



A systematic literature review on knowledge management in SMEs: current trends and future directions

Susanne Durst¹ · Samuel Foli¹ · Ingi Runar Edvardsson²

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Abstract

It is generally known that small and medium-sized enterprises (SMEs) are a significant driver of employment and economic growth for the majority of world economies. At the same time, SMEs are more fragile in times of crisis which in turn restricts their possibilities for action. In such an environment, it appears even more relevant for SMEs to consider knowledge and its management. Given that, it seems relevant to have an in-depth understanding of knowledge management (KM) in SMEs so that it can be better promoted. Therefore, this paper conducts a systematic literature review of the extant literature on KM in SMEs to present a state-of-the-art understanding. The review covers 180 papers from leading journals that have been published between 2012 and 2022. The review provides insight into the diversity and evolution of KM in SME research and evaluates the extant body of literature covered. Additionally, a framework is proposed that relates existing research on KM to SMEs. The paper concludes with proposals for future research on KM in SMEs.

Keywords Small and medium-sized enterprises · Small business management · Knowledge management · Knowledge · Systematic literature review

JEL Classification M0 · M10 · M1 · M19

1 Introduction

The world has become even more uncertain and is not only exposed to new challenges, but old ones have come back as well. This includes the climate change, the pandemic and its consequences, but also the recent invasion of Ukraine. Thus, organisations have to be ready and prepared to cope with an environment that is

✉ Susanne Durst
susanne.durst@taltech.ee

¹ Department of Business Administration, Tallinn University of Technology, Tallinn, Estonia

² School of Business, University of Iceland, Reykjavík, Iceland

characterised by a number of challenges that are taking place at the same time. This underlines not only the further increased role of knowledge, but also the need for a conscious and proactive use of it (Apte et al. 2022). Knowledge management (KM) has been viewed as helpful in systematically identifying, creating, applying, and disseminating critical knowledge, which in turn can support organisations' efforts towards sustainability (Durst and Zieba 2020). KM is relevant for all kinds of organisations; for small businesses perhaps especially to compete in an increasingly uncertain world (Durst et al. 2021; Rao et al. 2022).

Given the significance and contribution of small and medium-sized enterprises (SMEs) to almost all economies of the world and of knowledge to address current and upcoming organisational and societal challenges, it is important to have a good understanding of KM in SMEs and possible challenges that may hinder SMEs from using their knowledge in the best possible way so that KM in SMEs can be better promoted. The last few months have shown again, and continue to show, that small organisations in particular suffer significantly from the effects of crises (Clauss et al. 2022). Against this background, the authors of this paper offer a systematic literature review to promote an improved understanding of KM in SMEs in a knowledge-advancing way. Even though there are several reviews on KM in SMEs, either the time horizon covered in the reviews ends in 2014 (e.g. Cerchione et al. 2016; Durst and Edvardsson 2012; Massaro et al. 2016). The existing reviews cover large firms as well (e.g. Cerchione et al. 2020) or focus on very limited areas of KM in SMEs, e.g., Cerchione et al. (2016) focused on KM in SME networks, Costa et al. (2016) were interested in the role of information, knowledge, and collaboration in the internationalisation decisions of SMEs and recently Saratchandra and Shrestha (2022) conducted a review to determine the role of cloud computing in KM for SMEs and Su and Daspit (2021) addressed KM from the perspective of family firms; i.e., they are very narrow in perspective and not able to determine the evolution of research on KM in SMEs. Consequently, the overall purpose of the paper is to structure existing research, identify its current trends, and offer a comprehensive overview of recent research strands and topics in KM in SMEs to propose promising future directions. The emphasis is placed on KM in its entirety and not on certain KM processes only. The same applies to SMEs, the focus is on all types of SMEs, i.e. smaller and larger SMEs as well as younger and older ones. Based on the findings, a framework is proposed that relates existing research on KM to SMEs.

The paper is organised as follows. In section two the literature related to the field of research is briefly discussed. Section three then describes the method employed to address the research aim. Next, the results are presented, and in the final section, the conclusion and implications of the study are laid out.

2 Background to the study

If the aim is to study KM in SMEs, one should also define both terms to set the frame of this paper and thus reduce the danger of misunderstanding. SMEs can be defined using different ways, in the literature one can find qualitative and quantitative approaches. As regards qualitative approaches, they appear to highlight the

close relationship between owner and company as well as the aspect of independence, i.e. the firm is not part of a larger firm and the owner is relatively free from external control in making her strategic and operative decisions (Durst and Bruns 2018). Quantitative approaches to defining SMEs, however, seem to dominate. More precisely, it seems that the EU definition of SMEs has prevailed. The definition uses three criteria namely staff headcount, annual turnover and annual balance sheet to determine whether one speaks of micro, small or medium-sized enterprises. More precisely, the definition covers micro, small and medium-sized enterprises that employ fewer than 250 persons; and have either an annual turnover not exceeding EUR 50 million or an annual balance sheet total not exceeding EUR 43 million (European Commission 2020). Figure 1 shows the application of the three criteria to identify the category of SMEs.

The EU definition has been updated in order to take into consideration that the companies vary across sectors, i.e., companies in the trade and distribution sectors, have higher turnover figures than those in manufacturing.

KM has been defined as a systematic approach to creating, sharing and leveraging knowledge within and around organisations (Bounfour 2003). KM has a clear long-term orientation and thus can contribute to the sustainability of organisations (Chow 2012). The latter matters for many smaller firms in particular, given their comparatively higher failure rate (Davidsson and Gordon, 2016). Although KM has been studied extensively, there is still a tendency to focus on large businesses (Durst and Edvardsson 2012; Massaro et al. 2016).

In this paper, KM in SMEs is about the processes and structures developed and maintained by SMEs to support different knowledge processes, such as creation, transfer and retention which in turn is expected to bring these firms into a better position to cope with present and forthcoming internal and external challenges. Understanding KM in SMEs is important given their role of being drivers of economic growth, employment, technological development and structural change. For example, they represent 99% of all companies in Europe. SMEs employ around

Enterprise category	Headcount: annual work unit (AWU)	Annual turnover	or	Annual balance sheet total
Medium-sized	< 250	≤ EUR 50 million	or	≤ EUR 43 million
Small	< 50	≤ EUR 10 million	or	≤ EUR 10 million
Micro	< 10	≤ EUR 2 million	or	≤ EUR 2 million

Fig. 1 Definition of SMEs according to the European Commission (2020 p. 11)

100 million people and account for more than half of Europe's gross domestic product (European Commission 2022). There is research that has shown that KM drives growth, improves business performance and makes SMEs more innovative (Edvardsson and Durst 2013; Cardoni et al. 2020; Narayanan et al. 2020). At the same time, research has also stressed that the application of KM in general is constrained due to competing activities to which more attention is paid (Blankenship and Bruck 2008), this is even more of a challenge in SMEs, as fewer people have to do multiple jobs compared to large companies (Durst and Bruns 2018). Additionally, the central role of the founder or owner-manager has been found to influence the small firm's approach to KM too (Grimsdottir et al. 2019; Lowik et al. 2012).

