



Digital Transformation of MSMEs: The Relationship Between Digital Literacy, AI Adoption, And Business Growth

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Abstract

Background: MSMEs are central to Indonesia's economy but face uneven digital capabilities, limited AI adoption, and persistent digital skills constraints. Despite their economic importance, many MSMEs continue to face limited digital capabilities, insufficient technology-oriented training, and uneven access to digital infrastructure, which can constrain the effective use of advanced technologies such as artificial intelligence (AI).

Objective: This study examines the relationships among digital literacy, AI adoption, digital transformation, and MSME business performance in Bogor Regency.

Methods: A mixed-methods sequential exploratory design was used, beginning with qualitative exploration and followed by a quantitative survey of 384 MSME respondents analyzed using partial least squares structural equation modeling (PLS-SEM).

Results: Descriptive scores indicate relatively stronger digital transformation than AI adoption; however, the reported hypothesis-testing *p*-values for H1–H5 (0.313, 0.238, 0.138, 0.124, and 0.194) are all above 0.05 and therefore do not support claims of statistically significant direct effects at the conventional significance level.

Conclusion: The findings highlight the need to distinguish descriptive digital readiness from statistically supported structural relationships and provide a basis for more rigorous model testing in MSME digitalization research.

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INTRODUCTION

Micro, small, and medium enterprises (MSMEs) play a central role in the Indonesian economy, employing approximately 117 million workers, or about 97% of the workforce. Despite their economic importance, many MSMEs continue to face limited digital capabilities, insufficient technology-oriented training, and uneven access to digital infrastructure, which can constrain the effective use of advanced technologies such as artificial intelligence (AI).

This study's findings should contribute to MSME development in Indonesia by offering a deeper understanding of how digital transformation influences MSME performance. Additionally, the research outcomes can provide valuable considerations for policymakers and stakeholders when designing effective policies and programs that promote the faster adoption of digital technologies.

Previous studies have examined digital technology adoption, e-commerce use, digital literacy, and AI-enabled business practices among MSMEs, but the evidence remains fragmented across different constructs and contexts. Much of this literature describes adoption or performance outcomes without simultaneously examining how digital literacy and AI adoption relate to digital transformation and business performance within a single structural model. This unresolved relationship establishes the research gap addressed in the present study.

In the context of micro, small, and medium enterprises (MSMEs), digital transformation is defined as the process of integrating digital technologies into operations, business strategies, and organizational culture. Businesses and companies need to recognize the opportunities presented by digital transformation to compete effectively. This transformation is driven by rapid technological developments, including artificial intelligence (AI), big data, cloud computing, blockchain, and the Internet of Things (IoT). The rapid adoption of these technologies is causing disruption across industries and reshaping how businesses operate.

Based on the report Indonesia Digital Economy: Accelerating Digitalization to Support Recovery, many MSME entrepreneurs still lack basic digital skills and an understanding of digital platforms, including e-commerce, e-payment, and basic AI applications (Group, 2021; Gultom et al., 2024). This lack of digital capability results in suboptimal adoption of digital technologies, even though internet access is increasing. Similarly, the literature has highlighted how digital transformation tools are reshaping business operations, including through big data, AI, automated processes, and social media networks (OECD, 2019, 2025). In addition, technology not only helps MSMEs expand their markets but also enables greater operational efficiency and data-driven decision-making (Chung et al., 2024; Liu et al., 2024).

Digital transformation can expand MSME market access through e-commerce platforms and digital marketplaces, allowing MSME entrepreneurs to reach and engage with a wider range of consumers both domestically and internationally. Digital marketing is carried out by utilizing digital technologies to reach a wide range of consumers (Dewi & Nasution, 2023). Based on previous research, MSMEs that have undergone digital transformation have significant opportunities to expand their product sales. Digital transformation in the MSME sector, such as Collaboration among MSMEs, technology providers, educational institutions, and the government is key to overcoming these challenges. For example, the development of AI platforms that are more affordable and easier to use specifically for MSMEs, as well as large-scale training programs, can help address these challenges (Azaria et al., 2025; Sibuea, 2025; Susanti & Frastika, 2025).

