be involved in activities promoting culture and technology and improving relationships with customers and suppliers (Baños et al., 2016; Jardón & Martos, 2012). This can enhance the RC of SMEs, which can also have a stronger effect on performance compared with tangible resources (Jardón & Martos, 2012). 725 730

Furthermore, a subset of the literature has analyzed the influence of customer, social, technological, and spiritual capital on firms' performance (2015; Khalique et al., 2014; Khalique & Pablos, 2015; Ngugi, 2012; Ullah, Aziz, & Yousaf, 2016). All these components have been found to exhibit positive relationships with the financial performance of SMEs, except for spiritual capital; that is, the "intangible knowledge, faith and emotion ... which includes vision, direction, guidance, principles, values and culture" (Khalique et al., 2014, p. 19). One of the motivations for the lack of significant results associated with spiritual capital could be due to its complexity in being assessed through measurable metrics. Hence, more research could be aimed at investigating the role of spiritual capital in SME by adopting qualitative methodological approaches. To the best of our knowledge, all of the studies that have analyzed the impact of SC on firms' performance have yielded statistically significant relationships. More specifically, SC leverages the joint effect of HC and RC to achieve superior financial performance (Jardón & Martos, 2009). Since IC is based on knowledge, improved relationships can be the precursor to cooperation that leads to an increase in competitiveness; hence, financial performance (Jardón & Martos, 2012; Kozłowski & Matejun, 2012). In the case of Romanian SMEs, gender-balanced SC, where managers are middle aged, results in better financial performance (Ileanu, Isaic-Maniu, Herteliu, & Andrei, 2015). 735 740 745 750 755

Q73 Authors agree that SC is important for influencing, maintaining, and enhancing performance in SMEs operating in cloud computing (Cleary & Quinn, 2016), and international settings (Ling, 2013), where SC can mediate the strategic alliances-performance link and then affect a broad range of financial performance metrics (Ullah et al., 2016). However, some controversial findings have also been outlined. In particular, Leitner (2015) suggests that SC has a negative impact on the performance of Austrian SMEs. 760

However, for those firms in which HC was important for improving performance, investments in HC were as effective as research and development (R&D) investments in terms of innovation (Leitner, 2015).

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Social performance

Previous studies agree on the positive influence of IC on the social sustainability of SMEs (Akhtar, Ismail, Ndaliman, Hussain, & Haider, 2015; Aseanty, 2016). Given their small size, SMEs have to put more effort into developing the IC capabilities of their employees (Aseanty, 2016). SMEs can take advantage of these competencies and translate them into sustainability performance (Aseanty, 2016). Therefore, training of employees in SMEs is among the most important aspects for the enhancement of employee competencies and skills (Akhtar et al., 2015; Aseanty, 2016). Skills represent the most important predictor of SMEs sustainability, and a strong and positive correlation between IC and sustainability has been identified (Akhtar et al., 2015). Finally, Jardon and Dasilva (2017) found that IC positively affects the environmental concern of Argentinian SMEs operating in the timber industry.

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Discussion, critique, and future research directions

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Consistent with the structure adopted in previous studies (Nolan & Garavan, 2016), research gaps and directions for future research are identified in terms of theory, content, and research methodologies.

In terms of *theory*, this study analyzed the conceptual underpinnings of the literature on IC in SMEs. Specifically, based on this SLR, five different areas have been investigated in this respect. First, the role of public management in supporting SMEs in exploiting their IC is a topic of great interest. According to previous studies, developing countries are expending more and more research effort toward analyzing IC in SMEs, and the supporting role of government is critical in this context. Supported by the available literature, robust management of IC may provide not only private, but also public policy benefits (Guthrie, 2001). Therefore, there is a call for more research examining strategies for identifying and supporting national and supranational programs aimed at fostering and exploiting IC investments such as SME incubators (Khaliq, 2011; Tsai et al., 2009). Second, the relevance of adopting new IC reporting systems is justified by the presence of an increasing number of articles proposing new frameworks in this field. Grounded on voluntary disclosure theory, this need emerged from the willingness of firms to reduce information asymmetries between managers and stakeholders (Healy & Palepu, 2001). However, research in this area is fragmented and, therefore, future studies may seek to strengthen the evidence base. Third, the

