

# Knowledge management in SMEs: a follow-up literature review

Susanne Durst, Ingi Runar Edvardsson and Samuel Foli

## Abstract

**Purpose** – *The purpose of this paper is to structure existing research on knowledge management (KM) in small- and medium-sized enterprises (SMEs) to offer a comprehensive overview of research strands and topics in KM in SMEs to determine their evolution over time.*

**Design/methodology/approach** – *The paper, which is considered a follow-up literature review, is based on a systematic literature review that covers 180 scientific papers that were published since the review paper by Durst and Edvardsson in 2012 that covered 36 papers.*

**Findings** – *The findings of this review and those of the aforementioned review are brought together in the form of an overview that structures research on KM in SMEs based on themes that, in turn, allow the derivation of promising research directions and research questions aimed at structuring future research on KM in SMEs.*

**Originality/value** – *By combining the findings of this review with the findings from the review published in this journal in 2012, this paper offers, to the best of the authors' knowledge, the most comprehensive literature review on KM in SMEs produced to date.*

**Keywords** Knowledge management, Small to medium-sized enterprises, SMEs, Thematic evolution, Systematic review, Review, Entrepreneurship

**Paper type** Literature review

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## 1. Introduction

Ten years ago, [Durst and Edvardsson \(2012\)](#) published the first systematic literature review in the *Journal of Knowledge Management* on knowledge management (KM) in small- and medium-sized enterprises (SMEs) to find out whether the increasing interest in KM directed its attention to SMEs as well. More precisely, their review aimed to explore what had been studied in the field of KM in SMEs since 2001. Durst and Edvardsson justified the choice of the year 2001 by referring to a 2001 paper by McAdam and Read, which assumed that KM developed for large companies would later also be used in SMEs.

In the meantime, we have reached the second half of 2022, and a lot has changed since then. Not only has the topic of KM become established in all types of organisations ([Zaim et al., 2019](#); [Manfredi Latilla et al., 2019](#); [Durst and Zieba, 2020](#); [Su and Daspit, 2021](#)) but also organisations are also facing new, then unimaginable, challenges such as transboundary crises, which revolve around threats that easily cut across geographical and/or policy boundaries (for example, the refugee crisis, COVID-19) or the invasion of Ukraine; events that not only make the importance of KM even more central but also require a new understanding of the resource knowledge or even a re-definition.

Against this background, and the well-recognised importance of SMEs as drivers of employment, economic growth and innovation in most economies, it seems imperative to review the literature on KM in SMEs again, by considering the results established at that time, to see how research has evolved since then. More precisely, it would be interesting to

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know what has been added, what has been examined more intensively and also which areas/themes of KM have fallen into the background? In the 2012 paper, Durst and Edvardsson stressed that the areas of KM implementation, KM perception and knowledge transfer had been studied quite extensively while research on knowledge identification, knowledge storage/retention and knowledge utilisation was underdeveloped. In addition, these authors proposed four general areas that would require more attention and development, being longitudinal studies and country comparisons, the utilisation of mixed methods approaches and studies that take a realistic lens, i.e. studies that are aware of the heterogeneity found among SMEs and a corresponding procedure.

Therefore, the objective of this paper is to provide a comprehensive review of the existing research on KM in SMEs. More precisely, the overall purpose of the paper is to structure research on KM in SMEs to offer a detailed overview of research strands and topics to establish the research efforts in this field of research over time. To reach the purpose, we used the same questions which were used in the 2012 review, i.e. Which KM topics are well researched and which are not? Which were the main findings of the studies? Which methods were used? And, How does the research handle the particular challenges small firms are facing regarding KM?

Consequently, this paper contributes to KM research by providing detailed information on the evolution of KM in SME research and thus improving our understanding of the current state of knowledge. More precisely, by integrating the findings of this follow-up review with those findings established in the review by Durst and Edvardsson, the present paper provides to our knowledge the most comprehensive literature review of KM in SMEs to date, in terms of depth and breadth. The paper goes far beyond the existing reviews on the topic that have been published since 2012 and that have predominantly dealt with the certain parts or specific perspectives of KM in SMEs, such as the review by [Cerchione et al. \(2016\)](#) on KM in SME networks or that by [Saratchandra and Shrestha \(2022\)](#) on the role of cloud computing for KM in SMEs. The review by [Massaro et al. \(2016\)](#) is an exception; these authors also looked at KM holistically. However, the work only included publications (89 in total) that were published up to 2014. By broadening both the scope and depth, the paper contributes to the advancement of KM in SME scholarship by structuring insights from the current literature and promising opportunities for future research presented in the form of a list of possible research directions and research questions categorised by themes. Recent developments in the world call for a new and comprehensive review that includes an updated period of time (2012–2022). Practitioners who wish to improve their knowledge of the topic may find the outcomes of the paper useful as well.

The paper is organised as follows. In the next section (2), the relevant literature is outlined. Section three then presents and describes the method employed. Section four presents the findings and section five synthesises the findings. In the final section (6), the conclusion and implications of the study are laid out.

## 2. Knowledge management in small- and medium-sized enterprises

The existing literature on SMEs often highlights that this category of organisations is exposed to resource constraints ([Jarillo, 1989](#)), and as a consequence, the room for manoeuvre is reduced and the available resources must be used more carefully ([Eggers, 2020](#)). [Torrès and Julien \(2005\)](#) argue that SMEs produce primarily for local markets and tend to lack strategic vision. Often decisions are made by intuition and short-term thinking. The tendency for *ad hoc* activities, for instance, *ad hoc* collaboration, has been found in research on outsourcing in SMEs ([Edvardsson et al., 2011](#); [Smogavec and Peljhan, 2017](#)). In many of these firms, the owner-manager or founder assumes a central position ([Bridge et al., 2003](#)), which, in turn, increases the likelihood that organizational development, strategy and also decision-making are in the hand of only one person or a small number of people ([Culkin and Smith, 2000](#)). Research has shown that not only the decision-making processes in SMEs differ from those in large companies but also their objectives

(Hauser *et al.*, 2020). Characteristics such as being flexible and disposing of adaptive capacity, can make decision-making in SMEs shorter and faster (Branicki *et al.*, 2018), which can help them to be far more attuned to survival in a world that is subject to increasing number of significant economic shocks or crises as SMEs are used to dealing with uncertainty (Durst and Henschel, 2021).

It has also been argued that the above-mentioned centrality influences whether or not the benefits of KM are recognised to support firm development (Yew Wong and Aspinwall, 2004). Relevant knowledge and information might be in the minds of a small number of organisation members, which makes their work faster but can pose significant challenges to the small firms should these individuals leave the company for whatever reason (Durst and Wilhelm, 2012; Durst *et al.*, 2015). Furthermore, since the knowledge base in SMEs is also more limited due to their size, it is important for these companies to be good networkers to have permanent access to external knowledge carriers and sources (O'Donnell, 2014; Leick and Gretzinger, 2020); networks are considered a determinant of SME performance as well (Lechner *et al.*, 2006).

SMEs are highly sensitive to external threats because of the “liability of smallness”, which means that the probability of failure among such firms, specifically the younger and “smaller” SMEs, is much higher compared with larger and established firms (Davidsson and Gordon, 2016). Since external shocks are often coupled with other types of disruptions, the availability of firm-specific resources is likely to be further reduced (Osiyevskyy *et al.*, 2020), and thus, the scope of action decreases too (Durst *et al.*, 2021). This, in turn, also means that SMEs will be exposed to other KM challenges which are distinct from those of the large companies. Underlining Welsh *et al.*'s (1982) statement that small firms are not little big firms, thus one cannot transfer KM practices from large organisations to SMEs. Existing literature related to SMEs, however, suggests that scholars still tend to apply approaches originally developed for larger firms on SMEs – although previous research on KM in SMEs has shown differences between SMEs and larger firms (McAdam and Reid, 2001; Durst and Bruns, 2018). For example, research has shown that many SMEs have no strategic approach to KM but tend to treat KM on an operational level (Durst and Edvardsson, 2012; Massaro *et al.*, 2016). Referring to the situation that KM is often discussed by the means of different KM processes (KMPs) (Alavi and Leidner, 2001; Yew Wong and Aspinwall, 2004) such as knowledge identification, knowledge creation, knowledge storage, knowledge dissemination and knowledge application, Durst and Edvardsson, in their paper from 2012 have brought these processes together with typical SME characteristics such as lack of resources, flexibility, smallness, less formal and lower turnover rates to highlight the likely impact of these KMPs on SME survival.

In addition, what needs to be noted when researching SMEs is the issue of heterogeneity (Curran and Blackburn, 2001). The different categories of firms that are assigned to SMEs, micro, small and medium-sized ones, are difficult to compare; thus, one should refrain from the idea that there could be one single KM approach that fits all SMEs (Durst and Edvardsson, 2012). Finally, and despite the fact that the majority of companies are micro-, small- or medium-sized enterprises (European Commission, 2022), KM has traditionally been considered in the context of large companies (Durst and Edvardsson, 2012; Massaro *et al.*, 2016).

In summary, we believe that the above arguments and insights justify the need for both intensive and solid research on KM in SMEs and this study.

### 3. Methodology of literature review

In this follow-up paper, we also adopted the principles of a systematic review as recommended by Jesson *et al.* (2011), namely, mapping the field through a scoping review, comprehensive search, quality assessment, data extraction synthesis and write up.

Firstly, a research plan was developed comprising the research questions of interest, the keywords, and a set of inclusion and exclusion criteria. The paper aimed to provide a comprehensive review of the existing research on KM in SMEs since 2012. As mentioned in the introduction, we used the same questions which were used in 2012:

- Q1. Which KM topics are well researched and which are not?
- Q2. Which were the main findings of the studies?
- Q3. Which methods were used? With regard to the specific challenges, SMEs face as a consequence of their resource limitations.
- Q4. How does the research handle the particular challenges small firms are facing regarding knowledge management?

