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SUSTAINABLE INNOVATIONS IN MSMES DURING THE ERA OF DIGITAL TRANSFORMATION

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ABSTRACT
Business value generation processes have been significantly impacted by digital transformation, especially for the Micro, Small, and Medium Enterprises (MSMEs) sector, which accounts for 61% of GDP and is the backbone of the Indonesian economy. This study is to review the most recent research on how MSMEs employ digitalization to address a range of opportunities and challenges in order to promote sustainable innovation in a changing global context. This study investigates the use of digital technology in MSMEs prior to, during, and following the Covid-19 pandemic using a combination of approaches. Sales turnover records were used to collect quantitative data, and in-person interviews with respondents were used to gather qualitative data. According to the analysis's findings, digital technology plays a significant role in enhancing MSME capacity to meet strategic objectives, which the COVID-19 epidemic has expedited. With the pandemic speeding up digital transformation and changes in consumer behavior toward digital transaction patterns leading to higher turnover, it was determined that digital technology is a significant catalyst for sustainable MSME growth. However, to overcome the different challenges MSMEs encounter, effective digitization necessitates deliberate policy backing and pertinent training initiatives.

Keywords: *Digital Transformation, Sustainable Innovation, MSMEs*

ABSTRAK
Transformasi digital telah memberikan dampak signifikan dalam mekanisme penciptaan nilai bisnis, khususnya bagi sektor Usaha Mikro, Kecil, dan Menengah (UMKM) sebagai penopang utama perekonomian nasional Indonesia dengan kontribusi sebesar 61% terhadap Produk Domestik Bruto (PDB). Penelitian ini bertujuan untuk membedah literatur terbaru mengenai pemanfaatan digitalisasi oleh UMKM dalam merespons berbagai tantangan dan peluang, guna mendorong inovasi berkelanjutan di tengah dinamika lingkungan global. Dengan menggunakan metode campuran, riset ini mengkaji implementasi teknologi digital pada UMKM selama periode sebelum, selama, dan sesudah pandemi Covid-19. Pengumpulan data kuantitatif dilakukan melalui pencatatan omzet penjualan, sedangkan data kualitatif diperoleh melalui wawancara langsung dengan responden. Hasil analisis mengindikasikan bahwa teknologi digital menjadi faktor kunci dalam peningkatan kapabilitas UMKM untuk mencapai tujuan strategis, dipercepat oleh adanya pandemi Covid-19. Disimpulkan bahwa teknologi digital merupakan katalis utama pertumbuhan UMKM secara berkelanjutan, di mana pandemi menjadi momentum percepatan transformasi digital, dan pergeseran perilaku konsumen menuju pola transaksi digital berkontribusi terhadap peningkatan omzet. Namun demikian, keberhasilan digitalisasi menuntut dukungan kebijakan strategis dan program pelatihan yang relevan untuk mengatasi berbagai kendala yang dihadapi UMKM.
Kata Kunci: *Transformasi Digital, Inovasi Berkelanjutan, UMKM*

INTRODUCTION

In recent years, the advent of digital transformation has fundamentally changed the business landscape, driving innovation and increasing the competitiveness of companies in responding to the latest technological developments, including email, digital banking, social media, e-commerce, VPN, intranet, big data, artificial intelligence (AI), the Internet of Things (IoT), and

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cyber-physical systems (CPS) (Quinton et al., 2018; Kim S.S., 2021; Judianto et al., 2025; Navas et al., 2025). The impact of digitalization is also reflected in changes in interaction patterns and value exchange between organizations and consumers, as well as in the ways in which they access information, communicate, and consume products and services (Yadav & Pavlou, 2014; Hamill et al., 2010). Digital transformation has been proven to have an impact on various business scales, especially MSMEs (Kim S.S., 2021; Pratiwi, Z.H & Umam, M.S., 2025; Faisal et al., 2023).According to empirical evidence, MSME sales on digital platforms (like Shopee) have grown during the COVID-19 epidemic, highlighting the growing significance of implementing digital technology to assist MSME growth and sustainability. To help MSMEs adjust to the needs of the current market, this transition calls for the development of the digital ecosystem and continual education.

