



The Influence Of Knowledge Sharing, Technological Capabilities, And Innovation Strategies On The Smes Performance, Mediated By Open Innovation

Sya'dan Rizqi Tasyrin ¹⁾, Arif Hartono ²⁾

^{1,2)}Study Programme of Management Faculty of Economics and Business, Universitas Islam Indonesia

Email: ¹⁾Syadanrizqi98@gmail.com ;²⁾arif.hartono@fe.uii.ac.id

How to Cite :

Tasyrin, S, R., Hartono, A. (2025). The Influence Of Knowledge Sharing, Technological Capabilities, And Innovation Strategies On The Smes Performance, Mediated By Open Innovation. EKOMBIS REVIEW: Jurnal Ilmiah Ekonomi Dan Bisnis, 13(4). doi: <https://doi.org/10.37676/ekombis.v13i4>

ARTICLE HISTORY

Received [10 April 2025]

Revised [07 October 2025]

Accepted [13 October 2025]

KEYWORDS

Knowledge Sharing,
Technological Capabilities,
Innovation Strategies, SMEs
Performance, Open Innovation.

*This is an open access article
under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) licence*



ABSTRACT

SMEs play a very important role in the Indonesian economy, but often face challenges in utilising technology and adopting innovations needed to remain competitive. This study aims to examine the influence of knowledge sharing, technological capabilities, and innovation strategy on SME performance in Yogyakarta, with open innovation as a mediating variable. Using a quantitative approach, this study collected data from 106 respondents who are SME owners and employees who are active in innovation activities. Data analysis was conducted using Partial Least Squares-Structural Equation Modeling (PLS-SEM) to test the relationship between variables. The results showed that knowledge sharing has a positive and significant effect on open innovation and SME performance. In addition, technological capabilities are also proven to have a significant effect on open innovation and SME performance. Although innovation strategy has a positive effect on open innovation, its effect on SME performance is not significant. Open innovation was found to have a significant influence on SME performance. This finding indicates that SMEs that are active in knowledge sharing and have good technological capabilities, as well as implementing open innovation, will have better performance. This research provides insights for practitioners and academics in formulating strategies to improve SME performance through strengthening knowledge sharing, technology utilisation, and implementing open innovation.

INTRODUCTION

The increasingly fast and dynamic business development brings great challenges to business actors, especially Small and Medium Enterprises (SMEs). Increasingly competitive

competition and unpredictable changes make entrepreneurs constantly strive for improvement and innovation so that their businesses can survive and gain a competitive advantage (Rumanti et al., 2021). In this context, it is crucial for SMEs to maximise strategies to maintain business sustainability, given the significant contribution of SMEs to the economy, both at the national and global levels (Platonova and Maksakova, 2022). SMEs in Indonesia have shown a very high contribution to the national GDP, reaching more than 60%, as well as absorbing almost 97% of the total workforce (Coordinating Ministry for Economic Affairs of the Republic of Indonesia, 2024). Therefore, it is important to understand the factors that can drive SME performance, including technological capabilities, innovation strategies, and knowledge sharing.

The ever-evolving technology in the Industry 4.0 era has a significant impact on SME operations. Digital transformation involving artificial intelligence (AI), Internet of Things (IoT), and big data forces SMEs to adapt to remain competitive (Müller et al., 2021). However, many SMEs still face difficulties in accessing and implementing these technologies, mainly due to limited resources and knowledge (Valdez-Juárez and Castillo-Vergara, 2021). Therefore, understanding the technological capabilities (TC) possessed by SMEs is crucial, as technology is not just a device, but also involves the ability of humans to manage and optimise the technology (Yalcin and Daim, 2021). Strong technological capabilities can drive innovation and operational efficiency which in turn improve the competitiveness of SMEs in the global market (Wu et al., 2022; Taghizadeh et al., 2020).

In addition, knowledge sharing also plays an important role in SME performance. Effective knowledge sharing practices can accelerate innovation, improve internal processes, and enhance overall business performance (Singh et al., 2021; Rabie et al., 2024). Knowledge shared between employees can improve operational efficiency and create new opportunities for product development and innovation within the company (Nonaka, 1994; Rumanti et al., 2023). However, to achieve optimal performance, SMEs also need to adopt a more open approach to innovation, which enables collaboration with external parties, in order to improve technological capabilities and support growth (Lu and Yu, 2021; Donbesuur et al., 2020).