To sum up, the arguments presented above form the starting point for this study and also justify the need for reviewing existing literature on KM in SMEs in order to determine an in-depth understanding of present and emerging KM trends in SMEs.

3 Methodology of literature review

To present a state-of-the-art understanding of research on KM in SMEs, a systematic literature review approach was utilised. A systematic literature review is viewed as a useful tool to learn about existing research. More precisely, it can inform the creative development of future research and strengthen the arguments of researchers for such research, rather than blindly repeating what has been written before (East-erby-Smith et al. 2021). It is structured based on broad principles which allow replication and an easy update (Gray 2021). To provide a replicable review, this study was based on several steps which are presented in the following. The review also took advantage of bibliometrics, that is, the use of quantitative tools, to strengthen the review. The approach chosen is comparable to that used in reviews published in leading management journals (e.g. Kraus et al. 2022).

In the following, more detailed information is offered on how relevant articles were identified. It also provides information about the final number of articles involved in the present study.

To identify relevant articles on KM in SMEs, the search was carried out using Web of Science as the scientific database. This database offers a comprehensive view of worldwide research production (Sánchez et al. 2017). The following expressions included in the title, abstract, or keywords were used to identify relevant articles in Web of Science:

TS= ("Knowledge Management" OR "KM" AND SME* OR "small firm" OR "small and medium-sized enterprise*")

Refined by: DOCUMENT TYPES: (ARTICLES or EARLY ACCESS or REVIEW); YEARS: 2012 – present; WEB OF SCIENCE CATEGORIES: (BUSINESS OR MANAGEMENT); LANGUAGES: (ENGLISH)

Additionally, inclusion and exclusion criteria were developed and applied in this systematic review which are shown in Table 1.

Table 1 Summary of inclusion and exclusion criteria

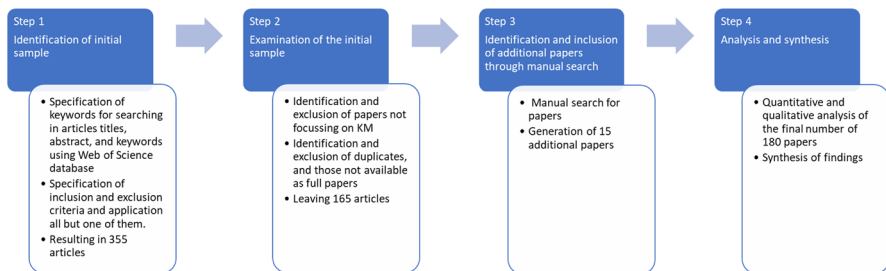
Inclusion criteria	Exclusion criteria
Papers published in the period 2012–2022, i.e. 01.01.2012–07.07.2022	Papers published before 2012
Types of documents: articles, early access or review	Books (textbooks), book chapters, conference papers, dissertations and grey literature
Written in English	Not written in English
Peer-reviewed	Not peer-reviewed
Published in Business or Management journals	Papers without a significant focus on KM

The initial search was carried out using the above-mentioned criteria but the criterion “Papers without a significant focus on KM” resulted in 355 articles. In the following steps, the papers identified were checked for any duplicates, availability (as full paper), and a lacking focus on KM in SMEs. As far as the latter is concerned, this meant that the authors 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. The outcomes left 165 articles. This quality search and subsequent screening process was followed by a manual search in certain journals such as the *Journal of Knowledge Management* or *Knowledge Management Research & Practice* to make sure that the corpus contained all relevant and recent publications on KM in SMEs. The manual search generated 15 additional papers. After completing the individual steps, 180 articles remained. All authors were involved in this quality process.

Figure 2 summarises the steps taken for selecting relevant contributions.

To determine a state-of-the-art understanding of KM in SME research, the authors used different methods and procedures. More precisely, they determined the annual distributions of the papers involved, the number of citations, the journals in which the papers were published as well as the theories and methods used in the papers covered. The countries where the research took place were also identified.

Conceptual structure analysis was conducted with the Biblioshiny package in R software using thematic mapping to identify key themes from studies of KM in SMEs. Thematic mapping assists in identifying key and development of research

**Fig. 2** Summary of paper selection process

themes (Singh and Ravi 2022). The thematic mapping resulted in six key themes. Each theme was discussed classifying KM into internal and external KM, i.e., focusing on the locus where KM is conducted, while drawing from the archetypes of open innovation as proposed by Gassmann and Enkel (2004), the authors added the coupled process, more precisely the underlying notion of this archetype, to the classification and labeled it “hybrid KM”. Additionally, the articles were analysed to identify the most frequently mentioned keywords to help establish an understanding of the key concepts studied in the papers covered in this review. A citation analysis was conducted as well to gain insight into the impact and influence of KM in SMEs research.

4 Presentation of findings

In this section, the findings of the systematic literature review are presented. It is started with an overview of publication activities since 2012, followed by the journals in which research on KM in SMEs has been published and the regional distribution of the research covered in this paper. After that insight into the theories and methods used are provided. The findings are then also assigned to broader themes to reveal more nuances found with regard to research on KM in SMEs. The section closes with a citation analysis to highlight the impact of KM in SME research.

