



Knowledge Management System Adoption Approach and the Critical Success Factors in Small Medium Enterprise: A Systematic Literature Review

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Abstract

Knowledge is a substantial factor in an organization, therefore successful implementation of Knowledge Management (KM) or Knowledge Management System (KMS) is important thing for many organizations. This applies for both for large companies, as well as for companies categorized as Small Medium Enterprise (SME). How each companies find solution to deal with KM problems, how to adopt KMS in their company's structure, and what the Critical Success Factors (CSF) need to be highlighted to implement those KMS often vary depending on the size of the organization. Regarding to this issue, this study is aimed to find out how the adoption approach and CSF in the implementation of KM / KMS in SME. On the other hand, this study also can improve the state-of-the-art for KM / KMS implementation in SME and the important CSF in implementing it. A systematic review was performed in this literature review, with the steps as follows: (1) structure the research question, (2) define inclusion-exclusion criteria, (3) paper quality assessment, and (4) data extraction. The study found that in the last 5 years from the time when this research is conducted, TABLE 1 which is from 2016 to 2021, SME has been using many methods like training, meeting, sharing session, repository, and research as a part of their KM / KMS adoption approach. We found also in the last 5 years the CSF for implementing KM / KMS in SME are as follows: organization structure and flexibility, organization culture towards KM adoption, the quality of the knowledge, and communication within and across areas in the organization. communication within and across areas of the organization, and team works within and across areas in the organization. SME can use this research as guideline for implementing KM / KMS in their organization.

Keywords: knowledge management (KM); knowledge management system (KMS); critical success factors (CSF); small medium enterprises (SME); systematic literature review (SLR)

1. Introduction

Small and Medium Enterprises (SME) is the main economic sector in Indonesia. This can be proven by fact that 59.89% of Indonesian Gross Domestic Product (GDP) [1] and 97.16% of employment in 2012 [2] are contributed by SMEs. In the period from 2000 to 2012, SMEs contributed in increasing Indonesia GDP and employment by 0.28% [1], and 1.1% [2] per year, consecutively. In connection with the large contribution to the Indonesian economy sector and the rapid growth of SMEs, Indonesian SMEs need to increase their competitive advantage by implementing Knowledge Management (KM) or Knowledge Management System (KMS) in their organization.

Nowadays, successful implementation of KM or KMS is one of important things for organizations. Companies of various business scales, both large and as well as for SME can gain benefit from implementing KM / KMS

in their organization. The ways in which companies deal with KM problems and how to adopt KMS often vary depending on the size of the organization [3]. For example, attitude that will be taken by large companies will differ from the attitude of companies with an SME in terms of adopting KM.

SME companies perform a variety of business functions, and each of these business functions plays an important role in the company's success in achieving its objectives. Furthermore, other factors such as ownership, business strategy, organizational structure and culture, decision-making processes, and IT infrastructure, also affect the performance of SME companies. Therefore, in order for the proper and successful implementation of KM or KMS, we need to consider and thoroughly investigate how SMEs companies implement KM and the success factors when doing so. To find out how the Adoption Approach and Critical Success Factors (CSF) is in the implementation

of KMS in SME in the current state of the art, a systematic literature review (SLR) is needed to be conducted.

Referring to several studies, Kitchenham SLR approach [4] - [6] fits the needs of study. Therefore, it was chosen to be used in this study. SLR is also used in identifying the category of KM / KMS adoption approach and the CSF that is conducted in various SME. This study aims to identify the adoption approach and CSF for the implementation of KM / KMS in SME and present the recent category related to the adoption approach and the CSF. Research questions were also created as a guide for conducting SLR and identifying research opportunities. Based on research objectives, mapping studies are driven by research questions about this following: (1) How do SME implement KM / KMS in their organization? (2) What CSF criteria affect the success of the adoption of KM / KMS in the SME? Based on these questions, this study implementing the SLR approach from the SCOPUS, Science Direct, Emerald Insight, EBSCOHost, and Springerlink databases. This study tries to create an adoption approach identification table and critical success factor for implementing KM / KMS in SMEs.

We organize this paper into several sections: Section I explain the research background. Section II provides a review of the literature related to the topic. Section III describes the methodology used in this study. Section IV discusses the results and the findings. Section V present the conclusions of the research and references for future research.

2. Research Methods

2.1. Literature Review

SME (Small Medium Enterprise) is usually categorized based on metrics of capital, assets, and industry sector, but mainly to easily categorized a company as a SME or not, usually measured by headcount or number of employees in an organization.

