

SMALL BUT SMART: HOW DOES KNOWLEDGE MANAGEMENT IMPROVE SMES' PERFORMANCE IN EMERGING ECONOMIES

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Abstract: Small and Medium Enterprises (SMEs) are crucial to Indonesia's economy. However, many SMEs encounter obstacles in enhancing their performance. This study seeks to examine the influence of knowledge management, Artificial Intelligence (AI), and innovation on the performance of SMEs in Indonesia. Data was gathered from 200 SMEs across diverse industrial sectors using the survey method. PLS-SEM was used to validate data and examine the hypothesized relationships. The results of the study show the effective implementation of KM contributes to increasing operational efficiency and driving innovation, which is important to adapt to market changes. By managing knowledge well, SMEs can improve their competitiveness and performance through the identification and utilization of opportunities. Innovation serves as a link between KM and performance, creating an environment that supports the development of new ideas. Additionally, AI acts as a mediator that accelerates decision-making and improves collaboration among employees. The results of this study show that SMEs need investment in an organized knowledge management system and supporting technology to achieve optimal performance and sustainable growth. These findings will be beneficial for practitioners and researchers in the field of marketing and entrepreneurship.

Keywords: Knowledge management, Innovation, Artificial intelligence, SME performance

Introduction

The success of a business, especially Small and Medium Enterprises (SMEs), is largely determined by performance, which includes financial, social and environmental performance. SMEs play a role as a generator of the world economy. In addition, SMEs play a role in improving living standards, forging innovations and new ideas. SMEs play an important role in the development of the circular economy (Türkeş et al., 2019). SMEs contribute to job creation, poverty alleviation, and economic growth. Many factors affect the performance of SMEs to achieve a competitive advantage. Research on the performance of SMEs is very relevant, especially in the face of increasingly complex challenges in today's digital era. Recent trends show that Artificial Intelligence (AI) is increasingly becoming the main focus in the development of business strategies (Wall, 2018), (Deranty & Corbin, 2024). AI is not only seen as a tool to improve efficiency, but also as an innovation driver that can help SMEs compete in the global marketplace (Q. Liu et al., 2022). AI is proven to improve financial performance, even return on assets and debt levels (Wilczynska et al., 2024). AI can also stimulate innovation, improve resource allocation, improve productivity as well as workforce structure (Zhang

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& Peng, 2024a). In an era of Volatility, Uncertainty, Complexity, and Ambiguity (VUCA), the ability to adapt and innovate is key to achieving a competitive advantage (Botega & da Silva, 2020).

This research is based on the Knowledge Base View Theory (KBV), which emphasizes the importance of knowledge in technology-based decision-making and innovation (Fernandes et al., 2022). Knowledge is considered an important asset for SMEs, which can improve the efficiency and quality of products and services (Shaikh & Vasudevan, 2020). By adopting effective knowledge management, SMEs can leverage knowledge to achieve a sustainable competitive advantage (Ayinde et al., 2021; Omotayo, 2015). Knowledge management is a process used to capture, store, and share knowledge within an organization (Serenko, 2013); (Botega & da Silva, 2020); (Q. Liu et al., 2022). Knowledge management is practitioner-driven and incorporated into academic research (Serenko, 2013). Knowledge management stimulates the competitive advantage of both large companies and SMEs (Kianto et al., 2017).

Knowledge management skills are the source of innovation (Hock-Doepgen et al., 2021). Empowerment of knowledge management in the management of information flows on social media related to innovation (Ali et al., 2020). Innovation is key for entrepreneurs in achieving a competitive advantage (Yi et al., 2021). Wealth of knowledge positively correlates with innovation performance (Ode & Ayavoo, 2020). Corporate innovation is heavily influenced by knowledge management practices, both directly and indirectly (Ferraris et al., 2021). The main drivers of companies in achieving competitive advantage are knowledge and innovation (Chaithanapat et al., 2022a). The quality of innovation mediates the relationship between customer knowledge management and company performance. Further the moderation effect of the relationship between customer knowledge management and innovation quality (Singh et al., 2021). Knowledge management has a positive relationship to company performance. If knowledge management is implemented well, then performance will improve (Al Suwaidi et al., 2021)

But while knowledge management, AI and innovation offer many opportunities, the challenges faced by SMEs in adopting this technology cannot be ignored. Many SMEs in developing countries often do not have enough budgets to invest in advanced technology (Bressler et al., 2011). Additionally, many SMEs feel unsure about integrating AI into their operations, which can increase uncertainty and doubt (Olsowski et al., 2022). Anxiety in the use of AI can result in a reduction in the workforce, which can trigger dissatisfaction among employees and the public (Jin et al., 2024; Uygungil-Erdogan et al., 2025). Complicated licensing processes and a lack of support from governments can slow down AI adoption, even though they are aware of its potential benefits (Alhosani & Alhashmi, 2024).

