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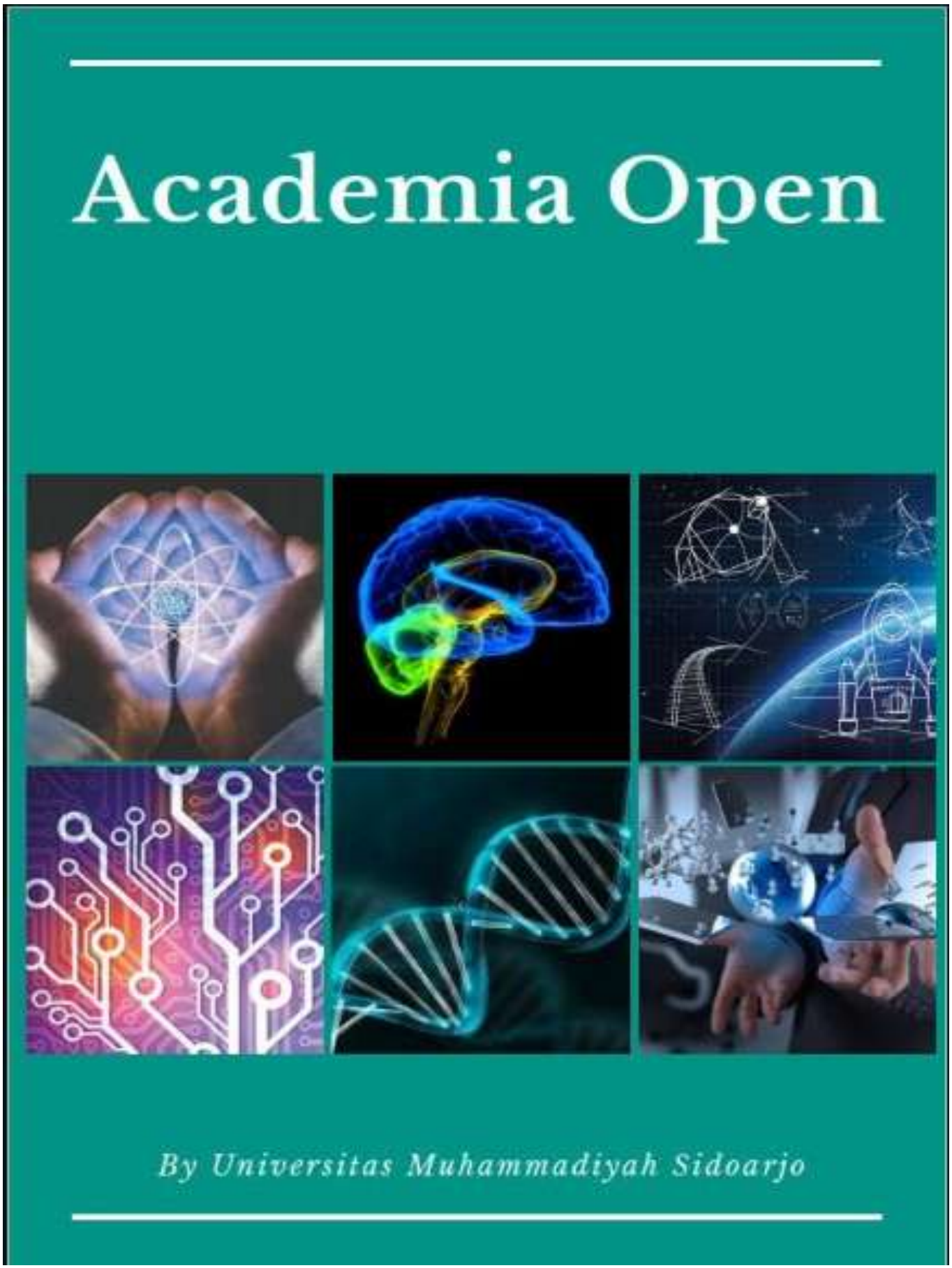

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Digitalization Drives Financial And Operational Outcomes In Small And Medium Enterprises: Digitalisasi Mendorong Capaian Keuangan Dan Operasional Pada Usaha Mikro Kecil Menengah