As keywords (search string) (“knowledge management” OR “KM”) AND (“SME\*” OR “small firm\*” OR “small and medium-sized enterprise\*”) were used. The inclusion criteria were: publications in the period 2012 to present, documents such as articles, early access or review, peer-reviewed, English language, the categories business and management of the Web of Science database. Papers published before 2012, grey literature such as reports and non-academic research, and other languages than English were excluded. Additionally, an excel data sheet was produced consisting of key aspects related to the research aim. In the given case, these were: name of the author(s), year of publication, name of the journal, research aim/objectives, theoretical perspective/framework, method, main findings and type of SME studied. As in the 2012 study that formed the basis of this follow-up paper, we were interested in the KMPs studied, i.e. knowledge identification, knowledge creation, knowledge storage, knowledge dissemination, knowledge application, the KMP in general and including other aspects of the KMP.

Secondly, once all relevant issues had been specified, one of us accessed the Web of Science database on the 7th of July 2022 and looked for suitable articles. This search resulted in 355 articles. To make sure that all relevant articles on KM in SMEs were included [even though Web of Science covers the majority of leading publishers (journals), it does not cover all], we also did manual searches on certain leading KM journal sites such as *Knowledge Management Research and Practice*. These proceedings and a first round of quality assessment resulted in a set of 292 articles which were used for the next step.

Steps three and four were dedicated to quality assessment and data extraction. More precisely, the 263 papers were divided among the three of us; thus, each of us read about 88 papers. Subsequently, we all entered the relevant data in the excel sheet. Then we all jointly went through each data entry and discussed the content. In the case of possible reservations on the part of us who had not read the paper, we all went through the paper in question. This approach helped to reduce the danger that the analysis and, thus, the conclusion drawn might not be consistent. This consultation round led to a further reduction of the number of suitable papers, as we excluded papers that did not have KM as their main focus but other concepts such as intellectual capital, innovation management or learning; thus, papers where KM was of secondary priority only. Fifthly, in the final excel sheet containing 180 papers, the extracted information of each paper was synthesised into KMPs/topics/themes. As stated by [Tranfield et al. \(2003\)](#), the ability to synthesise the findings of numerous studies in a coherent manner is crucial for attaining a higher abstraction level and improving the generalisability of research. Thus, following the approach used in the (2012) study that forms the very basis for this follow-up paper, 59 papers were assigned to the KMPs that were studied. While the data of the remaining (unassigned) papers was analysed using the underlying notion of affinity diagram to identify new themes. This was achieved by synthesising the data to uncover similarities, which were then jointly discussed. Affinity diagrams have been considered useful for aggregating findings across multiple studies ([McLean and Antony, 2014](#); [Psomas, 2021](#)). The discussion was about going through the similarities and defining the KM themes together including the reconsideration under what

theme each paper covered in the review should be assigned. It was also used to align the findings on the category of SME studied in the papers included in the Review. The final stage of the review process was devoted to writing up the findings.

#### 4. Presentation of findings

Regarding the presentation of results, which were based on different quantitative and qualitative analyses and techniques, we start with general results and then move on to the more specific results.

##### 4.1 General observations

The findings suggest that the interest in the study of KM in SMEs has further increased. Of the 180 papers in this review, 53 papers were published in 2016 or earlier, while 127 papers were published in 2017 or later. As far as individual years are concerned, the largest number of papers were published in 2021, with 35 articles in all.

The 180 papers were published in a variety of international peer-reviewed journals. The largest number of papers covered in the review were published in the leading KM journals (Serenko, 2021), that is, 42 articles in the *Journal of Knowledge Management*, 20 articles in *Knowledge Management Research and Practice* and 11 articles in the *VINE Journal of Information and Knowledge Management Systems*.

##### 4.2 Methodology

As mentioned in the introduction, Durst and Edvardsson (2012) called, based on their analysis, for more longitudinal studies, the utilisation of mixed methods approaches, country comparisons and research designs that take a realistic lens, i.e. to study KM from a small firm perspective. In the present review, 12 papers reported the conduct of cross-national research (Alonso *et al.*, 2019; Audretsch and Belitski, 2021; Durst and Evangelista, 2018; Scuotto *et al.*, 2020; Vatamanescu *et al.*, 2020; Villar *et al.*, 2014), two articles used longitudinal panel data (Fotso, 2021; Zhou *et al.*, 2021), one used longitudinal survey data (Garcia-Cabrera *et al.*, 2017), while six articles reported the application of mixed methods approaches (Crupi, 2020; Hermawati and Gunawan, 2021; Marques *et al.*, 2020; Miklosik *et al.*, 2019; Thrassou *et al.*, 2020; Väyrynen *et al.*, 2017).

Table 1 summarises the research methods used in the papers. Quantitative approaches are the dominant ones in the period covered. As it is shown in the table, 57% of the papers based the studies on a survey research design which was then usually conducted using a

**Table 1** Research methods used by scholars focusing on KM in SMEs

Qualitative	No.	%
Interviews	15	8.3
Case study	12	6.7
Multiple case studies	19	10.6
Focus group	1	0.6
Story analysis	1	0.6
<i>Quantitative</i>		
Survey, questionnaire	103	57.2
Longitudinal panel data	2	1.1
<i>Mixed method</i>		
Literature review	8	4.4
Theoretical papers	4	2.2
Other methods	9	5.0
<i>Total</i>	<i>180</i>	<i>100.0</i>

questionnaire. The far most used statistical analytical technique was structural equation modelling; partial least square analysis in particular. Next popular research methods are different types of case studies and then interview studies. Thematic analysis, the analysis of single cases and between cases, are quite common methods in those papers that were based on qualitative research approaches. Among other research methods used in the papers were action research, laboratory experiments, webpage analysis, story analysis and workshops.

### 4.3 Types of small- and medium-sized enterprises studied

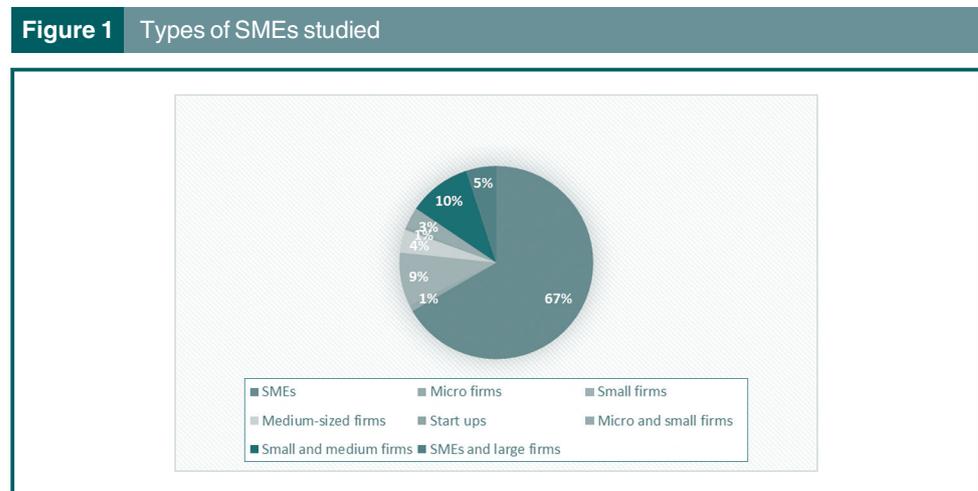
In the 2012 paper, Durst and Edvardsson stressed, as other researchers did before, that the heterogeneity found among SMEs should be taken into consideration; thus, in this follow-up study, we were interested whether researchers have responded to this call and, if yes, how. Figure 1 synthesises the findings regarding the types of SMEs studied in the papers reviewed.

Figure 1 shows that the vast majority of the studies examined seem to consider SMEs as a generic entity. The same applies to the studies that examined different SME categories, e.g. small- and medium-sized enterprises. Even though there are a few articles that would mention the issue of heterogeneity in the background to their study and may also control for size, the researchers tend to forget that when analysing their results considering the KM phenomenon of interest. We found only one article, the one by Pérez-Pérez *et al.* (2019), who studied how family firms pursue different strategies aimed at promoting strategic flexibility and knowledge-management practice to respond to strategic renewal goals and who considered the heterogeneity found among family firms throughout their study.

When individual categories of SMEs are examined, the focus is on small enterprises, which is understandable as they make up a large number of enterprises. In Europe, for example, small firms represent typically independent companies (Eurostat, 2022) and in addition, it can be assumed that these enterprises also have at least rudimentary company structures that make more complex projects possible.

### 4.4 Countries in which knowledge management in small- and medium-sized enterprises research is conducted

Regarding the countries involved in the papers covered in this review, there was no information available in 15 papers, while four were theoretical papers and eight represented literature reviews. Regarding the remaining papers, it is evident that KM in SMEs is a topic



that has been researched around the world. Figure 2 highlights the findings according to regions of the world. The study of KM in SMEs is still strongly influenced by studies conducted in European countries. One also sees that research on KM in SMEs has started in Africa as well; no studies from this continent were identified in the 2012 paper. Compared to the other regions in the world, the findings indicate that research on KM in SMEs in the Americas (i.e. North and South America) appears to be of lower interest.

