

## A Review of Digital Transformation Drivers and Barriers for SMEs in Malaysia

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### ABSTRACT

Digital transformation has become an essential driver of business growth and competitiveness, particularly for small and medium enterprises (SMEs) that operate within Malaysia's rapidly evolving digital economy. Despite government initiatives and increasing awareness of Industry 4.0, many SMEs continue to face challenges in adopting digital technologies effectively. This study conducts a structured literature review to synthesize existing research on the drivers, barriers, and outcomes of digital transformation among Malaysian SMEs. Guided by the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Theory of Planned Behavior (TPB), the review integrates key dimensions of digitalization—strategy, readiness, culture, and capability—and identifies customer value as a mediating construct that links internal efforts to business performance. The findings reveal that strategic alignment, strong digital readiness, and supportive organizational culture significantly enhance customer value and overall competitiveness, while barriers such as limited financial resources, digital skills gaps, and cultural resistance continue to impede progress.

**Contribution/Originality:** The review contributes to the theoretical integration of UTAUT and TPB within the SME digitalization context and provides practical insights for policymakers and managers seeking to foster sustainable digital adoption and performance improvement in Malaysia's SME sector.

## 1. Introduction

The global business environment is undergoing profound change as digital technologies reshape industries, redefine customer expectations, and disrupt traditional business models. This shift, often described as the fourth industrial revolution or Industry 4.0, is characterized by the integration of advanced digital tools, artificial intelligence, big data, and the industrial Internet of Things (IIoT) into economic activities. These transformations are not only enabling unprecedented levels of speed, connectivity, and

reliability but also redefining the very foundations of how firms compete in the global economy (Meyendorf et al., 2022). For small and medium enterprises (SMEs), which form the backbone of many national economies, digitalization is both an opportunity and a necessity. While digital adoption enables SMEs to expand their markets, improve efficiency, and enhance customer engagement, failure to digitalize risks leaving them uncompetitive in an increasingly digital-first economy (Kwarteng et al., 2023).

Digitalization differs from mere digitization. While digitization refers to the conversion of analog information into digital formats, digitalization extends beyond this by leveraging technology to transform organizational processes, create innovative business models, and deliver new forms of customer value (Reis et al., 2020). For SMEs, digitalization promises to reduce operational costs, streamline processes, and enhance decision-making through real-time data analysis (Anshari, 2022). The COVID-19 pandemic further underscored the strategic importance of digitalization. As global supply chains were disrupted and physical interactions limited, digital readiness became critical for business continuity, resilience, and competitive advantage (LaBerge et al., 2020). However, the extent and speed of adoption remain highly uneven across countries and sectors. While SMEs in advanced economies rapidly embraced digital tools, SMEs in developing countries, including Malaysia, continue to face barriers ranging from technological constraints to cultural resistance (Aly, 2022; Hussain et al., 2022).

In Malaysia, SMEs represent more than 97 percent of registered businesses and contribute significantly to national GDP and employment. Despite their importance, Malaysian SMEs have lagged in digital adoption compared to counterparts in more developed economies (Tong & Gong, 2020). Although government initiatives such as the Malaysia Digital Economy Blueprint (MyDIGITAL) and targeted funding programs aim to promote digitalization, many SMEs continue to struggle with limited access to infrastructure, insufficient digital skills, and a lack of strategic planning (Hussain et al., 2022). This digital divide highlights a pressing challenge: while digitalization is recognized as vital for Malaysia's sustainable economic growth, the pathways for SMEs to successfully adopt and integrate digital technologies remain unclear and fragmented. From a theoretical standpoint, research on SME digitalization has largely been fragmented, focusing either on specific technologies or isolated drivers such as infrastructure or skills development. Few studies provide a comprehensive, theory-driven framework that explains how multiple dimensions of digitalization—namely strategy, readiness, culture, and capability—interact to influence business performance. Equally underexplored is the mediating role of customer value, which links internal digitalization efforts to external performance outcomes. Customer value, defined as the perceived benefits customers receive relative to the costs, plays a pivotal role in shaping customer loyalty, satisfaction, and long-term organizational success (Jordaan & Badenhorst, 2022). Existing research recognizes the importance of creating customer value but seldom positions it as a central mediator in the digitalization–performance nexus (Ismail, 2022).

To address this gap, this review integrates two theoretical perspectives that are widely applied in technology adoption studies: the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) and the Theory of Planned Behavior (TPB) (Ajzen, 1991). While UTAUT emphasizes constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions, TPB highlights attitudes, subjective norms, and perceived behavioral control. Together, these frameworks

provide a more holistic lens to explain SME digitalization adoption. This review advances the argument that digitalization strategy and capability align with performance expectancy, readiness relates to facilitating conditions and perceived behavioral control, and culture reflects attitudes and subjective norms. Importantly, customer value is positioned as a mediating construct that explains how these internal drivers ultimately translate into improved performance outcomes.