The innovation strategy adopted by SMEs also has a major influence on their performance. Open innovation has been shown to foster external collaboration, accelerate product development, and reduce operational costs, ultimately improving SME performance (Donbesuur et al., 2020; Carrasco-carvajal et al., 2023). Therefore, this study aims to investigate how knowledge sharing, technology capabilities, and innovation strategy can improve SME performance, with open innovation serving as a mediator that strengthens the relationship between these variables.

This research makes an important contribution by filling a gap in the existing literature, especially in the context of SMEs in Indonesia, which often have limited access to technology and face high environmental uncertainty (Taghizadeh et al., 2020). Given that many SMEs in Indonesia are already utilising digital technologies, this research is expected to provide valuable insights into how the three factors interact and influence SME performance, with a focus on the contribution of open innovation which is still rarely discussed in the SME literature in developing countries (Valdez-Juárez and Castillo-Vergara, 2021).

Based on these problems, this study is entitled "The influence of Knowledge Sharing, Tech Capabilities, and Innovation Strategy on SME Performance Mediated by Open Innovation". This study aims to explore the relationship between these variables and provide relevant recommendations for SMEs in improving their competitiveness in the global market.

LITERATURE REVIEW

Knowledge Sharing

In knowledge management, knowledge sharing is considered a key element in improving innovation and organisational performance. Nonaka & Takeuchi (1995) define knowledge

sharing as the process of exchanging information and knowledge among individuals or groups to achieve common goals and support innovation. Research by Azeem et al. (2021) and Zhang et al. (2022) emphasise that knowledge sharing plays an important role in integrating new ideas from outside the organisation, which accelerates the innovation process and increases the competitiveness of the company. In the context of SMEs, knowledge sharing is often a key driver for achieving operational efficiency and improving responsiveness to market changes (Tsai et al., 2022).

SMEs that are active in knowledge sharing not only improve their ability to innovate, but also build a collaborative culture that supports operational efficiency and new product development. Research by Latifah et al., (2022) found that social networks and external interactions improve SMEs' ability to create open innovation, which in turn accelerates product development and expands access to new knowledge. Thus, knowledge sharing not only strengthens the internal capacity of SMEs but also improves their performance in competitive markets.

Technological Capabilities

Technological capabilities have become a very important element in facing global competition. Wu et al. (2022) define technological capability as an organisation's ability to manage and leverage technology for product and process innovation. SMEs that have better technological capabilities are able to respond to market changes faster and more effectively, and improve their operational efficiency (Taghizadeh et al., 2020; Valdez-Juárez & Castillo-Vergara, 2021).

One of the key aspects of TC is technological adaptability, which enables SMEs to quickly adapt to changes in technology and market needs (Noerlina et al., 2022). This is particularly relevant in the Industry 4.0 era, where technological developments such as artificial intelligence (AI), Internet of Things (IoT), and big data require SMEs to develop their technological capabilities to remain competitive in the global market. Research by Taghizadeh et al. (2020) shows that SMEs with higher TC can utilise new technologies to improve operational efficiency, reduce costs, and introduce new products that meet market needs. In addition, Al-Mamary et al. (2022) added that superior technological capabilities enable companies to accelerate innovation and increase responsiveness to market changes.

However, TC does not only include the adoption of new technologies, but also includes managing human resources who have the skills to optimally utilise those technologies. Yalcin & Daim (2021) emphasise that SMEs should develop digital competencies among their employees, as these skills will enable them to operate new technologies more efficiently and optimise the use of those technologies to improve company performance. Technology should be adaptable to the internal needs of the organisation, so as to not only adopt state-of-the-art technologies, but also integrate them in the existing operational flow.

In the context of SMEs, technological mastery also means the ability to manage the innovation process. (Li et al., 2024) showed that good technological capabilities enable SMEs to optimise process innovation, which focuses on improving operational efficiency and effectiveness. Thus, the right technology can not only improve product quality, but can also speed up time to market and reduce production costs, ultimately improving the competitiveness and performance of SMEs in local and international markets. Therefore, it is important for SMEs to develop human resources capable of operating and managing new technologies adopted, as well as utilising external knowledge in the innovation process to support their business growth (Lin and Lai, 2021).