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Abstract

General Background Micro, small, and medium businesses represent the backbone of global economic frameworks, contributing significantly to employment and gross domestic product. **Specific Background** In the post-pandemic era, technological integration through electronic commerce, cloud computing, and artificial intelligence has become an essential strategy for business survival and continuous resilience. **Knowledge Gap** Although numerous studies explore technology adoption drivers, systematic syntheses focusing specifically on post-adoption business performance measurements during the 2020 to 2026 period remain scarce. **Aims** This systematic literature review synthesizes empirical evidence regarding how technological tools dictate the monetary, administrative, and marketing achievements of smaller commercial entities. **Results** The PRISMA-guided analysis of fifty peer-reviewed articles reveals that digital payment systems, social platforms, and electronic commerce consistently accelerate revenue growth, administrative efficiency, and market expansion. However, these technological advantages remain structurally constrained by widespread digitalilliteracy, inadequateinternetinfrastructure, capitallimitations, and cybersecurity vulnerabilities. **Novelty** This research comprehensively maps the conditional nature of digital transformation, establishing that technological deployment alone cannot generate optimal business success without simultaneous human capital and infrastructural readiness. **Implications** Policymakers and practitioners must prioritize literacy programs, secure financial inclusion frameworks, and robust internet access alongside technology adoption to realize sustainable competitive advantages.

Highlights

- Electronic commerce and social platforms successfully accelerate revenue growth and market expansion.
- Structural barriers including inadequate internet infrastructure heavily restrict technological value realization.
- Systematic human capital development remains prerequisite for achieving sustainable competitive advantages.

Keywords

Digital Transformation; Business Performance; Systematic Literature Review; Artificial Intelligence; Competitive Advantage

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INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of the economy, making significant contributions to employment and gross domestic product (GDP), In Indonesia, MSMEs account for more than 99% off all business entities, contribute approximately 61% of the national GDP, and employ over 97% of the workface [1],[2]. The COVID-19 pandemic emphasizes the importance of digitalization for the sustainability of MSMEs. Priyono et al. show that MSMEs that shift to digital business models recover more quickly than those that remain conventional [3], highlighting the importance of digital transformation in supporting business adaptation and recovery.

The post-pandemic era has made digitalization a necessity for businesses. The adaption of e-commerce, social media, cloud computing, digital payment systems, and artificial intelligence has become essential for enhancing competitiveness [4]. A systematic review by Batubara et al. also found that digital transformation expands market reach and improves the operational performance of MSMEs [5]. Similarly, Legowo and Sorongan proposed a phased digital transformation model demonstrating how structured digital adoption accelerated MSME recovery and performance resilience during the pandemic period [6]. Global literature shows that digital adoption does not automatically improve business performance. Telukdarie et al., in a study of 200 SMEs in South Africa, found that although the benefits of loT, cloud computing, and ERP are recognized [7], their implementation is still hindered by high costs, skill gaps, and lack of system integration [8]. In Indonesia specifically, Alfirman and Widiastuti identified infrastructure limitations and chronic digital skill shortages as the most persistent structural barriers preventing MSMEs from translating digitalization into sustainable competitive advantage [2]. These tensions between the documented benefits of digital adoption and the equally documented barriers to its realization constitute the central problematic that motivates this review [9].

Research on SMEs and digital technology continues to grow. However, many studies still focus on the drivers of adoption using TAM, TOE, and RBV frameworks. While important, these studies emphasize the reasons and conditions for adoption rather than systematically synthesizing the post-adoption impacts on business performance. Several existing reviews have mapped the broader landscape of digital transformation research [10], [11], [12], yet these tend to be conceptually broad, spanning large enterprises and SMEs alike, and are not specifically calibrated to delineate performance outcomes across distinct digital technology categories. More targeted reviews focusing on the post-2020 period when pandemic induced digitalization produced a qualitatively different and more compressed wave of MSME digital transformation to remain scarce. Yasa et al. indicate that digital transformation generally has a positive effect on SMEs' economic performance. However, environmental and social aspects remain underexplored and require more technology-specific analysis [13]. Meanwhile, Dang et al. find that although AI and big date are widely studied as performance drivers, the measurement of business performance remain inconsistent, making comparisons across studies difficult [14]. Albuquerque et al., whose SLR of 131 Scopus articles assessed digital capabilities against all four BSC performance perspectives, noted that customer and learning perspectives show the strongest empirical links to digital capability, yet financial performance typically the most policy-relevant outcome is subject to the greatest methodological variance across studies [15]. Collectively, these gaps indicate that a dedicated, up-to-date synthesis one that is anchored specifically in the 2020 – 2026 window and organized around performance outcomes rather than adoption antecedents is both warranted and timely.