Practically, the fragmented adoption of digitalization in Malaysia reflects a lack of alignment between government support programs, organizational readiness, and managerial strategies. Policymakers often emphasize providing funding or subsidies but may overlook the need to strengthen digital culture and capabilities within SMEs. Similarly, managers tend to focus on acquiring digital tools without developing comprehensive strategies or fostering supportive cultures that enable sustainable transformation (Muhamad et al., 2020). Without a clear understanding of how internal drivers interact with external outcomes, digitalization efforts risk remaining superficial or ineffective.

This review, therefore, seeks to contribute both theoretically and practically. Theoretically, it synthesizes existing knowledge and integrates UTAUT and TPB with the concept of customer value to develop a robust conceptual framework for SME digitalization. Practically, it identifies the key barriers and drivers in Malaysia's SME ecosystem, highlighting actionable pathways for managers and policymakers to enhance digital adoption. By systematically analyzing the literature, this paper addresses critical gaps in understanding, particularly concerning the long-term effects of digitalization, the ethical and practical challenges SMEs face, and the contextual differences across regions. In sum, this study aims to achieve three main objectives:

- i. To synthesize existing research on digital transformation drivers and barriers among Malaysian SMEs.
- ii. To develop a conceptual framework integrating UTAUT, TPB, and customer value as a mediator between digitalization and business performance.
- iii. To identify research gaps and propose future research directions that address both theoretical and practical needs.

By pursuing these objectives, the paper not only provides a clearer theoretical foundation for understanding SME digitalization but also offers practical guidance for navigating Malaysia's digital economy. Ultimately, this review contributes to advancing scholarship while equipping SME managers and policymakers with insights to drive sustainable growth in the face of digital disruption.

## **2. Theoretical Background**

### **2.1. Digital Transformation and SMEs**

Digital transformation has become a defining force in contemporary business, reshaping industries and redefining how organizations create value. For small and medium enterprises (SMEs), this transformation is both a necessity and an opportunity. Unlike large corporations, SMEs face resource constraints that limit their ability to experiment with technologies. Yet digitalization allows them to overcome some of these limitations by improving efficiency, enhancing innovation, and expanding market reach. Scholars emphasize that digitalization goes beyond digitization. While digitization is concerned with converting analog processes into digital formats, digitalization refers to the

integration of digital technologies to fundamentally change organizational processes and business models (Reis et al., 2020). This broader scope means SMEs must adopt new strategies and develop new forms of customer engagement to remain competitive (Anshari, 2022).

The COVID-19 pandemic highlighted the urgency of digital readiness for SMEs. As physical operations were disrupted, firms with digital tools and infrastructures were able to maintain business continuity, while others struggled to survive (LaBerge et al., 2020). In Malaysia, the issue is particularly pronounced. Although SMEs represent more than 97 percent of businesses and contribute substantially to GDP, the pace of digital adoption remains uneven. Initiatives such as the Malaysia Digital Economy Blueprint (MyDIGITAL) have been launched to support digital transformation, but challenges persist. Limited infrastructure, inadequate technical skills, and resistance to organizational change continue to hinder SMEs from fully leveraging digital technologies (Tong & Gong, 2020; Hussain et al., 2022). This situation makes it essential to examine the drivers and barriers of digitalization in the Malaysian SME landscape through a robust theoretical lens.

## 2.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), provides a widely recognized framework for analyzing technology adoption. The theory consolidates earlier models such as the Technology Acceptance Model (TAM) and the Theory of Reasoned Action (TRA), offering a more comprehensive approach. It explains technology adoption through four central constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions.

In the context of SMEs, performance expectancy reflects the belief that digital tools will improve outcomes such as productivity and customer engagement. Effort expectancy refers to the perception of ease or difficulty in adopting technologies, a factor that is especially relevant for resource-constrained SMEs. Social influence captures the role of industry peers, networks, and customers in shaping organizational choices. Facilitating conditions represent the infrastructure and organizational support required to implement digitalization effectively. Studies show that SMEs with strong facilitating conditions and higher performance expectations are more likely to adopt technologies such as digital marketing and analytics (Okfalisa et al., 2021; Ursavaş, 2022). However, despite its explanatory power, UTAUT remains underexplored in the Malaysian SME context, leaving a gap for further application and empirical testing.

## 2.3. Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB), proposed by Ajzen (1991), complements UTAUT by emphasizing social and psychological determinants of behavior. According to TPB, three constructs influence behavioral intention: attitudes toward the behavior, subjective norms, and perceived behavioral control. These elements provide insights into how organizational culture and perceptions shape SME adoption of digital technologies.