The US Small Business Administration (USSBA) and the Organization for Economic Co-operation Development (OECD), state that SME has employee no more than 500 employees [7]. But this criterion of headcount could be different across countries. For example, SME in UK and across Europe is a company with a maximum of 250 employees, but in Southeast Asia countries specifically Indonesia, a company can be classified as SME if the number of employees is 100 people at max [8].

Knowledge is data, facts, and information that has value. There are 3 (three) tiers of hierarchy starting from data (lowest tier), information (middle tier), and knowledge (higher tier). Based on this hierarchy, knowledge is the richest, deepest, and most valuable compared to data or information. Generally, knowledge

is a tool that could be used to extract more information from data or even extract more useful/valuable information from less useful/valuable information. Whereas knowledge management is a process of management of knowledge. Knowledge is available in many forms and SMEs in running their business need to store and manage much knowledge to be able to sustain, increase their value, and even improve their competitive advantages [9]. Knowledge management is essential for SMEs in the long run, for them to stay afloat and be able to compete with their competitors.

Knowledge Management System or usually called KMS is a system that is enabling its users to collaborate within the system since its designed for managing the large size and complex databases. KMS is a real form of IT and business support to implement knowledge management practices in SMEs. KMS are usually divided into two categories which are KM-Practices and KM-tools (Fig. 1). KM-Practices are defined procedures, methods, and techniques that are used by SMEs to maintain their knowledge. Maintaining in the terms of knowledge creation, knowledge storage, and knowledge sharing/knowledge transfer. KM-Tools are comprehensive IT-based systems that are used to support the process of KM-Practices [10].

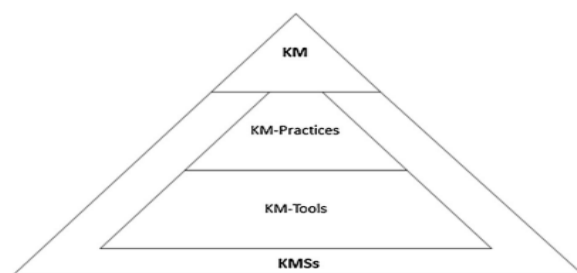


Figure 1. Knowledge Management System

In the last few years, there's been an increasing interest from managers from SMEs towards KMS implementation in their organizations, this shows the awareness of the managers and executives of SMEs towards the importance of KM to support the growth of their organization. KM adoption is very important to integrate sustainable development within an organization. There are many aspects affecting the KM adoption process in a SME, like drivers, enablers, and barriers [11].

Critical Success Factors (CSF) of KM adoption are variables that need to be considered and measured to achieve goals and objectives in the process of KM Adoption. These factors are derived from related literature on KM in SMEs. This section is aimed to summarize the CSFs of KM Adoption that will be categorized into 4 categories, which are organizational factors, strategic factors, resource factors, and people factors as stated in Table 1-4.

Table 1. CSF of KM – Organizational Factors

CSF	Source(s)
Top management commitment to support KM adoption	[11], [12], [13]
Organization structure and flexibility	[11], [12], [13]
Organization culture towards KM adoption	[11], [12], [13]
Best practices and benchmarking towards another organization for KM adoption	[11], [12], [13], [14]

Table 2. CSF of KM – Strategic Factors

CSF	Source(s)
Planning strategic of KM adoption	[11], [13], [15], [16], [14]
General definition of knowledge within organization	[11], [13], [15], [16]
Change management strategic after KM adoption	[11], [16], [13]

Table 3. CSF of KM – Resource Factors

CSF	Source(s)
Cost Factors to do KM adoption	[11], [13], [15]
The availability of human resources – Teams that will implement the process of KM Adoption	[11], [13], [14], [15]
The availability of infrastructure resources that will be needed for KM Adoption	[11], [13]
The quality of the knowledge	[11], [13], [14]

Table 4. CSF of KM – People Factors

CSF	Source(s)
Communication within and across area in the organization	[11], [12], [13], [14]
Team works within and across area in the organization	[11], [12], [13]
Resistance towards change (KM Adoption in organization)	[11], [12], [13], [14]

2.2 Literature-Based Examination

The researchers conducted a systematic review by using the guidelines which have been introduced by B. Kitchenham [4]. Articles collections were chosen within the period of 5 years ago until this period of research which is from January 2016 until October 2021. We obtained 989 papers from 5 electronic databases, namely SCOPUS, Science Direct, Emerald Insight, EBSCOHost, and Springerlink. From the papers that has been collected, the study was worked out to filter them into three levels. At the first level, we are screening the papers. Second, we filter the full paper, and last, data extraction / synthesizing papers.