#### 4.5 Knowledge management topics and themes studied

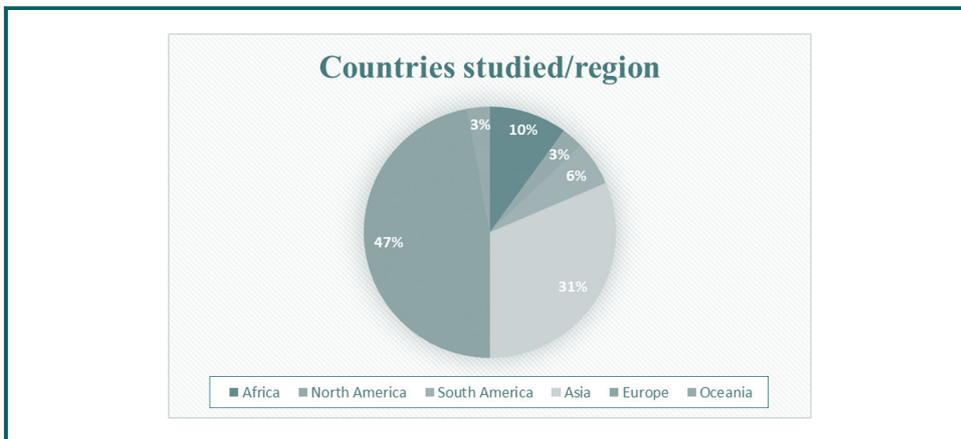
In the 2012 paper, Durst and Edvardsson presented the findings by referring to different KMPs. The authors found that the processes of KM implementation, KM perception and knowledge transfer had been studied quite extensively while at that time, research on knowledge identification, knowledge storage/retention and knowledge utilisation was underdeveloped. In the following, we will show what happened since then with regard to the KMPs/topics/themes of interest. We will start with the processes that were used in the 2012 papers before turning to the new topics/themes/processes.

**4.5.1 Research on knowledge management perception.** In the 2012 paper, nine papers were assigned to KM perception, which refers to the awareness of the benefits of KM for organisations, which, in turn, may favour the implementation of KM. In the follow-up review, we found one paper, namely, the paper by Gardan *et al.* (2018) (see Table 2), who studied the perceptions and opinions of Romanian SME managers on the importance of intellectual capital and the application of KM principles to competitive advantages. Not surprising, in an SME context, their study found a positive link between the manager’s level of education and the implementation of KM.

The decrease in the number of papers suggests that the advantages of KM for companies have been recognised in the meantime and that research has, therefore, switched to other KM-related topics.

**4.5.2 Research on knowledge identification.** No papers have been identified that had a dedicated focus on knowledge identification suggesting that KM has become more mature

**Figure 2** Countries studied by region



**Table 2** Papers dealing with knowledge perception

Knowledge management theme	Author
KM perception	Gardan <i>et al.</i> (2018)

over the years, and a stronger focus has been put on how to make use of existing and upcoming knowledge.

**4.5.3 Research on knowledge acquisition/creation.** In the 2012 review, five papers were identified that dealt with knowledge creation/acquisition, and one paper that dealt with knowledge creation/acquisition, transfer and utilisation. In the present review, there were 24 papers (see [Table 3](#)). According to the reviewed papers, knowledge creation/acquisition have a direct link with increased (open) innovation activities in SMEs ([Alshanty and Emeagwali, 2019](#); [Alshanty et al., 2019](#); [Azyabi, 2021](#); [Dabic et al., 2020](#); [Dost et al., 2019](#); [Fan et al., 2017](#); [Liao and Barnes, 2015](#); [Martinez-Costa et al., 2019](#); [Wahyono, 2020](#)) and to sense and respond to changing customer needs ([Ngo and Vu, 2020](#)). Knowledge creation, distribution and utilisation, together with risk-taking, can also reduce negative innovative outcomes in SMEs ([Games and Rendi, 2019](#)). [Zhou et al. \(2021, p. 21\)](#) write in this connection, that the findings “clearly support the conclusion that both external knowledge acquisition and internal knowledge-sharing practices contribute positively but indirectly to SME innovation performance by enhancing the firm’s innovation orientation.” The knowledge creation process is also related to better organizational performance ([Luhn et al., 2017](#)), such as export performance ([Boateng et al., 2020, 2021](#)). Access to different external sources is also material for small firms “knowledge creation activities ([Durst et al., 2013](#)), while [Alonso et al. \(2019\)](#) identified the importance of self-efficacy, shown by entrepreneurs” determination and self-motivation for knowledge acquisition. According to [Maldonado-Guzman et al. \(2016\)](#), KM can increase the intellectual properties of SMEs, while [Al-Tal and Emeagwali \(2019\)](#) argue that knowledge-based human resource management (HRM) increases intellectual capital, as well as process and product innovation. Finally, knowledge creation and distribution can mediate the relationship between entrepreneurial orientation and the e-commerce adoption of SMEs ([Nasution et al., 2021](#)). [Harris et al. \(2013\)](#) stressed that the more innovative SMEs are more likely to source external knowledge using a variety of methods, which, in turn, requires that these firms also have higher levels of absorptive capacity. By using [Nonaka and Takeuchi \(1995\)](#) model of dynamic knowledge creation, [Feller et al. \(2013\)](#) did a study aimed at promoting improved collaborative R&D processes, i.e. joined knowledge accumulation in (inter-)organisational settings. [Senivongse et al. \(2019\)](#) showed in their study the role of absorptive capacity on knowledge creation, specifically in environments that require rapid changes and propose to view absorptive capacity as a sole capability in turbulent markets. [Grimsdottir et al. \(2019\)](#) focused on knowledge creation/acquisition in knowledge-intensive SMEs. Their findings show that practical problems usually initiate new ideas and knowledge. Moreover, teamwork, formal and informal meetings, as well as brainstorming, are used in the knowledge-creating process. Little emphasis was on formal structures and strategies in the studied companies.

**4.5.4 Research on knowledge transfer.** In the 2012 review, there were six papers dealing with knowledge sharing/transfer. There is a rising interest in this topic in recent years, as 23 papers were found on knowledge transfer in the follow-up review (see [Table 4](#)). Knowledge sharing/transfer seems to have a positive impact on the efficiency and innovativeness of the SMEs’ working behaviour and methods ([Anser et al., 2020](#); [Hosseini et al., 2021](#); [Kambey](#)

**Table 3** Papers dealing with knowledge creation/acquisition

<i>Knowledge management themes</i>	<i>Author(s)</i>
Knowledge creation/acquisition	<a href="#">Alonso et al. (2019)</a> , <a href="#">Al-Tal and Emeagwali (2019)</a> , <a href="#">Alshanty and Emeagwali (2019)</a> , <a href="#">Alshanty et al. (2019)</a> , <a href="#">Azyabi (2021)</a> , <a href="#">Boateng et al. (2020, 2021)</a> , <a href="#">Dabic et al. (2020)</a> , <a href="#">Dost et al. (2019)</a> , <a href="#">Durst et al. (2013)</a> , <a href="#">Fan et al. (2017)</a> , <a href="#">Feller et al. (2013)</a> , <a href="#">Games and Rendi (2019)</a> , <a href="#">Grimsdottir et al. (2019)</a> , <a href="#">Harris et al. (2013)</a> , <a href="#">Liao and Barnes (2015)</a> , <a href="#">Luhn et al. (2017)</a> , <a href="#">Maldonado-Guzman et al. (2016)</a> , <a href="#">Martinez-Costa et al. (2019)</a> , <a href="#">Nasution et al. (2021)</a> , <a href="#">Ngo and Vu (2020)</a> , <a href="#">Senivongse et al. (2019)</a> , <a href="#">Wahyono (2020)</a> , <a href="#">Zhou et al. (2021)</a>

**Table 4** Papers dealing with knowledge sharing/transfer in SMEs

<i>Knowledge management themes</i>	<i>Author(s)</i>
Knowledge sharing/transfer	Al-Jabri and Al-Busaidi (2018), Anser <i>et al.</i> (2020), Curado and Vieira (2019), Cyril Eze <i>et al.</i> (2013), Fotso (2021), Garcia-Cabrera <i>et al.</i> (2017), Gaviria-Marin and Cruz-Cazares (2020), Harrington <i>et al.</i> (2019), Hatak and Roessl (2015), Hosseini <i>et al.</i> (2021), Kambey <i>et al.</i> (2018), Korbi and Chouki (2017), Kuruppuge <i>et al.</i> (2018), Letonja and Duh (2016), Magni <i>et al.</i> (2021), Oh and Kim (2021), Paoloni and Modaffari (2021), Soto-Acosta <i>et al.</i> (2014a, 2014b), Soto-Acosta <i>et al.</i> (2017), Vatamanescu <i>et al.</i> (2020), Yao <i>et al.</i> (2020), Yasir and Majid (2017)

*et al.*, 2018; Oh and Kim, 2021; Paoloni and Modaffari, 2021; Soto-Acosta *et al.*, 2014a, 2014b; Vatamanescu *et al.*, 2020; Yao *et al.*, 2020). Knowledge spillover has a positive effect on young SMEs' export potential (Garcia-Cabrera *et al.*, 2017) and can be supported by dedicated innovation policies aimed at promoting science-industry collaboration (Fotso, 2021) while sharing knowledge on customers and marketing with firms in similar markets can enhance the internationalisation of firms (Magni *et al.*, 2021). Hatak and Roessl (2015) found a strong relationship between knowledge transfer and intra-family succession. Similarly, Letonja and Duh (2016) argue that tacit knowledge sharing by a business founder to a successor is important for continued innovativeness, but knowledge originating from outside the family business is also needed. In another study involving family firms, Kuruppuge *et al.* (2018) stressed the impact of age, level of education and job orientation on knowledge sharing intentions of employees.

Curado and Vieira (2019) and Yasir and Majid (2017) found out that trust affected knowledge sharing and organisational commitment in a positive way. Al-Jabri and Al-Busaidi (2018) stress trust and risk are the core of inter-organisational transfer. Cultural differences and divergent management practices can, however, create mistrust and hinder knowledge sharing between firms in different parts of the world (Korbi and Chouki, 2017). Cyril Eze *et al.* (2013) established that knowledge technology, motivation, effective reward systems, trust and empowering leadership represent critical factors to explain different attitudes towards knowledge sharing in Malaysian SMEs.

