

Knowledge Management as a Competitive Advantage in SMEs: A Theoretical Exploration

Oscar Alejandro Vásquez-Bernal and Woody Figueroa Peinado

School of Basic Sciences, Technology, and Engineering
Universidad Nacional Abierta y a Distancia UNAD, Bogotá D.C., Colombia
oscar.vasquez@unad.edu.co, woody.figueroa@unad.edu.co

William Eduardo Mosquera Laverde

Faculty of Administrative and Economic Sciences
Universidad Cooperativa de Colombia, Bogotá D.C, Colombia
williame.mosquera@campusucc.edu.co

Abstract

Micro, small, and medium-sized enterprises are challenged to stay in the market by developing innovative processes. Well-focused knowledge management helps organizations to strengthen their innovative capabilities by building highly competitive work teams through learning and organizational culture. This paper illustrates an exploration of different databases of indexed journals and the analysis of different authors who focus on the importance of knowledge management as a competitive advantage for MSMEs. The scope is delimited in the documentary review from 2017 to 2023 and the analysis of the incidence of knowledge management in organizations.

Keywords

Knowledge management, SMEs, competitive advantage, innovation, disruption.

1. Introduction

The aim of this paper is to present documentary research on the topics of knowledge management, competitive advantage, innovation, and disruption with a focus on small and medium-sized enterprises. Through the development of an exploratory type of research for the review of indexed databases and the descriptive analysis of documents, it has been possible to review the most studied approaches that have contributed to knowing the research trends of different case studies.

1.1 Objectives

Conduct documentary research on knowledge management, competitive advantage, innovation, and disruption with a focus on small and medium-sized enterprises. To analyze the most studied approaches that contributed to understanding the research trends of different case studies.

2. Literature Review

For the methodological development of this review, an exploratory type of research with a qualitative approach was carried out for the preliminary review, using keywords related to micro, small and medium-sized enterprises, knowledge management, and competitive advantage, by consulting the indexed databases Science Direct, SCOPUS and WoS (Web of Science). A descriptive analysis of the references was then carried out using a non-probabilistic convenience sample of the results presented. The time horizon of the information review is in the range of 2017 to 2023 inclusive.

The following table illustrates the databases considered for the bibliographic search, the construction of the search equation, the observation window, and the number of research products found (Table 1).

Table 1. Databases consulted and searched equation.

Databases consulted	Search equation	Observation window	Number of research products found
Science Direct	SME AND Competitive advantage AND knowledge management	2017-2023	5197 resulted
SCOPUS		2017-2022	40 resulted
WEB OF SCIENCE (WOS)		2017-2022	111 resulted

This analysis gave interesting results on the amount of information presented in each of the databases, considering the search time horizon and the keywords. The statistics of the number of research results in SCOPUS (Figure 1) describes the relationship of the number of products per year considering the search topics. For the year 2021, a significant reduction is observed, however for the year 2022, there is an increase in research interest. and WoS (Figure 2) were considered, showing interest in the topics addressed.

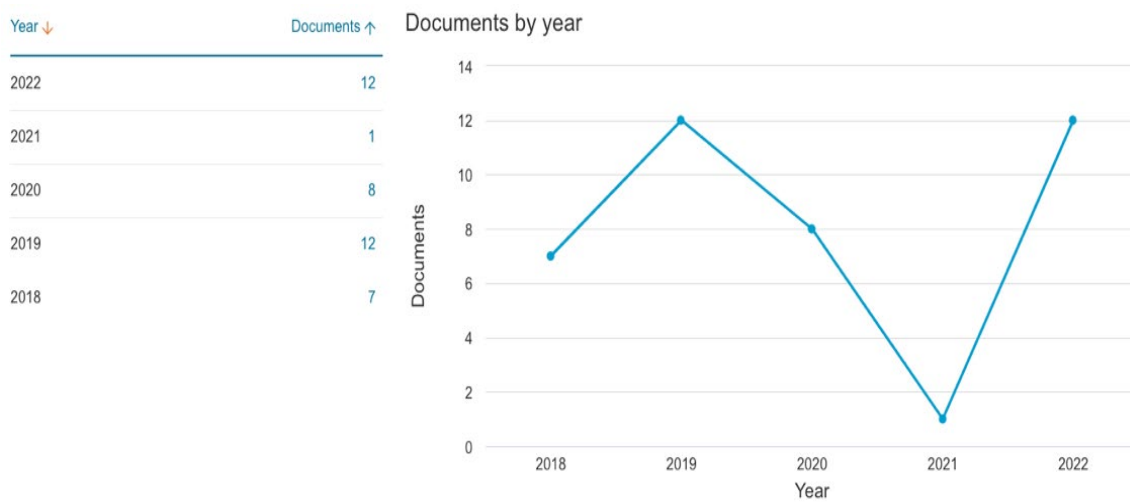


Figure 1. SCOPUS search statistics. Source SCOPUS (2022)