Innovation Strategy

Innovation strategy plays an important role in improving SME performance, both in terms of operational efficiency and customer satisfaction (Hlushenkova, 2022). According to

Chesbrough (2003), an effective innovation strategy not only relies on internal innovation but also integrates external knowledge and ideas through open innovation. By utilising open innovation, SMEs can accelerate the innovation process, reduce costs, and expand access to new markets, which contributes to strengthening their competitiveness in the global market (Chesbrough, 2004).

Research by Carrasco-Carvajal et al. (2023) shows that SMEs that implement innovation strategies involving open innovation perform better, as they are able to collaborate with external partners and utilise more innovative technologies. This allows them to create products that are more relevant to market needs and achieve faster growth. This is in line with the findings by Al-Mamary et al. (2022), who explained that collaboration between SMEs and external partners can enrich their knowledge, improve the quality of products and services, and enable them to be more responsive to changing market needs.

However, innovation strategies are not free from challenges either. O'Dwyer et al. (2011) revealed that many SMEs face difficulties in implementing an effective innovation strategy, mainly due to limited human, financial, and managerial resources. When innovation strategies are implemented without considering the internal capacity available, this can lead to operational disruption, affecting the efficiency and productivity of the company. Therefore, it is important for SMEs to carefully assess their innovation needs and plan implementation accordingly with existing resources to maximise the results obtained from innovation efforts.

Open Innovation

Open Innovation (OI) refers to an innovation approach that allows companies to collaborate with external partners to access knowledge and technology that is not available internally. Chesbrough (2003) defines open innovation as a paradigm that allows companies to utilise external knowledge to create innovations faster and more efficiently.

Research by Carrasco-Carvajal et al. (2023) shows that SMEs that implement open innovation tend to perform better, as they can access various external resources and knowledge that accelerate the innovation process. Open innovation allows SMEs to reduce innovation costs by co-operating with external partners such as universities, research institutes and other companies. It also helps SMEs to reduce the risks associated with innovation as they can share resources and learnings from their external partners.

According to Ta'Amnha et al., (2023), there are two main forms of open innovation that can be applied by SMEs, namely inbound open innovation and outbound open innovation. Inbound open innovation involves filtering and adopting external knowledge to enhance product or process innovation. Meanwhile, outbound open innovation involves sharing knowledge or innovations with external parties. Both forms allow SMEs to access new knowledge, accelerate technological development, and expand their markets.

Implementing open innovation in SMEs requires a clear strategy and careful risk management. Carrasco-Carvajal et al. (2023) note that although many SMEs have started to adopt open innovation, they often face challenges in managing external relationships and maintaining a balance between internal and external knowledge. Therefore, it is important for SMEs to develop an innovation strategy that not only relies on external innovation, but can also utilise their internal strengths and capabilities to achieve optimal results.

SME Performance

SME performance is one of the main topics in economic and management research, due to its significant role in the national economy. According to Carrasco-Carvajal et al. (2023), SME performance can be divided into two main dimensions: financial performance and operational performance. Financial performance includes aspects such as profitability, efficiency of resource use, and stability of income achieved by SMEs, which are often measured by indicators such as sales growth, net profit, return on investment (ROI), and healthy cash flow. Meanwhile,

operational performance emphasises more on the efficiency and effectiveness of internal processes, such as production management, customer satisfaction, and product innovation. These aspects enable SMEs to respond quickly to market demands, improve product or service quality, and maintain timeliness in order completion. Research by Ghiz (Taghizadeh et al., 2020) showed that good operational performance is essential to achieve optimal financial performance. Therefore, these two dimensions should be considered simultaneously in measuring the performance of SMEs, as they contribute to the competitiveness and sustainability of the business.

METHODS

This study uses a quantitative approach with the aim of examining the effect of knowledge sharing, technological capabilities, and innovation strategies on SME performance, mediated by open innovation. The data used in this study are primary data collected through questionnaires distributed to SMEs involved in innovation activities in Yogyakarta. The population in this study is all SMEs active in the Yogyakarta area, with sample criteria including SMEs that have been established for at least 2 years, have more than 5 employees, and are actively innovating products or processes in their operations.