Harrington *et al.* (2019) proposed a methodology to improve knowledge mobility in supply network configurations. Soto-Acosta *et al.* (2017) highlighted that the existence of technological and organisational factors are key drivers of social web knowledge sharing and Gaviria-Marin and Cruz-Cazares (2020) who focused on the diversity of knowledge/information provided by online business information providers offered a better understanding of what kind of knowledge/information is relevant for SMEs and thus should be disseminated.

*4.5.5 Research on knowledge storage/retention.* In 2012, only one paper was identified that focused on knowledge storage/retention. In the period 2012–2022, it was still the same, research on knowledge storage/retention remained underdeveloped. We identified two articles that could be assigned to this category (see Table 5). Firstly, the paper by Jayawickrama *et al.* (2019) studied both knowledge retention approaches for different types of knowledge and the factors that influence knowledge retention using a sample of SMEs in the UK industries. And secondly, the study by Whyte and Classen (2012) investigated the usefulness of storytelling to elicit knowledge from retiring experts.

**Table 5** Papers dealing with knowledge storage/retention

<i>Knowledge management theme</i>	<i>Author(s)</i>
Knowledge storage/retention	Whyte and Classen (2012), Jayawickrama <i>et al.</i> (2019)

4.5.6 *Research on knowledge management implementation/adoption.* In 2012, eight papers were found on KM implementation and five papers were found in the present review (see Table 6). Shrafat's (2018) study confirmed the influential role of KM capabilities, knowledge sharing, organisational culture and IT capability on the adoption of KM systems in SMEs. Durst and Evangelista (2018) found out that third-party logistics service providers are not sufficiently realising the full potential of KM. Based on the findings, it was concluded that the logistics sector is still reluctant regarding the implementation of more sophisticated KM systems and tools and called for taking a strategic approach to KM. Zieba et al. (2016) showed that there were no formal KM plans in the SMEs studied, although they have implemented various KM practices. Nupap et al. (2016) presented and tested a sophisticated KM system based on business process reengineering, enterprise resource planning (ERP), new product development and joint application development concepts. They concluded by noting that such an advanced KM system is promising for SMEs. Mageswari et al. (2017) underlined the positive and significant role organisational culture, leadership and management play in KM adoption in Indian manufacturing companies.

4.5.7 *Research on knowledge utilisation.* Research on knowledge utilisation seems to be neglected in the 2012 review, as only two papers were found on the subject. In the present review, four papers deal with knowledge utilisation/application (see Table 7).

Heredia-Calzado and Duréndez (2019) found out that professionalism and KM increase the use of ERP systems, which, in turn, increase their competitive advantages. Wang et al. (2021) studied how knowledge is used in medium-sized Chinese companies. Alonso et al. (2021) point out that micro firms make use of knowledge to enhance their potential, which can lead to increased competitiveness and general performance. Finally, Scuotto et al. (2017a, 2017b) argue that increasing the quality and magnitude of internal KM mechanisms enhances the possibility to explore and use external knowledge.

#### 4.6 New processes/themes/topics researched

The follow-up study also revealed several new research directions researchers have started to advance our understanding of KM in SMEs; they are presented in the following.

4.6.1 *Research on knowledge risks.* A new direction that has been started recently seems to be the study of risks related to knowledge. More precisely, we identified nine papers that addressed possible downsides of knowledge in SMEs (see Table 8).

Three papers addressed knowledge risks. Temel and Durst (2021) identified and discussed knowledge risks associated with emerging technological innovations, and based on that, proposed some countermeasures SMEs may apply to cope with these risks. Durst and Wilhelm (2013) developed a tool SMEs could apply to determine their knowledge at risk. Based on a review of the discussions in both studies that regard knowledge hiding as a form of knowledge risk, Scuotto et al.'s (2022) paper nicely fits this theme. Specifically, the

**Table 6** Papers dealing with knowledge implementation in SMEs

<i>Knowledge management theme</i>	<i>Author(s)</i>
Knowledge implementation	Durst and Evangelista (2018), Mageswari et al. (2017), Nupap et al. (2016), Shrafat (2018), Zieba et al. (2016)

**Table 7** Papers dealing with knowledge utilisation in SMEs

<i>Knowledge management theme</i>	<i>Author(s)</i>
Knowledge utilisation/application	Alonso et al. (2021), Heredia-Calzado and Duréndez (2019), Scuotto et al. (2017a, 2017b), Wang et al. (2021)

**Table 8** Papers dealing with knowledge risk and related topics in SMEs

Knowledge management theme	Author(s)
Knowledge risk	Arias-Perez <i>et al.</i> (2020), Barboza and Capocchi (2020), Durst and Ferenhof (2014), Durst and Wilhelm (2012, 2013), Joe <i>et al.</i> (2013), Temel and Durst (2021), Scuotto <i>et al.</i> (2022), Zieba (2017)

authors examined whether factors associated with transformational leadership, such as trust, collaboration and employee involvement, could influence a person's tendency to hide knowledge.

Two papers studied knowledge leakage. Durst and Ferenhof (2014) proposed a framework that lists different areas where knowledge leakage could occur and how to reduce the risk exposure. While Arias-Perez *et al.* (2020) showed in their study that knowledge leakage has a negative moderating effect on the relationship between absorptive capability and co-innovation.

Knowledge loss was studied in three papers. Durst and Wilhelm (2012) investigated how a medium-sized company deals with the danger of knowledge loss due to retirements or longer-term absences. Joe *et al.* (2013) studied older experts leaving knowledge-intensive firms. According to these authors, different types of knowledge tend to be lost, which are subject matter expertise; knowledge about business relationships and social networks; organisational knowledge and institutional memory; knowledge of business systems, processes and value chains; and knowledge of governance. Zieba (2017), in her paper, proposed the concept of knowledge safety which is perceived in the studied SMEs from a technical and a human perspective.

Barboza and Capocchi (2020) dealt with knowledge spillover. More precisely, the authors studied the impact of knowledge spillover on employment levels using a sample of Italian startups. The role of time and regional specialisation has been highlighted in their study.

**4.6.2 Knowledge management tools and practices.** No papers were found in the 2012 review dealing particularly with KM tools and practices. In the present review, 17 papers deal with KM tools and practices (see Table 9). Regarding KM practices related to KM tools, Centobelli *et al.* (2017) noticed three different patterns among SMEs. Firstly, some firms are using already known tools and practices; secondly, some SMEs adopt specialist practices of KM, and finally, there are a group of firms that invest in new technology and KM practices. While Centobelli *et al.* (2018) propose a taxonomy aimed at bringing together various types of behaviour associated with how a small firm's knowledge is related to the selection of KM systems. According to the authors, there are guideposts, practice laggards, tool laggards or latecomers.

Valentim *et al.* (2016) aimed at identifying and categorising KM practices SMEs can adopt to develop absorptive capacity. They showed the influence of both company size and sector on the relationship between KM practices and absorptive capacities. Hume and Hume (2016) researched the practice of KM not-for-profit SMEs in Australia and found,

**Table 9** Papers dealing with knowledge management tools and practices in SMEs

Knowledge management themes	Author(s)
Knowledge management tools and practices	Alvarez <i>et al.</i> (2016), Bettiol <i>et al.</i> (2021), Bolisani and Scarso (2016), Centobelli <i>et al.</i> (2017, 2018), Cerchione and Esposito (2017), Cocca <i>et al.</i> (2021), Crammond <i>et al.</i> (2018), García-Piqueres <i>et al.</i> (2019), Granados <i>et al.</i> (2017), Hume and Hume (2016), Kianto <i>et al.</i> (2018), Marques <i>et al.</i> (2020), Sytnik and Kravchenko (2021), Valdez-Juárez <i>et al.</i> (2018), Valentim <i>et al.</i> (2016), Väyrynen <i>et al.</i> (2017)

among others, the relevance of socialisation for KM success. [Cerchione and Esposito \(2017\)](#) found out that SMEs prefer traditional practices, such as problem-solving, teamwork and learning by doing rather than special KM practices, such as communities of practice, knowledge mapping and data mining. [Väyrynen et al. \(2017\)](#) compared KM practices used in small, medium and large companies and their impact on open innovation. The findings highlight that company size is key to supporting open innovation in different companies. [Granados et al. \(2017\)](#) provided insights into KM practices in small social enterprises in the UK. They found that the SMEs are primarily into knowledge acquisition and not into the conversion, application and protection of knowledge. [Valdez-Juárez et al. \(2018\)](#) tried to find out whether the adoption of explicit practices of internal and external KM has an effective impact on innovation practices in SMEs from Colombia and Mexico. [Kianto et al. \(2018\)](#) showed how KM is practised in Finnish logistics SMEs, and the study revealed that the firms involved lack a strategic approach to KM, which may impact the firms' long-term developments. [García-Piqueres et al. \(2019\)](#) showed in their study the link between KM practices and innovation outcomes. They further demonstrated the moderating influence of proactiveness and risk-taking on the before-mentioned relationship.

[Marques et al. \(2020\)](#) found, however, a good match between KM-tool and their practices in SMEs. [Bolisani and Scarso \(2016\)](#) argue that good management support, employee motivation and clear goals are necessary for the successful use of wiki technology in SMEs, whereas [Crammond et al. \(2018\)](#) argue that costs regarding specialist personnel and restructuring can be a challenge regarding using social media in SMEs. [Cocca et al. \(2021\)](#) introduce IT-based tools to support KM systems in SMEs. [Alvarez et al. \(2016\)](#) found out that larger firms use more IT tools to support KM, while smaller firms used collaborative tools more for knowledge sharing. The impact of Industry 4.0 and information and communication technology (ICT) on knowledge was the focus of the research of [Bettiol et al. \(2021\)](#). [Sytnik and Kravchenko \(2021\)](#) studied KM practices and tools in different types of Ukrainian organisations and determined the main differences between small, medium and large companies in the areas of KM policies, the intensity of KM tools application and the scope of application regarding more sophisticated KM tools.