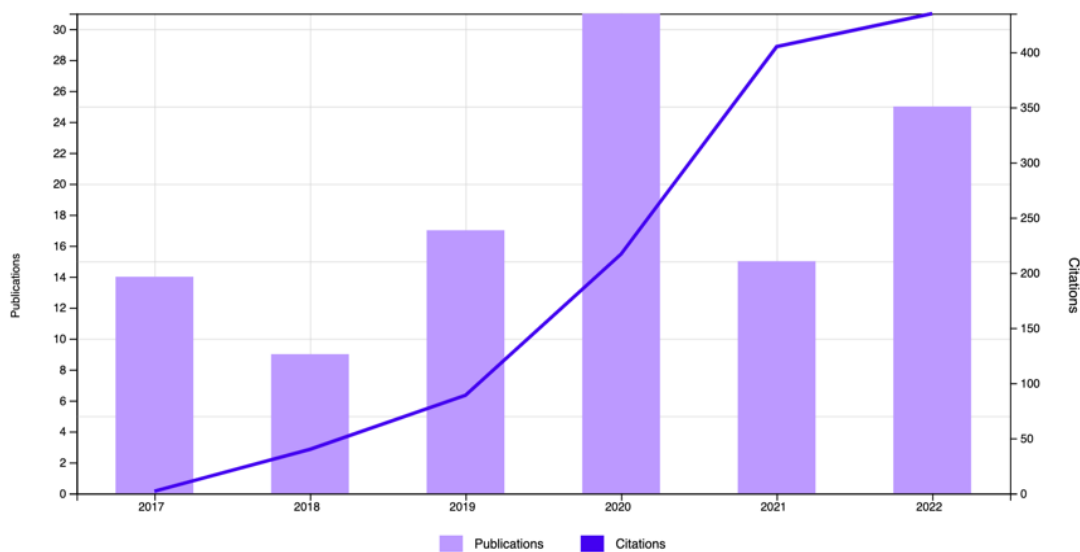


Figure 2. WoS search statistics. Source: Web of Science (2022).

3. Methods

Meanwhile, a descriptive review process was established by means of non-probabilistic convenience sampling, reviewing the titles and abstracts of articles of greatest interest to researchers. Figure 3 describes the process of review and analysis of information based on keywords, databases consulted, and extraction of articles for analysis.

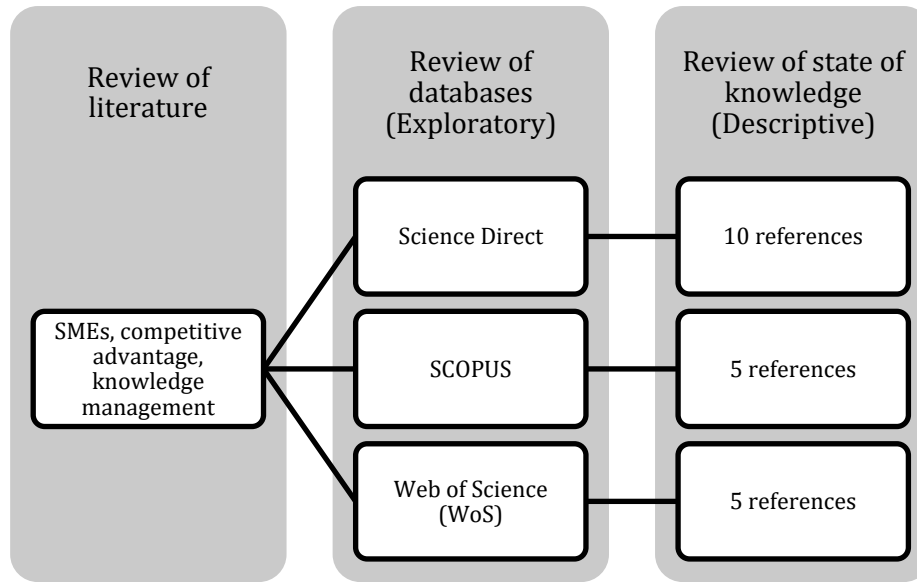


Figure 3. Review and analysis procedure.

4. Data Collection

The method used for the literature review was exploratory in databases such as Science Direct, SCOPUS, and Web of Science. The tables show the review of documents most relevant for research (Table 2-Table 4).