The SME literature shows that knowledge management (KM) practices do have an impact on innovation and performance, and play a role in accelerating digital transformation (Durst et al., 2023). However, there are still some important gaps. First, many studies have explored KM and digital transformation separately, so that the integrated relationship between KM (acquisition sharing application) practices, dynamic capabilities (e.g., absorptive capacity, digital orientation), and SME performance has not been tested in a single comprehensive causal model. Recent review findings confirm the role of KM but have not systematically integrated it with dynamic capabilities in the context of SMEs, particularly in developing countries (Idrees et al., 2023).

Second, the empirical evidence on Indonesian SMEs is still limited to descriptions of digital readiness and structural barriers; Inferential quantitative research that examines mediation/moderation mechanisms (e.g., mediation of innovation capabilities or digital knowledge management, moderation

of technological uncertainty or relational networks) is still scarce (Anatan & Nur, 2023). The latest Indonesian study focuses more on readiness, infrastructure gaps, and forms of knowledge transfer, rather than testing integrated theoretical models based on KM of performance dynamic capabilities. Third, the operationalization of KM is still inconsistent (various indicators between studies) and rarely distinguishes between traditional and digital KM practices (platform, analytics, big data) (TH. Tambunan & Busnetti, 2024) While recent studies mark a shift towards digital-based knowledge sharing/transfer and big data utilization in SMEs, its impact on performance and sustainability has not been quantitatively tested.

Given the vital role of SMEs in economic growth and job creation. This research can provide insights into how knowledge management, AI and innovation can improve the performance of SMEs and support the transition to a sustainable economy. This research also contributes to the academic literature by adding to the understanding of the relationship between knowledge management, innovation, AI adoption, and SME performance. As well as highlighting the third knowledge management in creating competitive advantages and adapting SMEs to market changes.

Literature Review

Knowledge Management (KM) is understood as a systematic process of creating, storing, sharing, and applying knowledge to improve organizational effectiveness (Nonaka & Takeuchi, 1995). In the context of SMEs, KM plays an important role because limited resources demand more efficient and strategic knowledge management (Ajayi et al, 2021). Recent studies confirm that while KM practices in SMEs are often informal, KM remains a key capability to face competition and rapid market dynamics (Durst et al., 2023). Thus, KM is positioned as the main foundation in supporting innovation and digital transformation.

The relationship between KM and innovation has been extensively researched, where KM has been proven to be able to strengthen innovation capacity through the process of creating and sharing knowledge. New knowledge from customers, suppliers, and the external environment is a source of ideas that encourage the development of more creative products, services, and processes (Bică et al., 2015). In SMEs, effective KM practices increase *innovation capability*, which in turn contributes to competitiveness and business growth (Nahimana, 2024). This shows that innovation is an important mechanism that bridges the influence of KM on the performance of SMEs.

In addition to innovation, the adoption of Artificial Intelligence (AI) technology is also increasingly seen as crucial in improving the performance of SMEs. AI helps with data-driven decision-making, improves operational efficiency, and expands market reach. However, the success of AI adoption is highly dependent on the quality of knowledge management within the organization (Lemos et al., 2022). KM facilitates the learning process of new technologies, reduces resistance, and strengthens the digital capacity of SMEs (North et al., 2019). Thus, KM, innovation, and AI adoption interact with each other in determining the performance of SMEs, both in terms of sales growth, efficiency, and competitiveness.

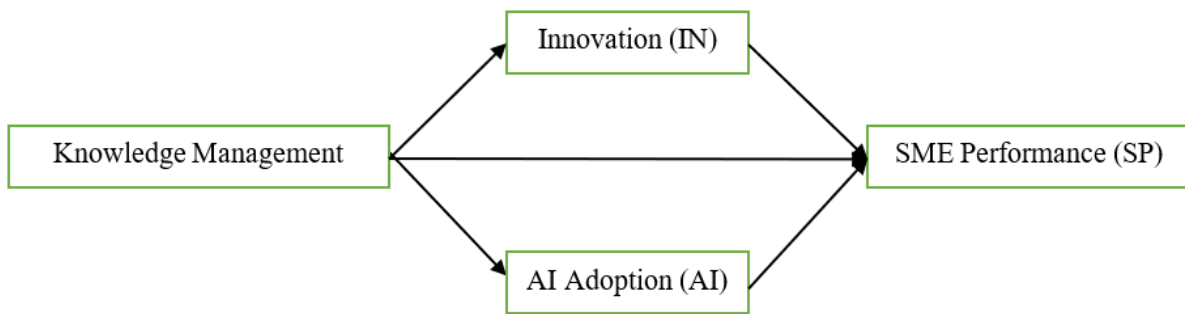


Figure 1. Conceptual Model

Hypothesis that can be presented based on literature studies are:

- Hypothesis 1. Knowledge management positive influences on SMEs Performance
- Hypothesis 2. Knowledge management positive influences on SMEs Performance mediated by innovation
- Hypothesis 3. Knowledge management positive influences on SMEs Performance mediated by artificial intelligence

Methodology

This study uses a quantitative research design with a survey method to collect data from SMEs in Indonesia which is suitable to examine the relationship between the adoption of artificial intelligence-mediated knowledge management and innovation on SME performance. Respondent selection, questionnaire development based on a predetermined scale, and statistical analysis using Structural Equation Modeling (SEM) (Wold et al., 2001). It is based on a strong theoretical foundation and is well-designed for research purposes. This approach allows for an in-depth examination of the hypothesized relationship and provides credible empirical evidence to support the study's conclusions. This methodology is consistent with field standards and contributes to the validity and reliability of the research as a whole. It can be seen from the conceptual model that the number of independent variables is much more diverse than the dependent variables. Therefore, the validity of conceptual models and for hypothesis testing, the help of Partial Least Square (PLS) analysis is needed – Structural Equation Modeling (SEM) (Wold et al., 2001). In order to achieve goals, survey-based empirical validation is used more often. Feedback on the appropriate questionnaire should be taken from usable respondents. Responses must be measured and coded appropriately. The value of the validity and reliability measurement can be seen in Table 1.

Research instrument

In the pre-test stage with a small sample, feedback on the questionnaire that has been compiled will help remove some ineffective questions and add relevant questions. With the help of expert opinions, the wording in complex questionnaires can be simplified, and misleading and biased questions can be eliminated (Worthington & Whittaker, 2006). In research by (Chatterjee & Kumar Kar, 2020), The pilot survey was conducted with a sample size between 50 to 100. From this trial, all the weaknesses in the questionnaire were successfully overcome (Ruel et al., 2016), and the final draft of the

questionnaire was prepared. The total number of items available is 32. (Chatterjee & Kumar Kar, 2020) consulted seven experts, five of whom are industry practitioners. They have more than 10 years of experience in the Industrial Research and Development (R&D) Division and have been involved in product development for SMEs. They also analyze the contribution of knowledge management to the development of the industry. The other two experts are from academic circles, each with a Doctorate, and more than nine years of research experience in this field. The questionnaire consisted of closed-ended questions in the form of statements using a five-point Likert scale (Strongly disagree = 1, Disagree = 2, Somewhat agree = 3, Agree = 4, and Strongly agree = 5).

Data Collection Strategy

Chatterjee & Kumar Kar, (2020) continue to validate hypotheses and conceptual models with the help of PLS-SEM analysis techniques. In this context, the researcher argues that an inadequate sample size will result in a decrease in generalizations (Kline, 2013). The researcher also recommends an item: the response should be between 1:4 and 1:10 (Deb & Lomo-David, 2014). The number of question items is 32, and therefore the response is preferably between 128 and 320. With this in mind, we selected 200 entrepreneurs related to SMEs as a research sample, namely SMEs in the Kupang City Area – Indonesia. The selection of SMEs in the Kupang City Area – Indonesia with the consideration that the city has quite a lot of SMEs because it is a meeting center for business people from various archipelagos in East Nusa Tenggara Province. Data collection was carried out through the distribution of questionnaires.

Result and discussion

Descriptive analysis

A total of 200 respondents as SMEs in this study with various business backgrounds such as culinary/food, fashion, agricultural products, automotive, handicrafts, beauty clinics, architecture, laundry, car/motorcycle rental services, tourist travel services, wooden furniture, and printing. The questionnaires used in this study were 136 male and 44 female respondents. The majority of respondents in this study were in the age group of 30-45 years with a percentage rate of 43.56% years. For the educational background, the majority of respondents are high school with a percentage rate of 43.7%, with the majority business age level of 5 – 10 years.