Attitudes toward digitalization are reflected in whether organizational leaders and employees perceive technology adoption as valuable or disruptive. Subjective norms

emerge in the form of competitive and industry pressures that drive SMEs to align with digital practices. Perceived behavioral control relates to SMEs' assessments of their resources and capabilities to carry out digital initiatives effectively (Charbonneau-Genest & Gamache, 2023). TPB therefore highlights the cultural and psychological barriers that may prevent SMEs from adopting technologies even when resources are available. For instance, a risk-averse organizational culture may discourage experimentation, while innovative mindsets foster digital adoption despite financial limitations.

#### **2.4. Integrating UTAUT and TPB**

Although both UTAUT and TPB provide valuable insights, each has limitations when applied in isolation. UTAUT emphasizes structural and technological conditions, while TPB highlights behavioral and cultural dynamics. Integrating the two theories enables a more comprehensive understanding of SME digitalization, particularly in emerging economies such as Malaysia.

Digitalization strategy and organizational capabilities correspond closely with performance expectancy from UTAUT, since these elements shape the expected outcomes of technology adoption. Readiness can be interpreted through both facilitating conditions in UTAUT and perceived behavioral control in TPB, as they capture the extent to which organizations feel equipped to adopt technologies. Culture aligns with attitudes and subjective norms, while external industry or policy pressures correspond with social influence. This integrated approach captures both the rational and behavioral dimensions of digital transformation, offering a more holistic framework to analyze adoption among SMEs.

#### **2.5. Customer Value as a Mediating Construct**

While UTAUT and TPB explain why SMEs adopt digital technologies, they do not fully account for how these efforts translate into business performance. To bridge this gap, customer value emerges as a critical mediating construct. Customer value refers to the benefits customers perceive relative to the costs of acquiring a product or service (Jordaan & Badenhorst, 2022). By positioning customer value at the center of the framework, this study emphasizes that digital transformation only contributes to performance if it enhances customer experiences and outcomes.

Digitalization allows SMEs to deliver greater value in several ways. It improves service quality, enables product personalization, expands access through online platforms, and reduces transaction costs through efficiency gains. Research demonstrates that these improvements foster customer satisfaction and loyalty, which are essential drivers of business success (Ismail, 2022; Abu Hasan et al., 2022). Without such value creation, digital investments may remain internally focused, failing to produce measurable market outcomes. In this way, customer value serves as the bridge between internal digitalization efforts and external business performance.

#### **2.6. Conceptual Framework**

The integration of UTAUT and TPB, combined with the mediating role of customer value, provides the foundation for the conceptual framework proposed in this review. The framework positions digitalization strategy, readiness, culture, and capability as the key

organizational drivers of transformation, with customer value functioning as the mechanism that connects these internal efforts to improved business performance. This conceptualization advances the literature by unifying technological, structural, psychological, and cultural perspectives into a single explanatory model. It also offers practical insights for SMEs in Malaysia, clarifying how internal readiness and external pressures can be translated into sustainable competitive advantage when mediated through customer value.

### 3. Methodology

#### 3.1. Research Design

This study adopts a structured literature review approach to provide a comprehensive synthesis of the drivers and barriers of digital transformation among Malaysian small and medium enterprises (SMEs). The structured review method was chosen because it allows for the systematic organization, evaluation, and synthesis of previous scholarly works without the strict procedural requirements of a full systematic review. Unlike a narrative review, which may be descriptive and selective, a structured review emphasizes transparency in literature identification, inclusion, and thematic analysis while maintaining flexibility suitable for conceptual integration (Snyder, 2019).

This approach is appropriate for the present study because the topic of digital transformation in SMEs is interdisciplinary and still evolving, spanning management, technology, economics, and policy domains. Therefore, the structured literature review enables the researcher to integrate findings from diverse sources, establish conceptual linkages, and identify theoretical and empirical gaps in the existing body of knowledge.

#### 3.2. Literature Search Strategy

To ensure the coverage of relevant and high-quality sources, an extensive search was conducted using major academic databases, including Scopus, Web of Science, ScienceDirect, Emerald Insight, and Google Scholar. These databases were selected for their credibility and wide range of peer-reviewed publications in the fields of business, management, and information systems.

The literature search utilized combinations of keywords and Boolean operators to capture relevant studies. The key terms included “*digital transformation*,” “*digitalization*,” “*small and medium enterprises*,” “*SMEs*,” “*Malaysia*,” “*drivers*,” “*barriers*,” “*customer value*,” “*UTAUT*,” and “*Theory of Planned Behavior*.” Variations and truncations were also used, such as “*digitali*”\* to include both “*digitalization*” and “*digitization*.” The search covered publications from 2010 to 2025, focusing on contemporary research that reflects the acceleration of digital adoption following Industry 4.0 and the COVID-19 pandemic.