2.3. Research Strategy

We select the relevant keywords during searching the relevant papers. Some general terms were used with the aim of confirming that most of the research papers were included in the study. We use four concepts terminology for searching the papers in the online journal databases: (1) Knowledge Management, (2) Knowledge Management System, (3) Critical Success

Factors, and (4) Small Medium Enterprise. Herewith are the sample keyword for searching the online electronic database mentioned above: (("knowledge management" OR "knowledge management system" OR "critical success factors" OR "critical success factor") AND (sme OR ("small and medium enterprise"))); Year: 2016-2021;

2.4. Research Question (RQ)

The systematic search of studies that discuss KM or KMS and CSF in SMEs was conducted between 2016 and 2021. Organization needs to consider the importance of KM / KMS to increase the efficiency and effectivity in running their business. So, the aim of the systematic search was to answer this following research question: What is the adoption approach of KM or KMS and the CSF when implementing it in SMEs? We know that the question was too general, so we reformulated it into these two more specific questions (Table 5).

Table 5. CSF of KM – People Factors

Research Question	Description of Objective
RQ1. How do Small and Medium Enterprise implement KM / KMS in the SMEs?	RQ1. To determine method or the adoption approach when SME implementing KM / KMS in the organization
RQ2. What CSF criteria that affect the successful of the adoption of KM / KMS in the SMEs?	RQ2. To determine critical success factors when SME implementing KM / KMS in the organization

2.5. Inclusion and Exclusion Criteria

We divide it into two steps for the literature selection procedure: selecting the literature based on the inclusion and exclusion criteria as shown in Table 6, followed by assessing the quality of the articles.

We select the paper for inclusion and exclusion. The first step is to identify literature and obtained 989 papers from 5 electronic databases. Then we filter the papers based on a parameter that papers have in relation to the research question and are written in English format. The result during the process of inclusion and exclusion papers is 149. The next step is full-text screening papers to include only papers that have (a) focus on KM, (b) KMS (c) CSF (d) SME. Only 111 articles meet these conditions as shown in Table 7. Last, we conduct eligibility checking of the literature with the research question. The paper quality was examined based on the research question.

Table 6. Inclusion and Exclusion Criteria

Stages	Inclusion Criteria	Exclusion Criteria
Initiation	Publication starts from 2016 until 2021 Contains the words 'Knowledge	The journal has no relation to the research question Journals or conference papers do not use English

Stages	Inclusion Criteria	Exclusion Criteria
Title and Abstract Selection	Management 'or Knowledge Management System' and 'Small Medium Enterprise'	
	Or the Contains the word 'Critical Success Factor'	
Full-text selection	Abstract is related to Knowledge Management System and Small Medium Enterprise	The abstract has no relation to the research question
	Abstract is related to Critical Success Factor	
Full-text selection	Literature describes Knowledge Management System in Small Medium Enterprise	The literature does not explain Knowledge Management / Knowledge Management System in Small Medium Enterprises
	The literature describes the Critical Success Factors related to the implementation of Knowledge Management / Knowledge Management System in Small Medium Enterprises	The literature does not explain the Critical Success Factors related to the implementation of Knowledge Management / Knowledge Management System in Small Medium Enterprises

Table 7. Summary of Relevant Publication Found

Electronic Database	Initiation	Title and Abstract	Full-text Selection
Scopus	701	111	80
Science Direct	19	7	4
EBSCOhost	139	25	22
Emerald Insight	103	3	2
Springerlink	27	3	3
Total	989	149	111

2.6. Paper Quality Assessment

Next, we check the suitability between RQ1 and RQ2 with the selected paper. We created a checklist to assess it (Table 8). We give two scores for each checklist, 0 for "not satisfied" and 1 for "satisfied". Therefore, the possible range of scores is 0–8. For further analysis, we select the articles that have scores more than 7.

Table 8. Quality Assessment Checklist

Checklist	Checklist Question
C1	Does the article clearly describe the research objective
C2	Does the article write a literature review, background, and context of the research?
C3	Does the article display related work from previous research to show the main contribution of the research?
C4	Does the article describe the proposed architecture or methodology used?
C5	Does the article have research results?
C6	Does the article present conclusions that are relevant to the research objective/problem?

