

DIGITAL TRANSFORMATION COMPETITIVE ADVANTAGE OF MSMEs THROUGH E-COMMERCE IN INDONESIA: A CONCEPTUAL STUDY

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ABSTRACT

This study examines how digital transformation through e-commerce can be a competitive advantage for Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. Based on literature studies and secondary data from 2020–2025, the results indicate that e-commerce plays a key role in expanding markets, increasing efficiency, and strengthening brand image. However, challenges such as low digital literacy, infrastructure inequality, and cybersecurity risks remain. The success of digital transformation is influenced by internal readiness, managerial support, and collaboration with digital platforms. Using the Technology-Organization-Environment (TOE) framework and Dynamic Capability Theory, this study concludes that inclusive and adaptive digital transformation, accompanied by policy support and cross-sector collaboration, is crucial for realizing a resilient and competitive Indonesian digital economy.

Keywords: competitive advantage, digital economy, digital transformation, e-commerce, MSMEs

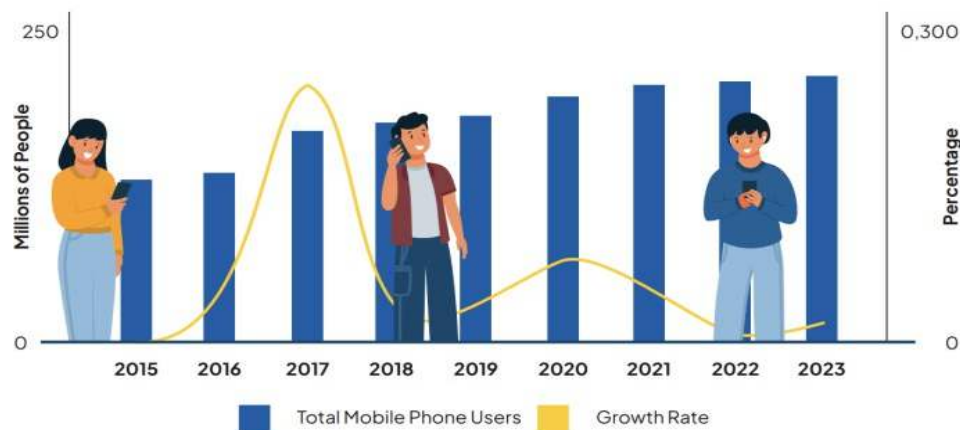
INTRODUCTION

The development of digital technology over the past decade has become a major driver of structural economic change in many countries, including Indonesia. The integration of information technology, internet penetration, and digital platforms has transformed the production, distribution, and consumption of goods and services, shifting traditional business models toward platform-based models. This phenomenon has not only created new distribution channels such as marketplaces and on-demand logistics services but has also transformed competition mechanisms, with digital capabilities becoming a key determinant of business competitiveness. For example, several studies have emphasized the role of e-commerce in expanding market access and improving MSME operational efficiency (Hafitasari et al., 2022).

Indonesia's digital economy has shown a consistent upward trend since the early 2020s. The e-Conomy SEA 2024 report notes that Indonesia's digital economy will reach approximately USD 82 billion in 2023 and is projected to grow strongly into 2025, with e-commerce remaining the largest contributor to the national digital ecosystem. The full e-Conomy SEA 2024 report presents an analysis of digital sectors and projected value-added for the Southeast Asian region (Temasek & Bain, 2024). National statistics related to e-commerce transactions and payment infrastructure also indicate accelerated digitalization. Bank Indonesia publishes payment system statistics and reports growth in the volume and value of digital transactions driven by e-

commerce and the adoption of cashless payment methods. Several market analyses and national digital economy outlooks also provide estimates of the value of e-commerce transactions and the proportion of e-commerce's contribution to Indonesia's total digital economy. For example, the Digital Economy Outlook (local industry report) notes the value and projections of e-commerce transactions for 2024–2025, which indicate significant growth from the 2020–2023 period.