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relevance of IC has been illuminated by analysis of its subcomponents. Since IC is conceived of as a “lubricant” of SMEs’ competitiveness (Khalique et al., 2011) and an “enabler” of innovation in SMEs (Durst, 2012), it is considered an investment option at the organizational and system levels. Research in this area aims at understanding the extent to which systemic approaches can explain the interactions between IC subcomponents and the performance of SMEs (for example, Mella, 2012; Stähle, Pöyhönen, & Stähle, 2003). Further research is needed to improve understandings of how the adoption of system dynamics approaches may contribute to the development of a comprehensive body of knowledge in the IC field and to provide recommendations on how to acquire, develop, and use IC in different business contexts. Many studies have identified synergies among different components, which implies that IC components can even exert an indirect effect on performance; thus, future research could analyze how synergies among the different components of IC enhance (inhibit) SMEs’ performance. Fourth, consideration of the interplay between IC and KM is evident, but it is still unclear whether IC should be considered as either a determinant of KM or as a consequence of it. Holistic investigations that include both IC determinants in SMEs and their effects on a variety of performance metrics would represent a desirable future research agenda. Insights from this literature review highlight the need for more research aimed at disentangling the boundaries (or intersections) between IC and KM. Finally, while analyses into whether IC matters for SMEs’ social responsibility can be found in the literature, it is of utmost importance to focus more effort on investigating strategic approaches that adopt IC as an enabler of SMEs’ sustainability performance to extend the knowledge base on the social responsibility of SMEs (Soundararajan, Jamali, & Spence, 2017).

This study also advances knowledge through the identification of research gaps and future research possibilities from the perspective of *content*. First, in terms of location, this review revealed relatively few studies in the United States, Latin America, and Africa. Further research, therefore, should be conducted in areas beyond Asia and Europe. Second, despite the fact that the link between IC and SMEs’ performance has been extensively studied, contrasting results on the relationship between IC subcomponents and performance have been found. While some studies found support for relationships between IC subcomponents and SMEs performance, others did not. Therefore, there is a need to better understand the conditions that foster the effect of IC on SMEs’ performance, considering the role of size/sector/business model and firm age. Regarding the latter, differences between born-global SMEs, startups, and internationalized SMEs should be further explored to develop a contingency and internationalization approach in the IC literature. This would provide more reliable and relevant results regarding SMEs operating in specific contexts. Third, few studies have analyzed whether IC is a determinant or moderator of SMEs’ innovation performance.

Further studies are thus needed to better understand this relationship, including if and how it varies systematically across different case study contexts. Fourth, there is an increasing body of literature investigating the role of IC management in women-owned SMEs. However, this stream of research needs consolidating to effectively identify whether and how CEOs' personal traits, such as tenure, gender, experience, and values, might differentially leverage IC or some of its components to achieve superior firm performance. Finally, the role of IC in collaborations within and between SMEs is still underdeveloped; thus, further studies could investigate which features of IC foster (block) collaboration among SMEs. 845 850

In terms of *methods* that have been chosen to investigate the effect of IC on SMEs' performance, results of this study suggest that, despite diverse approaches adopted in the literature, there are methodological issues that still need to be considered. First, the measurement of different constructs warrants further investigation. It is common in the literature to measure IC constructs in the same way as it is done for large firms. However, given the specificities of SMEs, bespoke measurements need to be investigated. The same methodological issues are detected with respect to the measurement of SMEs' performance. While studies have analyzed different types of performance, few have analyzed the simultaneous direct/indirect effect of IC on different types of performance. Since performance measures are not standardized across studies, further analysis is required to understand if and to what extent results are sensitive to this lack of standardization. Second, there is a lack of consensus vis-à-vis the link between IC and performance, and, especially, in terms of cause and effect. Related to this, there is dearth of studies adopting panel research designs. Given that, *ceteris paribus*, inferences based on panel data are more reliable than inferences based on time series or cross-sectional data, there is a pressing need for future studies to consider this so as to improve the evidence base. Additionally, insufficient attention has been given to methodological triangulation, which thus undermines collective confidence in prevailing understandings of the link between IC and SMEs' performance. Finally, despite nontrivial differences between large firms and SMEs (Bocconcelli et al., 2018; Greiner, 1998; Haltiwanger et al., 2013; Hudson et al., 2001; Shrader et al., 1989; SMEAR, 2012; Welsh et al., 1982), only a few studies have attempted to explore and unpack how firm size affects IC- performance relationships. Third, SMEs are not a homogenous group and further research could investigate differences in terms of the relationship between IC and performance between different clusters of firms (individual, micro, small, and medium). This would provide more refined and targeted conclusions and practical recommendations, moving beyond the "little big firm" approach and drilling down into the nuances of IC-performance relationships. Finally, the creation and sharing of datasets to compare results on the effect of IC on SMEs' performance in different case 855 860 865 870 875 880 885

study contexts would help improve understandings of the cross-national and dynamic effects of IC on SMEs' performance.