To supplement database searches, reference lists of key articles were also examined manually to identify additional relevant studies not captured by the keyword search. This ensured the inclusion of both conceptual and empirical studies from a wide range of academic perspectives.

### **3.3. Inclusion and Exclusion Criteria**

This study applied specific inclusion and exclusion criteria to make sure that only relevant and reliable studies were reviewed. The inclusion criteria focused on research that discussed digital transformation among small and medium enterprises (SMEs). Only peer-reviewed journal articles, conference papers, and recognized academic book chapters were selected. The studies had to focus on areas related to this research, such as digitalization strategy, readiness, culture, capability, or customer value. Both conceptual and empirical studies were included, covering qualitative, quantitative, and mixed-method designs.

At the same time, certain studies were excluded to maintain focus and quality. Research that examined large organizations, public institutions, or government agencies was not included because their digital transformation contexts are very different from SMEs. Studies that focused only on technical aspects of digitization without linking to management or business implications were also excluded. In addition, non-academic materials such as reports, blogs, or opinion pieces were left out to ensure academic reliability. Finally, studies that did not clearly describe their methods or theoretical background were also excluded.

By applying these criteria, the review was able to select studies that were relevant, credible, and closely related to the topic of digital transformation in Malaysian SMEs. This helped ensure that the findings and discussions were based on solid and trustworthy academic sources.

### **3.4. Literature Screening and Selection**

The initial search produced a large body of literature, exceeding 1,000 articles across the selected databases. After the removal of duplicates, approximately 700 articles remained. Their titles and abstracts were screened for relevance, focusing on studies that addressed the key themes of digitalization strategy, readiness, culture, capability, and customer value.

Following the initial screening, 210 articles were shortlisted for detailed review. Each of these studies was then examined in full to assess methodological soundness, conceptual alignment, and empirical relevance. After a careful evaluation, a total of 78 studies were selected for detailed synthesis. These studies formed the foundation for the thematic discussion presented in the Findings section of this paper.

While a formal PRISMA protocol was not applied, the review process maintained transparency and replicability through clear documentation of inclusion logic, screening rationale, and thematic categorization.

### **3.5. Data Extraction and Thematic Analysis**

A data extraction framework was used to organize key information from each selected study. The extracted information included the author(s), year of publication, country of focus, research method, theoretical framework, and major findings.

The analysis followed a thematic synthesis approach, which is well-suited to structured reviews that aim to identify recurring patterns and conceptual relationships across

diverse studies (Braun & Clarke, 2019). Coding was applied to categorize data under key dimensions—namely, *digitalization strategy*, *readiness*, *culture*, *capability*, and *customer value*.

For instance, studies addressing government policy, technological infrastructure, and funding availability were coded under *readiness*, while those discussing leadership attitudes, innovation orientation, and employee engagement were categorized under *culture*. The iterative thematic process allowed for the integration of findings, leading to the development of a conceptual framework that connects the four internal dimensions to business performance through customer value.

### 3.6. Ensuring Reliability and Validity

To enhance reliability, the review process adhered to a consistent set of selection and coding procedures. The use of multiple databases reduced the likelihood of missing relevant studies, while cross-referencing between databases ensured the comprehensiveness of coverage.

Validity was strengthened through triangulation of evidence from conceptual and empirical studies. For example, insights from Malaysian SMEs were compared with similar findings from other ASEAN contexts to test the generalizability of observed patterns. Peer consultation and supervisory feedback were also incorporated during the thematic coding stage to minimize subjective interpretation and improve the credibility of the themes identified.

### 3.7. Limitations of the Method

Although the structured literature review method provides transparency and depth, several limitations remain. The review relied solely on English-language publications, which may have excluded valuable local studies published in Malay or other languages. The absence of quantitative meta-analysis means that findings reflect thematic patterns rather than statistical relationships. Additionally, industry white papers and government reports, though informative, were excluded to maintain academic rigor.

Future research could build upon this review by employing bibliometric techniques, PRISMA-based systematic reviews, or meta-analyses to quantitatively verify the relationships among digitalization dimensions, customer value, and SME performance.

## 4. Findings

### 4.1. Digitalization Strategy

A digitalization strategy provides a structured roadmap for how SMEs integrate digital tools into their core operations. The literature consistently highlights that without a well-defined strategy, digital adoption often becomes fragmented, leading to wasted investments and limited performance outcomes (Kádárová et al., 2023). A strategy aligns technology adoption with long-term business objectives, ensuring that SMEs prioritize technologies that directly enhance productivity, customer engagement, and market expansion.

