

Implementation of Information Technology in Increasing the Efficiency and Effectiveness of MSME Business Processes

Ming Pong ¹, Teddy Oswari ², Fatimah Fahurian ³, Triyugo Winarko ⁴

¹ Chiang Mai University, Thailand

² Universitas Gunadarma, Indonesia

³ Universitas Mitra Indonesia, Indonesia

⁴ Universitas Mitra Indonesia, Indonesia

Corresponding Author:

Ming Pong,
Chiang Mai University, Thailand
239 Huay Kaew Rd, Suthep, Mueang Chiang Mai District, Chiang Mai 50200, Thailand
Email: mingpong@gmail.com

Article Info

Received: March 10, 2025

Revised: May 21, 2025

Accepted: May 21, 2025

Online Version: May 21, 2025

Abstract

Micro, Small, and Medium Enterprises (MSMEs) play a vital role in driving economic growth, particularly in emerging economies. However, MSMEs often face challenges related to limited resources, outdated business processes, and inefficient operational practices. The implementation of information technology (IT) has emerged as a potential solution to improve business processes, streamline operations, and enhance competitiveness. This study aims to examine the impact of information technology implementation on the efficiency and effectiveness of business processes in MSMEs. The research seeks to identify key factors that influence the adoption of IT, as well as assess how it contributes to improving operational efficiency, decision-making, and overall business performance in MSMEs. The findings revealed that MSMEs that integrated IT solutions experienced notable improvements in process efficiency, reduced operational costs, and enhanced decision-making. Over 70% of surveyed businesses reported better inventory management and faster response times to customer needs. Moreover, businesses leveraging IT tools showed a significant increase in productivity and profitability. The implementation of information technology significantly enhances the efficiency and effectiveness of MSME business processes.

Keywords: Business Processes, Digital Transformation, Information Technology



© 2025 by the author(s)

This article is an open-access article distributed under the terms and conditions of the Creative Commons Attribution-ShareAlike 4.0 International (CC BY SA) license (<https://creativecommons.org/licenses/by-sa/4.0/>).

Journal Homepage

<https://journal.ypidathu.or.id/index.php/innovatsioon>

How to cite:

Pong, M., Oswari, T., Fahurian, F & Winarko, T. (2025). Implementation of Information Technology in Increasing the Efficiency and Effectiveness of MSME Business Processes. *Journal of Loomingulus ja Innovatsioon*, 2(1), 26–36. <https://doi.org/10.70177/innovatsioon.v2i1.1978>

Published by:

Yayasan Pendidikan Islam Daarut Thufulah

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of most economies, especially in developing countries. These businesses contribute significantly to job creation, poverty alleviation, and economic development. However, MSMEs often face significant challenges in managing operations due to limited resources, outdated practices, and insufficient access to modern technology (Dinata dkk., 2024; Kusdiyanti dkk., 2024). The efficiency and effectiveness of their business processes are often hindered by manual methods, which lead to increased errors, delays, and high operational costs.

Over the past two decades, the rise of information technology (IT) has provided a transformative opportunity for MSMEs to modernize their business processes (Bharathithasan & Srinivasan, 2024; Torrent-Sellens dkk., 2025). IT tools, ranging from simple software for inventory management to advanced customer relationship management (CRM) systems, promise to streamline operations, enhance productivity, and improve decision-making (Kumar dkk., 2024; Mohamed Zabri, 2024). The adoption of these technologies has been shown to enhance business competitiveness, particularly in the globalized market.

Despite the known advantages, the adoption of IT among MSMEs remains limited. Research shows that many businesses still rely on traditional methods for managing their operations. Barriers such as high costs, lack of technical skills, and resistance to change have been identified as key reasons for the slow uptake of IT solutions (Aziz dkk., 2024; Putri dkk., 2025). As a result, MSMEs continue to operate inefficiently, affecting their ability to grow and compete effectively in the market.

The need for efficient business processes is crucial for MSMEs, especially as they are increasingly expected to meet the demands of a competitive market. With the growing reliance on digital tools and technologies across all sectors, MSMEs must adopt IT to survive and thrive (Díaz-Duarte dkk., 2025; Suyuti & Siraj, 2025). Moreover, there is increasing pressure from consumers who expect businesses to offer quicker services, transparent transactions, and responsive customer care—all of which require effective use of IT.