This study therefore undertakes a Systematic Literature Review aimed at consolidating and critically synthesizing the empirical evidence on how digitalization impacts the business performance of MSMEs in the post-pandemic period. This study examines the impact of digitalization on MSME performance by reviewing the most influential digital technologies, the business performance dimensions affected, and the key barriers to their implementation. A systematic analysis was conducted on 50 peer-reviewed articles published between 2020-2026 from Scopus, DOAJ, ScienceDirect, MDPI, and Google Scholar. The findings are expected to provide an evidence based reference while identifying research gaps for future studies.

METHOD

This study adopts a Systematic Literature Review (SLR) as its primary research design. Unlike narrative reviews, which are inherently subjective in their selection and interpretation of sources, an SLR applies a structured, replicable, and transparent process to identify, evaluate, and synthesize the available body of evidence on a defined research question [10]. To ensure methodological rigor and international scholarly acceptability, the review protocol was designed in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines a widely adopted standard in management and information systems research that prescribes explicit documentation of each stage of the literature selection process [13], [16]. The use of PRISMA is particularly appropriate for this study given the breadth of the digitalization literature and the necessity of systematically filtering a large initial corpus of potentially relevant works down to a final set of articles that directly and empirically address the impact of digital technologies on MSME business performance.

A. Search Strategy

The literature search was conducted using Scopus, DOAJ, Garuda, and Google Schoolar to broaden data coverage. Scopus and DOAJ were selected due to their high quality indexing, Garuda was used to capture Indonesian-languange studies on SMEs, and Google Schoolar served as a supplementary source for open-access articles not indexed in the main databases.

The search was executed using the following Boolean keyword string, applied consistently across all databases:

("digitalization" OR "digital transformation") AND ("MSME" OR "SME" OR "small and medium enterprise") AND ("business performance" OR "financial performance" OR "operational performance")

The search terms were deliberately broad at the OR level to ensure inclusivity across variant terminologies used in the literature, while the AND operators enforced thematic coherence by requiring each retrieved article to address both the digital technology construct and the performance outcome construct simultaneously. All searches were conducted with the publication date filter restricted to the period 2020 – 2026, reflecting the study's focus on post-pandemic digitalization dynamics.

B. Inclusion and Exclusion Criteria

To ensure that only methodologically sound and topically relevant articles were admitted into the final synthesis, a set of explicit inclusion and exclusion criteria was established prior to the commencement of database searching, following best-practice SLR protocol [14], [17].

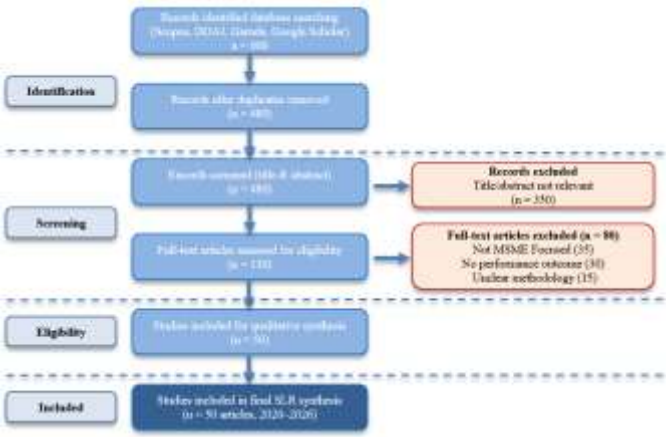
Articles were included if they satisfied all of the following conditions: (1) published between 2020 and 2026; (2) constituted a peer-reviewed empirical journal article whether quantitative, qualitative, or mixed-methods in design or a systematic review/bibliometric study that synthesized primary empirical evidence; (3) written in English or Bahasa Indonesia; (4) available as open-access full-text documents; and (5) explicitly examined the relationship between digital technology adoption or digitalization and one or more measurable dimensions of MSME or SME business performance, including but not limited to financial performance, operational efficiency, marketing performance, and competitive advantage [18].