Table 2. Review of documents most significant of Science Direct

#	Title	Authors	Year	Source	Abstract
1	SMES survival and knowledge in emerging economies: evidence from Vietnam	Nguyet Nguyen Thi	2022	Heliyon 8 (2022) e11387	This paper assesses how knowledge affects the survival of new private small and medium-sized enterprises (SMEs) in an emerging economy such as Vietnam. Panel data drawn from national surveys allow for a comprehensive analysis over the period 2005-2011 with the semi-parametric Cox proportional hazards model.
2	New Knowledge Management framework for manufacturing SMEs working in strictly regulated sectors	Sam John Abraham*	2021	Procedia Manufacturing 54 (2021) 290–295	Development of a new and practical Knowledge Management framework for manufacturing SMEs operating in strictly regulated sectors based on a research project focused on the acquisition, synthesis, internalization, and extension of knowledge and requirements related to hazardous environment regulations. The study of

#	Title	Authors	Year	Source	Abstract	
					knowledge management theory and practice has focused on SMEs, the manufacturing sector and the constraints imposed by regulatory compliance.	
3	Knowledge management in SMEs: preliminary ideas for a dedicated framework	Xingyu SIMA, Thierry Coudert. Laurent Geneste. Aymeric de Valroger	2022	IFAC Papers Online (2022) 1055	55-101050	Knowledge Management (KM), which refers to knowledge acquisition and exploitation activities, is relatively well implemented in large organizations. However, small, and medium-sized enterprises (SMEs) face several obstacles. In general, traditional KM methods offer a framework that is not adapted to the SME context, because SMEs have specificities that distinguish them from large organizations for this reason, this contribution proposes a concept of a knowledge management process specific to SMEs.
4	Innovative thinking in the leaders and competitiveness of SMEs in the Industrial sector in Colombia	Diva Licet Mendoza Ocasal, Aida Luz Vargas Lugo, Luis Alberto Bolaño Melo, Pabla Peralta Miranda	2022	Procedia Computer Science (2022) 333–338	210	The objective of this scientific paper is to determine whether managers' innovative thinking influences the competitiveness of SMEs. the competitiveness of SMEs. Currently, most research on innovation has not explored its relationship with managers' innovative thinking; the literature does not clarify what innovative firms do differently to achieve superior performance.
5	Government financial support and financial performance of SMEs: A dual sequential mediator approach	Olakunle Jayeola, Shafie Sidek, Shouvik Sanyal, Syed Inamul Hasan, Nguyen Binh An, Samuel-Soma Mofoluwa Ajibade, Thi Thu Hien Phan	2022	Heliyon 8 (2022) e11351		Public financial support is an important factor for firms in developing countries, particularly small and medium-sized enterprises (SMEs), to be competitive and perform better. However, studies on the relationship between public financial support and firm performance have not yielded conclusive results.
6	Factors affecting the adoption of Data Management as a Service (DMaaS) in Small and Medium Enterprises (SMEs)	Olwethu Zide, Osden Jokonya	2022	Procedia Computer Science (2022) 340–347	196	The study explores the factors affecting the adoption of data management as a service (DMaaS) in small and medium-sized enterprises (SMEs). The study conducted a systematic literature review of articles published during the period 2008-2020 to obtain information on the factors affecting the adoption of DMaaS in SMEs.

#	Title	Authors	Year	Source	Abstract
7	Evaluation of the critical success factors of dynamic enterprise risk management in manufacturing SMEs using an integrated fuzzy decision-making model	Delong Zhu, Zhe Li b, Arunodaya Raj Mishra	2023	Technological Forecasting & Social Change 186 (2023) 122137	To be successful, a company needs to assume the right amount of risk. Thus, the great importance of risk management has attracted many researchers to focus on implementing enterprise risk management (ERM) systems in the most effective way. In general, smaller companies must face this challenge in a more informed manner. Many small and medium-sized manufacturing enterprises (SMEs) are family-owned companies. Family dynamics greatly influence the way these companies do business.
8	Do sustainability innovation and firm competitiveness help improve firm performance? Evidence from the SME sector in Vietnam	Thanh Tiep Lea, Muhammad kramb	2022	Sustainable Production and Consumption 29 (2022) 588–599	This study reveals the nexus between sustainable innovation and the performance of small and medium-sized enterprises (SMEs) by exploring the mediating role of business competitiveness in the context of an emerging market. (SMEs) by exploring the mediating role of business competitiveness in an emerging market context. This study adopts a systematic literature review approach that allows us to argue that this relationship is not explored in depth in the current literature.
9	Building knowledge ambidexterity using cloud computing: Longitudinal case studies of SMEs experiences	Minu Saratchandra, Anup Shrestha, Peter A. Murray	2022	International Journal of Information Management 67 (2022) 102551	Using a longitudinal multisite case study longitudinal research design, this study demonstrates how cloud computing helps build knowledge ambidexterity (K-AMB) capabilities in small and medium-sized enterprises (SMEs). A cross-theory approach is used to highlight the connections between ambidexterity and knowledge management theories as a basis for exploring the benefits of K-AMB capabilities for SMEs.
10	Analysis of the knowledge management in industrial exporting SMEs	Gabriel Velandia Pacheco, Adalberto Escobar Castillo, Evaristo Navarro Manotas, Osvaldo Arévalo.	2022	Procedia Computer Science 203 (2022) 476–480	Several studies have amply demonstrated the impact of knowledge management on organizational performance in highly turbulent environments. However, it is confusing to identify how the process occurs in the reality of small and medium-sized companies, as most studies focus on large companies, leading to dispersion and fragmentation in the related literature.