The increasing adoption of digital technology in Indonesia is also reflected in the growth in the number of mobile phone users over the past decade. According to data from the Central Statistics Agency (BPS) through the National Socioeconomic Survey (2023), the number of mobile phone users in Indonesia continued to increase from 2015 to 2023, reaching over 240 million users. This increase demonstrates a significant expansion of digital access and serves as a crucial foundation for the development of the e-commerce ecosystem and digital transformation in the MSME sector (Dutta et al, 2024).



Source: Statistics Indonesia (BPS), National Socioeconomic Survey 2023

Figure 1. Mobile Phone Users in Indonesia, 2015–2023 (in Millions)
Source: Statistics Indonesia (BPS), National Socioeconomic Survey 2023.

These changes demonstrate the role of e-commerce as a key enabler of MSME competitiveness in Indonesia. Digitalization provides opportunities for MSMEs to expand their markets both domestically and across regions, streamline operations through digital platform integration, and strengthen brands through technology-based marketing strategies. For example, a study by (Syafa et al., 2025) shows that e-commerce implementation helps MSMEs expand their market reach and increase product and service innovation. Literature research by (Hamzah et al., 2025) reveals that factors such as technology training and digital marketing significantly improve MSMEs' ability to compete in the digital era.

This phenomenon also presents new challenges for the MSME sector, such as increased digital competition, infrastructure gaps between regions, and cybersecurity risks. For example, a study in Indonesia confirmed that MSMEs still face obstacles such as low digital literacy and uneven technological infrastructure conditions that directly hinder the full adoption of e-commerce (Ramdan et al., 2023; Dauda et al, 2023). Furthermore, other studies indicate that while technology adoption can open up opportunities for revenue increases of up to 25–30%, barriers such as limited financing and suboptimal distribution remain major stumbling blocks in many regions (Sutrisman & Susyanti, 2024). From a theoretical perspective, this situation

underscores that the potential benefits of digitalization cannot be realized without mitigating structural and resource constraints; this also demands an integrative strategy that focuses not only on technology but also on strengthening human capabilities, financing, and the institutional ecosystem.

This article aims to conceptually examine the role of digital transformation through the use of e-commerce in strengthening the competitiveness of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. Digital transformation is understood as a process of changing business systems that integrates digital technology to create efficiency, flexibility, and added value for business actors. In the context of entrepreneurship, e-commerce is seen not only as a medium for online transactions but also as a learning and interaction space that encourages collaboration, innovation, and expanded market access. This study seeks to provide a conceptual understanding of how digitalization can shape new business models, influence entrepreneurial mindsets, and foster a form of digital entrepreneurship that is more resilient and adaptive to changes in the business environment. Through this conceptual approach, it is hoped that a theoretical foundation will emerge that can be used in formulating strategies and policies to accelerate the digitalization process of the MSME sector in facing the dynamics of a modern, innovation- and knowledge-based economy.

Although several previous studies have explored the impact of e-commerce adoption on MSME performance (Hafitasari et al., 2022; Syafa et al., 2025; Hamzah et al., 2025), there remains a theoretical gap in understanding how technological, organizational, and environmental factors interact with firms' internal capabilities to produce sustainable competitiveness. Most existing research tends to analyze adoption factors or performance outcomes separately, without integrating the Technology Organization Environment (TOE) framework and Dynamic Capability Theory into a unified conceptual lens. This study seeks to bridge that gap by examining how MSMEs in Indonesia dynamically reconfigure their resources and routines to adapt to digital change. By synthesizing the TOE and Dynamic Capability perspectives, this paper extends prior theoretical discussions on digital transformation and contextualizes them within the unique challenges of emerging economies. In line with this objective, the following research questions are proposed to guide the conceptual analysis: (1) How do technological, organizational, and environmental dimensions interact to influence the digital transformation of MSMEs in Indonesia? (2) In what ways do dynamic capabilities mediate the relationship between e-commerce adoption and MSME competitive advantage? (3) What contextual factors differentiate Indonesia's MSME digital transformation from similar processes in other economies? By articulating these questions, this study aims to contribute to the advancement of digital entrepreneurship theory by extending the explanatory scope of the TOE and Dynamic Capability frameworks in the context of MSME transformation in Indonesia.