Articles were excluded from the review if they were not available in full text, were not peer reviewed journal articles, did not focus on MSMEs, or did not explicitly link digitalization to business performance.

C. Data Extraction and Selection Process

After database searching, all references were imported into a reference management tool to remove duplicates. Records appearing in multiple sources were merged so that each study was assessed only once. The selection process was conducted in two stages, namely title and abstract screening, followed by full text review. Articles that were still unclear at the screening stage were retained for full text assessment to ensure no relevant studies were missed. At the final stage, each article was evaluated, and reasons for exclusion were documented.

Data from the selected articles were extracted using a structured template covering authors(s) and year of publication, studi location, research method, type of digital technology examined, and its impact on MSME performance.



RESULTS AND DISCUSSION

A. Overview of Selected Literature

The systematic search and PRISMA-guided selection process yielded a final corpus of 50 peer-reviewed, open-access articles published between 2020 and 2026. The distribution of publications across the review period reveals a clear upward trajectory in scholarly attention to MSME digitalization: while the earliest articles in the corpus date to 2020, a year marked by acute pandemic disruption the volume of relevant empirical publications accelerated considerably from 2022 onward, with 2023 and 2024 representing the most productive years in the dataset. The publication pattern shows a gap between real world developments and their academic dissemination, along with an acceleration of digital adoption among SMEs in the post pandemic period.

Geographically, Indonesia is the most studied context (16 out of 50 articles), followed by China, Pakistan, European Union countries, and cross-country studies. Methodologically, approximately 60% of the studies employed quantitative approaches, primarily Structural Equation Modeling-Partial Least Squares (SEM-PLS), while the remainder adopted qualitative methods, mixed methods, Systematic Literature Reviews (SLR), and bibliometric analyses. The most frequently examined digital technologies include e-commerce, social media and digital marketing, digital payment and financial inclusion, cloud computing, and artificial intelligence. These five themes constitute the basis of the thematic systhesis presented in this

study.

B. Thematic Analysis: The Impact of Digitalization

1. Impact on Financial Perfomance

The literature most frequently higlights the positive impact of digital adoption on SMEs' financial performance (income, cost efficiency, ROI, profitability), although the magnitude of the effect varies depending on technology type, context, and digital readiness.

Digital payment systems and financial inclusion technologies represent perhaps the most direct pathway through which digitalization translates into measurable financial gains. Daud and Ahmad, in a SEM-PLS study of 190 Indonesian SMEs in Banten Province, found that digital marketing, digital finance, and digital payment each independently and significantly improved financial performance, with digital payment exhibiting the strongest direct effect [19], [20]. This finding aligns with Nahar, whose TAM and RBV-grounded survey of 250 Bangladeshi SMEs confirmed that online payment system adoption positively affects business performance, with the relationship moderated by owner gender male owned SMEs demonstrated stronger performance effects, a nuance that highlights the importance of disaggregating digitalization impacts by firm-level demographic characteristics [21]. More broadly, Alfarizi et al. extended this analysis to the supply chain level, demonstrating through multiple linear regression on 164 Indonesian MSMEs that both e-payment and e-commerce adoption positively influence supply chain performance, which in turn generates downstream financial efficiency gains [22]. Purnamasari et al. further elaborated this mechanism in a study of 260 culinary MSMEs, establishing that digital financial inclusion mediates the positive relationship between digital financial literacy and overall MSME performance suggesting that access to digital financial infrastructure, not merely tool adoption, is the operative financial performance driver [23].

E-commerce adoption is one of the main drivers of digitalization that significantly influences MSME financial performance. Santos-Jaen et al, (PLS-SEM, Mexican SMEs) found that integrating e-commerce with broader business digitalization and operational efficiency improves firm performance, particularly through revenue growth anf market expansion [24], [25]. Alam et al. (212 MSMEs in Bangladesh) also reported that e-commerce adoption enhances both financial and sustainability performance during the COVID-19 period, with digital markering providing additional support [26]. Teng et al, (335 SMEs in China) further confirmed that digital transformation including technological infrastructure, digital skills, and digital strategy has a positive effect on financial performance, with digital skills and strategy acting as key mediating factors [27]. Theoretically, digitalization is understood not merely as a technological investment, but as a capability building process whose outcomes depend on organizational learning.