Checklist	Checklist Question
C7	Does the article recommend future work or improvements for the future?
C8	Scopus indexed (Q1/Q2/Q3/Q4/unindexed)

Out of 111 articles, 30 articles met that criterion: 17 from SCOPUS, 3 from Science Direct, 7 from EBSCOhost, 2 from Emerald Insight, 3 from Springerlink, with four of the articles being listed in two online journal databases. Two papers were published in 2021, six in 2020, 2019, and 2017 each, three in 2018 and seven in 2016. Figure 2 explain the step-by-step start from initiation stage until paper quality assessment and selection.

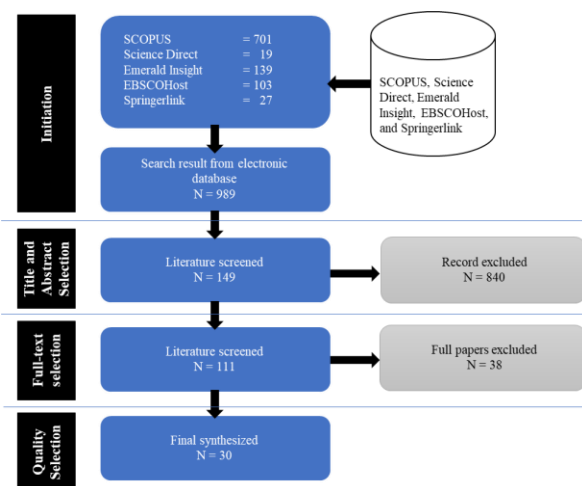


Figure 2. Flow of Systematic Literature Review

3. Results and Discussions

3.1. KM Adoption Approach in SME

From data extraction and synthesizing the literatures, this study classifies the KM / KMS adoption approach in SME into 32 domains / category.

Table 9. KM / KMS Adoption Approach in SME

KM / KMS Adoption Approach in SME	Author	Qty
Training (face-to-face or at a distance)	[13], [14], [17], [18], [19], [20], [21], [22], [23], [24], [25]	11
Meetings and phone calls	[13], [17], [18], [20], [21], [22], [23], [26], [27], [28]	10
Sharing Session	[13], [18], [19], [22], [29], [30], [31], [32], [33], [34]	10
Repository	[21], [22], [23], [24], [25], [32], [35], [36], [37], [38]	10
Research	[13], [18], [19], [22], [25], [26], [29], [39]	8
Communities of Practices	[18], [21], [22], [23], [25], [27], [29]	7
External Benchmarking	[14], [18], [19], [22], [23], [25], [32]	7
Internal Benchmarking	[18], [19], [22], [23], [25], [32]	6
Organizational newsletter/newspaper/private	[18], [21], [22], [23], [25], [40]	6

KM / KMS Adoption Approach in SME	Author	Qty	Factor	CSF	Author	Qty
broadsheet for internal distribution					[31], [32], [33], [34], [36], [38], [39], [43]	
Video conference	[21], [22], [23], [27], [40], [41]	6		Organization culture towards KM adoption	[13], [21], [22], [24], [25], [28], [29], [31], [32], [33], [34], [36], [37], [41], [43], [44]	16
Brainstorming	[17], [18], [21], [23], [28]	5		Best practices and benchmarking towards another organization for KM adoption	[22], [24], [25], [29], [30], [32], [33], [34], [38], [42], [44]	11
Mentoring	[18], [21], [22], [23], [24]	5				
Competency / Performance Management System	[13], [18], [23], [28], [37]	5				
Big Data	[18], [24], [27], [42]	4				
Informal Conversation	[18], [21], [22], [23]	4				
Knowledge Map	[18], [23], [41]	3				
Teamwork culture	[13], [21], [34]	3				
Adoption of Best Practice	[13], [18], [23]	3				
Peer Assist / Peer Review	[18], [23], [27]	3				
Expert systems	[18], [21], [27]	3				
Lesson Learned	[18], [21]	2				
Coaching	[18], [23]	2				
Electronic discussion forum	[18], [21]	2				
Intranet	[21], [23]	2				
Telephone	[20], [21]	2				
Yellow pages / directories of expert	[21], [23]	2				
Creative Rooms	[21]	1				
Staff mobility between offices, teams, and activities	[21]	1				
Handbook	[23]	1				
Blog	[21]	1				
Wiki	[21]	1				
Business Process Management System	[31]	1				
			Strategic Factors	Planning strategic of KM adoption	[13], [14], [21], [22], [25], [27], [29], [32], [33], [36], [39], [40], [41], [42], [44]	15
				General definition of knowledge within organization	[19], [23], [25], [26], [27], [29], [31], [32], [33], [34], [38], [41], [44]	13
				Change management strategic after KM adoption	[13], [21], [22], [25], [27], [29], [32], [33], [37], [40], [41], [44]	12
			Resource Factors	Cost Factors to do KM adoption	[14], [17], [18], [20], [21], [25], [29], [36], [37], [38], [39], [40], [42], [43], [44]	15
				The availability of human resources – Teams that will implement the process of KM Adoption	[17], [18], [20], [24], [25], [29], [36], [37], [38], [39], [42], [43], [44]	13
				The availability of infrastructure resources that will be needed for KM Adoption	[17], [18], [20], [24], [25], [29], [36], [37], [38], [39], [42], [43], [44]	13
				The quality of the knowledge	[14], [20], [24], [25], [26], [28], [29], [30], [31], [32], [33], [37], [38], [42], [43], [44]	16
			People Factors	Communication within and across area in the organization	[13], [23], [24], [25], [26], [27], [19], [29], [30], [31], [32], [33], [34], [37], [38], [44]	16
				Team works within and across area in the organization	[13], [19], [23], [24], [25], [26], [27], [29], [30], [31], [32], [33], [34], [37], [38], [44]	16
				Resistance towards change (KM Adoption in organization)	[13], [17], [24], [25], [26], [27], [28], [29], [32], [33], [34], [37]	12