4.1 Publication activity since 2012

As can be seen from Fig. 3 there has been a rising interest by researchers in the topic of KM in SMEs. The figure indicates that there are more published papers after 2017 than earlier, and the peak was reached in 2021 when 34 papers were published. The increase of publications recently could be attributed among other things to the

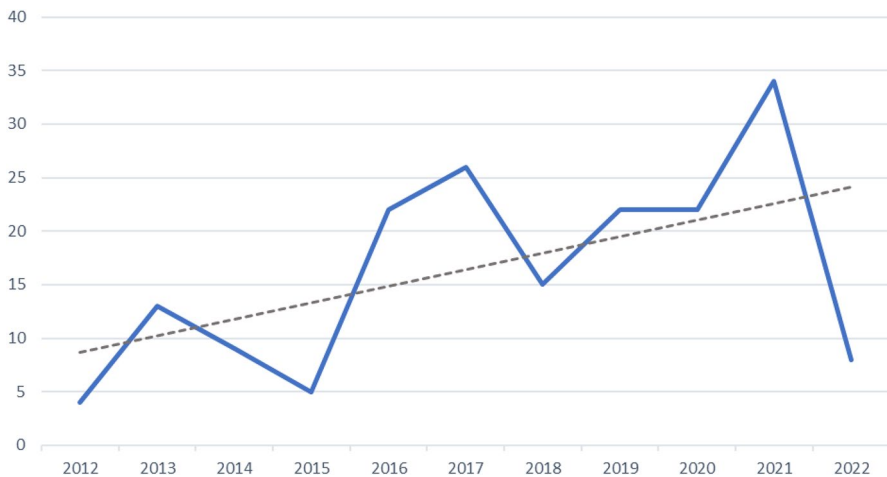


Fig. 3 The number of papers published each year from 2012

Covid-19 pandemic and its effects, which may have led SMEs to invest more in KM in order to remain able to act during and after the pandemic. An example can be found in Azyabi's (2021) study, which showed that the IT capabilities of SMEs are mediated by KM as a response to the disruption the Covid-19 pandemic caused. The struggles SMEs, in particular, had at the onset of the pandemic, given their limited resources, fueled debates around the topic, since many of them have been hit hard by the pandemic, which is also reflected in an increase in publications.

4.2 Journals in the review

The publications analysed in this review are distributed across 75 journals. Out of the 180 papers, 89 were published in the leading KM journals (Serenko 2021), i.e., *Journal of Knowledge Management*, *Knowledge Management Research and Practice*, and *VINE Journal of Information and Knowledge Management Systems*, which represent over 46 percent of the total number of papers reviewed. There is no surprise in this result, given the scope of these journals. The remaining journals, including journals such as *Journal of Business Research*, *Technology in Society* or *Journal of Intellectual Capital* have an Australian Business Deans Council (ABDC) ranking of A* or A, and a Chartered Association of Business Schools (CABS) rating which demonstrates that topics related to KM in SMEs are accepted and published in highly ranked journals.

4.3 Regional distribution of KM in SMEs research

Figure 4 displays the regional distribution of KM in SME research. It is evident that the geographical distribution of countries in the articles reviewed encompasses all continents. The figure shows that the majority of studies were conducted in Europe (52%), followed by Asia (34%), South America (4%), and the remaining continents, i.e., Africa, Oceania and North America.

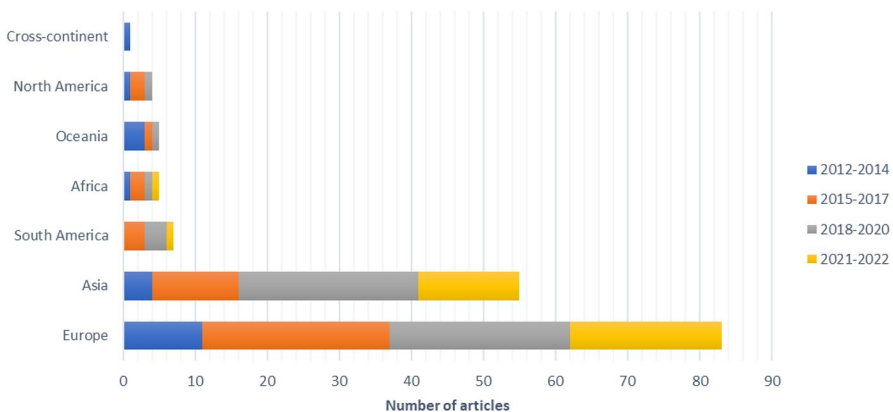


Fig. 4 Regional distribution of KM in SMEs research

than one continent were categorised as cross-continent. Six papers did not provide information about the location of the study, while six papers were theoretical in nature and eight were review papers without any reference to the location. Studies conducted in Europe focused on countries like Germany, Italy, Portugal, Spain, and the United Kingdom (e.g. Barboza and Capocchi 2020; Martinez-Conesa et al. 2017; Martins 2016).

The decade covered in this review was divided into four different periods, i.e., 2012–2014, 2015–2017, 2018–2020 and 2021–2022. As regards Europe, for example, in the first period (2012–2014) eleven papers were published while a total of twenty-six papers were published in the second period (2015–2017). In the third period, (2018–2020), twenty-five papers were published, followed by twenty-one papers in the fourth period (2021–2022).

Studies assigned to Asia are from China, India, Indonesia, Jordan, and Malaysia (e.g. Chong et al. 2014; Gu et al. 2021; Uma Mageswari et al. 2017; Wahyono 2020). According to the period-period analysis, twenty-five papers were published in 2018–2020, and twelve and fourteen papers were published in 2015–2017 and 2021–2022, respectively. The remaining four papers were published between 2012 and 2014.

In South America, countries with representation are Brazil, Colombia and Mexico (e.g. Marques et al. 2020; Valdez-Juárez et al. 2018). During the period from 2015 to 2020, a total of seven papers were published. Between 2012–2014 and 2021–2022, there were no studies published.

African studies focused on Ghana, Malawi and South Africa (e.g. Boateng et al. 2021; Chawinga and Chipeta 2017; Whyte and Classen 2012). Oceania studies involved Australia and New Zealand (e.g. Miklosik et al. 2019; Roxas et al. 2014). North America studies focused on Canada and the United States of America (e.g. Liao and Barnes 2015; Raymond et al. 2016). Lastly, the cross-continent study was focused on Europe-USA (i.e. Feller et al. 2013).

The comparison at the regional level makes clear that there is a lack of cross-continental studies examining KM in SMEs, so it is important for future research to focus more on this type of study in order to address broader contextual issues as a means to learn about similarities and differences regarding KM in SMEs across countries. Furthermore, the authors call for more studies to be conducted on continents lacking research on KM in SMEs such as Africa, the Americas and Oceania. In so doing, one would give attention to Durst's (2021) call for inclusive KM research efforts at the world level.