*4.6.3 Research on knowledge management enablers and barriers.* The 19 papers that were assigned to this theme identified KM enablers such as internal collaboration, trust, culture, SME and social networks, transformational leadership, organisational learning, social capital, information technology (IT)/information system (IS), entrepreneurial orientation and governmental support ([Gresty, 2013](#); [Gu et al., 2021](#); [Mazzucchelli et al., 2021](#); [Raymond et al., 2016](#); [Thomas et al., 2017](#); [Scuotto et al., 2017a, 2017b](#)) or as [Horvat et al. \(2016\)](#) put it, personal and technical factors (see [Table 10](#)). [Law and Chan \(2017\)](#) identified different types of managerial interventions, i.e. initiating intervention, reinforcing intervention and aligning intervention, which seem to be useful to promote KM activities among employees. By focusing on the usefulness of communities of practices (CoPs) in science-based SMEs, [Pattinson and Preece \(2014\)](#) identified three types of CoPs: apprentice-based CoPs that support individual learning; intra-organisational CoPs that facilitate internal knowledge sharing; and inter-organisational CoPs that emerge between SMEs and external organisations.

**Table 10** Articles on knowledge enablers and barriers

<i>Knowledge management theme</i>	<i>Author(s)</i>
KM enablers and barriers	<a href="#">García et al. (2018)</a> , <a href="#">Gresty (2013)</a> , <a href="#">Gu et al. (2021)</a> , <a href="#">Horvat et al. (2016)</a> , <a href="#">Jordao and Novas (2017)</a> , <a href="#">Law and Chan (2017)</a> , <a href="#">Martinez-Martinez et al. (2021)</a> , <a href="#">Mota Veiga et al. (2021)</a> , <a href="#">Mazzucchelli et al. (2021)</a> , <a href="#">Narayanan et al. (2020)</a> , <a href="#">Pattinson and Preece (2014)</a> , <a href="#">Rao et al. (2022)</a> , <a href="#">Raymond et al. (2016)</a> , <a href="#">Roxas et al. (2014)</a> , <a href="#">Scuotto et al. (2017a, 2017b)</a> , <a href="#">Thomas et al. (2017)</a> , <a href="#">Thrassou et al. (2020)</a> , <a href="#">Valaei et al. (2017)</a> , <a href="#">Wee and Chua (2013)</a>

The role of dynamic learning and knowledge capabilities for continued development in SMEs was shown in the study by [García et al. \(2018\)](#). Managerial learning was found relevant for knowledge generation and knowledge absorption by [Roxas et al. \(2014\)](#). While [Valaei et al. \(2017\)](#) found that organisational structure and technology utilisation is key for KM activities in an SME setting. [Martinez-Martinez et al. \(2021\)](#) stressed the meaning of a well-socialised environment as a means for better using knowledge in small knowledge-intensive businesses.

Talking about different KM enablers and their impact, [Narayanan et al. \(2020\)](#)'s study showed that internal collaboration and IT support have a positive influence on the KMP; transformational leadership has a negative influence on KMP; KMP has a positive influence on non-financial performance; and innovation speed is a mediator between KMP and non-financial performance. The study by [Mota Veiga et al. \(2021\)](#) assessed KMPs using a two-parallel approach, i.e. private and public KM. They found that private KM influences knowledge transfer and creation, as well as innovation, whereas public KM predicts knowledge creation. [Wee and Chua \(2013\)](#) concluded, based on their study, that KM rested largely on the owner's innovativeness, creativity and ability to acquire knowledge. Knowledge sharing requires the awareness of roles, mutual respect and trust, while knowledge reuse is fostered by the close proximity of employees, willingness and openness. The lack of the above enablement factors mentioned will hinder these KMPs. [Jordao and Novas \(2017\)](#) stressed the effects of SMEs networks both on KM and intellectual capital and proposed a theoretical-conceptual model supporting the analysis of these effects. [Thrassou et al. \(2020\)](#) highlighted the relevance of the coexistence of internal resources and external knowledge and information acquisition processes (here through network ties) for successful KM in SMEs. In a recent paper, [Rao et al. \(2022\)](#) propose a list of critical success factors of KM in SMEs, which are management leadership and support, culture, strategy (including IT and HRM) and measurement.

*4.6.4 Research on knowledge management measurement and performance.* An increasing number of papers have also started to investigate how to measure KM efforts in SMEs or how KM contributes to different types of company performance in these firms, thus showing the material benefit of investing in KM. In total, 29 papers were assigned to this topic (see [Table 11](#)).

As regard KM measurement, [Coyte et al. \(2012\)](#) examined processes used in SMEs to control the management of their knowledge resources. [Liu and Abdalla \(2013\)](#) offered an evaluation model to assess both KM performance and KM effectiveness which the authors named KM implementation. [Lee and Wong \(2015a\)](#) developed and tested a measurement tool to evaluate KM in SMEs. The same authors (2015 b) found out that KM did improve firm performance, but there are differences between firm sizes and KM maturity in companies. [Wang and Yang \(2016\)](#) proposed a model to show the success of KM adoption in SMEs. [Wibowo and Grandhi \(2017\)](#) proposed a fuzzy multicriteria group decision-making approach for measuring and benchmarking KM practices.

**Table 11** Articles on knowledge measurement and performance

<i>Knowledge management theme</i>	<i>Author(s)</i>
Knowledge measurement and performance	<a href="#">Albassami et al. (2019)</a> , <a href="#">Alegre et al. (2013)</a> , <a href="#">Audretsch and Belitski (2021)</a> , <a href="#">Azyabi (2018)</a> , <a href="#">Bloem and Salimi (2022)</a> , <a href="#">Byukusenge and Munene (2017)</a> , <a href="#">Chaithanapat et al. (2022)</a> , <a href="#">Coyte et al. (2012)</a> , <a href="#">Delen et al. (2013)</a> , <a href="#">Ferraris et al. (2019, 2021)</a> , <a href="#">Fischer et al. (2021)</a> , <a href="#">Dezi et al. (2021)</a> , <a href="#">Kareem et al. (2021)</a> , <a href="#">Hassan and Raziq (2019)</a> , <a href="#">Kmieciak and Michna (2018)</a> , <a href="#">Khraishi et al. (2022)</a> , <a href="#">Lee and Wong (2015a, b)</a> , <a href="#">Liu and Abdalla (2013)</a> , <a href="#">Obeso et al. (2020)</a> , <a href="#">Permatasari et al. (2022)</a> , <a href="#">Santoro et al. (2019)</a> , <a href="#">Schoenherr et al. (2014)</a> , <a href="#">Scuotto et al. (2020)</a> , <a href="#">UI Zia (2020)</a> , <a href="#">Wang and Yang (2016)</a> , <a href="#">Wibowo and Grandhi (2017)</a> , <a href="#">Yusr et al. (2021)</a>

[Kmieciak and Michna \(2018\)](#) showed the link between KM orientation and innovativeness in Polish SMEs. [Santoro et al. \(2019\)](#) examined the impact of KM orientation, and the use of dynamic capabilities as a mediating factor, on ambidextrous entrepreneurial intensity (EI) and firm performance. It was found that KM orientation has a positive impact on ambidextrous EI and firm performance under conditions of high dynamic capability. Similar results were found in studies conducted by [Dezi et al. \(2021\)](#) and [Ferraris et al. \(2019\)](#) on ambidexterity and KM orientation with respect to performance. [Dezi et al. \(2021\)](#) found out that external embeddedness and KM did increase ambidexterity (exploitation and exploration of knowledge) in SMEs, leading to better general performance. [Ferraris et al. \(2019\)](#) did look at big data analytical capabilities and found out that combined with KM orientation, and it increased firm performance.

The positive link between KM in SMEs and performance has been established in several papers. [Delen et al. \(2013\)](#) studied the impact of KM practices on the organisational (financial and non-financial) performance of Turkish SMEs. Knowledge utilisation has been found to influence both financial and non-financial performance. Organisational culture and structure impact the different types of performance too. The study by [Alegre et al. \(2013\)](#) showed that KM practice can enhance sustained competitive advantages in innovation performance, but it does so indirectly through the creation of KM dynamic capabilities. [Schoenherr et al. \(2014\)](#) drew on the knowledge-based view theory to establish a positive relationship between explicit and tacit knowledge, and supply chain performance.

[Byukusenge and Munene \(2017\)](#) showed that innovation fully mediates the relationship between KM (i.e. knowledge acquisition, knowledge sharing and knowledge application) and the business performance of SMEs in Rwanda. [Azyabi \(2018\)](#) showed the positive impact of both KMPs and capabilities on SME performance in Saudi Arabia. [Albassami et al. \(2019\)](#) studied the role of KM on the performance of SMEs from Pakistan and found that KM is a vital element to improve performance through organisational innovations. [Obeso et al. \(2020\)](#) investigated the impact of three KMPs, i.e. knowledge generation, knowledge storage and knowledge flow, on firm performance. The authors' findings underline that each KMP has a different influence on performance; they also showed the mediating role of organisational learning in these relationships. Similarly, among biotechnology SMEs based in the Netherlands, [Bloem and Salimi \(2022\)](#) analysed the role of different KMPs (i.e. knowledge acquisition, conversion, application and protection) play in each phase of innovation. While [Hassan and Raziq \(2019\)](#) demonstrated in their study the positive impact of KMPs (i.e. knowledge acquisition, knowledge dissemination and responsiveness to knowledge) on radical innovation in SMEs.