Table 3. Review of documents most significant of SCOPUS

#	Title	Authors	Year	Source	Abstract
1	Leveraging knowledge sharing and innovation culture into SMEs sustainable competitive advantage.	Arsawan, I. W. E., Koval, V., Rajjani, I., Rustiarini, N. W., Supartha, W. G., & Suryantini, N. P. S.	2022	International Journal of Productivity and Performance Management, 71(2), 405-428. doi:10.1108/IJPPM-04-2020-0192	This study aims to examine and explain the role of knowledge sharing in shaping innovation culture to improve business performance and build sustainable competitive advantage. This quantitative study involved 259 respondents from a sampling frame of 59 management levels of exporting SMEs in the province of Bali, Indonesia.
2	Capabilities and opportunities: Linking knowledge management practices of textile-based SMEs on sustainable entrepreneurship and organizational performance in China.	Qader, A. A., Zhang, J., Ashraf, S. F., Syed, N., Omhand, K., & Nazir, M.	2022	Sustainability (Switzerland), 14(4) doi:10.3390/su14042219	Most researchers argue the role of dynamic capability (DC) as a key factor in achieving sustainable business performance (SEP) and organizational performance (OP) with the competitive advantage of knowledge management practices (KMP). However, the effects of KMP with SEP and OP are still under debate.
3	A study on the relevance of knowledge management practices and learning organization process as innovative approaches in selected SMEs of Bengaluru.	Nalina, R., & Mahesh, K.	2022	Paper presented at the AIP Conference Proceedings, 2393 doi:10.1063/5.0074874 Retrieved from www.scopus.com	The study aims to understand the learning organization process and knowledge management practices in SMEs in Bengaluru. The study focuses on paving the way for the learning organization process and deciding on knowledge management practices.
4	Examining the performance outcome of intellectual capital: A parallel mediation analysis.	Adusei, E., Mensah, H. K., & Demah, E.	2022	African Journal of Economic and Management Studies, 13(4), 568-581. doi:10.1108/AJEMS-11-2021-0508	Today's knowledge economy considers the competitive advantage of firms based on the strategic management of knowledge resources. Therefore, drawing on the resource base theory, this paper empirically investigated how organizational ambidexterity and innovative leadership behavior mediate the relationship between intellectual capital (IC) and firm performance among small and medium-sized enterprises (SMEs) in Ghana.

#	Title	Authors	Year	Source	Abstract
5	Environmental management standards and resource efficiency in SMEs.	Fadly, D.	2020	Sustainability (Switzerland), 12(18) doi:10.3390/SU12187455	Over the last decade, companies have sought to minimize their environmental footprint through cleaner production strategies. There is evidence to support both the view that the adoption of environmental management standards (EMS) is a cost burden for firms and detrimental to competitiveness, and that the adoption of standards increases savings and gives firms a long-term competitive advantage. To resolve this apparent paradox in the context of an emerging country, we empirically examine the relationship between EMS certificate adoption and resource efficiency using a panel sample of 1,333 manufacturing SMEs in Vietnam for the period (2011-2013).

Table 4. Review of documents most significant of Web of Science (WoS)

#	Title	Authors	Year	Source	Abstract
1	SME internationalization process: Key issues and contributions, existing gaps and the future research agenda	Morais, F (Morais, Flavio); Ferreira, JJ (Ferreira, Joao, J.)	2020	European Management Journal Volume 38, Issue 1, February 2020, Pages 62-77 DOI: 10.1016/j.emj.2019.08.001	The literature studying the internationalization of small and medium-sized enterprises (SMEs), despite being recent, is already very extensive and fragmented, adopting different approaches and contributing to various facets of internationalization. It is also necessary to analyze and systematize the issues that have received attention in the field of SME internationalization. The present study aims to develop a systematic literature review on SME internationalization.
2	Current and future Industry 4.0 capabilities for information and knowledge sharing Case of two Swedish SMEs	Li, D (Li, Dan); Fast-Berglund, A (Fast-Berglund, Asa); Paulin, D (Paulin, Dan).	2019	The International Journal of Advanced Manufacturing Technology Volume 105, pages3951–3963 (2019) DOI: 10.1007/s00170-019-03942-5	Humans are indispensable in the manufacturing industry as its complexity increases in an Industry 4.0 context, mainly due to changing customer demands. Managing the challenges of increasing complexity can create a competitive advantage for SMEs.