In the Malaysian context, SMEs that have adopted e-commerce platforms, digital marketing campaigns, or data analytics in line with their strategic plans tend to achieve

greater efficiency and reach (Haq & Huo, 2023). For instance, SMEs in the retail and hospitality industries have leveraged digital analytics not only to streamline operations but also to target specific customer segments more effectively. By contrast, SMEs lacking a digitalization roadmap often engage in ad hoc adoption of technologies, such as implementing social media platforms without integrating them into customer relationship management systems. This fragmented approach reduces the impact of digital tools and may even create inefficiencies.

Furthermore, research suggests that a digitalization strategy is not static. It must evolve with technological trends and market dynamics. Martins (2023) argues that dynamic strategies, which incorporate ongoing learning and adaptation, are crucial for SMEs operating in rapidly changing environments. In Malaysia, where SMEs face both global competition and domestic challenges such as limited resources, a strategic approach ensures that digitalization contributes meaningfully to long-term sustainability rather than being a short-term response to external pressures.

## 4.2. Digitalization Readiness

Readiness reflects the extent to which an SME is prepared to adopt and implement digital technologies. It encompasses the firm's infrastructure, workforce skills, financial capacity, and overall openness to technological change (Lassnig et al., 2018). Studies consistently show that readiness is a prerequisite for successful digital transformation. SMEs with strong infrastructure, trained employees, and supportive leadership are better positioned to implement technologies effectively (Okfalisa et al., 2021).

The COVID-19 pandemic reinforced the importance of readiness for resilience. Firms with established digital infrastructures, such as cloud systems and e-commerce platforms, were able to continue operating, while those lacking such systems faced severe disruptions (Rajala & Hautala-Kankaanpää, 2022). In Malaysia, many SMEs face readiness challenges despite government support. Hussain et al. (2022) note that gaps in digital literacy, particularly among SME owners and employees, hinder adoption. Additionally, limited financial resources constrain SMEs' ability to invest in digital tools, even when they recognize their importance.

Interestingly, readiness is not merely technical but also psychological. Firms that perceive themselves as capable of adopting digital technologies are more likely to invest in them. This aligns with the concept of perceived behavioral control in TPB, where confidence in resources and capabilities significantly influences adoption (Charbonneau-Genest & Gamache, 2023). In Malaysia, SMEs often underestimate their readiness, perceiving digitalization as costly or overly complex, which in turn delays adoption. Therefore, readiness must be understood as both a structural and a perceptual construct.

## 4.3. Digitalization Culture

Organizational culture is increasingly recognized as a key determinant of successful digital transformation. Culture refers to the shared values, beliefs, and behaviors within an organization that influence how it responds to change (Firican, 2023). A supportive digital culture promotes experimentation, risk-taking, and continuous learning, enabling SMEs to integrate new technologies effectively. Conversely, cultures characterized by

risk aversion, rigidity, or resistance to change hinder adoption, regardless of available resources.

Studies demonstrate that SMEs with strong digital cultures exhibit greater agility and innovation. [Duerr et al. \(2018\)](#) show that organizations fostering open communication and collaborative problem-solving are more successful in adopting new tools. [Rozak et al. \(2023\)](#) add that cultures encouraging employee involvement in digital initiatives foster a sense of ownership, which increases the likelihood of successful implementation. In Malaysia, cultural resistance remains a significant barrier. Many SME leaders adhere to traditional business practices, creating skepticism about the benefits of digital tools. Employees may also fear that digitalization could threaten their jobs, further reinforcing resistance.

Yet culture can also serve as a powerful enabler. Malaysian SMEs that embrace digital mindsets often create informal learning environments where employees are encouraged to experiment with new technologies. Such cultures promote not only adoption but also innovation, as employees feel empowered to suggest improvements. Therefore, digitalization culture is not only about acceptance of technology but also about fostering an environment that values adaptability, creativity, and collaboration.

#### 4.4. Digitalization Capability

Digitalization capability refers to the extent to which SMEs possess the skills, resources, and competencies necessary to utilize digital technologies effectively ([Annarelli et al., 2021](#)). It encompasses both technical capabilities, such as data analytics and IT infrastructure, and organizational capabilities, such as change management and innovation processes. Strong capabilities provide SMEs with a sustained competitive advantage by enabling them to extract greater value from digital investments.

[Wu et al. \(2022\)](#) argue that digitalization capabilities are not merely operational but strategic, as they allow firms to continuously innovate and respond to environmental changes. [Wang et al. \(2023\)](#) support this view, noting that firms with advanced capabilities are better able to leverage open innovation and collaborate with external partners. In Malaysia, however, capability gaps are common. Many SMEs lack in-house expertise in areas such as data management, cybersecurity, and advanced analytics. This forces them to rely on external vendors, which may not always align with their long-term strategic goals.