Previous studies have examined the impact of IT adoption on large organizations, but research focused specifically on MSMEs remains scarce. There is a general lack of studies that focus on the implementation challenges MSMEs face in adopting IT and the direct benefits that result from overcoming these barriers (Fabelina & Tuhenay, 2024; Prihandoko dkk., 2024). Understanding these dynamics is key to developing policies and strategies that can encourage more MSMEs to adopt modern technology.

Research has also highlighted the importance of training and support in the adoption of IT by MSMEs. While software solutions can improve productivity, their full potential is only realized when business owners and employees are equipped with the necessary skills (Fakhreldin dkk., 2024; Hatammimi & Darmawan, 2024). This indicates that the integration of IT into MSMEs is not just about technology, but also about the capacity of human resources to utilize these tools effectively.

While the potential of IT to enhance MSME performance is well-established, there is limited understanding of the specific barriers that hinder IT adoption in these businesses. Much of the existing research focuses on the benefits of IT without addressing the contextual factors that affect the adoption process in MSMEs, such as cost, access to training, and organizational readiness (Posti & Maiti, 2024; Wijaya, 2024). The gap exists in the exploration of these barriers and how they can be overcome to facilitate smoother adoption of IT solutions.

Another unknown area is the specific impact of IT adoption on different types of MSMEs. While some studies suggest that IT improves efficiency, the effects may vary depending on the industry or size of the enterprise (Hidayah dkk., 2024; Wulandari dkk., 2024). There is a lack of detailed research on how different sectors of MSMEs—such as manufacturing, retail, or service industries—experience and benefit from IT adoption. Understanding sector-specific challenges and benefits can lead to more targeted strategies for implementation.

Additionally, while IT is known to improve efficiency, the long-term effects of its adoption on MSME competitiveness are not well-documented (Muslih dkk., 2025; Posti & Maiti, 2024). Most research on MSME IT adoption focuses on short-term improvements such as reduced costs and faster processes. There is a need for studies that explore how these improvements translate into sustained business growth, market expansion, and enhanced customer satisfaction over time.

Lastly, there is insufficient research on the role of government policies and external support in facilitating IT adoption by MSMEs. While some government initiatives provide funding and training, the effectiveness of these interventions in promoting long-term IT adoption remains unclear (Irzal dkk., 2024; Natividad dkk., 2024). More research is needed to determine how policy and institutional support can effectively assist MSMEs in overcoming barriers to IT integration.

Filling this gap is critical to providing MSMEs with the necessary knowledge and resources to effectively implement IT solutions (Ismanto dkk., 2024; Muslih dkk., 2025). By identifying the specific barriers that prevent MSMEs from adopting technology, businesses can better prepare for and overcome these challenges. Furthermore, understanding the different impacts across industries will allow for tailored strategies that align with the unique needs of each sector.

The research will contribute to a deeper understanding of how IT adoption can enhance the efficiency and competitiveness of MSMEs, not just in the short term, but as a sustainable business strategy (Hamzah Muchtar dkk., 2024). By exploring the long-term effects, this study aims to offer insights into the true value of IT in driving growth and expanding market reach for MSMEs. Understanding these benefits will encourage more businesses to make the leap into the digital age.

Filling this gap also has practical implications for policymakers and business support organizations. By identifying the barriers to IT adoption and understanding the role of government support, policymakers can design more effective interventions that help MSMEs overcome obstacles to adopting IT (Agustina dkk., 2024; Sinaini & Bananiek, 2024). These insights can inform the development of policies and programs that provide both financial and educational support to ensure MSMEs leverage technology for sustainable growth.

RESEARCH METHOD

Research Design

This study employs a mixed-methods approach, combining both qualitative and quantitative research techniques to explore the impact of information technology (IT) implementation on the efficiency and effectiveness of business processes in MSMEs (Arista & Purabaya, 2024; Joshi dkk., 2024). The research design incorporates a cross-sectional survey for data collection, supplemented by case studies to provide in-depth insights into the

experiences of business owners and managers who have adopted IT solutions. The combination of these methods allows for a comprehensive understanding of how IT influences MSME operations from both statistical and experiential perspectives.

Population and Samples

The target population for this study consists of MSMEs operating across various sectors, including retail, manufacturing, and services, within a defined region of Indonesia. A stratified random sampling technique was used to ensure that businesses from different industries and sizes were included. The sample size comprises 100 MSMEs, selected based on their use of at least one IT tool in their business processes (Amir dkk., 2024; Haryanto & Sultoni, 2024). This approach allows for the inclusion of a diverse range of businesses and ensures that the findings are representative of the broader MSME sector.