4.4 Theories and theoretical perspectives

To better understand the theoretical landscape underpinning KM in SMEs research over time, the authors also conducted a periodic-based analysis. As before four periods were used. In the first period (2012–2014), there were two studies each that utilised the resource-based view (RBV), technology-organisation-environment (TOE) theory and dynamic capability and three studies applied the knowledge-based view

(KBV). While one study applied Nonaka and Takeuchi’s SECI (Socialization, Externalization, Combination, and Internalization) model.

The second period (2015–2017) was characterised by the introduction of several theories/theoretical frameworks such as the theory of reasoned action (TRA), self-determination theory, sense-making theory, organisational learning theory, contingent theory, social exchange theory, relational-based view, and absorptive capacity. The application of KBV continued in this period (e.g. Alvarez et al. 2016; Martinez-Conesa et al. 2017).

Further theories were introduced to the study of KM in SMEs during the third period (2018–2020). In terms of popularity, social capital theory led the way having featured in three different studies, followed by the market sensing capability theory (two studies) and one study each of inter-organisational transfer theory, social cognitive theory, and institutional theory. The analysis of this period also stressed that the KBV and dynamic capability remained the dominating theory which were applied in seven studies each, followed by RBV (in six studies), and absorptive capacity with four studies.

As regards the most recent period 2021–2022, despite the introduction of internationalisation theory (period 2021–2022), the dynamic capability was popularly used (five studies), while KBV and RBV had four and three studies, respectively. Figure 5 summarises the theoretical perspectives used in the papers studied and highlights the preferred theoretical perspectives, i.e. KBV, dynamic capabilities, RBV and absorptive capacities, in the field under investigation.

4.5 Methodological peculiarities of KM in SMEs research

Table 2 presents an overview of the methodological design used in KM in SME research. It is shown in the analysis that the 180 papers can be categorised into five

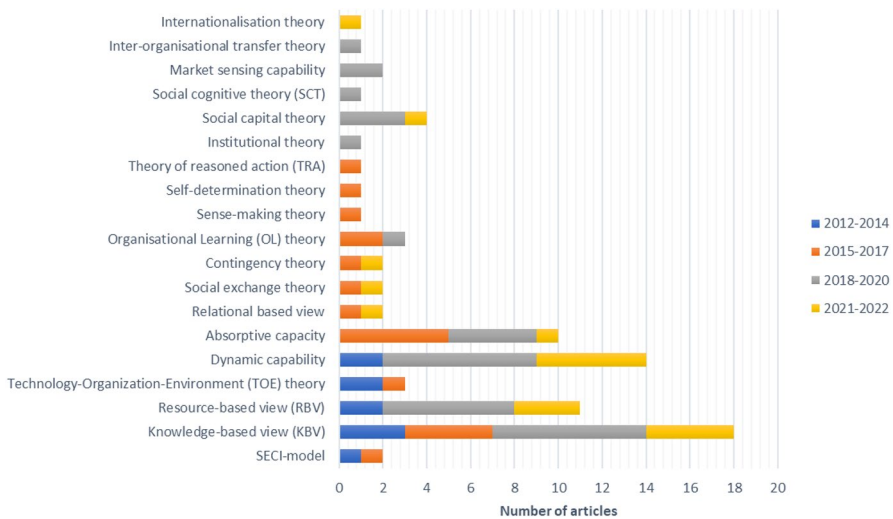


Fig. 5 Theories used in research on KM in SMEs

Table 2 Methodological design of KM in SMEs research

Methodological design	Number	%
Conceptual	6	3
Quantitative	111	62
Qualitative	50	28
Mixed methods	5	3
Review	8	4
	180	100

methodological designs. Quantitative research accounted for the majority of the papers with 111 papers representing 62%. Qualitative research approaches are the second most popular methodological design, comprising 50 papers (28%). Eight papers were classified as review studies. Out of the remaining eleven papers, six were conceptual studies and five used a mixed methods research design. In sum, a focus on the application of mono-methods is clear (ongoing).

The data collection methods used for KM in SME research are presented in Table 3. Most studies relied on surveys (66%), case studies (22%), and interviews (7%) to collect data; thus traditional data collection methods. The use of different data collection methods (mixed methods) (3%), field studies (1%), and databases (1%) are rarely used. The use of alternative data collection instruments seems to be a need in this research field that should be addressed in future studies in order to better address the complexity of KM in SMEs.

The data analysis techniques used in the reviewed articles are shown in Table 4. The structural equation modelling (SEM) family is the most popular and frequently used technique, which includes the general SEM, covariance-based SEM, and partial least squares structural equation modelling (PLS-SEM). In total, 61 of the 180 articles used one of the SEM techniques in the data analysis, followed by thematic analysis, which was used in 25 articles and accounted for sixteen percent of all the techniques identified. Several studies also employed descriptive analysis, while a few studies applied cluster analysis and fuzzy-set qualitative comparative analysis (fsQCA) among others.

Table 3 Data collection method of KM in SMEs research

Data collection method	Number	%
Case study	37	22
Field study	2	1
Interview	11	7
Mixed methods	5	3
Database	2	1
Survey	109	66
	166*	100

*The conceptual and review papers are excluded which explains the difference between the total number of papers included in the review and those addressed in this table

Table 4 Data analysis technique used in KM in SMEs research

Data analysis technique	Number	%
Cluster analysis	2	1.3
Confirmatory factor analysis	1	0.6
Content analysis	6	3.8
Correlation analysis	9	5.7
Analysis of variance (ANOVA)	2	1.3
Descriptive analysis	11	7.0
Elliptically reweighted least square	1	0.6
Factor analysis	5	3.2
Partial least square	4	2.6
Information-content analysis	1	0.6
Least square method	1	0.6
Machine learning technique	1	0.6
Multivariate analysis of variance (MANOVA)	1	0.6
Multiple-criteria decision-making (MCDM)	1	0.6
Path analysis	1	0.6
Regression	20	13.0
Structural equation modelling (SEM)	36	23.0
Covariance-based SEM (CBSEM)	3	1.9
Partial least squares structural equation modelling (PLS-SEM)	22	14.0
Fuzzy-set qualitative comparative analysis (fsQCA)	2	1.3
Thematic analysis	25	15.9
Chi-square	1	0.6
T-test	1	0.6
	100	

In summary, the research methods used in KM in SMEs are of a traditional nature and are very narrow. As far as data analysis methods are concerned, in some papers, the focus seems to be mainly on the application of a particular method, which raises the old issue of which should come first—the problem or the method?