In Indonesia, Micro, Small, and Medium Enterprises (MSMEs) play a major role as a key pillar of the national economic structure, contributing considerably to 61% of Gross Domestic Product (GDP) (Raihan & Tuspekova, 2022; Kadin, n.d.). Recognizing this critical role, the Indonesian government is actively encouraging improved MSME performance through various strategies, including the implementation of digitalization, supportive policies, and the provision of funding to facilitate digital innovation to strengthen the sector's competitiveness (Judijanto et al., 2024; Kadin, n.d.). In the context of the accelerating digital era (Alam, 2022), digital transformation is a fundamental element that must be implemented to increase the competitiveness of MSMEs (Faisal et al., 2023; Wulan et al., 2024; Akbari & Pratom, 2022). However, this digitalization process involves different problems and opportunities, which must be managed carefully so that MSMEs may increase their competitive position and ensure their sustainability (Sari & Kusumawati, 2022). The main challenges faced in implementing sustainable digital transformation in MSMEs are divided into three main categories: organizational, environmental, and technological aspects (Matt & Rauch, 2020). Organizationally, obstacles that arise include a lack of digital skills and competencies, resistance to change, and minimal support from leadership. From an environmental perspective, limited infrastructure and resources are key barriers. Meanwhile, in the technological element, the focus of the challenge rests in limited access to technology and the high cost of implementing digitalization (Reis et al., 2018; Saputri & Utami, 2023; Karpacz, Karpacz & Rudawska, 2021).

MSMEs can enhance their operational efficiency, lower distribution costs, integrate structural changes more successfully, and optimize business operations thanks to the potential presented by the adoption of digital transformation. Additionally, in the face of fierce competition among businesses, digital transformation creates chances to increase market share and boost competitiveness (Philbin et al., 2022; Shevyakova et al., 2021). A foundation for long-term competitive advantage in the digital age is established by the use of digital technology, which also promotes improved innovation, quicker data-driven decision-making, and less detrimental effects on the environment and society. By taking advantage of these chances, and in order to improve service quality, customer happiness, and loyalty, MSMEs can improve customer interactions, offer more individualized services, and react to requirements more rapidly and effectively (Lee et al., 2022; Tariq et al., 2022; Mbama & Ezepue, 2018). Additionally, digital transformation offers a range of online-integrated strategies, tools, techniques, and operations to increase sales of goods and services (Aljumah, Nuseir & Alshurideh, 2021; Sweiss et al., 2021). Consequently, digital transformation has become a strategic requirement for MSMEs to be able to adjust to the dynamics of ever-evolving business environments, in addition to serving to promote competitive advantage (Schmidt, 2025; Han & Trimi, 2022). In line with this, it is crucial for MSMEs to develop digital competencies to support sustainable business practices

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covering economic, environmental, and social aspects, as well as align operations with sustainable development goals (Gomez-Trujillo & Gonzalez-Perez, 2021; Rados, Simic & Misevic, 2019; Hendrawan et al., 2024).