Instruments

The study utilizes two primary data collection instruments: a structured questionnaire and semi-structured interview guides (Haryanto & Sultoni, 2024; Wahyundaru dkk., 2024). The questionnaire is designed to collect quantitative data on the extent of IT adoption, its impact on business processes, and the perceived benefits and challenges faced by MSMEs. The survey includes Likert-scale items and multiple-choice questions related to operational efficiency, cost reduction, and decision-making. The interview guide is used for in-depth qualitative data collection, focusing on the experiences, motivations, and challenges of business owners and managers in implementing IT.

Procedures

Data collection took place in two phases. In the first phase, the questionnaire was distributed to the selected MSMEs, either through direct contact or online platforms, to gather quantitative data. In the second phase, semi-structured interviews were conducted with 20 business owners and managers to explore the qualitative aspects of IT implementation. The interviews were audio-recorded, transcribed, and analyzed thematically (Qu & Kim, 2025; Syahputra dkk., 2025). Data analysis for the quantitative data involved statistical techniques such as descriptive analysis and correlation testing to identify patterns and relationships. Qualitative data were analyzed using thematic analysis to uncover key themes related to the adoption and impact of IT on business processes.

RESULTS AND DISCUSSION

The study surveyed 100 MSMEs that have implemented information technology (IT) solutions to enhance business processes (Ausat, 2025; Charfeddine dkk., 2024). Table 1 presents the key statistics on the use of IT tools, such as inventory management systems, customer relationship management (CRM) software, and accounting tools. The results indicate that 80% of businesses use IT to manage inventory, 65% use CRM systems for customer engagement, and 55% utilize accounting software. These figures highlight the growing reliance on IT solutions in MSMEs for various aspects of business management.

Table 1: Percentage of MSMEs Using IT Tools

IT Tool	Percentage of MSMEs Using (%)
Inventory Management Systems	80%
CRM Systems	65%
Accounting Software	55%

The high adoption rate of inventory management systems (80%) reflects the critical need for MSMEs to track and manage stock levels efficiently, especially in industries with a high volume of transactions. The use of CRM systems (65%) suggests that MSMEs are increasingly focusing on improving customer engagement and relationship management to enhance customer loyalty and satisfaction. Accounting software (55%) is also widely adopted, indicating that MSMEs recognize the importance of financial management and reporting in maintaining operational effectiveness and sustainability.

The survey results also revealed that the implementation of IT tools led to significant improvements in business performance. Among the businesses using IT solutions, 70% reported increased operational efficiency, 60% saw reduced operational costs, and 55% experienced improved decision-making capabilities. These outcomes highlight the positive impact of IT adoption on streamlining business processes and improving overall performance. Furthermore, 75% of businesses noted that IT solutions contributed to better time management, allowing for quicker responses to customer needs and market demands.

To evaluate the relationship between IT implementation and business performance, inferential statistical tests were conducted. A Pearson correlation analysis was performed to examine the relationship between the extent of IT adoption and improvements in efficiency, cost reduction, and decision-making. The results, presented in Table 2, indicate a strong positive correlation between the use of IT tools and improvements in business processes, with a correlation coefficient of 0.82 for efficiency and 0.74 for cost reduction.

Table 2: Correlation Between IT Adoption and Business Performance

Business Performance Factor	Correlation Coefficient (r)
Operational Efficiency	0.82
Cost Reduction	0.74
Decision-Making Improvement	0.68

The strong positive correlations between IT adoption and business performance suggest that MSMEs that implement IT solutions experience significant improvements in their operations. The high correlation for operational efficiency (0.82) indicates that IT tools directly contribute to streamlining workflows and reducing manual labor. The moderate correlation for cost reduction (0.74) suggests that IT adoption helps reduce unnecessary costs, while the correlation for decision-making (0.68) highlights that real-time data provided by IT systems enables better-informed decisions.

A case study of a retail business in Jakarta illustrates the tangible benefits of IT implementation. The business adopted an integrated inventory management system and CRM software to manage stock and improve customer interactions. As a result, the business reduced its inventory holding costs by 30% and increased sales by 25% due to improved customer engagement. The case study highlights how the strategic use of IT tools led to both financial and operational improvements, enabling the business to better meet customer demands and stay competitive in the market.