4.6 KM in SMEs research according to KM classifications

In this section, the outcomes of assigning each paper to one of the three components of the KM classification (internal, external, and hybrid) are presented.

4.6.1 Internal knowledge management

In this paper, internal KM is defined as the process whereby an organisation's internal knowledge is utilised to achieve value through KM processes. The review of the papers reveals that a significant portion of them focuses on internal KM. These papers often reflect how SMEs have mostly relied on existing or internally generated

knowledge to improve their companies. Thereby, the links to innovation and performance are the most researched topics.

To continuously improve the companies, research has shown that SMEs are quite active. Recognising, for example, the crucial role of employee creativity, Fan et al. (2017) examine the link between KM, leadership style, behaviour, motivation and innovation among Bangladeshi SMEs. Internal resources can also be utilised to support knowledge sharing, which in turn has a positive impact on innovation in SMEs (Soto-Acosta et al. 2014). García-Piqueres et al. (2019) investigate the association between KM practices and innovation outcomes. The findings indicate that internal knowledge creation has received particular attention, for example, “there is a strong commitment to depend on internal R&D activities to develop or improve technologies” (p. 7). Perez-Soltero et al. (2016) develop a performance-based methodology for improving an organisation’s team knowledge.

SMEs too, make increasing use of different tools to support their KM. A study by Bolisani and Scarso (2016) examines the factors associated with SMEs’ use of Web 2.0 technologies to enhance internal KM. The role of collaboration from an internal KM perspective has been addressed as well, by stressing the importance of collaboration between internal stakeholders, such as employees and managers for new knowledge creation. In this context, the framework for KM enablers based on internal collaboration, trust, SME networks, transformational leadership, IT support, and KM processes developed by Narayanan et al. (2020) can be named.

4.6.2 External knowledge management

The term “external knowledge management” refers to the process by which organisations acquire knowledge from external sources in order to continuously develop the company and its offering. Several papers could also be assigned to external KM. These studies investigated how SMEs take advantage of external knowledge sources to develop further by acknowledging their limited internal sources. Knowledge is acquired from or jointly developed with different external stakeholders (e.g. customers, suppliers, competitors, befriended companies, universities, etc.) typically by the means of collaborative agreements such as strategic alliances, partnerships, networks, or clusters. The topic that attracted the most interest among researchers is capability, primarily absorptive capacity, which should enable SMEs to absorb, integrate, transform, and utilise external knowledge. This emphasis is not surprising given the role of capabilities for businesses in general and thus for KM as well.

Relational capital is a critical asset for companies with limited resources (Paoloni and Modaffari 2022). In particular, SMEs rely on relational capital to strengthen their internal capability to innovate. Taking advantage of this rationale, Roxas and Chadee’s (2016) study reveals that KM orientation—the extent to which a firm can search, acquire, assimilate, and integrate external knowledge—is an important factor in improving relational capital and thereby increasing innovation capability. Al-Jabri and Al-Busaidi (2018) have shown that knowledge transfer from outside the organisation (in their study from other organisations) enhances internal learning capabilities because when external knowledge is acquired it is often new and unknown to employees which gives room to the development of new competencies as part of

the learning process. Taghizadeh et al. (2021a) stressed how essential it is for small firms to possess capabilities to gain access to knowledge beyond the boundaries of the organisation. Absorptive capacity has been found relevant to enhancing the acquisition and exploitation of external knowledge in several studies. For example, Costa et al. (2016) demonstrate that the acquisition of knowledge alone is not sufficient to promote innovation; only when knowledge acquisition is combined with absorption capacity and knowledge sharing, innovation outcomes can be enhanced significantly. According to Scuotto et al. (2017), cognitive factors and absorptive capacity substantially influence the choice of informal inbound-open innovation, where external knowledge is preferably the key focus. Bell and Cooper (2018) are on the other hand of the view that absorptive capacity facilitates the internalisation of knowledge acquired from external sources. While in an effort to investigate the nature of capabilities within an environment in which external knowledge acquisition is overly valued, Senivongse et al. (2019) conducted a study among highly dynamic IT SMEs. From the result, it is revealed that absorptive capacity dominates.

4.6.3 Hybrid KM

Hybrid KM brings together internal and external knowledge, thereby harnessing the benefits of both internal and external KM practices synchronously. Thus for a small firm, hybrid KM could involve a systematic search for and acquisition of knowledge that resides outside the organisation to blend it with the existing knowledge in order to better achieve the organisation's objectives. Given the above, deep and broad collaboration is essential for Hybrid KM.

Clusters and their formation can be considered a nice example in this context and as they require the active exchange of knowledge among the partners involved to learn from one another, combine resources and competences to compensate for individual weaknesses, and based on that develop jointly and individually. Martins and Solé (2013), for example, explored how Spanish SMEs could overcome the barriers to cluster formation. Amongst others the study underlines the critical role dynamic capability plays in the utilisation of internal and external knowledge in order to succeed with the formation.

The role of communities of practice (CoP) for different KM processes is well known. Research conducted by Pattinson and Preece (2014) shows that also SMEs use different forms of CoP as a means of supporting their KM and, in turn, innovation. According to a study by Zhou et al. (2021), SMEs that scan for external knowledge and create internal knowledge are more likely to improve their innovation performance. It has also been shown the role technology plays in the connection between internal and external knowledge for frugal innovation as presented by Dost et al. (2019). Valdez-Juárez et al. (2018) point out that external knowledge acquisition enhances internal KM in SMEs.

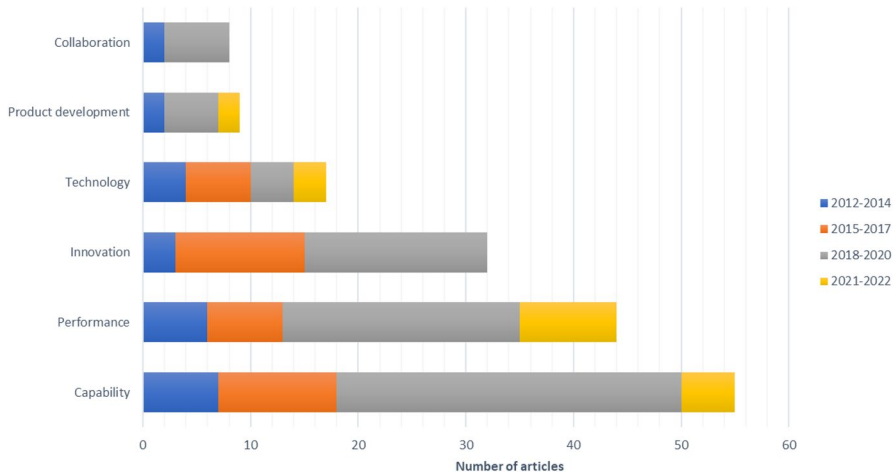


Fig. 6 Evolution of key themes in KM in SMEs research

4.7 Thematic evolution of KM in SME research

Figure 6 shows the thematic evolution of KM in SME research between 2012–2022, as before the decade was divided into four periods to analyse the situation at hand.