[Audretsch and Belitski \(2021\)](#), on the other hand, aimed to study the link between domains of knowledge complexity (i.e. managerial, strategic and operational) and firm performance and what role organisational resilience takes in this relationship. Resilience and agility appear to be important for SMEs to leverage the effect of knowledge complexity on performance. Focusing on SMEs from Iraq, [Kareem et al. \(2021\)](#) demonstrated the role of accounting information systems, KM capabilities and innovation in the organisational performance of these firms.

[Chaithanapat et al. \(2022\)](#) empirically studied the interplay between customer KM (CKM), knowledge-oriented leadership (KOL), innovation quality and firm performance. Specifically, their main findings suggested that innovation quality plays a positive mediation role in the relationship between CKM and firm performance.

[Yusr et al. \(2021\)](#) empirically tested the relationship between CKM and product innovation performance. They found no statistical support for this relationship which underlines that companies need to be able to apply the existing knowledge (here customer knowledge) too. Focusing on innovation performance too, [Ul Zia \(2020\)](#) examined the relationship between KOL, KM behaviour and innovation performance in project-based SMEs and

underlined, among others, the stronger relevance of KOL for KM in SMEs than in larger companies. Additionally, a mediating role of KM behaviour in the relationship between KOL and project-based innovation performance was found. With the same focus on innovation performance, [Ferraris et al. \(2021\)](#) analysed R&D internationalisation in SMEs and found that internationalisation combined with KM orientation, did increase innovative performance. While [Scuotto et al. \(2020\)](#), relying on upgrading and downgrading strategies, examined how SMEs' KM peculiarities maximise innovation performance.

Based on the mediation-moderation analysis, [Khraishi et al. \(2022\)](#) demonstrated that absorptive capacity and internal knowledge creation capacity influence offshoring innovation performance, while absorptive capacity mediates the relationship between internal knowledge creation and offshoring innovation performance. Further, their findings indicate that formal knowledge sharing routines moderate the relationship between absorptive capacity and offshoring innovation performance.

[Fischer et al. \(2021\)](#) examined the moderating effect of strategic KM competencies on knowledge-intensive entrepreneurial performance by examining the impact of entrepreneurial ecosystems and technical expertise. While [Permatasari et al. \(2022\)](#), in an understudied context of the weaving craft industry, found that higher traditional knowledge-based capabilities lead to better sustainable business performance.

*4.6.5 Research on knowledge management from a strategic point of view.* We identified 12 articles that investigated KM in SMEs from a strategic point of view (see [Table 12](#)). [Bagnoli and Vedovato \(2014\)](#) argue that there is a match between KM and strategies. Hence, most SMEs with prospector and defender strategies favour aggressive and conservative KM. [Hu et al. \(2019\)](#) stress that a clear KM strategy is needed at the beginning of projects, while [Bolisani et al. \(2016\)](#) found out that an emergent approach for managing knowledge referring to clients seems to be more suited for SMEs than a planned (deliberate) one. [Wilhelm et al. \(2013\)](#) argue for a strategic approach to valuable customer knowledge as a basis for improved collaboration with this group of stakeholders. [Diehr and Wilhelm \(2017\)](#) underline the significance of collaborating with strategic customers and taking advantage of various forms of knowledge utilisation to have a competitive edge.

[Miklosik et al. \(2019\)](#) studied how Australian companies of different sizes communicate about their KM activities. Not surprising, company size matters and SMEs tend not to disclose information about knowledge generation, knowledge sharing or KM in resources that are accessible online. [Jutidharabongse et al. \(2020\)](#) were interested in the relationships in the causal influences of different capabilities, such as cognitive capability, absorptive capability, dynamic KM capability and strategic intuition capability using a sample of SMEs from Thailand. [Hayaeian et al. \(2022\)](#) stressed based on their findings, the benefit of aligning intellectual capital (IC) with KM strategies to make possible ideal combinations and access high innovation in dynamic market environments. [Pérez-Pérez et al. \(2019\)](#) identified in their study of family firms three distinctive clusters, namely, proactive family firms, transitional or adaptive family firms and rigid family firms, which are useful for developing a better understanding of the firms' strategies towards promoting KM and strategic flexibility. [Taghizadeh et al. \(2021a\)](#) assessed the effect of organisational antecedents on KMC and then, in the next step, tested the influence of KM capability on innovation strategy using a

**Table 12** Articles on knowledge management strategies in SMEs

<i>Knowledge management theme</i>	<i>Author(s)</i>
Knowledge management strategies	<a href="#">Bagnoli and Vedovato (2014)</a> , <a href="#">Bolisani et al. (2016)</a> , <a href="#">Diehr and Wilhelm (2017)</a> , <a href="#">Hayaeian et al. (2022)</a> , <a href="#">Hu et al. (2019)</a> , <a href="#">Jutidharabongse et al. (2020)</a> , <a href="#">O'Connor and Kelly (2017)</a> , <a href="#">Miklosik et al. (2019)</a> , <a href="#">Pérez-Pérez et al. (2019)</a> , <a href="#">Petrov et al. (2020)</a> , <a href="#">Taghizadeh et al. (2021a)</a> , <a href="#">Wilhelm et al. (2013)</a>

sample from Malaysian SMEs. The need for SMEs to adopt new strategies, structures, processes, etc., quickly and continuously is highlighted.

[Petrov et al. \(2020\)](#) underlined that in addition to marketing and human resource management strategy presented the three pillars to determine KM in SMEs in transition economies, while [O'Connor and Kelly \(2017\)](#) stress the importance of using explicit and tacit knowledge for improved decision-making.

*4.6.6 Research on capabilities.* The review also covered ten papers that addressed the role of certain capabilities for KM (see [Table 13](#)). [Villar et al. \(2014\)](#) showed that the existence of KM dynamic capabilities is important for SMEs to achieve better results in terms of export intensity. Thus, the positive effects of the adoption of KM practices depend on the existence and management of dynamic capabilities in SMEs. [Martins \(2016\)](#) tried to identify and examine relational capabilities relevant for fostering new knowledge creation as perceived as relevant by managing directors of small firms located in the UK and Portugal. [Roxas and Chadee \(2016\)](#) showed the supporting role of relational capital found with SMEs in the Philippines for the firms' innovation capabilities, yet, to realise this potential, the firms must exercise a proactive KM orientation. While [Grandinetti \(2016\)](#) proposed a model of absorptive capacity for SMEs to support the analysis of the role of relationships in these firms' KMPs.

[Hussain et al. \(2019\)](#) examined the impact of different KMPs on innovation capacities. The study findings demonstrated the benefits of having effective KM systems in SMEs. [Taghizadeh et al. \(2021b\)](#) explained how technological capability contributes to enhanced performance in SMEs. [Hock-Doepgen et al. \(2021\)](#) examined the influence of internal and external KM capabilities on business model innovation (BMI) in SMEs and how these effects are moderated by its risk-taking tolerance. Among others, the study underlines that SMEs should emphasise the development of abilities to acquire, convert and apply knowledge for successful BMI. With particular attention paid to KM capabilities, [Martinez-Conesa et al. \(2017\)](#) found that KM capacities mediate the relationship between ICT-supported operations, interdepartmental connectiveness, commitment-based human resources and open innovation. [Hermawati and Gunawan \(2021\)](#) investigated how SMEs exploit dynamic capabilities and knowledge in a changing environment. Based on the findings, the authors conclude that SMEs need to adjust to external adjustment by creating knowledge via learning which means, in turn, that learning is a vital element in all dynamic capability processes. [Bamel and Bamel \(2018\)](#) examined the mediating role that KM capability plays in the relationship between organisational resources and strategic flexibility. The authors conclude that KM capability mediates the relationship to some extent.

*4.6.7 Knowledge management in general.* In addition to the above-mentioned, we also found 11 papers that addressed different aspects or processes of KM in their studies (see [Table 14](#)). [Martins and Sole \(2013\)](#) revealed in their study what a proper KMP should dispose of so that SMEs could set up a cluster, while [Bell and Cooper \(2018\)](#) studied how knowledge is acquired, assimilated and exploited in SMEs internationalisation. [Chawinga and Chipeta \(2017\)](#) show that KM and competitive intelligence contribute to the competitive advantages of SMEs. [Chong et al. \(2014\)](#) found that KMPs such as knowledge acquisition and knowledge application are key aspects in the decision-making of Malaysian SMEs regarding whether or not to adopt e-business in their supply chain. [Costa and Monteiro \(2016\)](#) investigated the mutual influences of different KMPs on organisational innovation in

**Table 13** Articles on capabilities for knowledge management in SMEs

<i>Knowledge management theme</i>	<i>Author(s)</i>
Knowledge management capabilities	<a href="#">Bamel and Bamel (2018)</a> , <a href="#">Grandinetti (2016)</a> , <a href="#">Hermawati and Gunawan (2021)</a> , <a href="#">Hock-Doepgen et al. (2021)</a> , <a href="#">Hussain et al. (2019)</a> , <a href="#">Martinez-Conesa et al. (2017)</a> , <a href="#">Martins (2016)</a> , <a href="#">Roxas and Chadee (2016)</a> , <a href="#">Taghizadeh et al. (2021b)</a> , <a href="#">Villar et al. (2014)</a>

**Table 14** General papers on knowledge management in SMEs

<i>Knowledge management theme</i>	<i>Author(s)</i>
KM in general	Bell and Cooper (2018), Chawinga and Chipeta (2017), Chong <i>et al.</i> (2014), Costa and Monteiro (2016), Esposito and Evangelista (2016), Giampaoli <i>et al.</i> (2021), Martins and Sole (2013), Perez-Soltero <i>et al.</i> (2016), Polas <i>et al.</i> (2021), Quijano-Garcia <i>et al.</i> (2017), Wang and Wang (2020)

SMEs. [Giampaoli \*et al.\* \(2021\)](#) stress that KM and intellectual capital in SMEs have an impact on firms' ability to innovate. [Esposito and Evangelista \(2016\)](#) did look at KM in SME networks and found out that "advanced KM systems can be used to manage knowledge more effectively at network level" (p. 204). In addition, it was noted that platforms facilitate knowledge exchange within the network, resulting in a positive effect on innovation processes. [Perez-Soltero \*et al.\* \(2016\)](#) proposed a methodology addressing organisational memory so that SMEs can better benefit from team knowledge and, in turn, have more efficient processes. [Quijano-Garcia \*et al.\* \(2017\)](#) investigated how different KMPs are applied in SMEs operating in the tourism sector. [Polas \*et al.\* \(2021\)](#) showed that KMPs such as knowledge acquisition, knowledge dissemination and knowledge responsiveness have a positive impact on the adoption of green innovation in SMEs. [Wang and Wang \(2020\)](#) highlighted what would be needed in SMEs to improve their KM to better handle big data.