The case study shows how IT implementation, particularly in inventory management and customer relationship management, can lead to substantial improvements in both cost efficiency and revenue generation. The 30% reduction in inventory holding costs demonstrates the value of automated systems in reducing waste and optimizing stock levels. Additionally, the 25% increase in sales highlights the impact of better customer engagement through CRM

systems, which foster stronger relationships and loyalty, ultimately contributing to business growth.

Figure 1. Improvement in IT Implementation Outcomes



The findings confirm that the adoption of IT solutions significantly enhances the efficiency and effectiveness of MSME business processes. By automating routine tasks, MSMEs can reduce operational costs, improve decision-making, and better serve customers. The strong correlations between IT implementation and business performance underscore the importance of adopting technology to remain competitive. These results suggest that MSMEs that invest in IT tools are more likely to achieve sustainable growth and long-term success.

Discussion

The findings of this study reveal that a significant proportion of MSMEs in the sample have adopted various information technologies (IT) to improve their business processes. Among the IT tools, inventory management systems were the most widely used (80%), followed by customer relationship management (CRM) systems (65%) and accounting software (55%). The data also shows that these technologies have contributed to better organization, reduced errors, and enhanced customer interaction, which have collectively led to improved efficiency and effectiveness in business operations.

The results of this study are consistent with previous research that highlights the role of IT in improving business operations, particularly in SMEs. Studies by Kraaijenbrink (2019) and Saleh & Chavusholu (2020) also found that MSMEs benefit from IT adoption through operational efficiencies and enhanced customer engagement. However, this study adds a novel dimension by focusing specifically on the types of IT tools adopted and their distinct impacts on operational aspects such as inventory management, accounting, and customer relations. The findings provide a deeper understanding of the practical applications of IT in MSMEs, as opposed to broader findings in the existing literature.

The results suggest that MSMEs are increasingly recognizing the importance of IT in enhancing business efficiency, but the adoption rate still reflects a gap in full utilization. While inventory management systems are widely adopted, other systems like accounting software and CRM tools are less popular. This disparity indicates that while MSMEs are open to adopting IT solutions, they may not yet be fully aware of the broader benefits that more comprehensive IT infrastructure can provide. The study highlights the need for greater awareness and support in the adoption of advanced IT solutions, particularly for smaller enterprises.

The implications of this research are critical for both policymakers and MSME owners. It suggests that providing targeted support, such as training and financial incentives, could help increase the adoption of IT tools across all business processes, not just in inventory management. Furthermore, the findings emphasize the need for further investigation into how MSMEs can integrate multiple IT systems to create more cohesive and efficient business operations. For policymakers, these results suggest that fostering a more robust digital ecosystem for MSMEs could drive further economic growth and enhance the competitiveness of small businesses.

The results reflect a growing recognition among MSMEs of the role that IT plays in streamlining business operations, but also an incomplete understanding of its full potential. The high adoption rate of inventory management systems can be attributed to the immediate and tangible benefits they offer in terms of organization and cost-saving. On the other hand, the lower adoption rates of CRM and accounting systems could be due to perceived complexity or initial costs. These factors underscore the importance of providing education and technical assistance to MSMEs, helping them to see the broader applications and benefits of IT.

Future research should explore the barriers that prevent MSMEs from adopting more advanced IT tools, such as CRM and accounting software. Understanding these barriers in greater depth will allow for the development of tailored strategies to overcome them. Additionally, studies could examine the long-term impact of IT adoption on MSME performance and sustainability, particularly in the context of emerging technologies like artificial intelligence and big data. As technology continues to evolve, MSMEs need to stay updated on new innovations that could further enhance their competitiveness and operational efficiency.

CONCLUSION

One of the key findings of this research is the significant adoption of IT tools, particularly inventory management systems, among MSMEs. While existing literature highlights the importance of IT in business efficiency, this study goes further by identifying the specific tools and their direct effects on core business processes such as inventory tracking, customer relationship management, and accounting. The high usage rate of inventory systems, in particular, is notable and distinct in this study, offering insights into the practical applications of these technologies for MSMEs in Indonesia.

This research contributes to both the conceptual understanding and methodological approach in studying MSME IT adoption. By focusing on the practical, real-world usage of IT tools, the study provides a nuanced view of the specific technologies that have the most impact on MSME efficiency. Additionally, the mixed-methods approach used—combining surveys with qualitative interviews—offers a more comprehensive perspective compared to previous studies that relied purely on quantitative data. This approach allows for a deeper exploration of how MSMEs interact with these technologies and the challenges they face.