As can be seen in Table 9, the top 5 of KM adoption approach are dominated by conducting training, whether face-to-face or at a distance. This result is identified by synthesizing 11 papers / literatures. Then followed by conducting meetings in second place, internal sharing sessions in the third place, using repository database for KM adoption in the fourth place with each having 10 papers stating this approach in their study. And in the fifth place, SME make a research group as a way of managing the knowledge internally in their organizations. As we can see, the top 5 KM adoption approach in SME, still dominated with non-technological methods like training, meeting, sharing session, and research. As for the technological method, mostly SME created repository databases for KM / KMS implementation in their organization.

3.2. Critical Success Factors

We already grouped the critical success factors for implementing KM or KMS in SME based on the data extraction as in Table 10.

Table 10. CSF for KM / KMS Adoption Approach in SME

Factor	CSF	Author	Qty
Organizational Factors	Top management commitment to support KM adoption	[13], [14], [17] [18], [19], [20], [21], [22], [23], [24], [25]	10
	Organization structure and flexibility	[13], [17], [19], [21], [24], [25], [29], [30],	16

As can be seen in Table 10, the top 5 of CSF for adoption approach in implementing KM / KMS in SME are dominated by organizational structure and flexibility, organizational culture towards KM adoption, the quality of the knowledge, communication within and across areas in the organization, and team works within and across areas in the organization. This can be seen in table 10, where each of them was mentioned 16 times in the papers / literatures. The top 5 CSF for KM / KMS adoption in SME fairly distributed

from Organizational Factors (2 CSF), People Factors (2 CSF), and Resource Factors (1 CSF). On the other hand, the Strategic Factors do not become the part of top 5 CSF.

4. Conclusion

The main objectives of this study are to examine the adoption approach and critical success factors when implementing KM or KMS in SME. According to the systematic literature review that has been explained systematically in previous sections, this study has found that several adoption approaches of KM / KMS are already implemented by SMEs in their organization. The top 5 tools that mainly used and implemented in SMEs are training, meeting, sharing session, repository, and research. From the analysis outcome of this study, this study also found that the critical success factors that need to be considered for the adoption KM / KMS in SME are organizational culture towards KM adoption, the quality of the knowledge, communication within and across areas in the organization, and team works within and across areas in the organization. We realize that this study has shortcomings, as this study only focusing on the general aspects of KM / KMS adoption approach and CSF in implementing KM / KMS in SME. The future study may identify the important sequence of the critical success factors. By providing this sequence, hopefully future researchers will have insight regarding of which CSF needs more attention while implementing KM / KMS. And in addition to that, other researchers can also analyze which adoption approach is more effective to follow during the implementation of KM / KMS in SME.

