Business Sustainability through Digitalisation: Evidence from Malaysian SMEs

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ABSTRACT

The Malaysian economy is powered by small and medium-sized enterprises (SMEs), but the long-term sustainability of these businesses is threatened by market volatility, limited resources and inconsistent digital proficiency. This study examines the impact of digitalisation on the sustainability of Malaysian SMEs in economic, environmental and social terms. It provides a purposeful conceptual synthesis, but not a systematic review, of 16 peer-reviewed academic papers published between 2021 and 2025, including empirical, conceptual and literature reviews. Qualitative content analysis was conducted by one researcher, and each paper was coded in relation to the digital dimension, sustainability pillars, mechanisms, enabling factors, barriers and industry. The findings indicate that digitalisation is regarded as an enabler of capabilities rather than a direct driver of sustainability. The findings show that digitalisation does not produce sustainability benefits directly. Instead, it has an indirect effect through dynamic capabilities, agility and innovation in business models, provided there is proper commitment from business leaders, adequate financial resources, awareness and government support. Economic aspects are discussed more frequently in the SMEs digitalisation literature than environmental and social aspects. This study provides a conceptual framework and six propositions for further empirical testing of the relationships between digitalisation, digital capabilities and sustainable SME performance, as well as suggestions for owner-managers, government and scholars.

Keywords: Digitalisation, Business sustainability, Small and medium-sized enterprises (SMEs), Dynamic capabilities, Sustainable performance

INTRODUCTION

Small and medium enterprises have long been regarded as the driving force behind emerging nations. According to Abu Jaish et al. (2023), citing national data, the most of Malaysia's businesses belong to SMEs, which accounted for 38.2% of gross domestic product in 2020. Micro, small, and medium enterprise statistics are released periodically by the Department of Statistics Malaysia (DOSM, 2024). Nevertheless, as the same authors have observed, many Malaysian SMEs ceased operating during the COVID-19 era, raising concerns about their sustainability. For SMEs, sustainability therefore implies more than profitability where organisations need to be sustainable, able to react quickly to changing markets and, increasingly, to manage their environmental footprint (Yadegaridehkordi et al., 2023).

Digitalisation is often proposed as the answer to this problem. Digital technologies can foster new business models, rapid decision-making and better market reach, and many SMEs adopted such technologies under the pressure of the pandemic (Abu Jaish et al., 2023; Yuen & Baskaran, 2023). Nonetheless, digitalisation does not guarantee sustainable development. Research suggests that digitalisation is a form of organisational change, and this process can be partly explained by conventional organisational theories (Hanelt et al., 2021). Research also shows that the value of digitalisation for sustainability is highly dependent on the context of its application (Ghobakhloo et al., 2021). Reviews of SMEs in developing countries also identify recurrent barriers and enablers that determine whether digital efforts succeed (Díaz-Arancibia et al., 2025). In the case of SMEs, lack of funds and low awareness of options are major barriers (Rupeika-Apoga & Petrovska, 2022; Yuen & Baskaran, 2023).

1.1 Research gap

The gaps that drive this study include, firstly, that most empirical evidence in Malaysia does not integrate digitalisation and sustainability into a single stream. The digital business model literature focuses on competitiveness and performance (Ahmad et al., 2022; Teoh et al., 2022), while the sustainability literature focuses on determinants of sustainability such as leadership commitment and green orientation (Yadegaridehkordi et al., 2023). Secondly, Yadegaridehkordi et al. (2023) find that only a few studies in emerging economies such as Malaysia examine all three pillars of sustainability in relation to performance; this is also true of the literature on digitalisation. Thirdly, the existing body of evidence is scattered across different academic fields and methods and has not been coded in terms of mechanisms, enablers and barriers linking digitalisation to sustainability.

1.2 Research questions

This study addresses the following research questions:

RQ1: How is digitalisation conceptualised and operationalised in research on Malaysian SMEs?

RQ2: How is digitalisation linked to the economic, environmental and social aspects of SME sustainability through what mechanisms?

RQ3: What are the enablers and barriers of the digitalisation-sustainability link in Malaysian SMEs?

RQ4: What conceptual framework and propositions can guide future empirical research?