Sampling was conducted using purposive sampling method, where respondents were selected based on certain criteria relevant to the research. The questionnaire used in this study measured variables related to knowledge sharing, technological capabilities, innovation strategy, open innovation, and SME performance using a 5-point Likert scale. Respondents were asked to rate each statement in the questionnaire based on their level of agreement. The scale used is 1 (Strongly Disagree) to 5 (Strongly Agree).

To collect data, questionnaires were distributed through an online platform to facilitate distribution and data collection from dispersed respondents. Data analysis was conducted using Partial Least Squares-Structural Equation Modeling (PLS-SEM), which allows for testing the relationships between latent variables and measuring the influence of independent variables on dependent variables. PLS-SEM was also used to test the mediating role of open innovation in the relationship between the independent variables and SME performance.

RESULTS

Descriptive Analysis

Descriptive analysis was conducted to provide an overview of the respondents' demographic characteristics and the research variables. Based on the data collected from 106 respondents, the characteristics of the respondents were divided according to gender, age, number of employees, industry type, and SME revenue, which are presented in Table 1.

Table 1. Characteristics of Respondents

Respondent Characteristics	Frequency	Percentage
Gender		
Men	65	61%
Women	41	39%
Age		
< 20 years	1	1%
21 - 25 years	21	20%
26 - 30 years	36	34%
31 - 35 years	24	23%
36 - 40 years	18	17%

> 40 years	6	6%
Number of Employees		
1 - 5 people (Minimum)	45	42%
6 - 19 people (Small)	54	51%
20 - 99 people (Medium)	7	7%
Industry Type		
Business and Trade	10	9%
Clothing	22	21%
Services	10	9%
Beauty and Health	7	7%
Crafts	15	14%
Food and Beverages	28	26%
Automotive	5	5%
Tourism	3	3%
Education	2	2%
Agriculture	1	1%
Technology and Electronics	3	3%
Position		
Manager	9	8%
Owner	44	42%
Owner - Manager	23	22%
Senior Staff	30	28%
Last Education		
High school equivalent	15	14%
Diploma equivalent	10	9%
S1 equivalent	70	66%
Master's degree	11	10%
Average Income		
IDR 2,000,000 - IDR 10,000,000	17	16%
IDR 10,000,000 - IDR 50,000,000	40	38%
IDR 50,000,000 - IDR 100,000,000	36	34%
IDR 100,000,000 - IDR 500,000,000	13	12%

Source: Primary Data, 2024

The results of the analysis of the respondents' characteristics provide a clear picture of the profile of the SMEs involved in this study. The majority of SMEs involved in this study have relatively young owners, with most being between 26 to 35 years old. Most also have an undergraduate education, which suggests that SMEs in Yogyakarta are savvy enough to utilise knowledge to improve their performance and competitiveness.

Descriptive Analysis of Variables

Analysis of variable characteristics was conducted to provide an in-depth understanding of how the variables studied in this research were measured, as well as the characteristics of the data generated for each variable. In this study, there are five main variables analysed, namely Knowledge Sharing, Technological Capabilities, Innovation Strategy, Open Innovation, and SME Performance, which are presented in Table 2.

Table 2. Descriptive Analysis of Variables

Variables	Average	Standard Deviation	Minimum	Maximum
Knowledge Sharing	4.20	0.56	2.80	5.00
Technological Capabilities	4.15	0.63	2.90	5.00
Innovation Strategy	4.17	0.58	3.00	5.00
Open Innovation	4.18	0.59	2.75	5.00
SME performance	4.19	0.60	3.00	5.00

Source: Primary Data, 2024

The results of the analysis of variable characteristics show that all variables studied, such as Knowledge Sharing, Technological Capabilities, Innovation Strategy, Open Innovation, and SME Performance, show a positive trend in all indicators measured. These variables have a significant influence in improving the performance of SMEs in Yogyakarta, with Knowledge Sharing and Open Innovation showing the highest value in average.