Tabel 1. Stages of testing the measurement model

Stages	Type of measurement	Conditions
Validity test convergent	<ul style="list-style-type: none"> • AVE value • Loading per-item value 	<p>>0.5</p> <p>>0.5</p>
Validity test discriminant	Square root value AVE	AVE square root value is greater than the correlation value between construct

Reliability test	Composite reliability	>0.7
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Source (s): Wold et al. (2001)

Measurement model testing

Table 2 shows that all variables in this study have an average variance extracted (AVE) value >0.5 so that it is concluded that the variables have met the requirements of the convergent validate test. The correlation value of each variable is greater than the correlation value with other variables, so it can be concluded that each variable has met the requirements of the discriminant validate test. The composite stability (CR) value of each variable is >0.7, so it is concluded that it has met the reliability test.

Structure modeling testing

Structural model testing (for independent variables, mediated variables, and bound variables) can be seen in table 2 which presents the r-square value and a summary of the hypothesis test results and their conclusions. Table 3 shows that the first hypothesis (H1) has a positive path coefficient value and a t-statistical value greater than 1.96 (alpha 5%). Thus, it can be concluded that knowledge management has a positive and significant effect on SME performance. In addition, the second (H2) and third (H3) hypotheses have a positive path coefficient value and a t-statistical value greater than 1.96 (alpha 5%). Thus, it can be concluded that innovation and artificial intelligence have a positive and significant effect on mediating the relationship between knowledge management and SME performance. The results of the square value, path coefficient and significance test can be seen in Table 3.

Table 2. Value of average (AVE), Composite reliability (CR) and correlation between variables

Variable	CR	AVE	AI	IN	KM	SP
Artificial Intelligence (AI)	0.976	0.871	0.933			
Innovation (IN)	0.975	0.885	0.978	0.941		
Knowledge management (KM)	0.967	0.831	0.969	0.969	0.911	
SME Performance (SP)	0.987	0.915	0.972	0.960	0.989	0.957

Source(s): Processed primary data (2025)

Table 3. R-Square value, path coefficient and significance

Item		Path coefficient	T-Statistic	Results	R-Square
Hypothesis	KM→SP	0.836	9.549	H1 Supported	
	KM→AI→SP	0.969	3.458	H2 Supported	
	KM→IN→SP	0.969	1.985	H3 Supported	
R-Square	Artificial intelligence (AI)				0.940
	Innovation (IN)				0.938
	SME performance (SP)				0.982

Source(s): Processed primary data (2025)

Discussion

Knowledge management on SME performance

From the results of the hypothesis test presented in Table 3, it shows that the value of the coefficient has a positive correlation, this means that knowledge management has a positive and significant effect on SME performance because the T-statistical value is more than 1.96. Thus, from the results of this study, it can be concluded that the first hypothesis is accepted. These results are in line with (Ayinde et al., 2021; Omotayo, 2015; Shaikh & Vasudevan, 2020) which revealed that knowledge management has a positive effect on SME performance. Knowledge management is an important process for SMEs in improving their performance. By managing knowledge effectively, SMEs can identify, develop, and leverage existing knowledge in the organization. This contributes to increased innovation, operational efficiency, and the ability to adapt to market changes. For example, SMEs that apply knowledge respond faster to customer needs and develop new products or services that are in line with market demand, thereby increasing their competitiveness.

From the theoretical perspective of knowledge-based view (KBV), knowledge is considered a strategic asset that can provide a competitive advantage for organizations. In the context of SMEs, a good implementation of KM allows them to optimize the use of their knowledge, both explicit and tacit. By integrating knowledge into business processes, SMEs can create greater added value, increase productivity, and strengthen their position in the market. This theory emphasizes that the success of an organization depends not only on physical resources, but also on the ability to manage and utilize knowledge effectively.

The implication of this study is that the implementation of KM in SMEs includes the development of a structured knowledge management system, training employees to share knowledge, and creating an organizational culture that supports collaboration. SMEs need to invest time and resources to build adequate KM infrastructure, such as digital platforms to share information and best practices. In addition, it is important for management to encourage the active participation of all team members in the knowledge sharing process. Thus, SMEs can not only improve their performance, but also create an innovative and responsive environment to change, which will ultimately contribute to sustainability and long-term growth.

Knowledge management on SME performance through innovation

The results of the hypothesis test in Table 3 show that the value of the coefficient has a positive correlation, meaning that innovation is positively and significantly in mediating the relationship between knowledge management and SME performance because the T-statistical value is more than 1.96. Thus the second hypothesis is accepted. These results are in line with (Ali et al., 2020; Chaithanapat et al., 2022b; Yi et al., 2021) which reveals that innovation mediates the influence of knowledge management with SME performance. Knowledge management (KM) and the performance of small and medium enterprises (SMEs) are interconnected with innovation. SMEs that use effective knowledge management methods not only collect and store data, but also create an environment that supports the development of new ideas. In other words, effective knowledge management practices create a strong foundation for innovation, which in turn drives economic improvement.