#	Title	Authors	Year	Source	Abstract
3	Open innovation in SMEs Collaboration modes and strategies for commercialization in technology-intensive companies in the forestry industry	Henttonen, K (Henttonen, Kaisa); Lehtimaki, H (Lehtimaki, Hanna).	2017	European Journal of Innovation Management ISSN: 1460-1060 DOI: 10.1108/EJIM-06-2015-0047	This study examines how technology-intensive small and medium-sized enterprises (SMEs) participate in open innovation. Three modes of multi-firm collaboration in the commercialization phase were identified: networks with a lead partner, equal partnership, and partnership for external technology commercialization.
4	Key factors affecting technological capabilities in small and medium-sized Enterprises in Taiwan.	Lin, FJ (Lin, Feng-Jyh); Lai, CHF (Lai, ChihuFeng)	2021	International Entrepreneurship and Management Journal volume 17, pages 131–143 (2021) DOI: 10.1007/s11365-019-00632-2	Technological capability is a core resource and a distinctive competency that enables companies to create business value. With greater technological capability, companies have more resources and unique skills and engage in more strategic activities, thus they can gain competitive advantages and increase their profitability while improving their organizational performance. However, small, and medium-sized enterprises (SMEs) invariably lack the resources to develop technological capabilities. This study explores the determinants of technological capability enhancement using data for SMEs in Taiwan.
5	Linking knowledge management to competitive strategies of knowledge-based SMEs	Ngah, R (Ngah, Rohana); Wong, KY (Wong, Kuan Yew).	2020	The Bottom-Line ISSN: 0888-045X DOI: 10.1108/BL-08-2019-0105	The objective of this paper is to study the effect of knowledge management on the formulation of competitive strategies for knowledge-based small and medium enterprises (SMEs) in Malaysia. Most dimensions of knowledge management have significant relationships with differentiation strategy except knowledge creation and knowledge acquisition, and only knowledge acquisition shows a significant relationship with cost leadership. The results reveal that knowledge management has a positive effect on competitive strategies with a greater inclination towards differentiation strategy, compared to cost leadership strategy, which does

#	Title	Authors	Year	Source	Abstract
					synchronize with its commitment to R&D and innovation.

5. Results and Discussion

Knowledge is considered the main talent of organizations, especially in the context of the industry 4.0 revolution. Knowledge management is focused on the acquisition, exploitation, and proper application of knowledge throughout the organization, however micro, small, and medium enterprises present several obstacles. The theoretical structure for knowledge management is not adapted to the context of these companies (SIMA et al. 2022). However, through the support of agile methodologies applied to the organizations' needs, valuable results in the adoption of knowledge could be acquired. The development of information technologies would serve as tools for knowledge exploitation. On the other hand, small and medium enterprises engaged in manufacturing could develop knowledge management for hazardous waste management for example, by acquiring, synthesizing, internalizing, and adopting new knowledge with the compilation of standards and regulations for that purpose (Abraham, 2021).

Knowledge management has served the survival of small and medium enterprises, the case of SMEs in Vietnam through a study of companies in the years 2005 to 2011, the knowledge acquired, stored, and internalized has generated development in these companies, generating strategic alliances with foreign companies through Start-ups in high-growth companies (Thi, 2022). Similarly, the development of sustainable innovation and firm competitiveness has been evidenced in the SME sector in Vietnam, the case of emerging markets, and that has been resilient in the context of the COVID-19 pandemic (Le and Ikram, 2022).

Regarding the relationship between knowledge management and knowledge-based competitive strategies, Ngah and Wong (2020), conclude in their study that most dimensions of knowledge management have significant relationships with a differentiation strategy, except knowledge creation and knowledge acquisition, and only knowledge acquisition shows a significant relationship with cost leadership. The results revealed that knowledge management has a positive effect on competitive strategies with a greater inclination towards differentiation strategy, compared to cost leadership strategy, which does synchronize with its commitment to research and development and innovation.

So that according to the study of manufacturing enterprises in Vietnam's SME sector in the years 2011 to 2013, whose findings were relevant not only for Vietnam but for many emerging countries where SMEs are the main drivers of economic growth, diversification, sources of employment generation and innovation; These contribute up to 45% of total employment and 33% of gross domestic product, Vietnam managed to make a success story given the structural transformation arising from a combination of institutional reforms, trade liberalization and the transfer of labor from agriculture to the industry which has generated more value added (Fadly, 2020).

In the Colombian context, Mendoza et al. (2022) conducted a study on innovative thinking and its competitiveness with different leaders of small and medium enterprises. Using a descriptive approach and mixed studies (qualitative-quantitative), the authors highlight the concentration of researchers in the education sector with 95.7% and only 2.5% in companies, of which 1.7% are outside the country; as a result, they emphasize the improvement of managers' innovative capabilities through the application of innovative thinking strategies and the adaptation of this in the organizational culture.