*4.6.8 Literature reviews on knowledge management in small- and medium-sized enterprises.* This follow-up study also covered eight literature review papers (see [Table 15](#)). The review by [Durst and Edvardsson \(2012\)](#), which represents the initial situation of this follow-up review, analysed 36 empirical papers. [Cerchione \*et al.\* \(2016\)](#) studied 94 articles to determine the then state-of-the-art on KM in SMEs, i.e. KM in SME networks in particular. [Costa \*et al.\* \(2016\)](#) did a systematic review of the existing literature to examine the role of information, knowledge and collaboration in the internationalisation decisions of SMEs. Thirty-eight articles were analysed in the review. [Massaro \*et al.\* \(2016\)](#) review consisted of 89 articles to determine the state of research regarding the study of KM in SMEs. [Cerchione \*et al.\* \(2020\)](#) reviewed 129 papers to provide an analytical overview of the role of KM systems to support innovative forms of knowledge translation occurring in collaborative relationships. It has to be noted that this review covered both large and small companies. [Chaithanapat and Rakthin \(2021\)](#) reviewed 95 articles on CKM covering all types of organisations to argue for the relevance of CKM in SMEs as well. [Anand \*et al.\* \(2021\)](#) did a literature review on knowledge sharing and knowledge transfer in SMEs involving 38 papers. Finally, [Saratchandra and Shrestha \(2022\)](#) conducted a systematic literature review that examined 157 papers (133 articles and 24 conference papers) to determine the role of cloud computing in KM for SMEs.

*4.6.9 Miscellaneous.* Six papers were assigned to this category (see [Table 16](#)). [Bocquet and Mothe \(2015\)](#) investigated how governance structures could support two types of ambidexterity in French SME clusters by the means of KM. [Calvo-Mora \*et al.\* \(2016\)](#) relate the European foundation for quality management-model with KM and found out that process methodology has more impact on KM in SMEs, while partner management is more important in larger firms. [Valaei \(2017\)](#), on the other hand, discusses the concept of knowledge quality, defined as the usefulness and innovativeness of acquired knowledge, for promoting competitiveness in SMEs. The role of KM in facilitating open innovation has

**Table 15** Literature reviews on knowledge management in SMEs

<i>Knowledge management themes</i>	<i>Author(s)</i>
Literature reviews	Anand <i>et al.</i> (2021), Cerchione <i>et al.</i> (2016), Cerchione <i>et al.</i> (2020), Chaithanapat and Rakthin (2021), Costa <i>et al.</i> (2016), Durst and Edvardsson (2012), Massaro <i>et al.</i> (2016), Saratchandra and Shrestha (2022)

**Table 16** Other articles on knowledge management in SMEs

<i>Knowledge management themes</i>	<i>Author(s)</i>
Miscellaneous	Bocquet and Mothe (2015), Calvo-Mora <i>et al.</i> (2016), Crupi <i>et al.</i> (2020), Kim and Ahn (2020), Scuotto <i>et al.</i> (2021), Valaei (2017)

been shown in the study by Kim and Ahn (2020), while Crupi *et al.* (2020) showed how European digital innovation hubs could take the role of knowledge brokers to support digital transformation in SMEs. Finally, Scuotto *et al.* (2021) showed the relevance of developing dynamic capabilities for improving marketing KM.

## 5. Bringing all together now

Based on the findings presented above, it can be concluded that our understanding of KM in SMEs has been further advanced since Durst and Edvardsson's, 2012 review. When both reviews are brought together, it becomes clear that research on KM in SMEs has not only increased in the number of publications, but it has also deepened the majority of topics identified in the 2012 paper and also addressed several new ones. It can, therefore, be concluded that the KM in SMEs research has "learned to walk", and thus, McAdam and Read's 2001 prophecy regarding the SMEs also adopting KM has come true.

The increase in the number of publications can also be easily understood by comparing the number of reviews published in the past, as mentioned in the section "Literature reviews on KM in SMEs". Accordingly, it can also be concluded that the present literature review is the most comprehensive in the field of KM in SMEs to date.

By having a closer analysis of the two reviews, the following can be stated: Since 2012, there has been a decline in papers dealing with KM perception and identification, knowledge storage/retention and KM implementation. At the same time, there has been a growing number of papers published on knowledge creation and knowledge transfer, and a slight increase in papers dealing with knowledge utilisation. As expected, new themes have also emerged, such as the study of knowledge risks, KM tools and practices, KM enablers, KM measurement and performance, strategic aspects of KM or capabilities needed for KM in SMEs.

Within these research activities, it should be highlighted that several of the papers covered in the present paper demonstrate the positive role played by KM, on its own or combined with other aspects/activities, in improving different types of SME performance, which, in turn, can promote the firms' further development and sustainability. Research on KM measurement and performance seems to have become the preferred field of study which is not surprising given the SME focus and the fact that active KM is time and resource-consuming (please refer to the section "Research on KM measurement and performance").

What is also welcome is the increased appearance of papers addressing the strategic relevance of KM in SMEs, which provide insights into this essential aspect of purposeful KM (please refer to section "Research on KM from a strategic point of view"). The crucial need for KM strategies and having them incorporated into the overall companies' strategies have been stressed in the existing KM literature for long (Hansen *et al.*, 1999; Zack, 1999).

Additionally, the follow-up review has shown that research on KM in SMEs has spread throughout the world. Although Western countries still dominate the scene, the diversity of KM in SMEs research has grown, acknowledging that the cultural setting matters when it comes to KM in organisations (Khan and Khan, 2015). The follow-up review, however, also underlines that research on KM in SMEs is still based on studying a single region or country. Cross-country comparisons are still rare. The situation is very similar when it comes to the conduct of longitudinal studies, the utilisation of mixed methods approaches or the

perception of SMEs; as regard, the latter, published research leaves the impression that SMEs are still considered as one generic entity.

To take the next step and thus to come closer to our aim to provide a comprehensive review of the existing research on KM in SMEs, we decided to synthesise the findings of both reviews, i.e. the one from 2012 and the present one and based on that develop and propose a list of promising research directions and research questions (Table 17).

The research directions mentioned in the table would benefit from research teams involving scholars from different countries/different parts of the world and at different stages of their development to increase the likelihood that new (different) ways of thinking are incorporated but also to make sure that these teams learn about the similarities and differences of KM in SMEs (in different types of SMEs) in their respective countries/regions so that active knowledge utilisation is practised which is ideally turned into something more impactful for both theory and managerial practice.

## 6. Conclusions

### 6.1 Contributions and implications

In a world that has become even more fragile, the efficient management of information and knowledge should be one of the main activities of SMEs to increase the likelihood of being better prepared for coping with present and upcoming challenges (referring to both internal and external challenges). This paper presents a follow-up review on KM in SMEs of the review paper published by Durst and Edvardsson in the year 2012.

The follow-up review, through the analysis of 180 articles, structures insights from the current literature categorised by themes that address different aspects of KM and thus takes into account not only the variety but also the complexity of KM in SMEs. The presented paper is not limited to very limited areas of KM in SMEs research, as it has been the case with several reviews that have been published recently, such as [Cerchione et al. \(2016\)](#), [Costa et al. \(2016\)](#), [Anand et al. \(2021\)](#) or [Saratchandra and Shrestha \(2022\)](#); thus, the present review provides more holistic and recent insights into the diversity of the research field over a longer period (2012–2022).

By synthesising this review with the review published by Durst and Edvardsson in 2012, the study presented goes further; it identifies the determination of existing research on KM in SMEs as well as outlines the areas where research efforts have been made over time (i.e. the period 2001–2022). Research on KM in SMEs has increased in breadth and depth (old topics have been deepened, i.e. the ones identified by Durst and Edvardsson in their 2012 paper, and new ones have been added). Thus, the review produced is, in our view, not only the most comprehensive but also the most complete one on the subject of KM in SMEs. The structuring approach chosen makes it emphatically clear that KM research dedicated to SMEs is becoming more and more interesting for researchers, and thus, these companies are finally getting the attention they deserve. Given the role of SMEs in the majority of economies, this is welcome. Based on the results, we also propose several research directions and research questions for future research. These proposals have been summarised in [Table 17](#) and represent the main theoretical contribution of this paper.

More precisely, we believe that the present paper makes a noteworthy contribution to the field of KM in general and KM in SMEs in particular by providing a thorough state-of-the-art overview of KM in SMEs research which should be relevant for researchers (early stage and established ones) who are interested in making a relevant contribution either theoretical, methodological or empirical in nature for the profound advancement of the research field.