4.7.1 First period (2012–2014)

As the figure shows, during this period, topics of discussion on KM in SMEs were diverse and distributed across multiple themes. A study by Wee and Chua (2013) explored the effect of barriers and enablers of KM processes on competitiveness. Durst and Wilhelm (2012) conducted interviews with a medium-sized company located in Germany to shed light on how it deals with knowledge loss as a result of turnover. Villar et al. (2014) used dynamic capability as a mediating variable to test the link between knowledge management and exports. Through the application of the SECI model, Feller et al. (2013) investigated how collaborative firms improve their research and development. Wilhelm et al. (2013) gathered insights from customers to help firms gain a better understanding of their valuable customers.

4.7.2 Second period (2015–2017)

In this period, the number of articles published annually decreased. Innovation received the most attention in terms of publications in this period. The topic was primarily discussed in connection with performance. There are a substantial number of studies that investigated the influence of KM processes on innovation performance (e.g. Byukusenge and Munene 2017; Fan et al. 2017; Letonja and Duh 2016; Maldonado-Guzmán et al. 2016; Soto-Acosta et al. 2017; Valaei 2017). This period was largely driven by discussions on information communication technology

(ICT) as a tool for KM (e.g. Alvarez et al. 2016; Horvat et al. 2016; Lee and Wong, 2015; Wang and Yang 2016, and Yasir and Majid 2017). In addition, there were studies that focused on KM systems (e.g. Centobelli et al. 2017, 2018; Cerchione and Esposito 2017; Hume and Hume 2016). In sum, this period can be considered a technology-driven period.

4.7.3 Third period (2018–2020)

During this period, two previous topics were again addressed, namely product development and collaboration, contributing to the period's high number of publications. All six themes were covered again, however, even though each of the themes was discussed, an emphasis in this period was placed on furthering the understanding of organisational capabilities for KM in SMEs, including the differences between dynamic capabilities and absorptive capacities. In this regard, insightful explanations were offered by Senivongse et al. (2019), who, based on their definition, argue that the thin line that distinguishes dynamic capabilities from absorptive capacities is the unequal weighting placed on external and internal knowledge. Some articles addressed KM from an open innovation perspective (e.g. Crupi et al. 2020; Kim and Ahn 2020; Martinez-Costa et al. 2019; Taghizadeh et al. 2021b). A comparison of this period with previous ones reveals nicely the increasing focus on innovation in the KM in SMEs research.

4.7.4 Fourth period (2021–2022)

The last period has (so far) received little or no discussion regarding innovation and collaboration. This period shows a strong focus on performance followed by capability. For example, Yusr et al. (2022) examined how total quality management practices and customer knowledge management contribute to building marketing capabilities. Kareem et al. (2021) investigated the relationship between the use of accounting information systems, capabilities, and performance among Iraqi SMEs. Zhou et al. (2021) recommended profound strategies that SMEs can leverage on in improving managerial outputs. Using technological institutes as a case study, Fotso (2021) assessed the indirect effect of cluster-based innovation policies. The study by Giampaoli et al. (2021) examined the relationship between KM, intellectual capital, planning effectiveness, and performance. Similarly, Hayaiean et al. (2022) used knowledge management strategies as moderating variables to examine the relationship between intellectual capital and performance.

4.8 Network structure of KM in SMEs research through the lens of keyword analysis

The authors also conducted a network analysis to determine the most recurrent keywords among the 180 reviewed papers. In network analysis, nodes and

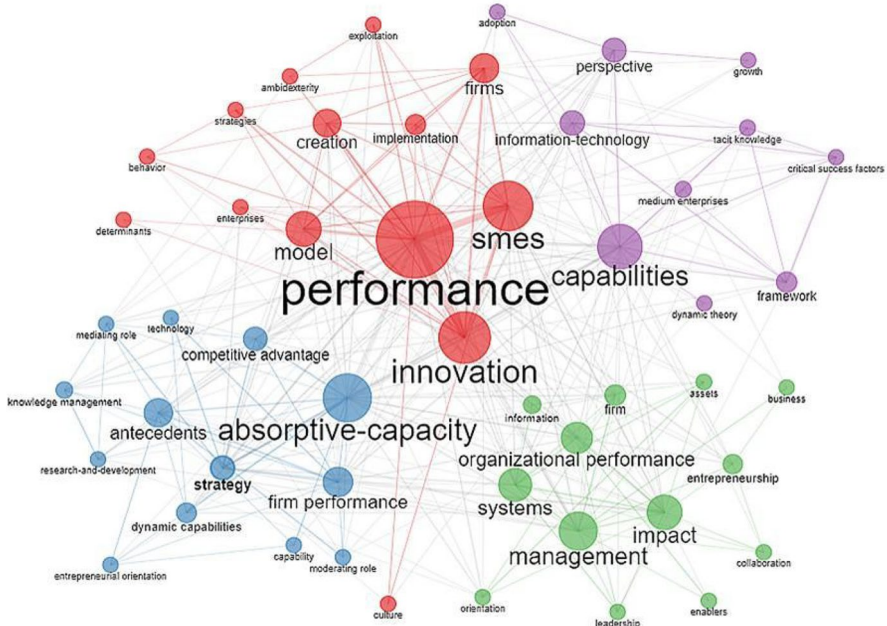


Fig. 7 Network structure of KM in SMEs research

connectors are generally used to demonstrate linkages (Kent Baker et al. 2020). Figure 7 provides a visualisation of the most prominent keywords of research on KM in SMEs. The visual indicates the popularity of focussing on the impact of KM on performance which in turn is strongly linked with innovation, (business) model and (knowledge) creation. One can also observe that thirteen frequently occurring keywords relate with innovation, the strong link between SMEs and performance and innovation as well as the link between strategy and absorptive capacity.