Outer Model Testing

Measurement model testing is carried out to test the validity and reliability of the constructs used in this study. This process ensures that the measuring instrument used is appropriate and the data obtained is valid and reliable. This test consists of validity and reliability tests. The test results are presented in the following table.

Table 3. Outer Loading for Convergent Validity Test

	Research Variables				
	KS	TC	SI	SME performance	OI
KS1	0,801				
KS2	0,852				
KS4	0,844				
TC3		0,817			
TC4		0,815			
TC5		0,840			
SI2			0,849		
SI4			0,795		
SI5			0,831		
FP1				0,825	
FP3				0,833	
FP4				0,840	
IOI2					0,831
IOI3					0,815
OOI1					0,871

Source: Primary Data, 2024

The test results in Table 3 show that all indicators in this study have an outer loading value of more than 0.6, which indicates that the indicators are valid in measuring the intended construct.

Table 4. AVE Value Measurement Results

Variables	Average Variance Extracted (AVE)
Knowledge Sharing	0,693
Technological Capabilities	0,679
Innovation Strategy	0,681
Open Innovation	0,704
SME performance	0,693

Source: Primary Data, 2024

Table 4 shows that all variables in this study meet the criteria with an AVE value above 0.5, which indicates good convergent validity (Hair et al., 2019). The Open Innovation variable has the highest AVE value, which is 0.704, indicating that the indicators used to measure this variable are very relevant and describe the construct well.

Table 5. Variable Reliability Test Results

Variables	Cronbach's Alpha	Composite Reliability (CR)
KS	0,780	0,871
OI	0,790	0,877
SI	0,768	0,865
SME PERFORMANCE	0,779	0,872
TC	0,764	0,864

Source: Primary Data, 2024

The reliability test results show that all variables in this study are reliable. All have Cronbach's Alpha and Composite Reliability values greater than 0.60, which indicates that the indicators used are consistent and reliable in measuring the intended construct.

Structural Model Testing (Inner Model)

After testing the outer model, the next step is to test the inner model, which aims to test the relationship between latent variables (constructs) in the structural model of this study. The inner model tests whether there is a significant relationship between the independent variable (exogenous) and the dependent variable (endogenous). This test consists of a collinearity test, R2 test, F2 Test, and Path Coefficient Test. The test results are presented in the following table.

Table 6. Colinearity Test Results

	KS	OI	SI	SME performance	TC
KS		2,874		3,562	
OI				4,208	
SI		2,465		2,614	
SME performance					
TC		3,332		3,869	

Source: Primary Data, 2024

Table 6 shows that there is no multicollinearity problem in this research model. All variables have Variance Inflation Factor (VIF) values that are within safe limits, which are below 5. Although the OI variable has the highest VIF value, at 4.208, this figure is still relatively reasonable and does not cause serious concern. Thus, these VIF values indicate that there is no excessive linear relationship between the independent variables, so the regression model used can be considered stable and valid for further analysis.

Table 7. R² Test Results

Variables	R-Square	Adjusted R-Square
Open Innovation	0,762	0,755
SME performance	0,781	0,772

Source: Primary Data, 2024

Based on Table 7, the results of the coefficient of determination test using R-Square show that the Open Innovation variable has an R-Square value of 0.762, which means 76.2% of the variation in this variable can be explained by the independent variables in the model. Meanwhile, the Adjusted R-Square value of 0.735 indicates a slight adjustment to the number of predictor variables in the model, but remains in the strong category. The SME Performance variable has an R-Square value of 0.781, which means that 78.1% of the variation in this variable can be explained by the independent variables in the regression model used. The Adjusted R-Square value of 0.772 indicates that the model remains stable and does not experience significant overfitting. Overall the R-Square value for these two endogenous variables is more than 0.67 and is in the strong category ($R^2 > 0.67$).

Table 8. F² Test Results

	KS	TC	SI	PERFORMANCE_UKM	OI
KS				0.152	0.239
TC				0.1	0.161
SI				0.021	0.060
PERFORMANCE_UKM					
OI				0.173	

Source: Primary Data, 2024

Based on the results of the f-Square test displayed in Table 8, it can be seen how each variable affects each other in the research model. The f-square value is calculated to assess the effect size of the predictor variables on the dependent variable. Knowledge Sharing ($f^2 = 0.239$) has a large influence on Open Innovation and ($f^2 = 0.152$) on SME performance, while

Technological Capabilities has a smaller influence on SME performance ($f^2 = 0.1$) than on open innovation ($f^2 = 0.161$).