LITERATURE REVIEW

2.1 Digitalisation

The literature distinguishes between digitisation (converting analogue information into digital form), digitalisation (using digital technologies to change business processes and models) and digital transformation (a broader organisational change). Hanelt et al. (2021) have conducted a review of 279 papers and argue that digital transformation does not fit entirely within the scope of conventional organisational change theories. The current research applies terms "digitalisation" and "digital capability" to SMEs' use of digital technologies in their operations and business models.

Digital business model innovation (DBMI) is one of the core constructs that has been used in studies concerning SMEs. Trischler and Li-Ying (2023) define the DBMI construct and identify research paths for the future, highlighting the fact that conceptual confusion undermines comparability among studies. In Malaysia, Teoh et al. (2022) investigate whether DBMI will turn out to be “a game changer” for competitiveness in the context of a developing nation, while Ahmad et al. (2022) analyze the role of entrepreneurial leadership and governmental support in the case of DBMI.

The research on industry 4.0 brings a technology-focused approach into play. According to Ghobakhloo et al. (2021), who conducted a review of 745 articles on the topic, industry 4.0 sustainability value drivers as well as factors of success for digital transformation have been identified, moving the focus away from the manufacturing sector. Likewise, the authors of Ching et al. (2022) review on industry 4.0 application in sustainable manufacturing presented their roadmap for sustainable development.

2.2 Business Sustainability

Business sustainability usually involves three main pillars which are economic viability, environmental sustainability, and social sustainability. Sustainable performance of businesses can be defined as performance that is achieved and maintained economically, environmentally, and socially (Hadi & Baskaran, 2021). In the case of SMEs, business sustainability has been studied using factors such as green entrepreneurial orientation, green innovation, leadership commitment, and market orientation (Yadegaridehkordi et al., 2023). Based on the

findings from 209 manufacturing companies in Malaysia, it can be noted that among all the factors mentioned above, leadership commitment has been found to have the greatest influence on environmental and social sustainability, while green entrepreneurial orientation is the leading driver of financial sustainability (Yadegaridehkordi et al., 2023). Hadi and Baskaran (2021) have also researched determinants of sustainable business performance in the upstream petroleum industry in Malaysia. Digital variable inclusion studies use environmental, social, and governance (ESG) performance as the dependent variable. In their study, which involved 360 manufacturing companies in Malaysia, Akhtar et al. (2025) observed that ESG moderated the effect of digital organisational culture on financial performance, with government policy moderating the relationship. Chen and Wang (2024) surveyed 215 SME executives, finding that digital transformation had a positive effect on ESG performance, partly because of innovation and servitization capability.

From a theoretical standpoint, the resource-based view, dynamic capability, and institutional theory lead the discourse (Abu Jaish et al., 2023; Yadegaridehkordi et al., 2023). Dynamic capability is particularly important in the study of SMEs because it explains how organizations with scarce resources perceive changes, act upon opportunities, and reconfigure resources in uncertain environments. Abu Jaish et al. (2023) state that sustainability among SMEs is higher if the organization has adequate and flexible resources.

There is increasing evidence that relates digitalization with sustainability in SMEs. Specifically, Del Baldo et al. (2022) propose a multicriteria framework research model that links financing, revenue, sustainability, and digital technologies in SMEs working in a difficult environment. Yuen and Baskaran (2023) examine how adapting business models through digital transformation can support long-term business performance with agility. Both studies indicate that sustainable outcomes depend on the combination of digital resources with organizational capabilities.

2.3 SMEs in Malaysia

Malaysian SMEs operates within a regulatory framework aimed at encouraging the digitalization process, with the statistical data on the micro, small and medium enterprises published by DOSM (2024). According to Abu Jaish et al. (2023), the SMEs are considered as a significant element of the country's economy, although at the same time a vulnerable segment of the economy, which can be seen from the fact that during the outbreak of COVID-19 a number of business organizations had been closed. In particular, Yuen and Baskaran (2023) cite the survey findings in relation to the Malaysian SMEs, according to which about half of the SMEs viewed the problem of funding as their primary challenge and 60% were not aware of the possibilities. Veeraya et al. (2024) explore the digital business transformation of Malaysian SMEs via digital leadership and digital culture perspectives. Díaz-Arancibia et al. (2025) synthesise 21 systematic mapping studies on digital transformation in SMEs in developing countries, providing a broader basis for comparison with the Malaysian barriers. These sources suggest that financial, informational and leadership factors are central, but most Malaysian primary evidence focuses on manufacturing.