Conclusions

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To the best of our knowledge, this study is the first of its kind to review the literature on IC in SMEs. IC plays a fundamental role in the context of SMEs because these firms have less tangible resources available compared to their larger counterparts and, thus, rely more on intangible resources (Kujansivu & Lönnqvist, 2007; Massaro et al., 2015). The communication of information related to intangibles can be used to inform future corporate growth reputation (Abeysekera, 2017).

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Starting from this premise, the present study aimed at investigating the following research question: What are the main effects of IC on SMEs performance? To answer this question, we undertook an SLR (Fayezi, Zutshi, & O'Loughlin, 2017; Massaro, Handley, Bagnoli, & Dumay, 2016; Nolan & Garavan, 2016) based on extant studies in the peer-reviewed literature. This type of literature review is considered rigorous (Nolan & Garavan, 2016) and effective in exploiting the links between past and more recent research, identifying gaps in understanding, and suggesting new research opportunities (Massaro et al., 2016). To effectively build insights from prior research, we grounded our analysis on a conceptual framework that accounts for differences in location, sector, and research methodology (Broadbent & Guthrie, 2008), as well as a comprehensive set of SME performance metrics (Orlitzky et al., 2003; Roos et al., 1997). In so doing, we reported and discussed the evidence available from the prior literature according to tangible and intangible consequences of IC management in the context of SMEs. From the analysis of 105 articles published between 1996 and 2017, we summarized findings and identified future research directions. Overall, this literature reviewed is focused more on the effect of IC on antecedents of firm performance, such as innovation, knowledge management, and core competencies; thus, future investigations are needed into other determinants of SME performance such as learning organization, conversation management, and invisible assets (Figure 7).

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Empirical findings show that IC management affects a broad range of financial performance metrics in SME; however, sometimes with unexpected and mixed results. Hence, more research aimed at replicating prior studies and corroborating extant research in both similar and different contexts would be desirable. Few studies have focused on the social performance of SMEs, although their role in this respect has been deemed as pivotal (Nejati, Quazi, Amran, & Ahmad, 2017).

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Several practical and policy implications can be drawn from our study. First of all, beyond the large firm context (Massaro et al., 2015), this study

enables SMEs to better understand the role of IC in enhancing their performance. Moreover, entrepreneurs could benefit from this study by exploiting knowledge on how SMEs can acquire, develop, and use their IC. Furthermore, SMEs harnessing different business models will be able to identify ad hoc solutions to exploit IC in their business. In so doing, SMEs can also benefit by identifying the areas of performance that can be most positively impacted by IC. In terms of policy implications, since SMEs usually do not have the requisite financial resources to heavily invest in IC, governments and policymakers are provided with a set of recommendations on how to support SMEs in enhancing their performance through IC. 930

This study is not without its limitations. First, the analysis is based only on those articles that respected stringent inclusion and exclusion criteria. Notwithstanding the justifiability of these criteria (Easterby-Smith, Thorpe, & Jackson, 2012; Rae & Wang, 2015), the omission of data (in this case, studies) always needs to be viewed with caution lest it negatively impact on the validity and generalizability of conclusions. Second, the analysis may be affected by issues emanating because of publication bias; consideration of unpublished works could help to identify the most recent research trends, although incorporating such studies could also lead to problems in terms of undetermined or underdetermined study quality. 940 945

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Appendix

Table A. Top 10 articles ranked by total citations.