METHODS

This study employs a literature review method with a conceptual approach aimed at analyzing how digital transformation through e-commerce contributes to enhancing the competitiveness of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. The literature review method was selected because it allows the integration of various previous studies to build a comprehensive theoretical understanding and identify emerging conceptual patterns (Torraco, 2005; Snyder, 2019). All data used in this study are secondary in nature, collected from reputable scientific and official sources such as national and international journals indexed in Google Scholar,

ScienceDirect, and DOAJ within the publication range of 2020–2025. Additional supporting data were obtained from Bank Indonesia reports, the Ministry of Cooperatives and SMEs, the Central Bureau of Statistics (BPS), and digital industry reports, including the Google Temasek & Bain e-Conomy SEA Report (2024). The analysis also refers to government policy documents relevant to digital transformation, such as the National Movement for Proudly Made in Indonesia (Gernas BBI) and the UMKM Go Digital Program, which represent part of the national strategy to accelerate the digitalization of the MSME sector.

The research process was carried out through several systematic stages:

1. Literature collection, focusing on studies related to digital transformation, e-commerce, MSME competitiveness, and organizational change management.
2. Literature selection, based on source credibility, relevance to the Indonesian context, and publication recency.
3. Literature analysis using a descriptive-analytical approach combined with thematic analysis (Braun & Clarke, 2006), aimed at categorizing findings into key themes such as MSME digitalization, technological adoption barriers, digital infrastructure gaps, and business adaptation strategies.

The findings from the reviewed literature were then synthesized to construct a comprehensive conceptual framework explaining the relationship between digital transformation and MSME competitiveness. The synthesis also helps identify research gaps that may serve as a foundation for future empirical studies. The contextual focus of this research centers on Indonesian MSMEs, particularly in sectors most affected by digital transformation such as online retail, culinary businesses, and the creative industries. Consequently, this study is expected to provide both theoretical contributions to the development of digital business and entrepreneurship literature, and practical implications for policymakers and MSME practitioners in strengthening sustainable digital transformation strategies.

FINDINGS

The findings of this study reveal that digital transformation through e-commerce has significantly reshaped the competitiveness and operational dynamics of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. According to data from Bank Indonesia (2024), the total value of national e-commerce transactions reached more than IDR 474 trillion in 2023, almost doubling from IDR 266 trillion in 2020. Similarly, the *e-Conomy SEA Report* by Google, Temasek, and Bain (2024) reported that Indonesia's digital economy was valued at USD 82 billion in 2023 and is projected to grow to USD 109 billion by 2025, with e-commerce accounting for over 65% of the total digital economy. These trends highlight how digitalization has become a major driver of a new, technology-driven economic structure. From an empirical standpoint, the adoption of e-commerce has been found to enhance efficiency, productivity, and market reach among MSMEs. Ratnawita and Veri (2025) emphasized that social media and online platforms allow MSMEs to expand their market visibility and strengthen brand awareness. In a similar vein, Selly Silviawati et al. (2025) discovered that e-commerce utilization increases customer trust, facilitates cross-regional sales, and reduces distribution costs. Moreover, digital literacy programs such as *Kampus UMKM Shopee* have proven effective in improving entrepreneurs' digital skills and readiness (Paramitha et al., 2022).

However, despite these opportunities, several structural barriers remain. Sitompul et al. (2025) found that low levels of digital literacy and unequal

technological infrastructure between urban and rural areas hinder inclusive participation in the digital economy. Salsabilla and Adlina (2023) further highlighted cybersecurity threats including transaction fraud, data breaches, and phishing as critical issues that undermine MSME resilience in the digital ecosystem. These findings indicate that improving digital capacity requires not only technical competence but also ethical and cybersecurity awareness. From a managerial perspective, Meliawati et al. (2025) reported that MSMEs implementing inclusive digital strategies through human resource development, cross-sector collaboration, and data-driven innovation achieve greater adaptability and *digital agility*. Supporting this view, Astuti (2024), using the *Technology Organization Environment (TOE)* framework, found that successful digital transformation depends on the alignment of technological fit, internal managerial support, and external pressures such as regulatory frameworks and market competition.