Developing digital capabilities requires continuous investment in training and knowledge acquisition. Yet SMEs in Malaysia often face financial constraints that limit their ability to build these competencies internally. Partnerships with universities, industry associations, and government programs can help bridge this gap, but such collaborations remain underutilized. Thus, capability is a crucial yet underdeveloped dimension of SME digitalization in Malaysia.

#### 4.5. Customer Value as a Mediator

While digitalization is often associated with efficiency gains and technological advancements, its true impact on performance is realized through customer value. Customer value is defined as the perceived benefits customers derive from a product or service relative to the costs they incur ([Jordaan & Badenhorst, 2022](#)). The literature

suggests that digital transformation does not directly improve financial performance; rather, it enhances the firm's ability to create and deliver superior customer value, which in turn drives satisfaction, loyalty, and profitability (Ismail, 2022; Abu Hasan et al., 2022).

For SMEs, customer value is particularly critical, as their survival depends heavily on close relationships with customers. Digital tools enable SMEs to personalize offerings, reduce response times, and enhance service quality. For example, Malaysian SMEs that adopted e-commerce platforms during the pandemic were able to maintain customer engagement despite physical restrictions, demonstrating how digital tools enhance perceived value. At the same time, failure to translate digital adoption into customer value can lead to wasted resources. Simply adopting technology without aligning it to customer needs risks creating complexity without benefit.

Thus, customer value serves as the bridge between internal digitalization efforts—whether strategy, readiness, culture, or capability—and external business performance. This mediating role clarifies why digital adoption does not automatically result in improved outcomes. Only when customer value is enhanced does digital transformation translate into sustainable competitive advantage.

## 5. Research Gaps and Future Directions

### 5.1. Long-Term Effects of Digitalization on SME Performance

A significant limitation in the current body of literature is the lack of longitudinal research examining how digital transformation affects SMEs over time. The majority of studies adopt a cross-sectional design, capturing only a snapshot of adoption behaviors and outcomes (Ahmad Rosli et al., 2022). While these studies provide valuable insights into immediate drivers and barriers, they fail to explain how digitalization strategies, readiness, culture, and capabilities evolve as SMEs mature. For example, an SME's initial adoption of e-commerce might improve short-term sales, but without a long-term strategy for customer retention or digital capability building, the benefits may diminish. Similarly, the long-term cultural shifts required to sustain innovation often unfold gradually and cannot be fully captured in cross-sectional designs.

Future research should adopt longitudinal approaches that track SMEs over multiple years, documenting how their digital transformation journeys unfold. Such studies would shed light on whether early adopters maintain a competitive advantage or whether late adopters eventually catch up as digital technologies become more widespread. In the Malaysian context, this would also help policymakers assess whether government support initiatives have enduring impacts or whether their effects fade once subsidies and incentives expire.

### 5.2. Ethical and Practical Challenges of Digitalization

While the benefits of digital transformation are widely discussed, ethical and practical challenges remain underexplored. Issues such as data privacy, cybersecurity, and algorithmic bias pose significant risks for SMEs but have received limited attention in the context of developing economies (Firican, 2023). In Malaysia, where SMEs may lack the resources to implement robust cybersecurity measures, data breaches could have devastating consequences for both businesses and customers. Furthermore, the

increasing reliance on digital platforms raises concerns about digital surveillance and the ethical use of customer data.

Future studies should therefore investigate how SMEs navigate these challenges. For example, research could explore how SMEs balance the need for personalized customer engagement with respect for privacy regulations, such as the Malaysian Personal Data Protection Act (PDPA). Another area of interest is how SMEs address the digital skills gap, particularly in training employees to manage ethical risks associated with digitalization. By focusing on these ethical and practical dimensions, researchers can provide more holistic insights that go beyond efficiency and performance metrics to address the sustainability of digital transformation.

### **5.3. Effectiveness of Different Digitalization Dimensions**

The literature currently presents a fragmented understanding of how the dimensions of digitalization—strategy, readiness, culture, and capability—interact with one another. Many studies examine these dimensions in isolation, failing to capture their interdependencies. For instance, while readiness is widely recognized as a prerequisite for adoption, it may not directly lead to improved performance without complementary cultural support or capabilities (Eller et al., 2020). Similarly, having a digital strategy without adequate resources or readiness may result in underperformance.

Future research should employ more sophisticated models to examine these relationships. Structural equation modeling (SEM) and partial least squares (PLS) approaches could be used to explore the direct, indirect, and moderating effects of these dimensions on business performance. In particular, scholars should investigate why readiness and capability sometimes fail to translate into enhanced customer value. This would help identify contextual factors, such as industry type or market competition, that moderate these relationships. Such insights would be invaluable for policymakers seeking to design sector-specific interventions rather than applying one-size-fits-all solutions.