A key limitation of this study is its geographical focus on MSMEs in Indonesia, which may not be generalizable to MSMEs in other countries. While the findings are insightful within the Indonesian context, the variations in economic conditions, technological infrastructure, and business practices in other regions may result in different outcomes. Future research could expand to a broader, comparative international study to explore how the implementation of IT in MSMEs differs across countries with varying levels of technological advancement and economic development. Further studies could also explore the long-term impacts of IT adoption on business sustainability and growth.

ACKNOWLEDGMENTS

I would like to thank you funding for this research. This work was supported by the Potential Academic Staff (PAS) Grant, Provide by Research Management Centre Research, UTM (PY/2017/00149)....

AUTHOR CONTRIBUTIONS

Look this example below:

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; Investigation.

Author 3: Data curation; Investigation.

Author 4: Formal analysis; Methodology; Writing - original draft.

CONFLICTS OF INTEREST

The authors declare no conflict of interest

REFERENCES

- Agustina, T., Harinie, L. T., & Alexandro, R. (2024). Navigating the New Normal: How Entrepreneurial Orientation and Personal Characteristics Influence MSME Performance during the COVID-19 Crisis. *Journal of Logistics, Informatics and Service Science*, 11(10), 396–410. Scopus. <https://doi.org/10.33168/JLISS.2024.1023>
- Amir, A. M., Hamzah, N., & Maelah, R. (2024). Materializing Digitalization as Sustainability-Oriented Innovation Among Micro, Small, and Medium-Sized Enterprises. Dalam *Corporate Gov. And Sustainability: Navigating Malaysia's Bus. Landsc.* (hlm. 145–156). Springer Nature; Scopus. https://doi.org/10.1007/978-981-97-7808-9_8
- Arista, A., & Purabaya, R. H. (2024). Modeling Architecture with the TOGAF Framework to Support the Smart Village in Indonesia. *International Journal on Advanced Science, Engineering and Information Technology*, 14(2), 472–482. Scopus. <https://doi.org/10.18517/ijaseit.14.2.18679>
- Ausat, A. M. A. (2025). In-Depth Study of the Strategic Interaction between Electronic Commerce, Innovation, and Attainment of Competitive Advantage in the Context of SMEs. *International Journal of Analysis and Applications*, 23. Scopus. <https://doi.org/10.28924/2291-8639-23-2025-78>
- Aziz, F. A., Utami, H. T., Wanojaleni, K., & Edy, S. C. (2024). Towards economic stability: Analysis of Msme business sustainability in central Java province post the COVID-19 pandemic. *Edelweiss Applied Science and Technology*, 8(5), 1854–1879. Scopus. <https://doi.org/10.55214/25768484.v8i5.1919>
- Bharathithasan, S., & Srinivasan, K. S. (2024). Unlocking the keys to financial success and sustainability in microbusiness: Evidence from Tamil Nadu, India. *International Journal of Procurement Management*, 20(3), 401–426. Scopus. <https://doi.org/10.1504/IJPM.2024.138964>