The analysis of the articles suggests that the majority of existing SME research is concerned with the influence of KM on output variables, i.e. on different types of performances and types of innovations and the conditions that enable such a positive relationship; the latter goes into the direction of the existence or development of different capabilities and absorptive capacities. It is also clear that KM in SMEs research is focused on enterprise development; KM is viewed as an essential component of sustainable successful SMEs.

4.9 Impactful KM in SMEs research through the lens of citation analysis

Additionally, an analysis of citations was conducted to identify the most influential and impactful studies related to KM in SMEs. Table 5 presents the top ten most-cited works. The paper by Durst and Edvardsson (2012) is the paper with the highest

Table 5 Top cited papers of KM in SMEs research

Author(s)	Title	Journal	Year	Citations
Durst and Edvardsson	Knowledge management in SMEs: a literature review	Journal of Knowledge Management	2012	276
Scuotto et al	Knowledge-driven preferences in informal inbound open innovation modes: An explorative view on small to medium enterprises	Journal of Knowledge Management	2017	182
Alegre et al	Knowledge management and innovation performance in a high-tech SMEs industry	International Small Business Journal	2013	179
Martinez-Conesa et al	On the path towards open innovation: Assessing the role of knowledge management capability and environmental dynamism in SMEs	Journal of Knowledge Management	2017	173
Villar et al	Exploring the role of knowledge management practices on exports: A dynamic capabilities view	International Business Review	2014	127
Wee and Chua	The peculiarities of knowledge management processes in SMEs: the case of Singapore	Journal of Knowledge Management	2013	99
Soto-Acosta et al	Social web knowledge sharing and innovation performance in knowledge-intensive manufacturing SMEs	The Journal of Technology Transfer	2017	90
Massaro et al	Knowledge management in small and medium enterprises: a structured literature review	Journal of Knowledge Management	2016	85
Cerchione and Esposito	Using knowledge management systems: A taxonomy of SME strategies	International Journal of Information Management	2017	80
Soto-Acosta et al	Web knowledge sharing and its effect on innovation: an empirical investigation in SMEs	Knowledge Management Research & Practice	2014	71

Based on data retrieved from WoS as of July 13, 2022

number of citations, garnering 276 citations. The paper was published a decade ago with the goal of reviewing research on KM in SMEs in order to identify gaps and propose future research directions.

The articles by Scuotto et al. (2017), Alegre et al. (2013), Martinez-Conesa et al. (2017), Villar et al. (2014) were among the next most-cited publications on KM in SMEs. Scuotto et al. (2017) examined three key aspects of informal inbound open innovation (OI) through the lenses of the OI model and KBV. In Alegre et al.'s (2013) study, the impact of KM on the innovation performance of biotechnology firms was investigated. Drawing on KM capability, Martinez-Conesa et al. (2017) identified internal and external factors that influence OI in SMEs. Using the dynamic capabilities theory, Villar et al. (2014) evaluated the role of KM on SMEs export intensity. The papers by Wee and Chua (2013), Soto-Acosta et al. (2017), Massaro et al. (2016), Cerchione and Esposito (2017), and Soto-Acosta et al. (2014) represent all papers with fewer than 100 citations.

4.10 An integrated view of the KM in SMEs research

Figure 8 presents an integrated view of KM in SMEs research, which was developed by bringing together the findings of the conceptual structure analysis the discussion around the three classifications of KM. The framework details possible KM orientations (i.e. emphasising internal KM, external KM or hybrid KM) SMEs use for attaining performance and innovation. It also highlights the relevance of capabilities such as dynamic capabilities, absorptive capacities, relational capabilities,

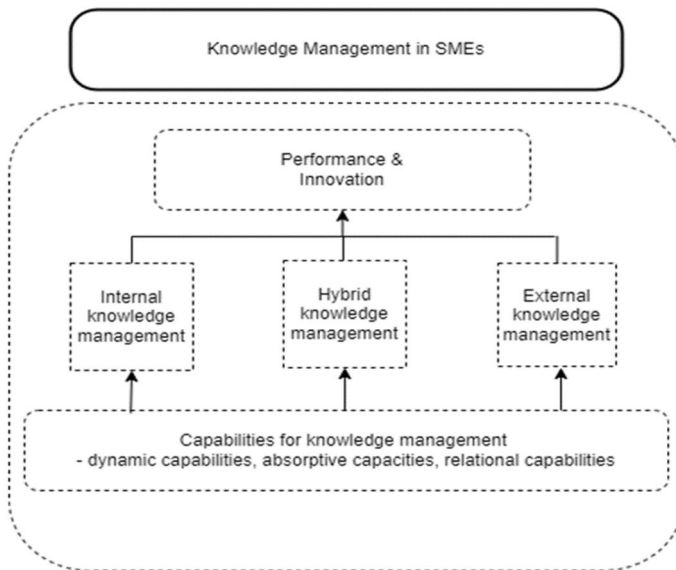


Fig. 8 Conceptual framework of KM in SMEs research

and relational capabilities for KM in general and the three KM orientations in particular.

As well, it is important to note that each of the three proposed KM orientations can be supported by one or more of the capabilities. As an example, the existing research highlights that both relational capabilities and absorptive capacities are crucial in the acquisition and exploitation of external knowledge (Sect. 4.6.2). In addition, research suggests that dynamic capabilities play an important role in capturing external knowledge and integrating it with internal knowledge to enhance innovation; as is indicated in Sect. 4.6.3, the framework also reflects this.

The study shows that KM in SMEs research is on a growth trajectory, with an upward trend predicted for 2022. The findings of the thematic analysis reveal that "performance" has now overtaken "capabilities" in the current publications of 2022, although "capabilities" has the most publications overall. It is reasonable to expect that future research will be conducted in the area of internal KM, given that more of the existing studies that have focused on performance come from this area. According to the regional distribution analysis (Sect. 4.3), European researchers are primarily responsible for the growth of KM research in SMEs. It is therefore not surprising that all three KM orientations have been explored in European contexts, but not in African contexts, particularly the hybrid KM. Thus, we can argue that hybrid KM is still in its infancy and has not been explored and tested in other contexts yet.