### **5.4. Cross-Cultural Differences in Digitalization Adoption**

Another notable gap in the literature is the limited exploration of cross-cultural differences in digitalization. Most studies are geographically restricted, focusing on SMEs within a single country or region. As a result, it remains unclear whether findings from Malaysia are generalizable to other ASEAN nations or beyond. Cultural values, regulatory environments, and institutional support vary widely across regions and can significantly shape digital adoption.

Comparative research could therefore provide valuable insights. For instance, a study comparing SMEs in Malaysia with those in Singapore might reveal how stronger institutional support in Singapore accelerates adoption, while a comparison with Indonesia might highlight how cultural factors influence attitudes toward risk and innovation. Extending this comparison to Western countries could further enrich the analysis, demonstrating how localized contexts interact with global trends. Such cross-cultural studies would contribute to a more universal understanding of SME digitalization while also highlighting the unique challenges and opportunities faced by Malaysian SMEs.

## 5.5. Customer Value as a Mediating and Moderating Construct

Although customer value is increasingly recognized as a crucial mediator between digitalization efforts and business performance, the literature lacks empirical depth on this relationship. Many studies focus primarily on internal dimensions such as readiness and capability, without examining how these dimensions translate into customer outcomes (Ismail, 2022; Abu Hasan et al., 2022). Moreover, customer value is often treated as a static concept, rather than a dynamic construct that evolves with market expectations and technological advancements.

Future research should examine customer value not only as a mediator but also as a potential moderator. For instance, the strength of the relationship between digitalization capability and performance may vary depending on the level of customer value delivered. In industries where customer loyalty is critical, such as retail and hospitality, customer value may play a stronger moderating role than in industries driven primarily by cost efficiency. By exploring these dynamics, future studies can provide a more nuanced understanding of how digitalization translates into sustainable business outcomes.

## 5.6. The Role of Government Policy and External Support

Government initiatives and external support programs play a significant role in shaping SME digitalization, yet their effectiveness remains underexplored. While funding schemes, training programs, and infrastructure investments are widely promoted, there is limited empirical evidence on whether these interventions produce measurable improvements in SME performance (Muhamad et al., 2020). Furthermore, most studies fail to differentiate between short-term impacts, such as increased adoption rates, and long-term outcomes, such as sustained competitiveness and innovation.

Future research should critically evaluate the role of government policy, distinguishing between financial incentives, regulatory frameworks, and educational initiatives. Scholars should also examine how external partnerships with universities, industry associations, and multinational corporations can complement government efforts. For Malaysia, such research is particularly important, as the country seeks to position itself as a regional leader in the digital economy. Evidence-based assessments would help policymakers design more targeted interventions, ensuring that resources are allocated effectively to address the most pressing barriers faced by SMEs.

## 5.7. Methodological Gaps in Existing Studies

The methodological landscape of SME digitalization research is dominated by surveys and cross-sectional designs. While these methods provide breadth, they often lack the depth needed to capture the complexity of digital transformation. Qualitative approaches, such as in-depth case studies and interviews, remain underutilized. These methods could provide richer insights into how SMEs experience digitalization on the ground, including the informal practices and cultural nuances that shape adoption.

Future research should adopt mixed-methods designs that combine quantitative breadth with qualitative depth. For example, large-scale surveys could identify general patterns of adoption, while case studies could explore the contextual factors that explain why some SMEs succeed while others fail. Additionally, bibliometric analyses could be

used to map the evolution of research on SME digitalization, identifying emerging themes and underexplored areas. By diversifying methodological approaches, scholars can generate a more comprehensive understanding of digital transformation.

## **6. Conclusion and Recommendations**

### **6.1. Summary of Key Findings**

This systematic literature review set out to examine the drivers and barriers of digital transformation among small and medium enterprises (SMEs) in Malaysia, with particular attention to the mediating role of customer value. By synthesizing studies across multiple disciplines, the review highlights that digitalization is a multi-dimensional phenomenon shaped by strategy, readiness, culture, and capability. The integration of the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Theory of Planned Behavior (TPB) provides a robust theoretical framework to explain adoption behaviors, while the inclusion of customer value clarifies how internal digitalization efforts translate into external business performance.

The findings suggest that SMEs with well-defined digitalization strategies, strong readiness in terms of infrastructure and skills, supportive organizational cultures, and advanced capabilities are more likely to achieve superior business outcomes. However, these internal efforts must ultimately be directed toward creating customer value. Without enhancing customer experiences and satisfaction, digital transformation risks remaining an internal exercise with limited market impact. At the same time, barriers such as limited financial resources, skill shortages, cultural resistance, and ethical challenges related to data privacy continue to hinder adoption in Malaysia.