Open Innovation has a major influence on SME performance with an f^2 value of 0.173. Overall, this analysis confirms that knowledge sharing, technological capabilities, and open innovation have a significant influence on SME performance, while innovation strategy has a smaller influence directly on SME performance and open innovation.

Table 9. Path Coefficient Test Results

Hypothesis	β	T-statistic	P-value	Conclusion
Knowledge Sharing -> Open Innovation	0,405	3,919	0,000	H1 accepted and Significant
Knowledge Sharing -> SME Performance	0,343	2,740	0,006	H2 accepted and Significant
Technological Capabilities -> Open Innovation	0,355	3,369	0,001	H3 accepted and Significant
Technological Capabilities -> SME Performance	0,289	2,806	0,005	H4 is accepted and Significant
Innovation Strategy -> Open Innovation	0,189	2,387	0,000	H5 is accepted and Significant
Innovation Strategy -> SME Performance	- 0.111	1,293	0.196	H6 is rejected and Not Significant
Open Innovation -> SME Performance	0,403	3,748	0,000	H7 is accepted and Significant

Source: Primary Data, 2024

Testing path coefficients aims to measure the strength of the relationship between latent variables. The results of the path test show that all relationships tested in this research model are significant, with a p-value of < 0.05 , T-Statistic > 1.96 , and a positive Path Coefficients, this indicates that all hypotheses proposed in this study are accepted. In Table 8, it is found that Knowledge Sharing has a positive influence on Open Innovation (coefficient = 0.405, $p < 0.05$, T-Stat 3.919), which supports hypothesis H1.

Knowledge Sharing also has a positive influence on SME Performance (coefficient = 0.343, $p < 0.05$, T-Stat 2.74), which supports hypothesis H2. Similarly, Technological Capabilities have a positive effect on Open Innovation (coefficient = 0.38, $p < 0.05$, T-Stat 3.369) and SME performance (coefficient = 0.355, $p < 0.05$, T-Stat 2.806), supporting hypotheses H3 and H4. Innovation Strategy shows a significant influence on Open innovation (coefficient = 0.189, $p < 0.05$, T-Stat 2.387), so hypothesis H5 is accepted.

However, Innovation Strategy does not show a significant effect on SME Performance (coefficient = -0.111, $p = 0.196$, T-Stat 1.293), so hypothesis H6 is rejected. In addition, Open Innovation has a significant influence on SME Performance (coefficient = 0.403, $p < 0.05$, T-Stat 3.748), which supports hypothesis H7.

DISCUSSION

In this study, the influence of several important factors on the performance of Small and Medium Enterprises (SMEs) in Yogyakarta has been analysed in depth. The results show that knowledge sharing has a significant positive influence on open innovation. The more effective the implementation of knowledge sharing in SMEs, the greater their ability to adopt and implement open innovation.

This shows that internal and external knowledge exchange plays an important role in increasing the innovation capacity of SMEs, which is in line with theories stating that knowledge sharing enables the integration of knowledge from various parties and sources. This study also found that knowledge sharing has a positive effect on the performance of SMEs, which illustrates that organisations that are able to share knowledge will be able to improve their capabilities and operational efficiency, which ultimately results in improved performance.

In addition, technological capabilities also play a significant role in encouraging open innovation. The results show that the higher the technological capabilities possessed by SMEs, the greater their ability to adopt open innovation. These technological capabilities enable SMEs to integrate new technologies and external knowledge, which are crucial elements in open innovation.

In terms of SME performance, technological capabilities are shown to have a significant positive impact, helping SMEs to increase operational efficiency, improve business processes, and expand market reach. By utilising technology effectively, SMEs can increase productivity, product quality, and reduce operational costs.