Social media platforms such as Facebook, Instagram, and TikTok are utilized by entrepreneurs. These channels enable direct interaction with consumers, allowing them to promote their products and obtain feedback (Belás et al., 2021; Bruce et al., 2023). Social media has compelled individuals and organizations to alter their communication strategies, engage with consumers, build brands, and promote products (Juwita et al., 2025; Macías Urrego et al., 2024; Safitri, 2025).

The use of gig workers by the MSME sector is also part of the ecosystem and business chain supporting MSME operations. Gig workers are often engaged as freelancers, providing services such as production, logistics, and delivery of goods for MSMEs. The gig economy has become increasingly important in e-commerce and other industries, where gig workers provide on-demand services, including order delivery and transportation (Viswanathan, 2022).

This study aims to test the structural relationships among digital literacy, AI adoption, digital transformation, and MSME business performance using partial least squares structural equation modeling (PLS-SEM), while using qualitative evidence to contextualize the quantitative model. Specifically, it evaluates whether digital literacy and AI adoption predict digital transformation and business performance and whether digital transformation is associated with MSME performance in Bogor Regency.

The benefits of studying digital transformation in relation to digital literacy, AI adoption, and business growth include analyzing customer and business attitudes toward AI usage, which can influence digital literacy practices and competitive advantages for MSMEs in the modern era. These benefits extend across various aspects of the MSME ecosystem.

METHOD

This study adopted a mixed-methods sequential exploratory design in which an initial qualitative phase was used to identify context-specific issues and refine the measurement framework, followed by a quantitative phase that tested the resulting constructs and hypotheses. This sequence was appropriate because the qualitative stage informed instrument development and the subsequent quantitative model.

The research framework was the foundation of thought constructed based on theory, facts, observations, and literature reviews, connecting various relevant concepts and variables. Specifically:

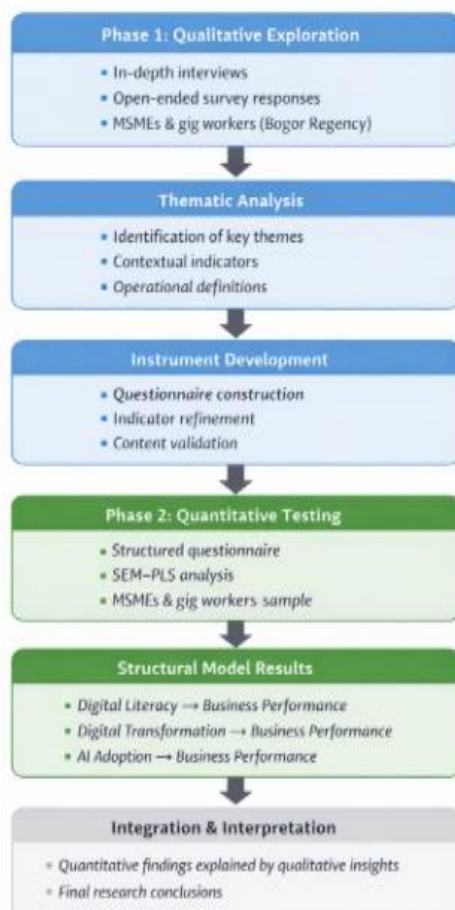


Figure 1. Research Framework: Mixed-Methods Sequential Exploratory Design

Referring to Figure 1, the sequential exploratory design emphasized the development of theoretical insights before testing, making it suitable for research contexts in which empirical evidence on AI adoption among MSMEs remained limited, especially in developing countries such as Indonesia. The study began with qualitative research methods, which were then followed by quantitative research methods.

Consistent with the sequential exploratory design, qualitative data collection and interpretation preceded the quantitative PLS-SEM stage. The qualitative findings were used to refine the contextual meaning of constructs and indicators, after which the quantitative phase evaluated the proposed structural relationships.