Implementing digital transformation can increase operational efficiency, fortify customer relationships, and broaden market access, according to research done in developed nations, especially the US, by Navas et al. (2025) and Faisal et al. (2023). However, a number of obstacles, such as limited financial resources, company culture, technology limits, and insufficient human resources, impact the degree of basic digitalization attainment. Nonetheless, firms can attain different degrees of digitization with the aid of strong leadership and training in digital skills. These results are consistent with study by Ta Anh and Lin Yu Chieh (2023) in developing nations, specifically Vietnam, which highlighted the significance of organizational, technological, and environmental aspects in facilitating the successful adoption of digital transformation. Therefore, to guarantee that the digital transformation process proceeds as smoothly as possible and has a major impact on organizational strengthening, the organization's strong support and the availability of trustworthy and qualified human resources are essential. Despite a number of challenges, the adoption of digital transformation in Indonesia has improved MSMEs' sustainability (Judianto et al., 2024). Utilizing digital transformation, especially through e-commerce platforms in product marketing, is efficient in optimizing sales and increasing MSME profitability, according to research by Yuwana (2020) and Basry and Sari (2018). These findings, however, go counter to those of Wijaya, Yadewani, and Wati (2020), who claimed that digital transformation had no appreciable beneficial effect on MSME performance. Employees' ignorance of digital technology, reluctance to switch to digital platforms, doubts about the long-term advantages of digitization, and worries about the transition process' expenses are some of the causes of this (Erlanitasari, Rahmanto & Wijaya, 2020). Thus, by looking at particular factors that may affect how well MSMEs implement digital transformation, this study seeks to improve the body of literature.

LITERATURE REVIEW

Digital Transformation

Digital transformation is the use of new digital technologies that can affect all aspects of life, for example in the fields of health, education, and especially business. (Mauro et al, 2024; Tambovceva, 2022; Verhoef et al, 2021). Digital transformation in business can bring fundamental changes to the way organizations operate, interact with customers, and strive to achieve goals and create value. (Agustian et al, 2023;Handayani & Marokhah, 2024).

The three phases of digital transformation are (1) Digitization is the process of converting analog tasks into digital ones by integrating information technology into existing activities, thereby generating cost efficiencies.. (2) Digitalization refers to how information technology or digital technology is used to transform existing business processes. Through digitalization, companies use digital technology to improve business processes by creating more efficient coordination and/or providing added value to customers. (3) Digital transformation is the most comprehensive stage involving comprehensive changes within a company to create a new business model, which may be unprecedented in the industry. This business model is the source of the company's competitiveness and competitive advantage.

The levels of digital information implementation are divided into three categories: basic level (e-mail, online banking, social networks, e-commerce), advanced level (VPN, intranet, extranet), dan frontier level (big data analysis, advanced robotics, IoT) (Navas et al, 2025)

MSME

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The criteria for Micro, Small, and Medium Enterprises (MSMEs) vary from country to country, based on operational scale, number of employees, and asset size. Micro businesses have the fewest employees and the smallest assets, while small and medium-sized businesses gradually have greater capacity (Melo, wet al, 2023; Handayati et al, 2024).
In Indonesia, the law governing MSMEs is Law No. 20 of 2008. The criteria for (1) Micro are having a net worth of < IDR 50 million and annual sales of < IDR 300 million. (2) Small are having a net worth of IDR 50-500 million and annual sales of IDR 300 million – 2.5 billion. (3) Medium enterprises have a net worth of IDR 500 million – 50 billion and annual sales of IDR 2.5 billion – 50 billion.

Digital Tranformation in MSME
Digital transformation in MSMEs encompasses the application of digital technology in various aspects of business and has proven to play a crucial role in the economy, especially during the COVID-19 pandemic (Marolt et al, 2024). MSMEs will face various opportunities and challenges in implementing digital transformationIn terms of opportunities, it can help reduce operational costs through workflow simplification, improve production efficiency, strengthen competitiveness and profitability, and provide added value to customers by supporting digital innovation in products, services, and business models (Judianto et al., 2025; Navas et al., 2025). Meanwhile, the challenges faced by MSMEs are limited financial and human resources, inadequate digital infrastructure, and a lack of knowledge and awareness of technology (Navas et al, 2025;Faisal, 2023; Hendrawan el al, 2024).

METHODS

In order to investigate the effects of digital transformation on MSMEs in Indonesia, this study used a mixed methods approach. By integrating quantitative and qualitative data into a single study framework, this method offers a thorough understanding (Creswell & Plano Clark, 2017). Sales income from 2018 to 2024 was used to gather quantitative data, which was then subjected to a one-way ANOVA using SPSS software. Semi-structured interviews with MSME owners or managers were used to gather qualitative data, which was used to supplement the quantitative data by illuminating the decision-making process and the evolution of digital transformation adaptation.To get a complete picture of the phenomenon being studied, both forms of data were integrated at the interpretation stage. Because it enables thorough and in-depth investigation, this mixed methods approach is ideal for tackling the complexity of digital transformation in the MSME setting (Creswell & Plano Clark, 2017).

RESULTS AND DISCUSSION

Five MSME respondents who satisfied the requirements of having an annual revenue of less than 4.8 billion rupiah and having used Shopee, an e-commerce platform, as a channel for product sales from at least 2018 to 2024 provided the data for this study. The pre-COVID-19, pandemic, and post-pandemic periods were all covered by the sales data collected during this time frame. The sales information from the five respondents is shown below.

Tabel 1Turnover Data

Respondents	2018	2019	2020	2021	2022	2023	2024
A	2.769.878.050	4.240.695.000	4.798.675.500	4.799.098.250	4.678.906.500	4.797.654.500	4.590.875.000
B	517.594.332	1.089.652.923	2.448.691.362	2.004.205.799	2.083.365.091	2.275.037.035	2.543.324.563

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C	1.925.674.000	2.167.976.500	2.492.000.000	2.521.000.000	2.031.000.000	1.781.000.000	983.400.000
D	857.330.002	986.810.600	1.075.515.000	1.164.570.000	3.513.015.000	3.725.562.000	2.630.824.000
E	1.124.587.091	1.512.221.881	2.754.975.345	4.018.225.895	2.770.762.152	4.075.551.974	3.092.583.425

Source : Primary Data, processed, 2025

Based on the data above, it can be seen that during the Covid period, sales through Shopee began to increase. For a clearer picture, here are the results of the descriptive analysis:

Tabel 2 Descriptive Analysis Results

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Before	10	517594332.00	4240695000.00	1719242037.9000	1116626741.83559
Covid	15	1075515000.00	4799098250.00	2876933726.2667	1227970729.78217
Pasca	10	983400000.00	4797654500.00	3049581249.7000	1240642179.29165

Source : Data processing result, 2025

Prior to the Covid-19 epidemic, MSMEs' average turnover was Rp 1,719,242,037.90, with a standard deviation of Rp 1,116,626,741.83, according to Table 2. During that time frame, the largest turnover was Rp 4,240,695,000, and the lowest was Rp 517,594,332. The average turnover rose to Rp 2,876,933,726.26 during the COVID-19 epidemic, with a standard deviation of Rp 1,227,970,729.78. Rp 1,075,515,000 was the lowest turnover throughout this time, while Rp 4,799,098,250 was the greatest. The average turnover increased once more following the pandemic, hitting Rp 3,049,581,249.70 with a standard deviation of Rp 1,240,642,179. Rp 4,797,654,500 was the largest turnover, and Rp 983,400,000 was the lowest.

The turnover data before, during, and after the Covid-19 pandemic had a significance value (sig) greater than 0.05, according to the Kolmogorov-Smirnov test for normalcy, which concluded that the turnover data distribution was normal during all three periods. Additionally, the mean-based homogeneity test revealed a significance value of 0.831, which was likewise higher than 0.05, indicating that the turnover data variation over the three periods was homogeneous.

The One-Way ANOVA test was used to compare the average turnover over the three periods, and the Duncan post-hoc test was performed at a significance level of 5% (0.05) to make sure the therapy had a meaningful impact. The analysis's findings will be shown as follows. Prior to the Covid-19 epidemic, MSMEs' average turnover was Rp 1,719,242,037.90, with a standard deviation of Rp 1,116,626,741.83, according to Table 2. During that time frame, the largest turnover was Rp 4,240,695,000, and the lowest was Rp 517,594,332. The average turnover rose to Rp 2,876,933,726.26 during the COVID-19 epidemic, with a standard deviation of Rp 1,227,970,729.78. Rp 1,075,515,000 was the lowest turnover throughout this time, while Rp 4,799,098,250 was the greatest. With a standard deviation of Rp 1,240,642,179, the average turnover increased once again to Rp 3,049,581,249.70 following the pandemic. Rp 4,797,654,500 was the largest turnover, and Rp 983,400,000 was the lowest.

According to a Kolmogorov-Smirnov normalcy test, the turnover data's significance value (sig) for the pre-, during-, and post-Covid-19 pandemic periods was higher than 0.05. This suggests that the turnover data distribution for the three periods satisfies the normalcy assumption. The variance in turnover data for the three periods is homogeneous, according to a homogeneity test based on the average value, which also produced a significance value of 0.831, which is greater than 0.05.

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To determine the difference in average turnover across the three periods, a One-Way ANOVA test was conducted, followed by a Duncan post-hoc test at a 5% (0.05) significance level to determine whether the applied treatment had a significant effect. The results of this analysis are presented in the next section.

Tabel 3 One-Way ANOVA Test Results

ANOVA					
Omzet					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1092825210698295 5000.000	2	5464126053491477500.000	3.786	.033
Within Groups	4618520426340376 0000.000	32	1443287633231367420.000		
Total	5711345637038671 5000.000	34			

Source: Data processing result, 2025

The ANOVA test used for the hypothesis test in Table 3 produced a significance value of 0.033, or less than 0.05. Consequently, it may be said that turnover before, during, and after COVID-19 differs significantly. The findings of this hypothesis test show that turnover is greatly impacted by the variations in circumstances prior to, during, and following COVID-19.

Tabel 4 Post Hoc Analysis

Omzet			
Tukey HSD[a,b]			
		Subset for alpha = 0.05	
Kode	N	1	2
Before Covid	10	1719242037.9000	
Covid	15	2876933726.2667	2876933726.2667
After Covid	10		3049581249.7000
Sig.		.072	.938
Means for groups in homogeneous subsets are displayed.			
a. Uses Harmonic Mean Sample Size = 11.250.			
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.			

Source : Data processing result, 2025

According to Table 4 above, the biggest change between pre-COVID and post-COVID-19 turnover data is seen in the latter. Consequently, we deduce that, in comparison to both pre-COVID and post-COVID situations, post-COVID conditions exhibit the largest turnover.

Data study indicates that the Covid-19 epidemic played a significant role in promoting the more effective adoption of digital transformation, which in turn helped MSMEs boost their sales. Even after the pandemic ended, the rising sales trend persisted and grew. Interviews with MSME owners and managers corroborate this, revealing that previous to the pandemic, some MSMEs continued to run both physical and online storefronts, with some giving priority to offline sales. However, actual retail activity significantly decreased during the pandemic and the introduction of Large-Scale Social Restrictions (PSBB) measures, resulting in several stores closing. MSMEs used e-commerce platforms, especially Shopee, the biggest marketplace in Southeast Asia, to increase sales in order to survive. Sustainable sales growth was driven

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by enhancing human resource capacity and optimizing digital transformation. Sales increased as a result of changes made to Shopee features including live streaming, promotional videos, and partnerships. Additionally, a major factor in the rise in post-pandemic sales was involvement in promotional initiatives such double-digit events (e.g., 9.9, 10.10, 11.11, and 12.12). Following the pandemic, shifts in consumer behavior—such as a preference for online buying, a desire for more affordable prices than physical stores, and convenience of use—have emerged as major drivers of e-commerce platform sales development.

CONCLUSION

The results of this study prove that the Covid-19 pandemic has accelerated digital transformation in MSMEs and increased sales through changes in consumer behavior, marked by a shift in shopping patterns from physical stores to online stores. Therefore, MSMEs need to optimize the use of e-commerce and its features to support product marketing. This proves that the success of digital transformation implementation greatly depends on the ability of MSMEs to adapt to technology, improve service quality, and utilize digital platforms sustainably to reach a wider market.

This study will provide greater benefits if subsequent studies examine variables that have not yet been researched and involve a broader sample, as the current limitations of the sample do not allow for a comprehensive and uniform interpretation of the application of digital transformation in Indonesia among MSMEs.

DAFTAR PUSTAKA

Agustian, K., Mubarok, E.S., Zen, A., Wiwin., Malik, A.J. (2023). The Impact of Digital Transformation on Business Models and Competitive Advantage. Technology and Society Perspectives (TACIT) Journal.

Akbari, T, T & Pratom, R, D. (2022). Higher education digital transformation implementation in Indonesia during the COVID-19 pandemic. Jurnal Kajian Komunikasi. Vol 10 (1).

Alam, A. (2022). Employing Adaptive Learning and Intelligent Tutoring Robots for Virtual Classrooms and Smart Campuses: Reforming Education in the Age of Artificial Intelligence. Lecture Notes in Electrical Engineering, 914.

Aljumah, A., Nuseir, M. T., & Alshurideh, M. T. (2021). The impact of social media marketing communications on consumer response during the COVID-19: Does the brand equity of a university matter. *The Effect of Coronavirus Disease (COVID-19) on Business Intelligence*, 367

Basry, A. and E. M. Sari. 2018. Use of Information and Communication Technology (ICT) in Micro, Small and Medium Enterprises (MSMEs). IKRA-ITH INFORMATICS: Journal of Computers and Informatics 2(3): 53-60.

C. Mbama, and P. Ezepue. (2018). "Digital banking, customer experience and bank financial performance," *The International Journal of Bank Marketing*, vol. 36, no. 2, pp. 230-255.

Erlanitasari, Y, Rahmanto, A, Wijaya, M. (2020). Digital Economic Literacy Micro, Small And Medium Enterprises (Smes) Go Online.

Faisal, R., Tawo,O., Fonkem, B., Awofadeju, M, O. (2023). The Impact of Digital Transformation on Small and Medium Enterprises (SMEs) in the USA: Opportunities and Challenges. *IRE Journals*. Vol 7 (6)

Gomez-Trujillo, A. M., & Gonzalez-Perez, M. A. (2021). Digital transformation as a strategy to reach sustainability. Smart and Sustainable Built Environment, 11(4), 1137-1162.

Hamill, J., Tagg, S., Stevenson, A & Vescovi, T. (2010). New Developments in Online Marketing. *Journal of Marketing Management.*

Han, H.; Trimi, S. (2022). Towards a data science platform for improving SME collaboration through Industry 4.0 technologies. *Technol. Forecast.*

Handayani, J., Masrokhah, S. (2024). Digital Transformation, Sustainability, And Msme Performance: The Role Of Organizational Agility. Ultima Management.

Jurnal Bisnis dan Manajemen, Volume 5, No. 2, Oktober 2025, p. 250-258

Handayati, R., Rozaq, A.S., As'adi, F.N., Saputra, M.Z.D., Ubaidillah, M.M.(2024). Challenges and Solutions in the Implementation of Digital Tech-nology in MSMEs: Perspectives from Entrepreneurs and Consumers. Technology and Society Perspectives (TACIT).

Hendrawan, S, A., Chatra, A., Iman, N., Hidayatullah, S., Suprayitno, D. (2024). Digital Transformation in MSMEs: Challenges and Opportunities in Technology Management.

Judianto, L., Arfiansyah, F., Rusdianto, Fatchuroji, A., Syaiful, M. Bibliometric Analysis of Digital Transformation in MSME Entrepreneurship in the Era of Creative Economy. *West Science Interdisciplinary Studies.*Vol. 03, No. 02, pp. 384-398

Karpacz, A, W., Karpacz, J & Rudawska, J. (2021). The impact of market orientation on the performance of MSMEs operating in technology parks: The role of market dynamism. Journal of Entrepreneurship, Management and Innovation Volume 17(2), PP: 29-52.

Kim, S.-S. (2021). Sustainable Growth Variables by Industry Sectors and Their Influence on Changes in Business Models of SMEs in the Era of Digital Transformation. MDPI.

Lee, K., Azmi, N., Hanaysha, J., Alshurideh, M., & Alzoubi, H. (2022). The effect of digital supply chain on organizational performance: An empirical study in Malaysia manufacturing industry. *Uncertain Supply Chain Management, 10*, 1–16.

Matt, D. T., & Rauch, E. (2020). SME 4.0: The role of small-and medium-sized enterprises in the digital transformation.

Marolt, M., Lenart, G., Kljaji, M., Pucihar, A.(2024). Exploring Digital Transformation Journey Among Micro, Small-, and Medium-Sized Enterprises.

Mauro, M., Noto, G., Prenestini, A., Sarto, F. (2024). Digital transformation in healthcare: Assessing the role of digital technologies for managerial support processes. (2024). Journal of Technological Forecasting & Social Change.

Navas E.B.G., Suarez J.E.S., Montanez J.R., Quintero Y.A.R. (2024). Determining factors for the digitization of micro, small, and medium-sized enterprises (MSMEs) in Ibero-America. *Journal of Innovation & Knowledge*.

Philbin, S., Viswanathan,R., & Tellukdarie, A. (2022) Understading How Digital Transformation Can Enable SMEs to Achieve Sustainable Development : A Systematic Literature Review. *Small Business Internation Review.*

Pratiwi, Z,H & Umam, M, S. (2025). MSMEs Digitalization Strategy : Increasing Sustainability in the Era of Digital Transformation. *Generate Clean and Sustainability Business*. Vol 01 (1), P:42-56

Quinton, S., Canhoto, A., Molinillo, S., Pera, R., & Budhathoki, T. (2017). Conceptualising a digital orientation: antecedents of supporting SME performance in the digital economy. *Journal of Strategic Marketing*, 1-13.

Rados, T., Simic, S., & Misevic, P. (2019). Digital Transformation - The Implementation Process in The Case of The Croatian Chamber of Economy (Cce). Economic and Social Development 46th *International Scientific Conference on Economic and Social Development*.

Raihan, A., &Tuspekova, A. (2022). Toward a sustainable environment: Nexus between economic growth, renewable energy use, forested area, and carbon emissions in Malaysia. Resources, Conservation & Recycling Advances.

Reis, J., Amorim, M., Melão, N., & Matos, P. (2018). Digital transformation: a literature review and guidelines for future research. *World Conference on Information Systems and Technologies*, 411-421.

Saputri, M. E., & Utami, F. N. (2023). Knowledge Management on Bandung MSMEs in the Digital Era. Conference on Digital Humanities 2022 (CODH 2022), 7-14.

Sari, N. T. P., & Kusumawati, A. (2022). The efforts to strengthening of micro, small and medium-sized enterprises (MSME) in Indonesia. *Asian Journal of Management Entrepreneurship and Social Sciene*, 02(01)

Schmidt, A.(2025). Sustainable Digital Transformation in Small and Medium Enterprises (SMEs). *International Journal of Global Tech Management*. Vol, 2.

Selfiani. (2021). the Effect of Green Accounting Disclosure, Company Size, on Stock Return With Gcg As a Moderating Variable. *International Journal of Business, Economics and*

Jurnal Bisnis dan Manajemen, Volume 5, No. 2, Oktober 2025, p. 250-258

Law, *24*(5), 156–165.

Selfiani, I. Y. (2022). Influence Of Lifestyle, Product Quality And Brand Image On Purchase Decisions With Health Awareness As Moderating Variables(Case Study Of Healthy Food Products Quaker Oat). *Enrichment: Journal of Management*, *12*(3), 2439–2447. https://doi.org/https://doi.org/10.35335/enrichment.v12i3.607

Selfiani, & Purwanti, A. (2020). The Effect Of Sustainability Reporting, Corporate Culture And ISO 14000 Toward Corporate Financial Performance With GCG As Moderating Variables. *International Journal of Business, Economics and Law*, *21*(5), 161–172. https://doi.org/https://www.ijbel.com/wp-content/uploads/2020/06/IJBEL21_261.pdf

Selfiani, S., Khomsiyah, K., & Gunawan, J. (2024). The Corporate Sustainability Performance In Indonesia. *Educational Administration: Theory and Practice*, *2024*(5), 1024–1034. https://doi.org/10.53555/kuey.v30i5.3004

Selfiani, S., & Yunita, I. (2022a). The Effect Of Green Culture And Csr On Financial Performance With XBRL Application As Moderating Variables. *International Journal of Educational Research & Social Sciences*. https://doi.org/10.51601/ijersc.v3i4.479

Selfiani, S., & Yunita, I. (2022b). The Effect Of Green Culture And Csr On Financial Performance With XBRL Application As Moderating Variables. *International Journal of Educational Research & Social Sciences*, *3*(4), 1797–1807. https://doi.org/10.51601/ijersc.v3i4.479

Shevyakova, A., Munsh, E., Arystan, M., & Petrenko, Y. (2021). Competence development for Industry 4.0: Qualification requirements and solutions. *Insights into Regional Development*, 3(1), 124–135.

Sweiss, N., Obeidat, Z. M., Al-Dweeri, R. M., Mohammad Khalaf Ahmad, A., M. Obeidat, A., & Alshurideh, M. (2021). The moderating role of perceived company effort in mitigating customer misconduct within Online Brand Communities (OBC). *Journal of Marketing Communications*, 1–24.

Ta, V, A & Lin, C, Y. (2023). Exploring the Determinants of Digital Transformation Adoption for SMEs in an Emerging Economy. *MDPI.*

Tariq, E., Alshurideh, M., Akour, I., & Al-Hawary, S. (2022) The effect of digital marketing capabilities on organizational ambidexterity of the information technology sector. *International Journal of Data and Network Science, 6*, 1–8.

Usmar, U., Prihanto, H., Lanori, T., & Selfiani, S. (2024). *The Influence of Green Culture on Sustainability Development Goals (SDGs) With GCG Variables as A Moderation*. *3*(4), 1263–1274. https://doi.org/https://doi.org/10.54443/sj.v3i4.393

Veckalne, R., & Tambovceva, T. (2022). The Role of Digital Transformation in Education in Promoting Sustainable Development. Virtual Economics, 5(4), 65-86.

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital Transformation: A Multidisciplinary Reflection and Research Agenda. Journal of Business Research, 122, 889-901

Wijaya, R., Yadewani, D & Wati, H. (2024). Digital Transformation And Performance Of Small And Medium Enterprises: Empirical Evidence In Pariaman City. *Journal Unrika*

Wulan, T,S., Reni., Putri, R, A., Solihin, D,A. (2024). Digital Transformation as a Catalyst for SMEs Productivity and Profitability in the Digital Era. *Journal of Economic Education and Entrepreneurship Studies*.

Yadav, M.S. and Pavlou, P.A. (2014) Marketing in Computer-Mediated Environments: Research Synthesis and New Directions. *Journal of Marketing*, 78, 20-40

Yuwana, S. I. P. 2020. Coronanomics: Strategies for Revitalizing MSMEs Using Digital Technology in the Midst of the Covid-19 Pandemic. *Journal of Technopreneurship on Economics and Business Review* 2(1): 58- 68.