The evidence from larger-scale quantitative studies reinforces this picture. Wang et al., using a difference-in-differences method on panel data from Chinese enterprises, found that digital transformation significantly promotes enterprise performance through innovation, and that public policy amplifies this positive performance effect a finding with important implications for the design of government-led MSME digitalization programs [28].

1. Impact on Operational and Marketing Performance

Beyond financial metrics, the reviewed literature documents equally compelling digitalization effects on MSME operational efficiency and marketing reach two performance dimensions that are often causally upstream of financial outcomes. The digitalization–operational performance nexus operates primarily through cost reduction, process automation, and supply chain optimization, while the marketing performance pathway runs through customer acquisition, engagement, and retention enabled by digital platforms [29].

Social media and digital marketing tools dominate the marketing performance literature [30]. Fraccastoro et al., through a survey and SEM study of Slovenian SMEs, established that social media use improves firm performance through two distinct mediating mechanisms: relational social commerce capability and competitive advantage [31]. The implication is that social media's performance effect is not simply a function of online presence but of the organizational capacity to leverage digital interactions into durable customer relationships and differentiated market positioning [32], [33]. Qalati et al. (381 SMEs in Pakistan, SmartPLS-TOE) found that technological, organizational, and environmental factors jointly drive social media adoption, which positively impacts SME performance, highlighting that marketing digitalization is not only a technological issue but also an organizational one [34]. Garrido-Moreno et al (Spanish SMEs, SEM-PLS TOE) also showed that social media marketing adoption enhances operational performance, with adoption decisions influenced by complexity, cost, and capability factors that very across industry contexts [35]. Abbasi et al. added a competitive dynamics dimension, showing that competitive industry intensity moderates social media marketing adoption, with adoption positively impacting customer engagement and sales performance most strongly in high-competition sectors [36].

Cloud computing presents another powerful operational lever [37]. Tarsakoo and Charoensukmongkol, in a TOE framework-based SEM-PLS study, demonstrated that cloud computing adoption positively affects MSME performance by reducing operational costs, improving data accessibility, and enhancing scalability precisely the operational constraints that characterize resource-limited MSMEs [38]. Musyaffi et al., studying Indonesian MSMEs via SEM-PLS, found that digital IT capabilities and innovation capabilities jointly and positively impact business performance, with digital capabilities mediating the effect of digital tools on operational outcomes [39]. Wulandari et al. complemented this at the individual level, confirming that digital capability and digital literacy positively influence both perceived digital and business performance among Indonesian MSMEs establishing human capital as a necessary operational complement to technological infrastructure [40].

At the market access level, the literature consistently documents that digitalization transitions MSME market reach from local to national and, in some cases, global scales. Batubara et al. [5] synthesizing Indonesian MSME studies from 2020 – 2024, confirmed that digital transformation provides expanded market reach and profitability, while Anatan and Nur established a readiness–performance gradient: Indonesian MSMEs with higher digital readiness demonstrated better performance and market expansion outcomes, while those at low-to-moderate readiness levels reaped proportionally smaller gains [41].

2. Impact on Business Resilience and Innovation

A third strand in the literature views digitalization as a resilience mechanism for MSMEs, not merely a performance enhancer, particularly during crises such as COVID-19.

Priyono et al. state that digitalization improves SME performance and recovery during the pandemic [3], while Legowo and Sorongan emphasize faster recovery through market expansion and operational resilience [6]. Ivanof et al, find that firm size, innovation, and competitive pressure drive digitalization, which enhances organizational resilience [42].

Meanwhile, Baabdullah et al. show that AI adoption improves customer satisfaction, efficiency, and business performance, woth customer readiness playing a moderating role [43], and Almaiah et al. find that AI enhances SMEs' sustainable performance, driven by relative advantage, compatibility, and market demand [44]. Tanda and Coluccia whose bibliometric and systematic analysis documented the normalization of AI adoption in SMEs, identified cost reduction, customer service enhancement, and decision-making improvement as the primary AI-driven performance outcomes, while identifying digital literacy as the most persistent remaining barrier [45]. Dang et al, synthesizing 57 global studies, concluded that digital transformation enhances SME innovation and dynamic capabilities in ways that help overcome the resource constraints characteristic of small firms a finding consistent with the Resource-Based View theoretical tradition [14].