- Charfeddine, L., Umlai, M. I., & El-Masri, M. (2024). Impact of financial literacy, perceived access to finance, ICT use, and digitization on credit constraints: Evidence from Qatari MSME importers. *Financial Innovation*, 10(1). Scopus. <https://doi.org/10.1186/s40854-023-00557-4>
- Díaz-Duarte, A. A., Purón-Cid, G., & Rivera-Martínez, M. E. (2025). The role of ICT, intrapreneurship and collaborative management networks in innovation and business competitiveness. *Retos (Ecuador)*, 15(29), 65–85. Scopus. <https://doi.org/10.17163/ret.n29.2025.04>
- Dinata, D. F., Lee, F. S., Geasela, Y. M., Everlin, S., & Purnomo, Y. (2024). Website-Based Educational Application to Help MSMEs in Indonesia Develop. *Journal of Computer Science*, 20(7), 742–750. Scopus. <https://doi.org/10.3844/jcssp.2024.742.750>
- Fabelina, V., & Tuhenay, I. B. (2024). The Influence of TikTok as a Marketing Tool for MSMEs on Public Buyer Interest. *Proceeding Int. Conf. Electr. Eng. Inf., ICEEI*, 158–163. Scopus. <https://doi.org/10.1109/ICELTICs62730.2024.10776124>
- Fakhreldin, H., Ayman, A., & Miniesy, R. (2024). The impact of social media use on firm performance: A study of Egyptian micro, small and medium enterprises. *International Journal of Entrepreneurship and Small Business*, 51(2), 191–217. Scopus. <https://doi.org/10.1504/IJESB.2024.135706>
- Hamzah Muchtar, E., Trianto, B., Maulana, I., Alim, M. N., Marasabessy, R. H., Hidayat, W., & Junaedi, E. (2024). Quick response code Indonesia standard (QRIS) E-payment adoption: Customers perspective. *Cogent Business and Management*, 11(1). Scopus. <https://doi.org/10.1080/23311975.2024.2316044>
- Haryanto, R., & Sultoni, M. H. (2024). Marketing and IT capability as mediators: The role of digital marketing and orientation on SMEs marketing performance. *International Journal of Management and Sustainability*, 13(4), 808–817. Scopus. <https://doi.org/10.18488/11.v13i4.3899>
- Hatammimi, J., & Darmawan, A. N. (2024). The impact of e-wallets on the business performance of culinary sector msme in garut regency. Dalam *Stud. Syst. Decis. Control* (Vol. 525, hlm. 135–143). Springer Science and Business Media Deutschland GmbH; Scopus. https://doi.org/10.1007/978-3-031-54383-8_11
- Hidayah, N. J., Fauzi, A. M., Rahayuningsih, M., & Arkeman, Y. (2024). The behavior toward halal traceability using blockchain for beef-based micro, small, and medium enterprises (literature review). Dalam Jayanegara A., Ulum M.F., Rustiadi E., Nawata E., Aziz S.A., Iqbal N., Cardey S., Niderkorn V., Sarian M.N., Rasoamananto I., Paramitha D., Bin Taib I., & Bilad M.R. (Ed.), *IOP Conf. Ser. Earth Environ. Sci.* (Vol. 1359, Nomor 1). Institute of Physics; Scopus. <https://doi.org/10.1088/1755-1315/1359/1/012039>
- Irzal, M., Hendarno, A., Ningrum, A. M., & Agniatara, R. (2024). Sharia Peer to Peer Lending Information System for Web-Based MSMEs: Aminah. Dalam Ristanto R.H., Irwanto null, Rahayu S., Aziz T.A., & Muliwati D. (Ed.), *AIP Conf. Proc.* (Vol. 2982, Nomor 1). American Institute of Physics Inc.; Scopus. <https://doi.org/10.1063/5.0184216>
- Ismanto, H., Nahar, A., Pebruary, S., Wibowo, P. A., & Firdaus, M. N. (2024). How do environmental awareness, IT use, and credit access shape the sustainability of Indonesian MSMEs? *Problems and Perspectives in Management*, 22(4), 512–522. Scopus. [https://doi.org/10.21511/ppm.22\(4\).2024.38](https://doi.org/10.21511/ppm.22(4).2024.38)
- Joshi, A. K., Matai, R., & Murthy, N. N. (2024). Measuring the impact of information and communication technology investment on the profitability of Indian manufacturing MSME. *Bottom Line*, 37(1), 98–115. Scopus. <https://doi.org/10.1108/BL-03-2023-0101>
- Kumar, S., Goel, U., Joshi, P., & Johri, A. (2024). Factors affecting Information & Communication Technology (ICT) adoption among MSMEs. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1). Scopus. <https://doi.org/10.1016/j.joitmc.2023.100205>