On the other hand, the complexity of government financial support, financial performance, and competitive advantage for the acquisition of new resources is a finding in the research conducted by Jayeola, et. al, (2022), where he analyzes how the management of enterprise resource planning through cloud ERP tailored to organizations will reduce barriers

in the procurement of new resources and increased confidence in the organization of information. Along with the organization and centralization of information are the factors that affect the adoption of data management technologies, such as information security, organizational cost, and government regulations, as indicated by Zide and Jokonya (2022) in their research.

The case of Saratchandra et al. (2022) in building ambidextrous knowledge by using cloud computing, research developed in small and medium enterprises. Tushman and O'Reilly (1996) define ambidextrous knowledge (K-AMB) as the ability of an organization to explore and exploit knowledge to enable innovation, on the other hand, they explain knowledge exploitation as the ability of an organization to improve and update existing knowledge and processes on the way to improve products and services and exploitation as the discovery of new knowledge and skills with the recognition of new needs and emerging users.

In the same vein is the analysis of the Industrial Revolution 4.0 and the role of SMEs. For Li et al. (2019), the technologies that enable the emerging phenomenon of Industry 4.0 have the potential to simplify the exchange of information and knowledge between people at work, especially for Operator 4.0. However, few SMEs have implemented these technologies for this purpose.

Open innovation and the approach of small and medium-sized enterprises is an investigation of interest to Henttonen and Lehtimäki (2017), in which they conclude with the identification of three modes of multi-enterprise collaboration in the commercialization phase: networks with a main partner, equal partnership and partnership for external technology commercialization. The study showed that in SMEs, open innovation is used for commercialization rather than research and development. The main conclusion of the study was the mode of collaboration in commercialization is determined by the firm's core competence and open innovation strategy.

For Zhu et al. (2023) the critical success factors for risk management in small and medium-sized manufacturing companies, indicate that the evaluation of risk management is mainly applied to large companies, the research they have conducted is focused on propitiating that risk assessment for SMEs, given that in the review of research literature there is a lack of depth in those studies and through a multi-criteria decision analysis methodology, they analyze eighteen critical success factors: the professional pool and business contingency planning (CF1), fostering competencies, diversity and experience (CF2), adequate internal feedback on the effectiveness of the risk management framework (CF3), iterative and responsive to change (CF4), facilitation of continuous organizational improvement and enhancement (CF5), periodic review of the risk management policy and framework in response to change, (CF6), appropriate and timely communication of change to the framework (CF7), integration of risk management into the overall risk management system (CF8), clear accountability for the development and implementation of the risk management framework (CF9), an integral part of organizational processes (CF10), consideration of internal and external organizational context (CF11), the effectiveness of risk management in the organization (CF12), internal and external organizational context (CF11), dependent on effectiveness, agility and resilience (CF12), create value for the organization (CF13), systematic approach, planned and structured (CF14), monitoring of risk indicators directly aligned with business performance indicators (CF15), continuous testing of the adequacy of the risk management framework (CF16), integrated into the organization's decision making (CF17) and risk management practice must adapt to changes in the organization (CF18). The risk management practice must adapt to the evolution of organizations (CF18). Using a Fuzzy decision-making model, they can compare iterations on the weight of critical factors on the normative objectives of the voluntary commission constituted by representatives of five U.S. private sector organizations for thought leadership vis-à-vis enterprise risk management, internal control, and fraud deterrence. Such objectives as control environment, risk assessment, control activities, information, communication, and supervision are compared with critical success factors.

On the other hand, the issues of critical factors of technological capability in SMEs are reviewed. In research conducted in Taiwan by Lin and Lai (2020), small and medium-sized enterprises (SMEs) invariably lack the necessary resources to develop technological capabilities. The study conducted explored the determinants of technological capability enhancement based on data about SMEs in Taiwan.

Knowledge management in small and medium exporting companies. In a case presented in the city of Barranquilla (Colombia), knowledge acquisition is the most important factor followed by knowledge exploitation, concluding that managers prefer activities that provide them with relatively cheap and short-term solutions, neglecting actions that result in the preservation and transfer of knowledge (Velandia et al., 2022).

For Arsawan et al. (2022), leveraging innovation culture and knowledge sharing as a competitive advantage and the incidence of culture with knowledge sharing was the result of a research conducted in Bali (Indonesia) to a representative sample of 259 respondents. The relationship of knowledge management and business practices in the textile sector where small and medium enterprises in China, the ambidexterity view, which explores the direct impact of knowledge management practices mediated by dynamic capabilities, provides evidence of the sustainability of entrepreneurship and organizational performance (Qader et al. 2022). Another interesting study by Nalina, and Mahesh, (2022), in which they analyze the learning organization process and knowledge management practices in small and medium-sized information technology (IT) firms in Bengaluru (India). It is also highlighted that the strategic management of knowledge resources is considered a competitive advantage and again takes the theory of ambidexterity in the organizational field to relate innovative leadership and intellectual capital, an analysis conducted in Ghana (Adusei et al. 2022).