Moreover, a closer examination of the theoretical evolution, presented in Sect. 4.7 of this study, in relation to the conceptual framework demonstrates that dynamic capabilities represent a promising area for the three KM orientations. Meanwhile, the absorptive capacity is fading in use, as its application tends to dwindle over time. In conjunction with the conceptual framework, the three KM orientations that can assist in achieving innovation and performance, there are currently no studies that are focused on innovation and only a few on performance from 2021 to date. This suggests that these KM orientations may have certain outcomes or consequences that remain unexplored yet or new ones may be forthcoming. Last but not least, the network analysis demonstrates the relevance of performance, innovation, and KM capacities of KM in SMEs research, which the framework clearly illustrates. To this end, the conceptual framework has been successful in integrating the findings derived from conceptual structure analysis of KM in SMEs research that spans from 2012 to the present.

5 Conclusion

The findings presented in this paper are drawn from a systematic literature review of 180 peer-reviewed papers published on KM in SMEs. To the knowledge of the authors, this paper is the first to address the topic of KM in SMEs in such breadth. Thus, it exceeds the scope of the existing literature that so far has been limited to certain domains (see for example Cerchione et al. 2016; Saratchandra and Shrestha 2022). The framework proposed is viewed as a solid basis for informing further research and discussions in the field.

The outcome of the review indicates that the field has developed into a rich area of research over the last decade; with a rising interest after 2018 in particular. The majority of the papers covered in the review were published in leading knowledge management journals and high impact management journals. Hence, KM in SMEs has become an acceptable topic in leading mainstream journals. Even though KM in SMEs as a research field is still new compared to KM in large organisations, the evidence provided does show several published articles in leading journals, which have been cited 100 times or more. Existing research suggests that researchers are interested in studying KM with a strong emphasis on its possible implications for the companies' overall performance and innovation, thus output-driven. Additionally, there is a great focus on studying different types of capabilities the companies need to support their KM activities and thus to come closer to improved performance and innovation. The findings suggest that capabilities are seen as a key aspect, not only in terms of being ready for KM but also able to exploit its potential.

Based on the findings several research gaps can be identified and hence there are several ways future research could go to address these gaps. The following provides some proposals:

- Research on KM in SMEs is dominated by contributions from Europe followed by Asia, other regions of the world have received less attention. It is highly recommended that future research sheds light on KM in SMEs in these regions too, considering that SMEs play a vital role in the development and prosperity of societies and economies.
- The key themes of interest regarding KM in SMEs research are capabilities, performance and innovation. Considering both present and upcoming societal challenges, topics such as sustainability, digitalization, risks and strategic flexibility in relation to KM in SMEs appear relevant and promising fields of research.
- The variety of theories used in the context of SME studies has increased over the years. In addition to the classic theories/theoretical approaches such as KBV, RBV, dynamic capabilities, new theories have emerged. This is a development that should be continued. This should also include the application of the classical theories in new ways. Consequently, a combination of classical and new theories is postulated.
- The evaluation of the methodological approaches of current KM in SME research shows that the majority of the research is designed for theory testing. This development should be questioned and researchers in the field should (increasingly) be open to alternative methodological approaches to advance the understanding of KM in SMEs in a relevant and meaningful way.
- The use of the structural equation modelling (SEM) family has proved to be very popular, although nothing speaks against this technique, the authors appeal for a greater variety of methods regarding both data collection and analysis; experiments, observations but also qualitative comparative analysis techniques seem relevant and useful in this regard, to name a few examples.

It can therefore be said that research in the field of KM in SMEs has increased steadily over the last decade, which can be seen as promising and thus increasingly

reflecting the importance of SMEs for societies. However, the results of the literature review also show that there are still many research opportunities open.

Future research could explore how SMEs amend their KM approaches to meet present and forthcoming social, environmental and technological challenges. Future research could also expand our understanding of how the relationship between accessibility to recent and updated knowledge and strategic management affects sustainable business development in SMEs. The importance of continuously updating and transferring knowledge in the small firms as well as the accessibility of affordable digital tools and solutions for KM can also be avenues for future research. The issue of retaining critical knowledge could be another relevant topic, perhaps even more so than in the past, as dependence on IT solutions increases, which in turn may encourage the forgetting of relevant capabilities and competencies. The study of collaborative agreements in the context of KM in SMEs still appears to be a relevant issue. Future research could focus more on the importance of individual partners for sustainable KM in SMEs. How and when is knowledge generated with these different partners? How is the knowledge transferred? How do SMEs protect their knowledge from the increasing number of cyberattacks? Against the backdrop of the link between KM and innovation and ultimately performance, on what basis do decision-makers of SMEs know that KM is paying off for the company? How does this perception change over time, e.g. in case of internal or external crises? A limitation of this study is that the authors only searched the Web of Science database which might have the possible consequence that some articles in the field of KM in SMEs may have been missed. The exclusive use of the term KM/knowledge management in the search may also have resulted in isolated papers not being included in this review. Future works could include a wider range of databases and search terms.

In summary, this paper has developed and presented a detailed and comprehensive overview of current accomplishments in KM research dedicated to SMEs published in leading journals between 2012 and 2022. The authors of this paper believe that the paper makes a relevant and noteworthy contribution to KM in SMEs research through the developed and presented state-of-the-art overview. More precisely, this paper has presented a thorough synopsis of KM in SMEs research published in the last decade (2012–2022) by covering publication activity, regional distribution of research as well as theoretical, methodological and thematic features. Based on the overview established which was the outcome of a systematic approach to literature review the identification and formulation of promising avenues for future research was possible which will hopefully encourage more rigour research on KM in SMEs.

The findings presented are viewed as relevant not only to researchers but also to SME decision-makers as well as other stakeholders interested in SMEs and their sustained development (e.g. policymakers, consultants, business lecturers, etc.). For example, the findings of this study provide useful information to SME decision-makers for understanding both the opportunities and challenges arising from KM. This improved understanding can be crucial in terms of relationships with relevant stakeholders such as customers, suppliers, and business partners which typically play a great role in KM in SMEs; the ongoing structural changes,

as well as societal challenges, call for even more collaboration between different actors to increase the likelihood of mastering them. This improved understanding is also relevant for preparing the SMEs internally, helping place them in a better position to cope with KM and its effects on the business and its operations. Depending on the KM orientation, different investments are necessary for the areas of education, training, and (digital) infrastructure.

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Declarations

Conflict of interest All authors declare that they have no conflict of interest.

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