Conceptually, the enhancement of MSME competitiveness through e-commerce can also be explained by the *Resource-Based View (RBV)* and *Dynamic Capability Theory*. Teece (2018) asserted that sustainable competitive advantage emerges from an organization's ability to integrate, build, and reconfigure resources in response to environmental change. In this context, MSMEs' digital competencies such as data analytics, customer management, and technology-based innovation form the core of their adaptive capability. Suyono et al. (2024) found that MSMEs with higher *digital dynamic capability* tend to adapt faster to market shifts and seize opportunities in digital platforms. Collaboration has also emerged as a crucial factor in strengthening MSME competitiveness. Pramesti et al. (2025) identified that partnerships among MSMEs, digital platforms, and financial institutions foster more efficient value chains through digital financing systems (*credit scoring*) and data-based logistics (*smart logistics*). Furthermore, e-commerce has become a catalyst for non-oil exports particularly in crafts and fashion through initiatives such as *Shopee Export* and *Tokopedia Global*, which open international market access for local enterprises (Salsabilla & Adlina, 2023).

From a policy standpoint, the government has played a strategic role in supporting digital transformation through programs like *UMKM Go Digital* and the *National Movement for Proudly Made in Indonesia (Gernas BBI)*. As of early 2025, 22.8 million MSMEs had adopted digital technologies out of the targeted 30 million (KemenkopUKM, 2025). Nevertheless, Lestari et al. (2024) noted that regional disparities persist, calling for more localized interventions to ensure equitable digital adoption across regions. Socio-economically, digitalization has generated positive impacts on employment and community welfare. Ratnawita and Veri (2025) observed that the digital expansion has increased demand for jobs in logistics, digital content, and online customer services, thereby promoting inclusive economic growth. Despite these benefits, ethical concerns such as data misuse and platform monopolization remain challenges that must be addressed to ensure a fair and sustainable digital economy.

In sum, the study affirms that e-commerce functions as a key enabler in strengthening MSME competitiveness in Indonesia. Nevertheless, its effectiveness depends heavily on internal readiness, institutional support, and adaptive public policy. Cross-sector collaboration among government, digital platforms, financial institutions, and educational organizations is essential to building an inclusive, secure, and sustainable digital ecosystem that supports MSME growth in the digital economy era.

DISCUSSION

This conceptual review makes clear that e-commerce-driven digital transformation is more than a technical upgrade for Indonesian MSMEs; it reshapes how these enterprises access markets, organize operations, and innovate their business models. Rather than simply lowering transaction costs or expanding reach, digitalization encourages firms to rethink value creation for example, by embedding data into product decisions, personalizing customer interactions, and redesigning logistics. Such reconfiguration of resources and routines aligns with the dynamic capability perspective, which emphasizes firms' ability to sense opportunities and reconfigure assets in turbulent environments (Teece, 2018).

Empirical studies corroborate this thesis. MSMEs that adopt digital tools not only report improvements in sales and market exposure but also show gains in operational efficiency and brand visibility (Ratnawita & Veri, 2025; Selly Silviawati et al., 2025). Yet these gains do not occur automatically. Our synthesis indicates that outcomes depend on a contingent mix of internal capacities managerial skills, digital literacy, and absorptive capacity and external enablers such as infrastructure, supportive regulation, and platform partnerships. This interplay reflects the Technology–Organization–Environment (TOE) framework: adoption and performance are shaped by technological fit, organizational readiness, and environmental pressures (Astuti, 2024).