Other authors such as Morais and Ferreira (2020), establish a clear and important relationship between the internationalization processes that small and medium enterprises have had, highlighting the rapid and continuous growth of this sector; going back a little in time, towards the year 2019, Li et al. (2019) conduct an investigative study in which they highlight the great importance that has for companies the development and management of knowledge, emphasize over the way, the disproportionate support of human resources in the context of industry 4.0, analyzing and providing solutions to the main needs of potential customers, which gives SMEs a great competitive advantage, making them a major sector of the world economy.

For their part, Henttonen and Lehtimäki (2017), Lin, Lai, (2021), and Ngah, and Wong (2020), establish through their research studies, the great importance of knowledge management within the development of companies through innovation, generating competitiveness strategies; These research studies show that knowledge management has a positive effect on competitive strategies with a greater inclination towards the differentiation strategy, compared to the cost leadership strategy, which is synchronized with its commitment to research and development and innovation.

6. Conclusion

Knowledge management is perceived as the need to integrate the different knowledge acquired by the human being in a disciplinary training area that contributes significantly to the development of companies. Knowledge Management is consolidated as a fundamental and indispensable factor in strategic decisions and orientation toward quality, innovation, and business development. Knowledge management has generated the most significant contribution to the growth and positioning of SMEs in the global business framework. Knowledge management processes allow high reliability in decision-making, giving the management the tranquility to explore new markets, products, or services. Knowledge and innovation management involves the management of knowledge in the entities to improve the products and services offered, the management results, and the strengthening of institutional capacity and performance; likewise, through innovation and knowledge, organizations of corporate governance can be sustainable and environmentally sustainable, as evidenced by the SMEs in Asia that have created awareness about the environmental footprint and the ecological seal that they print in their companies with the support of environmental policies established by the state.

Knowledge management in organizations is conceived from the idea of the entrepreneur and can be maintained through interaction with people who make up the work team. The creation of knowledge memories helps to perpetuate the entrepreneur's legacy to the work teams. It facilitates the training processes of new members in the organization. It also encourages the co-creation of new knowledge from the experiences lived in the development of the company's processes. Finally, knowledge management and innovation seek to generate benefits for the company by transforming knowledge into value, creating new products or services, or optimizing its processes to achieve permanence in the market.

References

Abraham, S. J., New Knowledge Management framework for manufacturing SMEs working in strictly regulated sectors. 10th CIRP Sponsored Conference on Digital Enterprise Technologies (DET 2021) – Digital