Guerrero-Báez et al. contributed a strategic dimension to this discussion, arguing through SLR evidence that a structured digital transformation strategy enables MSMEs to build not merely resilience but antifragility the capacity to improve performance under stress rather than merely surviving it [46]. Their finding that phased digital adoption is most effective for resource-constrained SMEs resonates with Barroso-Méndez et al, who similarly concluded that successful MSME digital transformation is contingent on aligned strategy, incremental adoption, and firm-specific characteristics rather than wholesale technology deployment [17].

C. Barriers to Achieving Optimal Performance

Despite the predominantly positive performance impacts documented across the three thematic clusters above, the reviewed literature converges with equal consistency on a set of structural and organizational barriers that systematically attenuate the digitalization performance relationship. A critical synthesis of these barriers reveals that they are neither isolated nor idiosyncratic: they recur across geographies, technology types, and firm sizes in ways that suggest a systemic rather than incidental problem.

Digital illiteracy and skill gaps emerge as the most universally cited barrier in the corpus. Alfirman and Widiastuti identified digital skill shortages as a primary structural constraint on sustainable MSME performance in Indonesia [2], while Tanda and Coluccia established it as the dominant remaining impediment to AI adoption and value realization in SMEs globally [45]. Evanita and Fahmi, in their PRISMA guided SLR of the Indonesian MSME digital landscape, documented that limited skills, capital access, and cybersecurity awareness collectively constitute a "triple barrier" to effective digitalization [47]. Importantly, the skill gap operates not merely at the individual operator level but at the managerial level: Harini et al, in a regression analysis of Indonesian SME determinants, found that managerial quality is a significant positive determinant of digital technology adoption and performance outcomes, implying that human capital deficits at the leadership level compound the operational skill deficits at the worker level [48].

Financial barriers constitute the second major constraint category. High implementation costs, subscription fees for cloud-based tools, and the upfront capital requirements of digital infrastructure investment remain prohibitive for many MSMEs, particularly those operating in capital-scarce contexts. Telukdarie et al documented this cost barrier among South African SMEs [8], while Prokop et al, analyzing EU level data, found that government subsidies are the most effective instrument for reducing cost barriers to digital technology adoption [49]. Purnamasari et al. reinforced the financing dimension from a different angle, demonstrating that digital financial inclusion rather than technology access alone is the operative mediator of financial performance improvement, implying that MSMEs without access to digital financial services remain structurally excluded from the performance benefits of digitalization even when digital tools are nominally available [23].

Infrastructure and cybersecurity vulnerabilities represent the third critical barrier cluster. Inadequate digital infrastructure particularly reliable internet connectivity and affordable data services disproportionately affects rural and peri-urban MSMEs in developing economies, creating a geographic digital divide that compounds existing economic inequalities. Raza et al. identified cybersecurity and interoperability as critical challenges to digital payment adoption [50], while Batubara et al. and Evanita and Fahmi both identified cybersecurity threats as a persistently underaddressed risk factor in the Indonesian MSME digitalization discourse [5], [47]. Digitalization without adequate digital literacy and cybersecurity support may increase operational risks, thereby reducing MSME performance benefits.

The digital infrastructure gap calls for targeted policies, including equitable internel access, stronger digital infrastructure, and improved digital literacy through collaboration between government, universities, and the private sector.

Overall, the impact of digitalization is conditional rather than linear. Optimal benefits are achieved only when MSMEs are supported by digital literacy, financial inclusion, and adequate infastructure, as the absence of any of these factors can

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reduce of hinder performance. Digitalization without adequate digital literacy and cybersecurity can increase operational risks and reduce SME performance benefits. The digital infrastructure gap needs to be addresses through targeted policies, improved access and infrastructure, and enhanced digital literacy via collaboration between government, academia, and the private sector. Overall, the impact of digitalization is conditional, where optimal benefits are only achieved when supported by digital literacy, financial inclusion, and adequate infrastructure

CONCLUSION

This systematic literature review set out to address a central research question: How does digitalization impact the business performance of Micro, Small, and Medium Enterprises (MSMEs)? Based on a PRISMA-guided synthesis of 50 peer reviewed, open access articles published between 2020 and 2026, the evidence assembled in this review provides a clear and affirmative answer: digitalization exerts a predominantly positive, multidimensional impact on MSME business performance, operating through financial, operational, marketing, and resilience pathways simultaneously rather than through any single performance channel.