At the same time, the review highlights important obstacles that can blunt the benefits of digitalization. Infrastructure gaps between urban and rural areas, persistent low digital literacy among some entrepreneur groups, and rising cybersecurity incidents collectively limit inclusion and resilience (Sitompul et al., 2025; Salsabilla & Adlina, 2023). If left unaddressed, these structural constraints risk producing uneven digital dividends a phenomenon where digitally enabled firms surge ahead while others fall further behind. This pattern echoes broader debates in digital economics that warn of technology-driven divergence unless governance and capacity-building accompany innovation (Brynjolfsson & McAfee, 2017). Another theme that emerges is the managerial and cultural dimension of transformation. Adopting e-commerce effectively requires changes in leadership mindset, workflows, and performance metrics. Firms that combine training, data-driven decision making, and collaborative networks tend to develop greater “digital agility” and sustain improvements over time (Meliawati et al., 2025). In other words, technology is an enabler only when paired with human and organizational change; investments in tools without parallel investment in people and processes yield limited returns.

Collaboration surfaces repeatedly as a practical lever. Partnerships among MSMEs, marketplaces, logistics providers, and fintechs have produced more efficient value chains by enabling digital financing, data-driven logistics, and cross-border channels for exports (Pramesti et al., 2025; Salsabilla & Adlina, 2023). Such ecosystems reduce barriers to scale for small firms and allow them to plug into broader demand networks. Policymakers and platform operators therefore have complementary roles — the former in creating an enabling regulatory and investment environment, the latter in offering affordable, trustable services geared to the capacity of small vendors. Policy implications follow directly from these findings. National programs like *UMKM Go Digital* and *Gernas BBI* demonstrate that top-down initiatives can accelerate uptake; yet the evidence also underlines the need for localized, context-sensitive interventions that address digital divides and sectoral specificities (Lestari et al., 2024). A one-size-fits-all approach is unlikely to close gaps in infrastructure, skills, or market access. Instead, blended strategies combining

subsidies for connectivity, targeted digital literacy campaigns, and incentives for platform–bank collaboration appear more promising.

Finally, ethical and security considerations cannot be sidelined. As MSMEs handle more customer data and digital transactions, issues of privacy, fraud prevention, and market concentration become salient. Ensuring fair competition, protecting consumers, and raising cybersecurity standards will be essential to maintain trust in the digital marketplace and to secure long-term gains for MSMEs. Digital transformation via e-commerce is a multi-faceted process: technical adoption, organizational change, institutional support, and ecosystem collaboration must align to produce inclusive and sustainable competitiveness gains. Future empirical research should investigate how these elements interact in different local contexts and which policy mixes most effectively promote equitable digital inclusion among MSMEs.

CONCLUSION

Digital transformation through e-commerce has become a structural shift for Indonesian MSMEs, influencing how they access markets, manage operations, and build innovation capacity. It is not only about technology adoption but about rethinking how value is created. Through digital tools, MSMEs can personalize customer engagement, use data for product innovation, and optimize logistics aligning with the dynamic capability view, which stresses the firm's ability to adapt and reconfigure resources in changing environments. Empirical studies confirm that e-commerce adoption improves sales performance, operational efficiency, and market reach. However, these benefits depend on managerial readiness, digital literacy, and infrastructure quality. The Technology Organization Environment (TOE) framework explains this interdependence: MSMEs succeed digitally when technology, organizational capacity, and the external environment are mutually supportive.

Despite progress, significant barriers remain. Infrastructure gaps between regions, limited digital literacy, and growing cybersecurity risks continue to constrain inclusivity. These disparities risk deepening inequality among MSMEs, where digitally advanced firms progress faster than those left behind. Addressing these issues requires not only technological support but also human resource development and stronger institutional frameworks. Managerial transformation is equally vital. Firms that invest in digital skills, encourage data-driven decision-making, and build partnerships tend to achieve sustained growth.

Collaboration among MSMEs, e-commerce platforms, logistics, and fintech providers has also proven effective in expanding access to finance and markets. These network effects are essential to building resilient digital ecosystems. From a policy perspective, national programs such as *UMKM Go Digital* and *Gernas BBI* have provided momentum, yet localized strategies remain necessary to bridge regional divides. Policies should balance top-down support with community-level empowerment, including affordable internet access, targeted training, and incentives for digital partnerships. Finally, as MSMEs become more digitally connected, ethical and security considerations must be prioritized. Ensuring fair competition, protecting consumer data, and promoting digital trust will determine the long-term sustainability of Indonesia's MSME digital transformation.

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