- Technologies as Enablers of Industrial Competitiveness and Sustainability. *Procedia Manufacturing* 54 (2021) 290–295, 2021.
- Adusei, E., Mensah, H. K., & Demah, E., Examining the performance outcome of intellectual capital: A parallel mediation analysis. *African Journal of Economic and Management Studies*, 13(4), 568-581, 2021. doi:10.1108/AJEMS-11-2021-0508
- Arsawan, I. W. E., Koval, V., Rajiani, I., Rustiarini, N. W., Supartha, W. G., & Suryantini, N. P. S., Leveraging knowledge sharing and innovation culture into SMEs sustainable competitive advantage. *International Journal of Productivity and Performance Management*, 71(2), 405-428, 2022. doi:10.1108/IJPPM-04-2020-0192.
- Fadly, D., Greening industry in Vietnam: Environmental management standards and resource efficiency in SMEs. *Sustainability (Switzerland)*, 12(18), 2021. doi:10.3390/SU12187455
- Henttonen, K. and Lehtimäki, H., Open innovation in SMEs Collaboration modes and strategies for commercialization in technology-intensive companies in the forestry industry. Volume20, Issue: 2, Pages: 329-347, 2017. DOI: 10.1108/EJIM-06-2015-0047
- Jayeola, O., Sidek, S., Sanyal, S., Hasan, S. I., An, N. B., Ajibade, S-S. M., Phan, T.T.H. , Government financial support and financial performance of SMEs: A dual sequential mediator approach. *Heliyon* 8 (2022) e11351, 2022.
- Le, T. T., Ikram, M., Do sustainability innovation and firm competitiveness help improve firm performance? Evidence from the SME sector in Vietnam. *Sustainable Production and Consumption* 29 (2022) 588–599, 2022.
- Li, D., Fast-Berglund, A. y Paulin, D., Current and future Industry 4.0 capabilities for information and knowledge sharing Case of two Swedish SMEs. Volume 105, Issue 9. Pages: 3951-3963, 2019. Special Issue. DOI: 10.1007/s00170-019-03942-5
- Lin, FJ. y Lai, C. H. F., Key factors affecting technological capabilities in small and medium-sized Enterprises in Taiwan. Volume: 17, Issue: 1, Pages: 131-143, 2020. DOI: 10.1007/s11365-019-00632-2
- Mendoza Ocasal, D. L. Vargas Lugo, A. L. Bolaño Melo, L. A. Peralta Miranda, P., Innovative thinking in the leaders and competitiveness of SMEs in the Industrial sector in Colombia. The 4th International Workshop of Innovation and Technologies (IWIT) 26-28 October 2022, Leuven, Belgium. *Procedia Computer Science* 210 (2022) 333–338, 2022.
- Morais, F-. Ferreira, J. J., SME internationalization process: Key issues and contributions, existing gaps and the future research agenda. *European Management Journal*. Volume 38, Issue 1, February 2020, Pages 62-77. DOI: 10.1016/j.emj.2019.08.001
- Nalina, R., & Mahesh, K., A study on the relevance of knowledge management practices and learning organization process as innovative approaches in selected SMEs of Bengaluru. Paper presented at the AIP Conference Proceedings, 2393, 2022. doi:10.1063/5.0074874 Retrieved from www.scopus.com
- Ngah, R. y Wong, K. Y., Linking knowledge management to competitive strategies of knowledge-based SMEs. Volume 33, Issue 1, Pages: 42-59, 2019. DOI:10.1108/BL-08-2019-0105
- Qader, A. A., Zhang, J., Ashraf, S. F., Syed, N., Omhand, K., & Nazir, M., Capabilities and opportunities: Linking knowledge management practices of textile-based SMEs on sustainable entrepreneurship and organizational performance in China. *Sustainability (Switzerland)*, 14(4), 2022. doi:10.3390/su14042219
- Saratchandra, M., Shrestha, A. Murray, P. A., Building knowledge ambidexterity using cloud computing: Longitudinal case studies of SMEs experiences. *International Journal of Information Management* 67 (2022) 102551, 2022.
- SIMA, X. Coudert, T. Geneste, L. Valroger, A., Knowledge management in SMEs: preliminary ideas for a dedicated framework. *IFAC PapersOnLine* 55-10 (2022) 1050–1055, 2022.
- Thi, N. N., SMEs survival and knowledge in emerging economies: evidence from Vietnam. *Heliyon* 8 (2022) e11387,, 2022.
- Velandia Pacheco, Escobar Castillo, A., Navarro Manotas, E., Arevalo, O, Analysis of the knowledge management in industrial exporting SMEs. *Procedia Computer Science* 203 (2022) 476–480, 2022.
- Zide, O., Jokonya, O., Factors affecting the adoption of Data Management as a Service (DMaaS) in Small and Medium Enterprises (SMEs). *Procedia Computer Science* 196 (2022) 340–347, 2022.
- Zhu, D., Li, Z., Mishra, A. R., Evaluation of the critical success factors of dynamic enterprise risk management in manufacturing SMEs using an integrated fuzzy decision-making model. *Technological Forecasting & Social Change* 186,122137, 2023.

Biographies

Oscar A. Vasquez-Bernal is an Associate Professor in the School of Basic Sciences, Technology, and Engineering at Universidad Nacional Abierta y a Distancia, Bogotá Colombia. He earned his Ph.D. in Engineering at Universidad Nacional de Colombia, MBA - Master's in Business Administration from UNAD Florida USA, and BS in industrial

engineering from Universidad Antonio Nariño, Colombia. He has published several journal articles and conference papers. Professor Vasquez-Bernal has been involved in projects with manufacturing and engineering companies. He is a management consultant in quality assurance, project management, and safety management. He has taught courses in entrepreneurship, strategy, and corporate logistics and innovation for engineers; his research interests include certification, accreditation, multi-criteria decision analysis, and optimization. He is a member of NFPA, LACCEI, and IEEE.

Woody Figueroa Peinado is a Professor in the School of Basic Sciences, Technology, and Engineering at Universidad Nacional Abierta y a Distancia, Bogotá Colombia, magister of business administration, specializing in international business at EAFIT University, and a Chemical Engineer at Universidad Pontificia Bolivariana (UPB), Colombia. Professional experience in supply chain management, operations, infrastructure, and IT projects for supply and distribution. Certified as a Scrum Practitioner, Kanban Designer, and Design Thinking. Research Professor for humanitarian logistics and innovation, and global value chains.

William E. Mosquera-Laverde, is an Assistant professor Researcher in, Business Administration Program, graduated as Chemical Engineer from the Universidad Nacional de Colombia, in 1993; Specialist in Higher Education, Universidad Nacional Abierta y a Distancia - UNAD, in 2010 and full master's in environmental management at Universidad de Los Andes, Bogota in 2014. Professor and researcher of Environmental Management at Universidad Cooperativa de Colombia. He has taught courses in Environmental Management, Operations Research, Quality Management, and Finance. He has worked with the Entrepreneurship Center at Universidad Cooperativa de Colombia and sustainability management in vulnerable communities and as a consultant to industrial companies since 1995.