However, this study also shows that innovation strategy has no significant effect on SME performance. This may be due to various external factors that affect the successful implementation of the strategy, such as resource limitations or lack of adequate support to implement innovation. Nonetheless, innovation strategy is shown to have a positive impact on open innovation, where SMEs with a clear and purposeful innovation strategy are better able to utilise internal and external knowledge to drive the innovation process. Finally, the findings on open innovation show that the implementation of open innovation has a positive and significant influence on SME performance.

Through collaboration with various external parties, such as large companies and universities, SMEs can improve their innovation capabilities and competitiveness, especially in times of crisis. These findings emphasise the importance of open innovation in supporting the growth and sustainability of SMEs, making it a factor that cannot be ignored in an increasingly competitive economic context.

CONCLUSION

1. Knowledge sharing has a positive effect on open innovation, which has an impact on SME performance.
2. Technological capabilities have a significant effect on open innovation, facilitating the adoption of open innovation.
3. Innovation strategy is important in facilitating open innovation, improving the competitiveness of SMEs.
4. Innovation strategy has no significant effect on SME performance.

5. Open innovation has a positive effect on SME performance, accelerating innovation and improving performance.

SUGGESTION

1. Benefits of Theory

This research is expected to enrich the literature on knowledge sharing, technological capability, and innovation strategy in the context of SMEs, as well as the role of open innovation as a mediator in the relationship to SME performance.

2. Practical Benefits

This research provides guidance for practitioners, especially SME owners and managers, to develop more effective strategies in improving company performance through the implementation of open innovation to improve SME competitiveness and business sustainability.

REFERENCES

- Al-Mamary, Y.H.S. *et al.* (2022) 'The impact of technological capability on manufacturing companies: A review', *Journal of Public Affairs*, 22(1), pp. 1–12. Available at: <https://doi.org/10.1002/pa.2310>.
- Carrasco-carvajal, O., García-pérez-de-lema, D. and Castillo-vergara, M. (2023) 'Jurnal Inovasi Terbuka : Teknologi , Pasar , dan Kompleksitas Dampak strategi inovasi , kapasitas serap , dan inovasi terbuka t e r h a d a p kinerja UKM : Sebuah studi kasus di Chili', 9, pp. 0–2.
- Carrasco-Carvajal, O., García-Pérez-de-Lema, D. and Castillo-Vergara, M. (2023) 'Impact of innovation strategy, absorptive capacity, and open innovation on SME performance: A Chilean case study', *Journal of Open Innovation: Technology, Market, and Complexity*, 9(2), p. 100065. Available at: <https://doi.org/10.1016/j.joitmc.2023.100065>.
- Chesbrough, H. (2004) 'Managing Open Innovation', *Research-Technology Management*, 47(1), pp. 23–26. Available at: <https://doi.org/10.1080/08956308.2004.11671604>.
- Donbesuur, F. *et al.* (2020) 'Technological innovation, organizational innovation and international performance of SMEs: The moderating role of domestic institutional environment', *Technological Forecasting and Social Change*, 161(February), p. 120252. Available at: <https://doi.org/10.1016/j.techfore.2020.120252>.
- Hair, J.F. *et al.* (2019) 'When to use and how to report the results of PLS-SEM', *European Business Review*, 31(1), pp. 2–24. Available at: <https://doi.org/10.1108/EBR-11-2018-0203>.
- Hlushenkova, A.A. (2022) 'Innovative strategies in business management', *Economy. Management. Business*, 40(3–4). Available at: <https://doi.org/10.31673/2415-8089.2022.034044>.
- Latifah, L. *et al.* (2022) 'Human Capital and Open Innovation: Do Social Media Networking and Knowledge Sharing Matter?', *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), p. 116. Available at: <https://doi.org/10.3390/joitmc8030116>.
- Li, X. *et al.* (2024) 'FinTech and SME' performance: Evidence from China', *Economic Analysis and Policy*, 81, pp. 670–682. Available at: <https://doi.org/10.1016/j.eap.2023.12.026>.
- Lin, F.-J. and Lai, C. (2021) 'Key factors affecting technological capabilities in small and medium-sized Enterprises in Taiwan', *International Entrepreneurship and Management Journal*, 17(1), pp. 131–143. Available at: <https://doi.org/10.1007/s11365-019-00632-2>.
- Lu, C. and Yu, B. (2021) 'External Collaboration and Innovation Performance of SMEs: The