### **6.2. Theoretical Contributions**

This review makes several contributions to the theoretical understanding of SME digitalization. First, it integrates UTAUT and TPB, two influential yet often separately applied theories, into a unified conceptual framework. This integration allows for a more comprehensive analysis by capturing both the structural determinants of adoption, such as infrastructure and facilitating conditions, and the psychological dimensions, such as attitudes and perceived behavioral control. Second, the study advances the literature by positioning customer value as a mediating construct between digitalization and business performance. This perspective clarifies the mechanism through which digital transformation produces competitive advantage, offering a pathway for future empirical testing. Third, the identification of key research gaps—including the need for longitudinal studies, exploration of ethical challenges, and cross-cultural comparisons—provides a clear agenda for future scholarship.

### **6.3. Practical Implications for SME Managers**

For SME managers, the review highlights that digital transformation is not merely about acquiring technologies but about embedding them within coherent strategies and supportive organizational cultures. Managers should prioritize developing digitalization strategies that align with business objectives, rather than engaging in piecemeal adoption of tools. They must also foster cultures that value experimentation, learning, and adaptability, as these cultural elements are essential for overcoming resistance to change.

Capability development emerges as another priority. SMEs should invest in continuous training to build technical and analytical skills among employees. Where financial resources are limited, partnerships with educational institutions, industry associations, or technology providers can offer cost-effective solutions. Importantly, managers must view digitalization not as an end in itself but as a means of creating customer value. Efforts should focus on how digital tools enhance customer experiences, build loyalty, and generate sustainable growth.

#### **6.4. Policy Implications for Government and Institutions**

The findings also carry significant implications for policymakers. Government initiatives in Malaysia, while valuable, often focus heavily on financial incentives or infrastructure provision. While these are important, they must be complemented by programs that address cultural and capability-related barriers. Policies should support training initiatives that build digital mindsets and skills among SME leaders and employees. Furthermore, regulatory frameworks must balance the promotion of digital innovation with safeguards for data privacy and cybersecurity, ensuring that customer trust is maintained.

Policymakers should also consider the heterogeneity of SMEs. Different industries and firm sizes face distinct challenges, meaning that one-size-fits-all policies may be ineffective. Tailored interventions—such as sector-specific training or region-specific infrastructure investments—would ensure that support is aligned with the unique needs of SMEs. Collaborations between government agencies, universities, and industry stakeholders should also be strengthened to provide SMEs with access to knowledge, expertise, and networks that can accelerate their digital transformation.

#### **6.5. Recommendations for Future Research**

This review identifies several directions for future scholarship. Longitudinal studies are needed to capture the long-term effects of digital transformation, particularly how SMEs sustain or lose competitive advantages over time. Ethical and practical challenges, including cybersecurity, privacy, and the digital divide, warrant deeper exploration in the Malaysian context. Researchers should also examine the interplay of different digitalization dimensions, investigating why readiness and capability sometimes fail to yield customer value.

Comparative studies across ASEAN and other global regions would provide valuable insights into how cultural, institutional, and regulatory factors shape adoption. Methodologically, mixed-methods approaches combining surveys, case studies, and bibliometric analyses would generate richer and more comprehensive findings. Finally, future research should continue to refine the role of customer value, exploring it not only as a mediator but also as a moderator in the digitalization–performance relationship.

Digital transformation represents both a challenge and an opportunity for SMEs in Malaysia. While government policies and technological advancements have created pathways for adoption, significant barriers remain in the form of cultural resistance, capability gaps, and ethical concerns. The success of digital transformation ultimately hinges on whether SMEs can translate internal efforts into customer value, which serves as the foundation for sustainable performance and competitiveness.

By integrating UTAUT and TPB into a unified framework and emphasizing customer value, this review provides a strong theoretical and practical foundation for understanding SME digitalization. For managers, the findings underscore the need for strategic planning, cultural change, and capability development. For policymakers, the study highlights the importance of tailored, holistic support programs that move beyond funding to address skills and culture. For researchers, the review outlines a clear agenda that can deepen theoretical insights and inform practical interventions.

In conclusion, digital transformation in SMEs is not a destination but an ongoing journey. Its success depends on the alignment of strategies, readiness, culture, and capabilities, mediated by the ability to create superior customer value. As Malaysia continues its transition toward a digital economy, the insights from this review provide critical guidance for SMEs, policymakers, and researchers seeking to navigate and shape this transformation.

### **Ethics Approval and Consent to Participate**

This study did not involve human participants or primary data collection; therefore, formal ethics approval and consent to participate were not required. All research activities were conducted in accordance with established academic and publication ethics standards.

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### **Conflict of Interest**

The authors declare that there are no conflicts of interest related to the research, authorship, or publication of this article.

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