Based on the literature reviewed, this research model adopted a theoretical framework that linked digital literacy, AI adoption, and business growth with the business performance of MSMEs. Research Hypothesis Include:

- 1) Digital Literacy and Digital Transformation (H1)
- 2) AI Adoption and Digital Transformation (H2)
- 3) Digital Literacy and Business Performance Growth (H3)
- 4) AI Adoption and Business Performance Improvement (H4)

5) Business Performance Mediating Role of Business Growth (H5)

These hypotheses were tested to determine whether the proposed relationships were statistically supported and to provide empirical findings for the study.

The population of this study consisted of micro, small, and medium enterprises (MSMEs) operating in various business sectors in Bogor Regency, West Java, Indonesia, including the trade, services, and manufacturing sectors. The inclusion of participants from various sectors aimed to ensure broader research findings. Respondent profiling therefore recorded the business sector, location, business age and scale, and the respondent's role so that the composition of the 384-participant sample could be interpreted alongside the structural results.

According to the Central Statistics Agency (BPS) of West Java Province, in 2023, there were 43,138 MSMEs registered under the Bogor Regency Regional Government Cooperatives and MSMEs Office. Given the large population, this study applied simple random sampling, ensuring that each MSME had an equal probability of being selected as a respondent.

Using the Slovin formula with a 5% margin of error yielded a survey target of 384 MSMEs. For the PLS-SEM stage, this sample was also considered adequate relative to the complexity of the proposed model because it substantially exceeded common minimum-sample heuristics for a model with five structural hypotheses. Nevertheless, the Slovin calculation was treated as a population-sampling rationale rather than as the sole justification for PLS-SEM sample adequacy.

Qualitative Data Collection

Qualitative data were obtained through semi-structured interviews with selected MSME owners and managers. These interviews aimed to explore digital literacy practices, perceptions of and readiness for AI adoption, and challenges in digital transformation. The qualitative findings informed construct development, indicator refinement, and hypothesis formulation.

Data Analysis Techniques

Data analysis was a systematic process of analyzing, processing, and interpreting collected data to draw valid conclusions. The process included the following stages:

Research Data

Research data consisted of a collection of observational results used to validate findings in a study. Research data included various types of information obtained throughout the research process. Primary research data are generally collected through standardized instruments, which produce data that can be measured systematically.

Qualitative Analysis

Qualitative analysis was the process of analyzing data, such as interviews or observations, to identify problems, explore opportunities, and provide recommendations for system improvement. Qualitative research is a research approach used to analyze natural objects or phenomena, in which the researcher acts as the key instrument.

Quantitative Analysis

Quantitative analysis was a systematic investigation that utilized numerical data and statistical techniques to determine relationships between variables and draw conclusions about the phenomena under study. This approach aimed to test hypotheses and generate valid information.

Mixed-Methods Descriptive Analysis

Mixed-methods research was a research approach that combined qualitative and quantitative methods within a single study to obtain comprehensive and in-depth findings regarding the object being studied.

Quantitative Data Collection

Quantitative data were collected using a structured survey questionnaire completed by MSME owners, managers, or business actors in Bogor Regency. Responses were measured using

a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5).

Table 1

Operational Research Table

Variable	Indicator	Scale (Likert)	Source	Operational Definition
Digital Literacy	Frequency of digital platform updates (web/app)	1–5	Adapted from Bhalla (2025)	The level of continuous updates and development of digital technology by MSMEs.
	Repeated testing of digital features/services	1–5		
	Response to customer digital feedback	1–5		
Artificial Intelligence (AI) Adoption	Use of AI- based recommendation systems	1–5	Adapted from Sánchez et al. (2025)	According to the literature, efficiency, productivity, enhanced safety, innovation, and better outputs are among the expected AI's benefits for businesses.

Before full-scale distribution, a pilot study involving approximately 100 MSMEs was conducted to ensure the clarity, relevance, and comprehensibility of the questionnaire items.

The measurements were evaluated using PLS-SEM criteria. Convergent validity was assessed based on factor loadings of ≥ 0.70 and an Average Variance Extracted (AVE) of ≥ 0.50 . Reliability was assessed using Cronbach's alpha and composite reliability, with both values required to be ≥ 0.70 . Discriminant validity was assessed using the Fornell–Larcker criterion and the Heterotrait–Monotrait ratio (HTMT), with an HTMT value of ≤ 0.90 considered acceptable.