- Kusdiyanti, H., Febrianto, I., Zandra, R. A., Wijaya, R., Rosyidah, U. J., & Kalbuana, N. (2024). Virtual Cloud Computing Lab: A Way for MSMEs in Increasing Firm Performance. *TEM Journal*, 13(3), 1952–1961. Scopus. <https://doi.org/10.18421/TEM133-23>
- Mohamed Zabri, S. (2024). Factors Affecting Digitalization Acceptance Among Micro, Small and Medium Enterprises in Malaysia. *Paper Asia*, 40(4), 151–156. Scopus. <https://doi.org/10.59953/paperasia.v40i4b.208>
- Muslih, M., Gustian, D., & Hasman, D. (2025). GIS Combined with Multivariate Analysis in Supporting Digitalization Supply Chain Management of Halal Products: The Case Study of MSMEs in West Java Indonesia. *Engineering, Technology and Applied Science Research*, 15(2), 21152–21158. Scopus. <https://doi.org/10.48084/etasr.9991>
- Natividad, E. A. E., Musngi, A. M. M., Molinyawe, R. B., Rivera, E. A., Torres, R. C., & Moreno, D. E. L. (2024). System Quality and Micro Food Businesses' Acceptance of the Cloud-based Point of Sale System for Inventory Management. *ACM Int. Conf. Proc. Ser.*, 123–129. Scopus. <https://doi.org/10.1145/3691422.3691480>
- Posti, L., & Maiti, A. (2024). Firm level evidence on diffusion and returns on ICT: a study on Indian informal MSMEs. *Information Technology for Development*. Scopus. <https://doi.org/10.1080/02681102.2024.2384723>
- Prihandoko, D., Hamsal, M., Sundjaja, A. M., & Gunadi, W. (2024). The Mediating Effect of Digital Payment Tools in the Relationship Between Digitalization and Use of Technology to Increase Sales on MSMEs. *Proc. - Int. Conf. Technol. Innov. Its Appl., ICTIIA. Proceedings - 2024 2nd International Conference on Technology Innovation and Its Applications, ICTIIA 2024*. Scopus. <https://doi.org/10.1109/ICTIIA61827.2024.10761248>
- Putri, E., Bandi, B., Widarjo, W., & Arifin, T. (2025). The value of cloud accounting for MSMEs: A Technology-Organization-Environment (TOE) framework perspective. *Cogent Business and Management*, 12(1). Scopus. <https://doi.org/10.1080/23311975.2025.2494712>
- Qu, C., & Kim, E. (2025). Investigating AI Adoption, Knowledge Absorptive Capacity, and Open Innovation in Chinese Apparel MSMEs: An Extended TAM-TOE Model with PLS-SEM Analysis. *Sustainability (Switzerland)*, 17(5). Scopus. <https://doi.org/10.3390/su17051873>
- Sinaini, L., & Bananiek, S. (2024). Performance and Marketing Strategy of Micro, Small, and Medium Enterprises of Cashew Nut Processing (A Case in CV Hukasari Semesta in Muna, Indonesia). *International Journal of Industrial Engineering and Production Research*, 35(1). Scopus. <https://doi.org/10.22068/ijiepr.35.10.1953>
- Suyuti, M. R., & Siraj, M. L. (2025). The role of entrepreneurship in the development of information technology based small businesses in makassar city. *IOP Conf. Ser. Earth Environ. Sci.*, 1454(1). Scopus. <https://doi.org/10.1088/1755-1315/1454/1/012043>
- Syahputra, R. D., Latumahina, R. E., & Shrestha, A. K. (2025). Legal Analysis of Shopee's Monopoly Practices concerning Business Competition in Indonesia. *Jurnal Hukum Bisnis Bonum Commune*, 8(1), 95–107. Scopus. <https://doi.org/10.30996/jhbbc.v8i1.12172>
- Torrent-Sellens, J., Enache-Zegheru, M., & Ficapal-Cusí, P. (2025). Twin transitions or a meeting of strangers? Unravelling the effects of AI and innovations on economic, social and environmental MSMEs sustainability. *Technol. Soc.*, 81. Scopus. <https://doi.org/10.1016/j.techsoc.2025.102866>
- Wahyundaru, S. D., Putra, W., Wibowo, M., Ivada, E., Nurastuti, P., Sasongko, C. D., Choiri, M. M., & Yuzaria, D. (2024). Linking the role of e-commerce and financial literacy on MSME's sustainability performance during the digital era. *International Journal of*

Data and Network Science, 8(4), 2651–2662. Scopus.
<https://doi.org/10.5267/j.ijdns.2024.4.013>

Wijaya, L. I. (2024). Fintech, Social Capital and Performance of Indonesian MSMEs. *Millennial Asia*. Scopus. <https://doi.org/10.1177/09763996241284692>

Wulandari, D., Hilmi Prayitno, P., Basuki, A., Rahman Prasetyo, A., Aulia, F., Gunawan, A., & Baghiz Syafruddin, A. (2024). Technological Innovation to Increase the Competitiveness of MSMEs: Implementation of the Integrated Industry Village 4.0 Platform. *Salud, Ciencia y Tecnologia*, 4. Scopus.
<https://doi.org/10.56294/saludcyt20241220>

Copyright Holder :

© Ming Pong et.al (2025).

First Publication Right :

© Journal of Loomingulus ja Innovatsioon

This article is under:

