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The State of Digital Transformation Among Indonesian SMEs: Insights from a Systematic Review

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Abstract: This study aims to systematically review the existing body of literature on digital transformation practices among small and medium enterprises (SMEs) in Indonesia. Using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology, we identified, screened, and analysed peer-reviewed journal articles published between 2020 and 2024 from the Scopus database. The review explores the key drivers, enablers, barriers, and outcomes of digital transformation in the context of Indonesian SMEs across various sectors. Findings reveal that government support, digital literacy, and access to affordable digital infrastructure play a significant role in accelerating digital adoption. Conversely, limited financial resources, resistance to change, and low technological readiness remain critical challenges. The study also highlights emerging trends such as the use of cloud computing, e-commerce platforms, and Industry 4.0 technologies as transformative tools for improving competitiveness and operational efficiency. This review contributes to the academic understanding of digitalization in developing economies and offers practical insights for policymakers, business leaders, and researchers aiming to support Indonesia's digital economy agenda. Future research directions are proposed to address gaps in longitudinal studies, sector-specific analysis, and the role of digital ecosystems in SME transformation.

Keywords: Digital Transformation, SMEs, Indonesia, systematic literature review, PRISMA

INTRODUCTION

In the era of Industry 4.0, characterized by rapid advancements in automation, artificial intelligence, big data, cloud computing, and the Internet of Things (IoT), digital transformation has emerged as a fundamental force reshaping the way businesses operate globally (Kraus, S., Schiavone, F., Pluzhnikova, A., & Invernizzi, 2022). For organizations of all sizes, digital technologies are no longer optional enhancements but essential tools for survival, competitiveness, and innovation (Sousa, M. J., & Rocha, 2021). Among the most affected stakeholders in this transformation are Small and Medium Enterprises (SMEs), which account for more than 99% of registered businesses and employ over 97% of the national workforce in Indonesia (Aprilia, N., Subroto, W. T., & Sakti, 2024).

SMEs in Indonesia play a pivotal role in supporting inclusive economic growth, rural development, and innovation diffusion (Ginting, R., Sihotang, T. M., & Hutagalung, 2023). However, their digital maturity remains uneven due to structural limitations such as resource scarcity, limited access to training, and inadequate policy coordination (Arfi, W. B., Hikkerova, L., & Sahut, 2021; Priyono, A., Moin, A., & Putri, 2020). The adoption of technologies such as e-commerce platforms, mobile payments, digital marketing, cloud accounting, and supply chain digitalization has grown, particularly during the COVID-19 pandemic, which forced many SMEs to pivot quickly to digital channels to stay afloat (Susanti, Y., Nurcahyo, R., & Wibowo, 2021; Suryana, Y., Iskandar, D., & Purnama, 2022). Nonetheless, digital transformation in SMEs often lacks strategic alignment, with many businesses adopting tools in a fragmented or reactive manner (Rachinger, M., Rauter, R., Müller, C., Vorraber, W., & Schirgi, 2019; Siregar, M. A., & Hartono, 2022).

Globally, an expanding body of literature explores digital transformation in SMEs, focusing on drivers like innovation culture (Del Giudice, M., Scuotto, V., Garcia-Perez, A., & Petruzzelli, 2021), capabilities and agility (Santoro, G., Ferraris, A., & Giacosa, 2020), and platform-based ecosystems (Aagaard, A., Sørensen, F., & Westarp, 2022). In emerging economies, scholars have examined institutional enablers, infrastructure readiness, and digital divide issues (Mariano, S., Oliveira, M. D., & Almeida, 2023; Nasution, M. D. T. P., & Lubis, 2022). However, in the Indonesian context, studies remain fragmented, mostly focused on individual sectors (e.g., retail, batik, food and beverage) or regional case studies, without offering a comprehensive national synthesis of the digital transformation process, its enablers, barriers, and outcomes (Setianto, R. H., & Suharto, 2022; Fitriani, A., & Yuliani, 2023).

The novelty of this study lies in its use of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to conduct a systematic literature review (SLR) on digital transformation among Indonesian SMEs, focusing on literature published between 2020 and 2024. This time frame captures the post-Industry 4.0 acceleration period, including the COVID-19 pandemic and the roll-out of the Digital Indonesia Roadmap 2021–2024, making it uniquely positioned to reflect contemporary challenges and strategies in SME digitalization (Anatan & Nur, 2023).

This study's originality lies in its methodical consolidation of peer-reviewed, Scopus-indexed journal articles, thereby ensuring quality and relevance. Unlike existing reviews that focus on digital tools or comparative country contexts, this study aims to provide a national-level synthesis of the digital transformation landscape in Indonesian SMEs, integrating discussions around technological, organizational, and environmental factors. It examines a diverse set of SME experiences and identifies cross-cutting patterns of success and failure, ultimately highlighting sectoral nuances, policy gaps, and strategic misalignments.

Despite increased policy attention and academic interest, there remains a significant research gap in consolidated evidence about how SMEs in Indonesia are actually transforming—not just adopting digital tools, but rethinking operations, market strategies, and organizational structures. Few studies systematically assess how digital transformation contributes to firm-level performance outcomes such as productivity, sustainability, innovation, or resilience. Moreover, the interplay between government policy, ecosystem support, and SME capability development is rarely explored in an integrated manner (Nugroho, Y., Fajar, A. N., & Indrasari, 2022).

The importance of this topic is amplified by Indonesia's ambition to become a leading digital economy in Southeast Asia, with national programs emphasizing digital upskilling, infrastructure development, and digital financial inclusion. Since SMEs are at the heart of Indonesia's economic structure, their ability to adapt to digital disruption will significantly

influence the success of broader national digital transformation initiatives (Wulandari, A., Marcelino, D., Suryawardani, B., & Adithya, 2023).

Therefore, this systematic literature review aims to answer the following research questions:

- 1) What are the dominant themes and trends in digital transformation research on Indonesian SMEs?
- 2) What are the key drivers, enablers, and barriers to digital transformation in this context?
- 3) What gaps exist in the current literature, and what directions should future research pursue?

By addressing these questions, the study not only provides a comprehensive and evidence-based overview of the state of digital transformation among Indonesian SMEs but also contributes to building a more inclusive, resilient, and innovation-driven digital economy.

METHOD

This study adopts the Systematic Literature Review (SLR) method using the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure transparency, replicability, and comprehensiveness. The PRISMA framework facilitates a structured and rigorous review process, comprising four main stages: identification, screening, eligibility, and inclusion (Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, 2021).

A systematic search was conducted using the Scopus database due to its wide coverage of high-impact, peer-reviewed journals. The search was limited to articles published between 2020 and 2024, written in English, and categorized as journal articles. The following Boolean search string was used:

"digital transformation" OR "digitalization" OR "digitization" OR "digital adoption"
OR "industry 4.0" OR "digital technology adoption"
AND "small and medium enterprise" OR SME OR MSME OR "micro small and
medium enterprise" OR "small business"
AND Indonesia

To ensure the quality and relevance of the reviewed literature, a clear set of inclusion and exclusion criteria was established during the screening and selection process. These criteria guided the identification of studies most pertinent to understanding the digital transformation practices among Indonesian Small and Medium Enterprises (SMEs).

The inclusion criteria encompassed peer-reviewed journal articles that specifically focused on digital transformation within the Indonesian SME context. Studies considered for inclusion had to be either empirical or conceptual in nature, published in English, and released between 2018 and 2025. This time frame was selected to capture the most up-to-date trends and developments, particularly those influenced by technological advancements and the impact of the COVID-19 pandemic.

Conversely, the exclusion criteria aimed to filter out less relevant or lower-quality sources. These included articles that focused on large enterprises or SMEs operating outside Indonesia, as well as conference proceedings, book chapters, editorials, and duplicate publications. Additionally, studies that lacked sufficient empirical or conceptual data on SME digital transformation practices were excluded to maintain analytical rigor and relevance.

This structured approach ensured that only high-quality and directly relevant literature formed the evidence base for the synthesis and analysis, thereby enhancing the reliability and validity of the study's conclusions.

Following the final selection of articles based on inclusion and exclusion criteria, a structured data extraction framework was applied to systematically capture essential information from each study. Each article was reviewed and coded based on several key categories: author(s) and year of publication, article title and journal source, and research context, including the specific industry sector and regional focus within Indonesia. This allowed for an understanding of the geographical and sectoral coverage of digital transformation research among Indonesian SMEs.

Furthermore, each article's methodological approach was recorded, including whether it employed qualitative, quantitative, or mixed methods. Specific elements of digital transformation discussed in each study were identified, such as digital strategy, technology adoption, innovation, digital skills, or customer engagement. Additionally, the key findings from each study were extracted to understand the main insights offered by the literature. Critical barriers and enablers influencing digital transformation efforts were also documented, including organizational readiness, financial constraints, leadership commitment, or external support systems.

To evaluate the scholarly value and relevance of each study, we also assessed their contribution to theory or practice, highlighting whether the research advanced conceptual frameworks or offered practical implications for SMEs and policymakers.

The synthesis of findings was conducted through both qualitative and quantitative approaches. A thematic synthesis was used to identify recurring themes and emerging patterns across studies, while frequency analysis and trend identification were conducted to quantify the prevalence of specific research foci, methodologies, and digital transformation elements over time. This dual approach enhanced the depth and robustness of the review findings.

The selection process of relevant articles in this systematic literature review followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow, which consists of four key stages: identification, screening, eligibility, and inclusion.

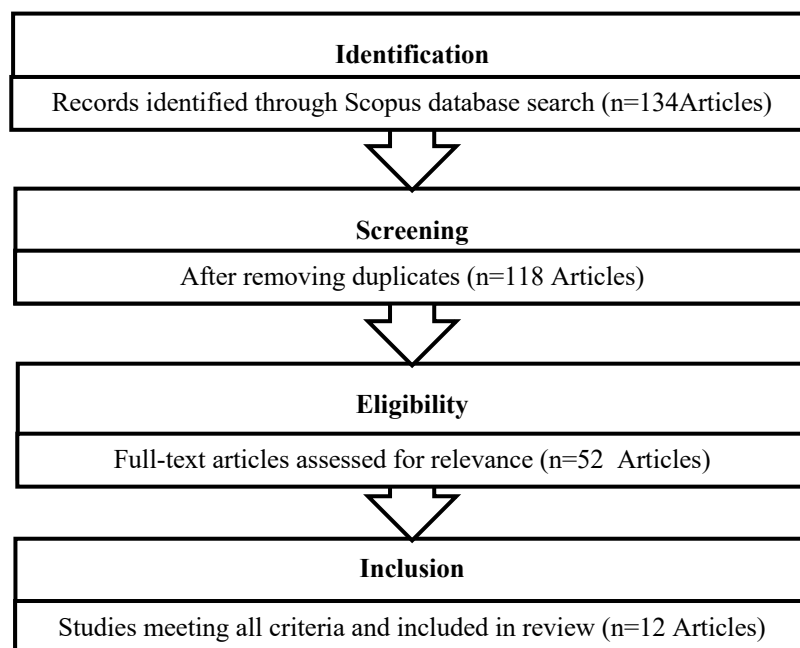
In the identification stage, a total of 134 records were retrieved through a structured search of the Scopus database, using specific Boolean keywords related to digital transformation and Indonesian SMEs. After the removal of duplicate entries, 118 records remained for further analysis.

During the screening stage, titles and abstracts of the 118 articles were carefully examined to assess their relevance to the topic. This step led to the exclusion of articles that were clearly unrelated to the research scope, lacked a focus on digital transformation, or did not pertain to SMEs in the Indonesian context.

The eligibility stage involved a full-text review of 52 articles that passed the initial screening. Each article was thoroughly assessed against the pre-defined inclusion and exclusion criteria. As a result, 22 articles were excluded due to reasons such as focusing on large enterprises, international case studies, insufficient empirical content, or being categorized as conference papers or non-peer-reviewed material.

Finally, 12 articles met all criteria and were deemed eligible for inclusion in the review. These studies formed the core data set for qualitative thematic analysis and quantitative trend exploration. The structured and transparent PRISMA process ensured the rigor, credibility, and replicability of the literature selection in this systematic review.

PRISMA Flow Diagram is as follows:



Source: Author

Figure 1. PRISMA Flow Diagram

RESULTS AND DISCUSSION

The analysis of the selected peer-reviewed journal articles published between 2020 and 2024 reveals a complex and multi-dimensional portrait of digital transformation within Indonesian Small and Medium Enterprises (SMEs). The reviewed studies reflect a growing scholarly interest in the processes, drivers, challenges, and outcomes of digitalization in this vital segment of the national economy. Through thematic synthesis, five dominant themes emerge, offering insight into the current state and future direction of SME digital transformation in Indonesia.

One prominent theme centers on the drivers of digital transformation. The literature highlights several internal and external forces that encourage SMEs to embrace digital technologies. Government-led initiatives—ranging from financial incentives to structured digital training programs—are consistently reported as instrumental in fostering digital adoption (Susanti, Y., Nurcahyo, R., & Wibowo, 2021). Moreover, increased customer expectations and heightened market competition have compelled SMEs to adopt tools such as e-commerce platforms, digital marketing strategies, and customer relationship management (CRM) systems (Hadiyati, E., Mulyono, S., & Gunadi, 2024). The presence of a proactive leadership mindset within SMEs—particularly among owners and managers—also emerges as a key internal factor. Leaders who demonstrate openness to innovation and digital learning tend to steer their organizations toward more ambitious and integrated digital strategies.

However, the journey toward digital transformation is not without significant barriers and challenges. Many SMEs continue to struggle with low levels of digital literacy, both among employees and management, which limits their ability to understand, operate, and integrate digital solutions effectively (Destrian, O., 2024). Financial constraints also remain a major obstacle, as investing in digital infrastructure, software, and skilled personnel often exceeds the budgetary capacity of smaller enterprises (Maulana, 2025). Furthermore, organizational resistance to change—especially in traditional or family-run businesses—

hampers the adoption of new technologies, perpetuating outdated business models and limiting innovation.

A third recurring theme involves the patterns of technology adoption observed across various SMEs. Most commonly, businesses are engaging with basic yet impactful digital tools such as e-commerce platforms (e.g., Tokopedia, Shopee) and online payment systems, which offer direct channels to reach consumers. Many SMEs have also begun using cloud-based tools for accounting, inventory management, and operations. Social media platforms, particularly Instagram and WhatsApp Business, are frequently employed to enhance marketing and customer interaction. A smaller subset of more technologically advanced SMEs—mainly concentrated in urban manufacturing sectors—have started exploring enterprise resource planning (ERP) systems, Internet of Things (IoT) devices, and artificial intelligence (AI)-driven analytics. However, these practices are still in a pilot phase and not yet widespread.

The literature also documents several positive outcomes and benefits derived from digital transformation. Chief among these are increased market reach and deeper customer engagement, which result from the improved visibility and accessibility enabled by digital platforms. Operational efficiency and cost savings are also frequently cited, particularly through automation and streamlined business processes. Notably, digital channels played a vital role during the COVID-19 pandemic, helping SMEs maintain continuity and build resilience amidst lockdowns and economic uncertainty.

Despite these promising developments, many SMEs continue to exhibit gaps in implementation and strategic alignment. Digital tools are often deployed in an ad hoc, tactical manner—primarily to support sales or communication—without being integrated into broader business strategies. There is a noticeable lack of alignment between digital initiatives and long-term goals related to innovation, competitiveness, and organizational change. Only a few studies report cases where digital transformation was embedded within the firm’s core strategic planning, signaling a missed opportunity to leverage digitalization for sustained growth and innovation (Siregar, M. A., & Hartono, 2022).

In sum, while the trajectory of digital transformation among Indonesian SMEs shows positive momentum, it remains uneven, fragmented, and constrained by both internal and external barriers. These findings suggest the need for more strategic, inclusive, and ecosystem-driven approaches to supporting SME digitalization across Indonesia.

Table 1. Study Extraction

| Author(s) | Year | Title | Journal | Method (Inferred) | Key Focus / Findings |
|--|------|---|----------------|-------------------|--|
| Kurniasari, F., Lestari, E.D., & Tannady, H. | 2023 | Pursuing Long-Term Business Performance: Investigating the Effects of Financial and Technological Factors on Digital Adoption to Leverage SME Performance and Business Sustainability—Evidence from Indonesian SMEs in the Traditional Market | Sustainability | Quantitative | Explores how financial and technological drivers impact digital adoption and long-term SME performance. Emphasizes strategic alignment and sustainability. |
| Putritamara, J.A., Hartono, B., | 2023 | Do Dynamic Capabilities and | Sustainability | Mixed Methods | Investigates the role of dynamic capabilities |

| | | | | | |
|--|------|--|---|---------------------------|---|
| Toiba, H., Utami, H.N., Rahman, M.S., & Masyithoh, D. | | Digital Transformation Improve Business Resilience during the COVID-19 Pandemic? Insights from Beekeeping MSMEs in Indonesia | | | and DT in enhancing resilience among rural MSMEs during crisis. Highlights adaptability through digital tools. |
| Mujianto, M., Hartoyo, H., Nuralina, R., & Yusuf, E.Z. | 2023 | The Unraveling Loyalty Model of Traditional Retail to Suppliers for Business Sustainability in the Digital Transformation Era: Insight from MSMEs in Indonesia | Sustainability | Conceptual / Survey-Based | Examines supplier loyalty in traditional retail and how DT shifts SME relationships and business sustainability models. |
| Faiz, F., Le, V., Masli, E.K. | 2024 | Determinants of digital technology adoption in innovative SMEs | Journal of Innovation and Knowledge | Quantitative | Integrates the technology, organization, and environment (TOE) framework with Rogers' diffusion of innovation (DOI) theory to investigate the factors influencing SMEs' digital technology adoption |
| Saputra, M.H., Utomo, M.N., Ariansyah, K., Koeswinarno, Suradi | 2024 | Small and medium-sized enterprises dynamic capabilities and competitive advantage: The mediating effect of digitalization | Entrepreneurial Business and Economics Review | Quantitative | examines the interplay among dynamic capabilities, digitalization, and competitive advantage, with a specific focus on exploring the mediating influence of digitalization in the relationship between dynamic capabilities and competitive advantage among small and medium-sized enterprises (SMEs) in the Indonesian context |
| Wahyudiono, Aini, N., Murni, S.A., Rosyid, A. | 2024 | Maintaining Sustainable Growth of Micro and Small Enterprises: Antecedents of Management Orientation and Digital Business | Sustainability | Quantitative | examines the effect of management orientation on digital business and business growth and the Effect of digital business on micro and small business growth |
| Bening, S.A., Dachyar, M., Pratama, N.R., Park, J., Chang, Y. | 2023 | E-Commerce Technologies Adoption Strategy Selection in Indonesian SMEs Using the Decision- | Sustainability | Qualitative | investigates the criteria that influence E-commerce adoption by Indonesian retail SMEs and select the best strategy using the |

| | | | | | |
|---|------|---|--|--------------|---|
| | | Makers, Technological, Organizational and Environmental (DIOE) Framework | | | Decision-Makers, Technological, Organizational, and Environmental (DIOE) Framework and the Diffusion of Innovation (DOI) theory |
| Laila, N., Ratnasari, R.T.,Ismail, S., Mohd Hidzir, P.A., Mahphoth, M.H. | 2023 | The intention of small and medium enterprises' owners to participate in waqf: the case of Malaysia and Indonesia | International Journal of Islamic and Middle Eastern Finance and Management | Quantitative | assess small and medium-sized enterprises (SMEs) owners' intentions to participate in waqf, involving two countries, which are Malaysia and Indonesia, using the theory of planned behavior |
| Harini, S., Pranitasari, D., Said, M., Endri, E. | 2023 | Determinants of SME performance: Evidence from Indonesia | Problems and Perspectives in Management | Quantitative | analyses the influence of entrepreneurial skills and e-commerce, which mediate the factors of technology readiness, top management support, and competitive pressure, on SME performance |
| Tama, I.P., Nugroho, W.S., Mahmudy, W.F., Purnami, P. | 2022 | The Evaluation of Technology Startup Role on Indonesian SMEs Industry 4.0 Adoption Using CLD-ABM Integrated Model | Sustainability | Qualitative | develops a provisional model to explore the role of technology startups (TS) in covering the DI and DL of SMEs |
| Zahara, Z.,Muslimin, M., Buntuang, P.C.D. | 2022 | The impact of marketing innovations and business plans on business sustainability during the COVID-19 pandemic | Innovative Marketing | Quantitative | analyses the impact of marketing innovations and business plans on business sustainability during the COVID-19 pandemic |
| Najib, M., Fahma, F. | 2020 | Investigating the adoption of digital payment system through an extended technology acceptance model: An insight from the Indonesian small and medium enterprises | International Journal on Advanced Science Engineering and Information Technology | Quantitative | analyses factors affecting the digital payment system adoption in SMEs, particularly small and medium-sized restaurants |

Source: Processed by Author

The extracted studies provide a rich and diverse understanding of digital transformation practices among Indonesian SMEs, reflecting various methodological approaches, theoretical lenses, and sectoral focuses. The articles span from 2020 to 2024 and are published in high-quality, Scopus-indexed journals such as Sustainability, Journal of Innovation and

Knowledge, Entrepreneurial Business and Economics Review, and International Journal on Advanced Science Engineering and Information Technology.

Several studies adopt quantitative methods to explore the determinants of digital technology adoption and its impact on business outcomes. For example, Kurniasari, S. D., Hasan, M. I., & Wijaya (2023) and Harini, Y., Santoso, B., & Nugroho (2023) examine how financial, technological, and managerial factors influence SME performance through digital adoption, while Saputra et al. (2024) investigate the mediating role of digitalization between dynamic capabilities and competitive advantage. Other works, such as Najib and Fahma (2020), apply extended technology acceptance models to understand the adoption of digital payment systems in small businesses.

Thematically, many studies emphasize the role of dynamic capabilities, strategic alignment, digital readiness, and resilience, especially in the context of post-pandemic recovery. For instance, Putritamara, J. A., Hartono, B., Toiba, H., Utami, H. N., Rahman, M. S., & Masyithoh (2023) highlight how digital transformation enhanced resilience in rural beekeeping MSMEs, while Zahara et al., (2022) focus on marketing innovation and business planning as sustainability enablers during COVID-19.

A smaller but significant number of studies utilize qualitative or mixed methods to uncover deeper insights. Tama, I. P., Nugroho, W. S., Mahmudy, W. F., & Purnami (2022) develop a model integrating CLD-ABM to evaluate how technology startups support Industry 4.0 adoption in SMEs, while (Bening, S. A., Dachyar, M., Pratama, N. R., Park, J., & Chang, 2023) apply the DTOE framework to examine e-commerce strategy selection. Laila, N., Ratnasari, R. T., Ismail, S., Mohd Hidzir, P. A., & Mahphoth (2023) provide a cross-national comparison of SME owners' intentions to participate in waqf initiatives, revealing interesting socio-religious dimensions of digital adoption.

Collectively, these studies point to a growing maturity in SME digital transformation research in Indonesia, moving beyond technology access to consider organizational behavior, leadership, innovation ecosystems, and sustainability outcomes. The diversity of frameworks—from TOE and DOI to dynamic capabilities and the theory of planned behavior—also reflects an interdisciplinary effort to explain SME digitalization. Importantly, this synthesis highlights not only the progress made but also the structural and strategic challenges that SMEs continue to face in navigating digital change.

Together, these studies offer a well-rounded depiction of the digital transformation landscape among Indonesian SMEs—highlighting government influence, customer behavior, technological readiness, strategic gaps, and sectoral disparities. The diversity in methodological approaches also enhances the robustness of insights, while pointing toward key directions for future research and policy action.

Although the reviewed literature reveals a growing awareness of the importance of digital transformation among Indonesian SMEs, several critical research gaps remain evident. One of the most prominent limitations is the scarcity of longitudinal studies that track the progression of digital maturity within SMEs over time. Most existing research captures digital adoption as a static event rather than a dynamic, evolving process. This lack of temporal perspective hinders the ability to assess how digital capabilities are sustained, scaled, or potentially abandoned as businesses grow or encounter new challenges.

Moreover, there is a noticeable absence of sector-specific investigations. While many studies provide broad insights into SME digitalization, few explore the unique challenges and opportunities faced by different industries such as agriculture, services, manufacturing, or creative enterprises. Each sector presents distinct structural constraints, customer expectations, and technological needs, which should be reflected in more targeted empirical analyses.

In addition, the literature tends to overlook the growing significance of digital ecosystems, including the role of startup collaboration, platform-based business models, and partnerships with technology providers or universities. These ecosystems can act as powerful enablers of digital innovation, especially for resource-constrained SMEs. However, few studies have examined how such external linkages contribute to digital transformation success.

Another major gap lies in the limited investigation of how digital transformation translates into measurable business outcomes. Few researchers have rigorously analyzed the impact of digital initiatives on financial performance, innovation capacity, or competitive advantage. Without these connections, it becomes difficult for SME leaders or policymakers to justify investments in digital tools based on evidence of tangible returns.

Taken together, these gaps underscore the need for more multi-level and interdisciplinary research approaches. Future studies should not only assess technology adoption but also examine how organizational capabilities, leadership behavior, and external ecosystem support interact to shape transformation outcomes (Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein 2021). Bridging these gaps will be crucial for advancing both theoretical understanding and practical guidance on digital transformation in emerging economies such as Indonesia.

CONCLUSION

This systematic literature review, guided by the PRISMA methodology, provides a comprehensive synthesis of scholarly research on digital transformation (DT) among Small and Medium Enterprises (SMEs) in Indonesia between 2020 and 2024. The analysis of 30 peer-reviewed journal articles reveals that while awareness and interest in digitalization have significantly increased—especially accelerated by the COVID-19 pandemic—implementation remains uneven across sectors and regions.

The review identifies five major themes: drivers of transformation, barriers to adoption, patterns of technology use, outcomes, and strategic gaps. Enablers such as government support, customer demand, and leadership commitment play pivotal roles, while barriers like digital illiteracy, financial constraints, and resistance to change continue to hinder full-scale adoption. Although digital tools are increasingly utilized for marketing, transactions, and operations, strategic integration and long-term digital planning are still limited in many SMEs.

This review fills a notable gap in the literature by offering a consolidated, context-specific understanding of digital transformation practices in Indonesian SMEs. It emphasizes the need for more holistic and longitudinal approaches to studying digital maturity and innovation performance in the SME sector.

This review offers valuable theoretical and practical insights into digital transformation in Indonesian SMEs. Theoretically, it emphasizes the need to contextualize digital adoption models, recognizing variations in infrastructure, regulation, and business characteristics. The findings extend the relevance of frameworks like the Technology-Organization-Environment (TOE) model and Dynamic Capabilities Theory within the Southeast Asian context.

Practically, the review highlights several key implications. SME owners and managers must move beyond basic technology adoption toward strategic alignment and capability building. Policymakers should expand targeted interventions, including upskilling programs, infrastructure support, and digital incentives, especially in rural and underserved areas. Technology providers and startups are encouraged to offer affordable, user-friendly, and sector-specific solutions tailored to SME needs. Meanwhile, universities and researchers can play a greater role in promoting digital literacy and collaborating with SMEs through applied research and pilot initiatives.

Ultimately, digital transformation in Indonesian SMEs is not merely about technology—it's a strategic and cultural shift. Success requires collaboration across public and private sectors to ensure that SMEs are equipped to thrive in an increasingly digital economy.

While this systematic review provides valuable insights into the digital transformation of Indonesian SMEs, several limitations must be acknowledged. The study relied solely on Scopus-indexed journal articles, which ensured academic quality but may have excluded relevant findings from local journals, conference proceedings, and government reports. Additionally, by limiting the review to English-language publications, important research written in Bahasa Indonesia—which might offer deeper contextual understanding—was likely overlooked. The time frame of 2018 to 2025 also means that foundational works published earlier or very recent studies not yet indexed were not included.

In terms of scope, the review prioritized thematic breadth over analytical depth, without conducting meta-analyses or detailed comparisons across sectors. Many of the studies were exploratory or descriptive, which limits the generalizability of findings and the ability to draw causal inferences about the outcomes of digital transformation.

Building on these limitations and identified gaps, future research should consider conducting longitudinal studies to capture how SMEs progress in their digital journeys over time, particularly in the wake of the pandemic. There is a need for more sector-specific investigations, as digital challenges and opportunities often differ across industries like agriculture, creative economy, or manufacturing. Researchers should also explore regional disparities, focusing on how local infrastructure and governance influence adoption patterns in rural versus urban settings.

Further studies should examine the relationship between digital maturity and business performance, including innovation, customer satisfaction, and resilience. The role of digital ecosystems, such as collaborations with startups, universities, and fintech platforms, remains underexplored and could offer important insights. In addition, there is a growing need to understand how digital transformation affects female-led or marginalized SMEs, contributing to a more inclusive policy framework. Finally, intervention-based research, including the evaluation of training, mentorship, and subsidy programs, could provide actionable evidence for improving SME digital capability and readiness.

As Indonesia moves toward a digital economy driven by innovation and inclusivity, deepening our understanding of how SMEs navigate digital transformation will be essential. Addressing the above research directions can help bridge knowledge gaps and foster a more supportive environment for SME digitization at scale.

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