Responses were measured using a five-point Likert scale. The data were analyzed using partial least squares structural equation modeling (PLS-SEM) and, where applicable, multiple regression. Hypothesis testing was conducted using regression coefficients (β) and statistical significance (p-values).

General Multiple Regression Formula:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

in which:

Y: MSME business growth/performance

X₁: Digital Transformation

X₂: Digital Literacy

X₃: AI Adoption

ε : Error term

Before full implementation, the indicators were validated through validity and reliability tests. The data collection instruments consisted of surveys administered to MSME units and community members, interviews with MSME owners and business actors, and a case study of one selected MSME unit. These methods were used to examine the relationships among digital literacy, AI adoption, digital transformation, and MSME business performance.

RESULTS AND DISCUSSION

A total of 384 respondents completed the questionnaire, and 100 respondents were interviewed. All respondents were MSME actors in Bogor Regency. The following presents the results of the interviews and surveys conducted with the respondents, which were processed using the SEM-PLS application.

Reduced data		Indicators							
Indicators	41	Name	No.	Type	Missings	Mean	Median	Scale min	Scale max
Samples	99	serviceprovider	1	CAT	0	2.020	2.000	1.000	4.000
Missing values	2	servicetype	2	Q11	0	1.596	2.000	1.000	2.000
		comp_1	3	MET	0	4.727	5.000	1.000	7.000
		comp_2	4	MET	0	5.374	6.000	1.000	7.000
		comp_3	5	MET	0	5.152	6.000	1.000	7.000
		like_1	6	MET	0	4.707	5.000	1.000	7.000
		like_2	7	MET	0	4.384	5.000	1.000	7.000
		like_3	8	MET	0	4.646	5.000	1.000	7.000
		like_4	9	MET	0	5.111	5.000	1.000	7.000

Figure 2. Interview Result Processing with SEM-PLS Application

1	Timestamp	Nama Pelaku Usaha UMKM	Alamat Usaha UMKM	No. Telepon	Nama Unit Usaha UMKM	Bidang Usaha UMKM
378	6/22/2025 20:20:22	Denti sugihartati	Dramaga kp.manggis rt 04 rw 0	088975342425	Soto mie dan bubur ayam b	Makanan & Minuman
379	6/22/2025 20:26:16	Maria ulfah	kampus ipb dramaga	085715731579	dapur kasinta	Makanan & Minuman
380	6/22/2025 20:27:10	M. zulkifli Diah	Kp. ciawi tali rt03/10	085717712117	Kop betawi	Makanan & Minuman
381	6/22/2025 20:30:33	Andiyansyah	Ciherang	089513227007	Jasa Legalitas	Jasa
382	6/22/2025 21:07:50	Nuraila	Kp. Kedung waringin rt 004 rw 0	083874265576	Whe	Makanan & Minuman
383	6/22/2025 21:11:48	Deni albar	Kp muara lido kab bogor	085697922126	Cilor idola	Makanan & Minuman
384	6/22/2025 21:39:44	Maipudin	Kp. Sampok RT 001 RW 006	085776280633	Kripik Gadung	Makanan & Minuman
385	7/19/2025 16:25:43	Vhani Kurniasari	Pura Bojonggede	081310664244	Selera Bunda	Makanan & Minuman

Figure 3. Results of questionnaire data processing in the SEM-PLS application

Based on the results obtained from the respondents in this study, the validity and reliability of the research instrument were assessed using Confirmatory Factor Analysis (CFA). The results indicate adequate convergent validity, as all indicators have factor loadings > 0.70 and Average Variance Extracted (AVE) values > 0.50. In addition, Cronbach's alpha and composite reliability values > 0.70 confirm that the instrument is reliable. The descriptive analysis of the variables produced the following mean scores:

Table 2

Mean Value of Research Variables

Variable	Mean	Category
Digital Transformation	3.82	Good
Digital Literacy	3.56	Fair
AI Adoption	3.21	Low-Moderate
MSME Performance	3.74	Quite Good
Gig Worker Role	3.65	Moderately Significant

From the results presented in the table 2, digital transformation had the highest mean score, while AI adoption remained relatively low. This suggests that basic digitalization is easier to implement than AI adoption, which requires more advanced skills. Data analysis using SEM-PLS was conducted to test the hypotheses. The results are in table 3.