According to the theory of knowledge-based knowledge (KBV), knowledge is considered a strategic resource that can be used to gain a competitive advantage. In this case, innovation serves as a link between KM and SME performance. Effective knowledge management enables SMEs to more quickly find market opportunities and create innovative products that meet customer needs. Effective knowledge management also strengthens the SME market position and improves overall performance.

It is important for SMEs to integrate knowledge management (KM) strategies with their innovation processes. SMEs need to create a work environment that encourages cooperation and knowledge exchange, as well as provide the necessary training to enhance innovative skills. In addition, the innovation process can be accelerated by investing in technology that supports KM, such as knowledge management information systems. Not only will SMEs have the ability to improve their performance through innovation, but they will also be able to create a sustainable cycle where innovation and KM are mutually beneficial, resulting in sustainable growth and better competitiveness in the market.

Knowledge management on SME performance through artificial intelligence

The results of the hypothesis test in Table 3 show that the value of the coefficient has a positive correlation, meaning that artificial intelligence is positively and significantly in mediating the relationship between knowledge management and SME performance because the T-statistical value is more than 1.96. Thus the third hypothesis is accepted. These results are in line with (W. Liu & Si, 2022; Zhang & Peng, 2024b) which revealed that artificial intelligence mediates the influence of knowledge management with SME performance. When knowledge management (KM) affects the performance of small and medium-sized enterprises (SMEs), artificial intelligence (AI) can help them manage knowledge more efficiently. For example, AI can analyze big data and automate processes,

allowing SMEs to make faster and more informed decisions. It improves operational efficiency and encourages innovation, increasing the competitiveness of SMEs in the market.

In this case, AI also serves as a tool to make employees better work together and share knowledge. SMEs can use AI-based platforms to create an environment where people interact and exchange ideas, which is a critical component of knowledge management. AI speeds up the decision-making process and improves the quality of results achieved because it can find and provide personalized recommendations so that employees can easily gain the knowledge they need to complete their tasks.

Considering the role of AI in mediating KM and SME performance, SMEs should consider adopting AI solutions that suit their needs and provide training to their employees to maximize the use of such technologies. Additionally, it is important for SMEs to develop strategies that integrate AI with their KM practices so that they can create strong synergies between knowledge and performance. With this method, small and medium-sized enterprises (SMEs) will not only improve their performance, but will also build a solid foundation for sustainable growth.

Conclusion

This research focuses on the SME sector in developing countries and successfully fills a gap in the literature on the linkages between knowledge management (KM), innovation, artificial intelligence (AI), and SME performance. The results of the study prove that SME performance in Indonesia is significantly influenced by effective KM practices, innovation, and the use of AI. KM implementation has been proven to improve operational efficiency, encourage innovation, and strengthen the competitiveness of SMEs. In addition, AI acts as an important mediator that enables SMEs to manage knowledge more efficiently, accelerate decision-making, and create synergies for sustainable growth. Thus, despite being in a developing country, Indonesian SMEs are able to demonstrate adaptive capabilities that support competitive advantage.

This research contributes to strengthening the Knowledge-Based View (KBV) by showing that knowledge is not only a strategic resource, but also more effective when integrated with innovations and digital technologies such as AI. The study expands the literature by adding the mediated role of AI in the relationship between KM and SME performance, which was previously relatively underexplored. In addition, these findings emphasize that innovation serves as a connecting mechanism that strengthens the impact of KM on competitiveness, thereby enriching KM theory and innovation in the context of SMEs in developing countries.

For SMEs, this research emphasizes the importance of building a structured knowledge management system, as well as investing resources in digital technology, especially AI. Business practitioners can leverage AI to optimize internal processes, improve decision accuracy, and accelerate responses to market changes. In addition, SME managers need to encourage a culture of innovation so that the knowledge gathered is not only stored, but also translated into new products, services, or business models that are relevant to customer needs. This implication is also relevant for policymakers who can design SME digitalization assistance programs to strengthen competitiveness at the national and global levels.

Limitations and Recommendations

Although it provides significant findings, this study has methodological limitations. First, this study only focuses on the Indonesian context so generalization of results to other developing countries

needs to be done carefully. Second, the use of self-reported survey data has the potential to cause a bias in respondent perception. Third, the cross-sectional approach limits the ability to dynamically identify causal relationships. Therefore, further research is recommended using longitudinal design, data triangulation, and expanding the country context so that the findings are more comprehensive and can be compared across regions.

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