As a theoretical implication, this review has identified emerging themes that, in our view, call for future SME KM studies to consider new theoretical approaches and conceptualisations. Taking the example of knowledge risks – one of the new topics – it becomes clear that

**Table 17** Overview of research directions and research questions regarding KM in SMEs research

<i>Topic</i>	<i>Promising research directions</i>	<i>Possible research questions</i>
KM perception	Insights into differences concerning KM perception depending on the type of SMEs or industry as well as the company's state of development	How is the KM perception changing over time? What are internal and external factors changing KM perception? How is KM perception influenced by age, gender and education (level of education, discipline)? How can KM be studied at schools/universities to further promote KM?
Knowledge identification	Insights into approaches pursued regarding knowledge identification Insights into the type(s) of knowledge regard as relevant Insights into ways used to determine the knowledge needed, and if and how they are changing over time	What are the internal and external moments determining the need for new or updated knowledge? How to make the need for knowledge updating a permanent activity in SMEs? What sources and technologies can support different types of SMEs in this process? What are new strategies for searching for knowledge? How to design and implement KM solutions that help small firms address present and future knowledge needs?
Knowledge acquisition/creation	Insights into unlearning activities as a means to new knowledge generation Insights into knowledge creation using external knowledge sources Insights into knowledge creation combining internal and external knowledge	What does knowledge creation in small firms look like? What are the processes and strategies behind knowledge creation? When to emphasise internal knowledge creation/when external knowledge acquisition/when a combination? What does unlearning look like in SMEs? When does/do the firm/the persons concerned know that unlearning took place? How to speed up knowledge creation/updating/unlearning in SMEs/different types of SMEs? Are some small firms better/more reluctant regarding knowledge creation/acquisition?
Knowledge retention/storage	Insights into factors that foster/hamper knowledge retention/storage Insights into the development and implementation of measures related to knowledge retention/storage Insights into means used to codify knowledge Insights into handling tacit knowledge in the context of retention	What are suitable methods and techniques for different types of SMEs to determine what knowledge should be stored/retained and why? How to make knowledge storage/retention an activity so that it is not disturbing day-to-day business? When to store/retain knowledge in the minds/systems or both?
Knowledge sharing/transfer	Insights into both sides of the knowledge transfer process; to date the focus is mainly on the sender	How to measure if the knowledge transferred/shared has been received in the desired way? How to incorporate knowledge sharing/transfer activities which are time-consuming in the day-to-day business of SMEs? Depending on the type of knowledge to be shared/transferred, what are suitable tools, sources and technologies for SMEs depending on size, industry and/or state of development When to share/when not to share? What are suitable mechanisms for small companies in this regard?
Knowledge implementation/adoption	Insights into KM implementation in SMEs across the world	What can be learned from other firms that have implemented KM/different KM processes? How to make KM implementation affordable for SMEs in different parts/regions of the world?
Knowledge utilisation	Insights into knowledge utilisation in SMEs Insights into factors that foster/hamper knowledge utilisation in SMEs Insights into country differences regarding knowledge utilisation	How is knowledge used in SMEs and what for? How does a small firm know that knowledge has been used?

*(continued)*

**Table 17**

<i>Topic</i>	<i>Promising research directions</i>	<i>Possible research questions</i>
Knowledge risks	Insights into the practice of dealing with risks associated with knowledge	What types of knowledge risks are covered and why? What are the mechanisms and practices used in SMEs to identify, analyse and monitor material knowledge risks? What are the countermeasures used for managing the risks that occurred? What solutions could support small firms to make the management of these risks affordable? What KM tools and practices work across SMEs?
KM tools and practices KM enablers	Insights into tools and practices that promote KM in general/different KM processes Insights into size differences or cultural differences regarding knowledge enablers	Are there KM enablers that work across different KM processes? What are the direct and indirect costs of doing KM/not doing KM? What are suitable quantitative and qualitative measures and indicators of different types of SMEs to get continuous feedback on the KM activities? What are the trade-offs between KM practices and different types of performance?
KM measurement and performance	Insights into KM measurement and performance from different types of SMEs, company age, countries and sectors	How to make KM a central component in any small firm? How to develop a strategic mindset in SMEs so that more of them acknowledge the relevance of a systematic KM approach? Are there KM strategies that are useful for micro, small and medium-sized firms regardless of where they are located in the world?
KM from a strategic point of view	Insights into strategic management, strategic skills and strategic leadership in SMEs needed for strategic KM Insight into the impact of KM on supporting digital transformation or sustainable development Insight into the impact of KM on developing more resilient SMEs	Considering a world that has become unstable and unknown, how to develop dynamic capabilities so that small firms are in a better position to amend their KM to the situation? Is there a set of capabilities any small firm should possess to benefit the most from KM? If yes, how to develop this set and keep it updated?
Capabilities for KM	Insights into capabilities needed for KM or different KM processes	Considering the complexity of KM in SMEs, what are alternative research methods to advance our understanding? How to assure diversity regarding methods in KM in SME research? What are suitable measures/techniques to study KM in different types of SMEs operating in different sectors/ industries? How to develop an European (global) data set that captures KM in SMEs over time (panel)? And that involves qualitative and quantitative data?
Methodology	SEM dominates as quantitative analysis techniques as well as mono methods and mono country studies	

**Note:** SEM = structural equation modeling

future theory development should take into account the notion of “knowledge liability” as a means of viewing knowledge in a negative light. In this way, alternative theories would be available that contribute to the further development of the field as a whole and thus reduce the application of existing theories that view knowledge mainly as something positive; which can be problematic when studying knowledge risks due to possibly differing epistemological and ontological considerations.

The methodological approaches found in previous research show that studies in the field of KM in SMEs are largely positivist (quantitative) in nature. To enable a better balance and, thus, a better level of knowledge, future research should also strive to advance research in this area through theoretical, conceptual and qualitative contributions. Despite the fact that quantitative studies dominate, most are cross-sectional, while longitudinal studies remain

rare. The development of a European (global) data set for KM in SMEs, as proposed in [Table 17](#), could allow longitudinal studies and thus provide valuable insights into KM in SMEs as it is practised over time. Additionally, it is important to emphasise that a longitudinal approach in this regard will help analyse the trend of KM initiatives of SMEs by providing a basis for validating most cross-sectional studies. Further, it will provide an opportunity to better understand the cause-and-effect relationships observed in existing research from a long-term perspective.

The findings presented should be useful to SME owners/managers, policymakers as well as other actors interested in deepening their understanding of KM in SMEs. SME owners/managers, for example, may create an increased awareness of the close link between KM and different types of performance. This can assist them in better handling the costs related to KM and, as a consequence, to better exploit the knowledge available. SMEs owners/managers may also learn from the paper that KM is relevant for all SMEs regardless of the category and thus can be successfully implemented even in very small companies. At the same time, the large number of KM topics shows that KM is very complex and that the individual activities are interlinked or that one KM measure can have an impact on others, which, in turn, emphasises the importance of an overarching KM strategy. Furthermore, the results should encourage SME decision-makers to also consider knowledge risks in their KM approach or to consider these risks more in their risk management approach; the studies conducted on this topic have pointed out possible consequences. A review such as this can also help SME owners/managers to (better) familiarise themselves with some existing KM practices and strategies, as well as provide insight into which ones are gaining traction and which ones are fading. Such insight would guide their decisions regarding where and how to channel financial and non-financial resources to maximise the benefits of KM.

The findings presented can also help policymakers all over the world develop policies that take a more holistic and comprehensive view of KM and its relevance for SMEs (different types of SMEs). These policies may be better prepared to support the continued business development of SMEs and can also help firms belonging to the “SME” category to become more resilient. Policymakers should seek to raise awareness of the concept of KM, including both the upsides and the downsides of knowledge, as an important element of promoting entrepreneurial activities. In view of the proposal to develop data sets to capture SMEs and the potential relevance of these for research, we also call on prominent institutions, agencies, commissions or intergovernmental organisations such as the European Commission and the United Nations to take this initiative. We expect that this will not only advance the field of research but also benefit SMEs for the development of national and regional economies and the world at large. Given the importance of SMEs for individual countries, Europe, etc., and the various measures that already exist to support SMEs at different levels, e.g. the European Union (EU) Entrepreneurship and SME Support Programme, it would only be logical to include the topic of KM. SME advisors might benefit from the findings presented as well as the areas addressed can give them some food for thought as to what types of services could be needed to support SME development. The results regarding the KM enablers and capabilities appear relevant in this regard.

## *6.2 Future research and limitations*

Future scholars may use the content presented in [Table 17](#) and the issues discussed in Section 5 to position their papers, detect research gaps and promising topics. It seems also useful to revisit the four general research areas proposed by Durst and Edvardsson in their 2012 paper: longitudinal studies, country comparisons, mixed methods approaches and a realistic lens. The follow-up review showed that not much progress happened in these four areas; thus, we are renewing the call from 2012 and invite researchers to incorporate these,

in our view, important aspects when trying to advance research on KM in SMEs and research on KM in general.

To conduct more cross-national or comparable studies in the field, as mentioned above, it would be helpful to develop a data set that captures KM practices and processes and their implications and performance at regional, national, EU and global levels for SMEs. This initiative could, for example, be linked to the Community Innovation Survey, which is a relevant data source for the analysis of business innovation activities. Such a combined survey would be very welcome. Future research would also benefit from more participatory research approaches that bring researchers and SMEs together from the beginning to jointly design and conduct the research to ultimately increase the potential impact of the study.

As with any research, this paper has limitations. The review process chosen may not have allowed us to identify all relevant articles in the field of KM in SMEs. Additionally, this paper can only propose some research directions and research questions, and the field offers many more opportunities for research.

We, the authors, hope that research on KM in SMEs will continue in the next years and that researchers (new and established ones) take advantage of the understanding developed so far and build upon it accordingly.

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