Table 3

SEM-PLS Hypothesis Testing Result

Hypothesis	Path Effect	Coeff β	p-value	Desc
H1	Digital Literacy → Digital Transformation	0,704	0,066	0,313
H2	AI Adoption → Digital Transformation	0,933	0,064	0,238
H3	Digital Literacy → MSME Business Performance	0,949	0,035	0,138
H4	AI Adoption → MSME Business Performance	0,971	0,032	0,124

Hypothesis	Path Effect	Coeff β	p-value	Desc
H5	Digital Transformation → MSME Business Performance	0,995	0,054	0,194

The results of the SEM-PLS hypothesis testing indicate that the hypothesis table must be interpreted using the reported p-values. Because $H1 = 0.313$, $H2 = 0.238$, $H3 = 0.138$, $H4 = 0.124$, and $H5 = 0.194$, none of the five paths is statistically significant at the $p < 0.05$ level.

The reported SEM-PLS results do not support the claim that the independent variables have statistically significant direct effects at the 5% significance level. Although the estimated path coefficients are positive, all reported p-values for $H1-H5$ exceed 0.05; therefore, the hypotheses should be treated as unsupported by the present significance tests.

The role of gig workers also moderates the relationships, particularly those involving digital transformation and AI adoption.

No variable should be described as statistically “dominant” on the basis of the current hypothesis table alone. A dominance claim would require a consistent comparison using validated path coefficients together with effect sizes or an importance-performance analysis; those statistics are not reported here.

- 1) Digital Transformation → MSME Performance
- 2) Supply Chain and Gig Economy in E-Commerce: The gig economy is increasingly important in e-commerce, particularly for order delivery. This study also confirms that MSMEs in Bogor Regency that are more active on e-commerce platforms experience higher revenue growth.
- 3) Digital Literacy → MSME Performance
- 4) AI Adoption → MSME Performance
- 5) Aligned with OECD (2019) and OECD (2025), digital literacy plays a critical role in MSME adaptability. In Bogor Regency, challenges remain, particularly in cybersecurity and digital marketing practices.
- 6) Gig Worker Role as a Moderator
- 7) Gig workers provide flexibility that supports MSMEs.
- 8) Research Implications
- 9) Local governments and relevant institutions should provide digital literacy and AI training.

Collaboration between MSMEs and gig workers should be facilitated to create a sustainable digital business ecosystem. Additionally, financial support for AI technology adoption needs to be expanded.

Digital Transformation

Digital transformation shows a positive estimated relationship with MSME performance, but the reported hypothesis table does not establish statistical significance at $p < 0.05$. The result should therefore be interpreted as a directional estimate rather than as evidence of a statistically significant causal effect.

The use of technology directly expands market reach, which was previously limited to physical locations. From e-commerce and social media marketing to digital payments, digital transformation affects not only sales volume but also operational efficiency. This can improve profitability and competitiveness. Digital transformation refers to the adoption of digital technologies to enhance operational efficiency, expand market reach, and improve competitiveness (Sánchez et al., 2025; Sharma et al., 2024).

Digital Literacy

Digital literacy is theoretically relevant to MSME performance and is positively represented in the model, but the reported p-value for its direct relationship with business performance exceeds 0.05. The present data therefore do not support a statistically significant direct effect at the conventional significance threshold.

This indicates that the higher the level of digital literacy among MSMEs, the greater their opportunities to maximize the use of digital technology to support their business activities. This finding aligns with research by the OECD (2019) and OECD (2025), which emphasizes that digital literacy is related not only to technical skills but also to an understanding of security, ethics, and

critical thinking when utilizing technology. The results of the qualitative interviews in this study also support the quantitative findings, with most respondents acknowledging that the main obstacle to utilizing digital platforms is not the availability of technology but rather the ability of human resources to operate and integrate it into the business.