- Moderation of Government Institutional Support in Chinese Context', in *2021 10th International Conference on Industrial Technology and Management (ICITM)*. IEEE, pp. 41–45. Available at: <https://doi.org/10.1109/ICITM52822.2021.00015>.
- Müller, J.M., Buliga, O. and Voigt, K.I. (2021) 'The role of absorptive capacity and innovation strategy in the design of industry 4.0 business Models - A comparison between SMEs and large enterprises', *European Management Journal*, 39(3), pp. 333–343. Available at: <https://doi.org/10.1016/j.emj.2020.01.002>.
- Noerlina, N. *et al.* (2022) 'The role of technology capability in supporting firm performance in the high-tech manufacturing industry', *F1000Research*, 11, p. 595. Available at: <https://doi.org/10.12688/f1000research.122025.1>.
- Nonaka, I. (1994) 'A dynamic theory of organizational knowledge creation.', *Organization Science*, 5(1), pp. 14–37.
- O'Dwyer, M., Gilmore, A. and Carson, D. (2011) 'Strategic alliances as an element of innovative marketing in SMEs', *Journal of Strategic Marketing*, 19(1), pp. 91–104. Available at: <https://doi.org/10.1080/0965254X.2010.537765>.
- Platonova, I.N. and Maksakova, M.A. (2022) 'Promoting small and medium-sized businesses in Europe for sustainable development in the digitalization era', 003, pp. 1–5.
- Rabie, N., Moustafa, A. and Ghaithi, F. Al (2024) 'Organizational Practices' Role in Managing Open Innovation and Business Performance', *Administrative Sciences*, 14(5). Available at: <https://doi.org/10.3390/admsci14050087>.
- Rumanti, A.A. *et al.* (2021) 'The Impact of Open Innovation Preparation on Organizational Performance: A Systematic Literature Review', *IEEE Access*, 9, pp. 126952–126966. Available at: <https://doi.org/10.1109/ACCESS.2021.3111091>.
- Singh, S.K. *et al.* (2021) 'Top management knowledge value, knowledge sharing practices, open innovation and organizational performance', *Journal of Business Research*, 128(March 2019), pp. 788–798. Available at: <https://doi.org/10.1016/j.jbusres.2019.04.040>.
- Ta'Amna, M.A. *et al.* (2023) 'Open innovation: The missing link between synergetic effect of entrepreneurial orientation and knowledge management over product innovation performance', *Journal of Open Innovation: Technology, Market, and Complexity*, 9(4), p. 100147. Available at: <https://doi.org/10.1016/j.joitmc.2023.100147>.
- Taghizadeh, S.K. *et al.* (2020) 'Technological capabilities, open innovation and perceived operational performance in SMEs: the moderating role of environmental dynamism', *Journal of Knowledge Management*, 25(6), pp. 1486–1507. Available at: <https://doi.org/10.1108/JKM-05-2020-0352>.
- Tsai, F.S. *et al.* (2022) 'Open innovation and SME performance: The roles of reverse knowledge sharing and stakeholder relationships', *Journal of Business Research*, 148(September 2020), pp. 433–443. Available at: <https://doi.org/10.1016/j.jbusres.2022.03.051>.
- Valdez-Juárez, L.E. and Castillo-Vergara, M. (2021) 'Technological capabilities, open innovation, and eco-innovation: Dynamic capabilities to increase corporate performance of smes', *Journal of Open Innovation: Technology, Market, and Complexity*, 7(1), pp. 1–19. Available at: <https://doi.org/10.3390/joitmc7010008>.
- Wu, W., Liang, Z. and Zhang, Q. (2022) 'Technological capabilities, technology management and economic performance: the complementary roles of corporate governance and institutional environment', *Journal of Knowledge Management*, 26(9), pp. 2416–2439.

Available at: <https://doi.org/10.1108/JKM-02-2021-0135>.

Yalcin, H. and Daim, T. (2021) 'A scientometric review of technology capability research', *Journal of Engineering and Technology Management*, 62, p. 101658. Available at: <https://doi.org/10.1016/j.jengtecman.2021.101658>.