References

- [1] "Statistics Indonesia, 'Gross Regional Domestic Product at 2000 Constant Market Prices by Provinces, 2000 - 2013 (Billion Rupiahs),' 1 January 2014," 2014, <https://www.bps.go.id/linkTabelStatistik/view/id/1623> (accessed Feb. 08, 2023).
- [2] "Statistics Indonesia, 'Number of Labor Force, Labor, Unemployment, TPAK dan TPT, 1986–2013,' 1 January 2014," 2014, <https://www.bps.go.id/linkTabelStatistik/view/id/973> (accessed Feb. 08, 2023).
- [3] P. Ansari, A. Tehraninasr, and S. Murugesan, "Knowledge management in small and medium enterprises," *Organ. Innov. IT Gov. Emerg. Econ.*, no. May, pp. 1–20, 2014, doi: 10.4018/978-1-4666-7332-8.ch001.
- [4] B. Kitchenham, O. Pearl Brereton, D. Budgen, M. Turner, J. Bailey, and S. Linkman, "Systematic literature reviews in software engineering – A systematic literature review," *Inf. Softw. Technol.*, vol. 51, no. 1, pp. 7–15, Jan. 2009, doi: 10.1016/J.INFSOF.2008.09.009.
- [5] P. Brereton, B. A. Kitchenham, D. Budgen, M. Turner, and M. Khalil, "Lessons from applying the systematic literature review process within the software engineering domain," *J. Syst. Softw.*, vol. 80, no. 4, pp. 571–583, 2007, doi: 10.1016/j.jss.2006.07.009.
- [6] P. Rahayu, D. I. Sensuse, B. Purwandari, I. Budi, F. Khalid, and N. Zulkarnaim, "A Systematic Review of Recommender System for e-Portfolio Domain," *ACM Int. Conf. Proceeding Ser.*, pp. 21–26, Jan. 2017, doi: 10.1145/3029387.3029420.
- [7] S. C. Eze, V. C. Chinedu-Eze, and H. O. Awa, "Studying Service SME Adoption of Mobile Marketing Technology (MMT) via Technology-Organization-Environment Framework," <https://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/IJISS.202101.0a1>, vol. 14, no. 1, pp. 1–16, Jan. 1AD, doi: 10.4018/IJISS.20220101.OA1.
- [8] Asian Development Bank, "Asia small and medium-sized enterprise monitor 2020. Volume I, Country and regional reviews."
- [9] I. Shaikh Ibrahim and H. Vasudevan, "Review and Analysis of issues related to the implementation of Knowledge Management practices in Indian Automotive SMEs," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 376, no. 1, p. 012125, Jun. 2018, doi: 10.1088/1757-899X/376/1/012125.
- [10] P. Centobelli, R. Cerchione, and E. Esposito, "Knowledge management systems: The hallmark of SMEs," *Knowl. Manag. Res. Pract.*, vol. 15, no. 2, pp. 294–304, May 2017, doi: 10.1057/S41275-017-0054-X.
- [11] J. Karamat, T. Shurong, N. Ahmad, S. Afridi, S. Khan, and N. Khan, "Developing Sustainable Healthcare Systems in Developing Countries: Examining the Role of Barriers, Enablers and Drivers on Knowledge Management Adoption," *Sustain.*, vol. 11, no. 4, Feb. 2019, doi: 10.3390/SU11040954.
- [12] P. Chaithanapat and S. Rakthin, "Customer knowledge management in SMEs: Review and research agenda," *Knowl. Process Manag.*, vol. 28, no. 1, pp. 71–89, Jan. 2021, doi: 10.1002/KPM.1653.
- [13] A. Animesh and S. K. Mukti, "Case study of critical success factors affecting knowledge management in small- and medium-sized enterprises in developing state: Steel sector," *Lect. Notes Mech. Eng.*, pp. 825–831, 2019, doi: 10.1007/978-981-13-6412-9_76.
- [14] M. Becker, S. Klingner, J. Friedrich, F. Kramer, M. Schneider, and K. P. Fähnrich, "Mass customized knowledge management: A project for adequate and dynamic knowledge transfer for small and medium enterprises," *Commun. Comput. Inf. Sci.*, vol. 713, pp. 37–43, 2017, doi: 10.1007/978-3-319-58750-9_5.
- [15] J. Huusko, S. Kuusisto-Niemi, and K. Saranto, "Knowledge Management in Health Technology SMEs," *Stud. Health Technol. Inform.*, vol. 245, pp. 878–881, 2017, doi: 10.3233/978-1-61499-830-3-878.
- [16] E. Marques Júnior, J. A. Gobbo, F. Fukunaga, R. Cerchione, and P. Centobelli, "Use of knowledge management systems: analysis of the strategies of Brazilian small and medium enterprises," *J. Knowl. Manag.*, vol. 24, no. 2, pp. 369–394, Mar. 2020, doi: 10.1108/JKM-06-2019-0334/FULL/XML.
- [17] P. Centobelli, R. Cerchione, and E. Esposito, "Aligning enterprise knowledge and knowledge management systems to improve efficiency and effectiveness performance: A three-dimensional Fuzzy-based decision support system," *Expert Syst. Appl.*, vol. 91, pp. 107–126, Jan. 2018, doi: 10.1016/J.ESWA.2017.08.032.
- [18] M. Heredia-Calzado and A. Duréndez, "The influence of knowledge management and professionalization on the use of ERP systems and its effect on the competitive advantages of SMEs," *Enterp. Inf. Syst.*, vol. 13, no. 9, pp. 1245–1274, 2019, doi: 10.1080/17517575.2019.1640393.
- [19] L. F. Moreno, L. Gamiño, A. Perez-Soltero, F. Javier Leon Moreno, M. Barcelo-Valenzuela, and J. Alfredo Lino Gamiño, "An Approach Based on Knowledge Management for the Use of ICTs in Mexican SMEs," *IUP J. Knowl. Manag.*, vol. 15, no. 4, pp. 7–23, 2017.
- [20] S. Wibowo and S. Grandhi, "Benchmarking knowledge management practices in small and medium enterprises: A fuzzy multicriteria group decision-making approach," *Benchmarking*, vol. 24, no. 5, pp. 1215–1233, 2017, doi: 10.1108/BIJ-01-2016-0013/FULL/XML.
- [21] L. Valentim, J. V. Lisboa, and M. Franco, "Knowledge management practices and absorptive capacity in small and