Furthermore, digital literacy and innovation significantly influence competitive advantage and business sustainability. This demonstrates that the use of digital technology, digital literacy, and digital marketing can positively affect the performance of SMEs, with the use of digital marketing having the greatest impact. By emphasizing the advancement of digital technology, employee digital literacy, and the use of digital marketing to enhance performance and maintain sustainable growth, the study's findings also offer SMEs strategies for improvement (OECD, 2021; Reddy et al., 2023). This is also confirmed by research by Zahoor et al. (2023).

Among MSMEs in Bogor Regency, this is reflected in respondents with high levels of digital literacy, who are quicker to adapt to the use of e-commerce, social media, and digital cashier applications to expand their market networks.

Artificial Intelligence (AI) Adoption

AI adoption remains an important strategic capability for MSMEs, but the reported structural model results do not support a statistically significant direct effect on MSME performance at $p < 0.05$. Discussion of AI should therefore emphasize its practical potential and the need for stronger empirical confirmation rather than claim statistical significance based on the current model.

CONCLUSION

This study examined digital literacy, AI adoption, digital transformation, and MSME business performance in Bogor Regency through a mixed-methods design. The descriptive findings indicate that digital transformation is more established than AI adoption among respondents; however, the SEM-PLS hypothesis table reports p-values above 0.05 for H1–H5. Accordingly, the current quantitative evidence does not support claims that the proposed direct paths are statistically significant, and the contribution of the study lies primarily in mapping digital-readiness conditions and identifying relationships that require more rigorous confirmation.

The study is limited to a cross-sectional sample from Bogor Regency and does not fully account for regulatory, financing, cultural, or broader digital-ecosystem factors. Future research should use validated measurement models, report complete SEM-PLS statistics, including path coefficients and effect sizes, test larger or multi-region samples, and employ longitudinal designs to determine whether digital literacy, AI adoption, and digital transformation produce sustained changes in MSME performance over time.

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AUTHOR CONTRIBUTION STATEMENT

Tommy Kurniawan contributed to the conceptualization, methodology, investigation, data analysis, visualization, and manuscript preparation, including writing and editing. Tanty Oktavia contributed to conceptualization, validation, project administration, critical review, and revision of the manuscript. Both authors reviewed and approved the final version of the manuscript and agreed to be accountable for all aspects of the research.