Title	Authors	Year	Journal	Citations
"Intellectual capital and new product development performance: The mediating role of organizational learning capability"	Hsu, Y. H., and Fang, W.	2009	<i>Technological Forecasting and Social Change</i>	369
"The positive effect of green intellectual capital on competitive advantages of firms"	Chen, Y.S.	2008	<i>Journal of Business Ethics</i>	297
"Intellectual capital and corporate performance in knowledge-intensive SMEs"	Cohen, S., and Kaimenakis, N.	2007	<i>The Learning Organization</i>	243
"Investigating the value and efficiency of intellectual capital"	Kujansivu, P., and Lönnqvist, A.	2007	<i>Journal of Intellectual Capital</i>	166
"The influence of intellectual capital on new product development performance – The manufacturing companies of Taiwan as an example"	Chen, Y. S., James Lin, M. J., and Chang, C. H.	2006	<i>Total Quality Management and Business Excellence</i>	158
"Intellectual property management in the small and medium enterprise (SME)"	Kitching, J., and Blackburn, R.	1998	<i>Journal of Small Business and Enterprise Development</i>	126
"Importance and contribution of intangible assets: SME managers' perceptions"	Steenkamp, N., and Kashyap, V.	2010	<i>Journal of Intellectual Capital</i>	116
"Territorial knowledge management: Towards a metrics of the cognitive dimension of agglomeration economies"	Cappellin, R.	2003	<i>International Journal of Technology Management</i>	96
"Intangible assets and performance: Analysis on manufacturing SMEs"	St-Pierre, J., and Audet, J.	2011	<i>Journal of Intellectual Capital</i>	92
"The relationship of intellectual capital, innovation and organizational performance: A preliminary study in Malaysian SMEs"	Ngah, R., and Ibrahim, A. R.	2009	<i>International Journal of Management Innovation Systems</i>	90

Table B. Top 10 articles ranked by citations per year (CPY).

Title	Authors	Year	Journal	Citations	Years	CPY
"Intellectual capital and new product development performance: The mediating role of organizational learning capability"	Hsu, Y. H. and Fang, W.	2009	<i>Technological Forecasting and Social Change</i>	369	9	41
"The positive effect of green intellectual capital on competitive advantages of firms"	Chen, Y.S.	2008	<i>Journal of Business Ethics</i>	297	10	29,7
"Intellectual capital and corporate performance in knowledge-intensive SMEs"	Cohen, S. and Kaimenakis, N.	2007	<i>The Learning Organization</i>	243	11	22,1
"Intellectual capital in small and medium enterprises in Pakistan"	Khalique, M., Bontis, N., Abdul Nassir bin Shaari, J., and Hassan Md. Isa, A.	2015	<i>Journal of Intellectual Capital</i>	60	3	20
"Evaluating innovative processes in French firms: Methodological proposition for firm innovation capacity evaluation"	Boly, V., Morel, L., and Camargo, M.	2014	<i>Research Policy</i>	63	4	15,75
"Investigating the value and efficiency of intellectual capital"	Kujansivu, P. and Lönnqvist, A.	2007	<i>Journal of Intellectual Capital</i>	166	11	15,1
"Importance and contribution of intangible assets: SME managers' perceptions"	Steenkamp, N. and Kashyap, V.	2010	<i>Journal of Intellectual Capital</i>	116	8	14,5
"The influence of intellectual capital on organizational performance-knowledge management as moderator"	Ling, Y. H.	2013	<i>Asia Pacific Journal of Management</i>	70	5	14
"Intellectual capital as competitive advantage in emerging clusters in Latin America"	Jardon, C. M. and Susana Martos, M.	2012	<i>Journal of Intellectual Capital</i>	83	6	13,83
"The influence of intellectual capital on new product development performance – The manufacturing companies of Taiwan as an example"	Chen, Y. S., James Lin, M. J., and Chang, C. H.	2006	<i>Total Quality Management and Business Excellence</i>	158	12	13,17

Table C. Distribution of studies by geographic location.

	Continent	Most investigated country/countries	References
Q46	Europe	Italy	(Agostini et al., 2017; Agostini & Nosella, 2017; Crema & Nosella, 2014; Crema & Verbano, 2016; Marzo & Scarpino, 2016; Massa and Testa 2009)
Q47	Asia	Taiwan	(Chen et al., 2012; Chen et al., 2006; Chen, 2008; Hsu & Fang, 2009; Ling, 2013; Tsai et al., 2009)
Q48		Pakistan	(Khalique, 2011; Muhammad and Bontis 2015; Ullah et al., 2016)
Q49		Malaysia	(Akhtar et al., 2015; Darus et al., 2017; Daud & Yusoff, 2011; Khalique, 2011 2014; Muhammad & Bontis, 2015; Nasir et al., 2015; Ng & Kee, 2012; Rohana, 2009, 2011; Steffan-Dewenter & Schiele, 2008; Tobora, 2014)
Q50	Africa	Kenya	(Ngugi, 2012)
Q51		Nigeria	(Tobora, 2014)
Q52	Americas	United States	(Link & Ruhm, 2011)
Q53		Latin America	(Vazquez-Avila et al., 2012; Jardón & Martos, 2009 2012; Daou et al., 2013, 2014; Sanchez et al., 2016)
Q54		Canada	(St-Pierre & Audet, 2011)

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