- medium-sized enterprises: is there really a linkage?," *R D Manag.*, vol. 46, no. 4, pp. 711–725, Sep. 2016, doi: 10.1111/RADM.12108.
- [22] C. Tesavrita and K. Suryadi, "Organization learning through effective knowledge sharing in SME's: A conceptual model," *2016 IEEE Int. Conf. Manag. Innov. Technol. ICMIT 2016*, pp. 203–207, Oct. 2016, doi: 10.1109/ICMIT.2016.7605034.
- [23] A. Kurniawati, T. M. A. A. Samadhi, and I. I. Wiratmadja, "Indicators of knowledge management cycle in Indonesian small and Medium Enterprises," *2016 IEEE Int. Conf. Manag. Innov. Technol. ICMIT 2016*, pp. 198–202, Oct. 2016, doi: 10.1109/ICMIT.2016.7605033.
- [24] N. M. Nor, S. Murni, M. Khairi, H. Rosnan, R. Maskun, and E. R. Johar, "Establishing a knowledge-based organisation Lesson learnt and KM challenges in Malaysian organisation," *Innov. Manag. Rev.*, vol. 17, no. 3, pp. 2515–8961, 2020, doi: 10.1108/INMR-05-2019-0065.
- [25] J. Abbas, Q. Zhang, I. Hussain, S. Akram, A. Afaq, and M. A. Shad, "Sustainable innovation in small medium enterprises: The impact of knowledge management on organizational innovation through a mediation analysis by using SEM approach," *Sustain.*, vol. 12, no. 6, Mar. 2020, doi: 10.3390/SU12062407.
- [26] D. Giampaoli, F. Sgrò, and M. Ciambotti, "How Knowledge Management and Intellectual Capital Improve SMEs Planning Effectiveness," *Proc. ... Int. Conf. Intellect. CAPITAL, Knowl. Manag. Organ. Learn.*, vol. 1, pp. 150–159, 2019, doi: 10.34190/IKM.19.058.
- [27] E. Bolisani, E. Scarso, and M. Zieba, "How to deal with knowledge in small companies? defining emergent KM approach," *Int. J. Learn. Intellect. Cap.*, vol. 13, no. 2–3, pp. 104–118, 2016, doi: 10.1504/IJLIC.2016.075701.
- [28] A. D. Suryawan, E. Putra, and A. Pratiwi, "Knowledge management strategy model for small to medium enterprises," *Proc. - 2015 Int. Conf. Sci. Inf. Technol. Big Data Spectr. Futur. Inf. Econ. ICSITech 2015*, pp. 219–224, Feb. 2016, doi: 10.1109/ICSITECH.2015.7407807.
- [29] A. K. Choudhary, J. A. Harding, M. K. Tiwari, and R. Shankar, "Knowledge management based collaboration moderator services to support SMEs in virtual organisations," *Prod. Plan. Control*, vol. 30, no. 10–12, pp. 951–970, Jun. 2019, doi: 10.1080/09537287.2019.1582102.
- [30] M. ul Hassan and A. Iqbal, "Open Innovation and Innovative Performance of Pakistani SMEs: Moderated Mediation of Knowledge Management Capability and Innovative Climate," *Pakistan J. Commer. Soc. Sci.*, vol. 2020, no. 4, pp. 962–990.
- [31] K. K. Law and A. Chan, "Managing knowledge work in Asia Pacific contexts: case studies of Hong Kong SMEs," *Asia Pacific Bus. Rev.*, vol. 23, no. 4, pp. 475–492, Aug. 2017, doi: 10.1080/13602381.2017.1346207.
- [32] O. Olaitan and S. Flowerday, "Critical success factors in introducing performance measurement metrics for small and medium-sized enterprises (SMEs)," *Int. J. Educ. Econ. Dev.*, vol. 8, no. 2/3, p. 144, 2017, doi: 10.1504/IJEED.2017.10007358.