Across the financial performance dimension, the literature establishes that digital payment systems, e-commerce platforms, and digital marketing tools collectively reduce transaction costs, accelerate cash flow cycles, expand revenue sources, and improve overall profitability for MSMEs particularly in developing economy contexts where traditional market access was previously constrained by geography and capital. At the operational and marketing level, the adoption of social media, cloud computing, and integrated digital platforms enables MSMEs to reach previously inaccessible customer segments, build durable customer relationships, and streamline internal processes in ways that generate efficiency gains extending well beyond the immediate post-adoption period. At the resilience and innovation level a dimension whose salience was sharpened considerably by the COVID-19 pandemic the literature demonstrates that digitalization functions not merely as a performance optimizer under stable conditions but as a structural enabler of adaptive capacity, allowing MSMEs to pivot their business models, preserve operational continuity, and sustain competitive positioning under conditions of acute market disruption.

This review indicates that the impact of digitalization is neither automatic nor universal, as it is strongly influenced by digital literacy, infrastructure access, managerial capability, and financial inclusion. Without adequate support in human resources, cybersecurity, and access to digital financial services, digitalization has limited impact and may pose risks, its effectiveness is therefore conditional, mearning that improving SME performance requires integrating technology with digital literacy, managerial capacity, financial inclusion, and cybersecurity. Furthermore, this review is limited to 50 peer-reviewed and open-access articles published between 2020 and 2026 that met the PRISMA selection criteria; therefore, relevant studies outside these criteria may not have been included. Future research is encouraged to expand the range of databases, publication periods, and research contexts, as well as to complement these findings with empirical studies across various MSME sectors.

Recommendations and Future Research

For SME practitioners, digital transformation should be carried out gradually, starting from social media, digital payments, and basic e-commerce, and progressing toward cloud computing, data analytics, and AI. Its success depends on digital literacy and the integration of digitial financial services to optimize performance.

For Policymakers, Governments play a crucial role in strengthening MSME digitalization through the provision of digital infrastructure, digital literacy training programs, and expanded access to digital financial services. These policies are key to accelerating a sustainability and inclusive digital transformation.

Governments should prioritize bridging the infrastructural digital divide particularly the rural urban connectivity gap as a prerequisite for equitable access to the performance benefits of digitalization. In parallel, regulatory frameworks governing cyber security, data privacy, and digital payment interoperability require strengthening to reduce the systemic risks that currently accompany digital adoption for smaller enterprises.

Limitations of This Study. This review acknowledges several limitations that should be considered when interpreting its findings. First, the corpus was restricted to open-access, peer-reviewed journal articles published between 2020 and 2026 and retrievable from Scopus, DOAJ, Garuda, and Google Scholar; it therefore excludes potentially relevant contributions published in subscription-access journals, conference proceedings, or grey literature. Second, the geographic scope is still dominated by Indonesia and East Asia, so the findings cannot be fully generalized to high-income countries or economics with different structures. Third, the reliance on self-reported survey data in most primary studies introduces recurring common method bias, which limits the strength of causal inferences that can be drawn from the aggregated evidence.

Directions for Future Research. Several avenues warrant prioritization in the next generation of MSME digitalization research. Most urgently, the field requires meta analytic studies capable of quantifying the effect sizes of specific digital technologies on specific performance dimensions work that would allow researchers and policymakers to move beyond the binary question of whether digitalization improves performance and toward the more practically useful question of by how much, under which conditions, and for which technology types. Future research should emphasize the still underexplored environmental and social dimension of SME performance, use longitudinal designs to assess the sustainability of digitalization impacts, and examine the effect of generative AI and large language models, which remain relatively new in the 2020-2026 literature.

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