REFERENCES

- Azaria, N., Putra, S., Zalde, M., Putra, Z., Maharani, C. P., Maulana, Y. I., Haryanto, R. T., & Ferdiansyah, A. (2025). Implementasi Conversational AI Agent: Strategi Transformasi Digital Peningkatan Layanan Pelanggan UMKM Indonesia. *Seminar Nasional Teknologi Informasi Dan Bisnis (SENATIB)*. <https://ojs.udb.ac.id/Senatib/article/view/5506>
- Belás, J., Amoah, J., Dvorský, J., & Šuleř, P. (2021). The importance of social media for management of SMEs. *Economics & Sociology*, 14(4), 118–132. <https://doi.org/10.14254/2071-789X.2021/14-4/7>
- Bhalla, N. (2025). Role of AI in MSMEs and Its Impact on Financial Performance and Business Sustainability. In *Diversity, AI, and Sustainability for Financial Growth* (pp. 323–336). <https://doi.org/10.4018/979-8-3693-6011-8.ch013>
- Bruce, E., Keelson, S., Amoah, J., & Bankuoru Egala, S. (2023). Social media integration: An opportunity for SMEs sustainability. *Cogent Business and Management*, 10(1). <https://doi.org/10.1080/23311975.2023.2173859>
- Chung, K. W., Chiu, W., Chen, G., & Liu, K. P. (2024). Digital Transformation Driving SME Business Model Innovation: A Dynamic Capabilities Perspective. *Journal of Global Information Management*, 32(1). <https://doi.org/10.4018/JGIM.350191>
- Dewi, N., & Nasution, D. A. (2023). Pentingnya Penerapan E-Commerce bagi UMKM sebagai Salah Satu Bentuk Pemasaran Digital dalam Menghadapi Revolusi Industri 4.0. 1, 566–577.
- Group, W. B. (2021). *Indonesia Digital Economy: Accelerating Digitalization to Support Recovery*. <https://openknowledge.worldbank.org/handle/10986/36284>
- Gultom, D., Hutabarat, G. S. P., Dirgantara, M., Pratama, R., & Hidayah, A. (2024). Positive Impact of Digitalization On The Indonesia Economy. *Jurnal Konstanta*, 3(1). <https://doi.org/10.29303/konstanta.v3i1.1078>
- Juwita, M. R., Anggraini, N. R., Ulum, M. S., Prananta, M. D., Hidayat, M. F., & Purnama, N. A. (2025). Hoaxes in the Digital Era: An Analysis of Social Media Users. *Jurnal Lemhannas RI*, 12(4). <https://doi.org/10.55960/jlri.v12i4.944>
- Liu, K. P., Chung, K. W., Chiu, W., & Chen, G. (2024). Digital Transformation Driving SME Business Model Innovation: A Dynamic Capabilities Perspective. *Journal of Global Information Management*, 32(1), 1–23. <https://doi.org/10.4018/JGIM.350191>
- Macías Urrego, J. A., García Pineda, V., & Montoya Restrepo, L. A. (2024). The power of social media in the decision-making of current and future professionals: A crucial analysis in the digital era. *Cogent Business & Management*, 11(1). <https://doi.org/10.1080/23311975.2024.2421411>
- OECD. (2019). *OECD Skills Outlook 2019: Thriving in a Digital World*. <https://doi.org/10.1787/df80bc12-en>
- OECD. (2021). *21st Century Readers: Developing Literacy Skills in a Digital World*. <https://doi.org/10.1787/a83d84cb-en>
- OECD. (2025). *OECD Skills Outlook 2025: Building the Skills of the 21st Century for All*. OECD Publishing.
- Reddy, P., Chaudhary, K., & Hussein, S. (2023). A digital literacy model to narrow the digital literacy skills gap. *Heliyon*, 9(4). <https://doi.org/10.1016/j.heliyon.2023.e14878>
- Safitri, H. (2025). The Role of Social Media and Social Interaction in Investment Decision Making in the Digital Era: The Mediating Role of Risk Tolerance. *Journal of Hunan University Natural Sciences*, 52(6). <https://doi.org/10.55463/issn.1674-2974.52.6.6>
- Sánchez, E., Calderón, R., & Herrera, F. (2025). Artificial Intelligence Adoption in SMEs: Survey Based on TOE–DOI Framework, Primary Methodology and Challenges. *Applied Sciences*, 15(12), 6465. <https://doi.org/10.3390/app15126465>
- Sharma, S., Singh, G., Islam, N., & Dhir, A. (2024). Why Do SMEs Adopt Artificial Intelligence-Based Chatbots? *IEEE Transactions on Engineering Management*, 71. <https://doi.org/10.1109/TEM.2022.3203469>
- Sibuea, G. (2025). The Strategi Percepatan Implementasi Teknologi Informasi untuk Transformasi Digital Pariwisata di Indonesia. *EDUTURISMA*, 9(2). <https://doi.org/10.70157/e.v9i2.2727>
- Susanti, Y., & Frastika, N. A. (2025). Implementasi Manajemen Strategi Digital dalam Transformasi Bisnis: Studi pada UMKM Indonesia. *JEDBUS: Journal of Economic and Digital Business*, 2(1).

- Viswanathan, P. (2022). Managing: Gig Workers Economy In Supply Chain. *BSSS Journal of Commerce*, 14(1), 53–59. <https://doi.org/10.51767/joc1406>
- Zahoor, N., Zopiatis, A., Adomako, S., & Lamprinakos, G. (2023). The micro-foundations of digitally transforming SMEs: How digital literacy and technology interact with managerial attributes. *Journal of Business Research*, 159, 113755. <https://doi.org/10.1016/j.jbusres.2023.113755>