- [33] P. Mbassegue, M. L. Escandon-Quintanilla, and M. Gardoni, "Knowledge management and big data: Opportunities and challenges for small and medium enterprises (SME)," *IFIP Adv. Inf. Commun. Technol.*, vol. 492, pp. 22–31, 2016, doi: 10.1007/978-3-319-54660-5_3.
- [34] A. Cardoni, F. Zanin, G. Corazza, and A. Paradisi, "Knowledge management and performance measurement systems for SMEs' economic sustainability," *Sustain.*, vol. 12, no. 7, Apr. 2020, doi: 10.3390/SU12072594.
- [35] R. Z. A. Aziz, M. F. Azima, and S. Y. Irianto, "Development of knowledge management system for determining organizational culture in micro, small and medium enterprises using organizational culture assessment instrument," *IOP Conf. Ser. Mater. Sci. Eng.*, vol. 403, no. 1, p. 012078, Sep. 2018, doi: 10.1088/1757-899X/403/1/012078.
- [36] F. Castagna, P. Centobelli, R. Cerchione, E. Esposito, E. Oropallo, and R. Passaro, "Customer knowledge management in SMEs facing digital transformation," *Sustain.*, vol. 12, no. 9, May 2020, doi: 10.3390/SU12093899.
- [37] A. Sultan, "ICT for Improving Competitive Performance of Small and Medium-Sized Enterprises (SME's) through Information & Knowledge Management: An explorative study," *Trends Inf. Manag.*, vol. 11, no. 1, pp. 68–80, 2017, [Online]. Available: <http://recursosdigitales.usb.edu.co:2066/ehost/pdfviewer/pdfviewer?vid=8&sid=720f0492-9ccb-4aec-9f75-2e7772944a1c%40sessionmgr103>.
- [38] D. Pinto, M. Oliveira, F. Bortolozzi, N. Matta, and N. Tenório, "Investigating knowledge management in the software industry: The proof of concept's findings of a questionnaire addressed to small and medium-sized companies," *IC3K 2018 - Proc. 10th Int. Jt. Conf. Knowl. Discov. Knowl. Eng. Knowl. Manag.*, vol. 3, pp. 73–82, 2018, doi: 10.5220/0006925000730082.
- [39] N. Hassan and A. Raziq, "Effects of knowledge management practices on innovation in SMEs," *Manag. Sci. Lett.*, vol. 9, no. 7, pp. 997–1008, 2019, doi: 10.5267/J.MSL.2019.4.005.
- [40] R. Cerchione and E. Esposito, "A systematic review of supply chain knowledge management research: State of the art and research opportunities," *Int. J. Prod. Econ.*, vol. 182, pp. 276–292, Dec. 2016, doi: 10.1016/J.IJPE.2016.09.006.
- [41] V. A. Alexandru *et al.*, "Knowledge management approaches of small and medium-sized firms: a cluster analysis," *Kybernetes*, vol. 49, no. 1, pp. 73–87, Jan. 2020, doi: 10.1108/K-03-2019-0211/FULL/PDF.
- [42] R. Sujatha, "A Systematic Methodology for Assessing and Building Knowledge Management Capacity Among SMEs in India." Apr. 19, 2021, Accessed: Feb. 09, 2023. [Online]. Available: <https://papers.ssrn.com/abstract=4087229>.
- [43] M. Jami Pour and M. Asarian, "Strategic orientations, knowledge management (KM) and business performance: An exploratory study in SMEs using clustering analysis," *Kybernetes*, vol. 48, no. 9, pp. 1942–1964, Sep. 2019, doi: 10.1108/K-05-2018-0277/FULL/XML.
- [44] J. Salvadorinho and L. Teixeira, "Organizational knowledge in the 14.0 using BPMN: a case study," *Procedia Comput. Sci.*, vol. 181, pp. 981–988, Jan. 2021, doi: 10.1016/J.PROCS.2021.01.266.