Research on Malaysian SMEs is also focused on certain sectors. Yadegaridehkordi et al. (2023) concentrate on production, whereas Teoh et al. (2022) and Ahmad et al. (2022) investigate digital business model innovation inside SMEs in a broader context. This specialisation among sectors implies that results pertaining to manufacturing may not seamlessly apply to services, retail, or agro SMEs, which vary in technological intensity, customer interactions, and ecological impacts.

METHODOLOGY

3.1 Research design

This study adopts qualitative design, interpretive and uses documentary content analysis as the method. Documentary content analysis is appropriate for this study since it focuses on representation of concepts, mechanisms, facilitators and barriers in a pool of secondary literature and not primary data. The study follows PRISMA 2020 guidelines (Page et al., 2021) in terms of transparency, clear inclusion/exclusion criteria, a search strategy and a reproducible selection strategy.

3.2 Search and identification

The identification process was iterative and focused and involved conducting web-based academic searches in November 2026, followed by verification of the DOIs of each document in the publisher and repository databases. Scopus and Web of Science were not searched separately. The search history was made up of three stages.

In stage 1, a web academic search with the query "digitalisation SMEs Malaysia sustainability performance" found Malaysian studies that connect digitalisation and sustainability. In stage 2, another search using "Malaysian SMEs digital transformation sustainable performance 2024" covered the period until 2024-2025. Stage 3 consisted of checking titles and authors of each document identified in stages 1 and 2 (e.g. Hanelt 2021, Ghobakhloo 2021 and Akhtar 2025) to verify DOIs.

A replicable database protocol was created but not yet tested: TITLE-ABS-KEY ((digitaliation OR "digital transformation" OR "digital business model" OR "industry 4.0") AND (sustainab OR "sustainable performance" OR ESG) AND (SME* OR "small and medium*") AND Malaysia*) AND PUBYEAR > 2020 AND DOCTYPE (ar OR re). The authors are supposed to run it in Scopus and Web of Science, save the counts, expand the corpus and submit the paper.

3.3 Eligibility, selection and exclusions

Criteria for inclusion in the systematic review were that the document must be (a) a peer-reviewed journal article published in the period 2021 to 2025; (b) focused on either digitalization, digital transformation, DBMI or Industry 4.0 and SME performance or sustainability; or offering a review of relevance to SMEs; and (c) have a verifiable DOI. The most recent document to meet these criteria was from December 2025 and there were no documents meeting the criteria in 2026. There was no systematic logging of candidate document numbers so that no flow chart is provided, and instead section 3.5 presents all included documents. Exclusions included conference proceedings, journals not verifiably peer-reviewed and indexed, and documents not specifically about SMEs or relevant to digitalization. Three additional references are background reading only and not coded: DOSM (2024), Hadi and Baskaran (2021), and Page et al. (2021).

3.4 Eligibility, selection and exclusions

Coding was done by one analyst ([initials]) using a codebook with six families: digital focus, sustainability pillar, mechanism, enabler, barrier, and sector. Two documents (D1, D2) were coded using the full text while the other 14 documents were coded using the abstract/bibliographic record only and thus some details may be lost. The coding sheets record every choice in the form of an audit trail. There was no second coder used and there is no report of any inter-coder agreement statistics. Coding examples are illustrated below.

Coding examples include three cases. D1 coded the statement that capital, knowledge, and funding constrain SME digitalisation as a barrier concerning resources and knowledge. In D3, the result that ESG acts as a mediator between digital culture and performance and government policy as a moderator was coded using the mechanism of ESG and the enabler of government support. Finally, in D8, the result that innovation capability mediates the effect of digital transformation on ESG performance was coded using the mechanism of innovation capability.

3.5 Included documents and evidence appraisal

The strength of evidence was assessed based on the information obtained at the abstract level: Strong (systematic or umbrella review with a specified corpus), Moderate (empirical study with a specified sample and analysis), Limited (theoretical/conceptual/untested), Not rated (design not identified). The assessments need to be re-evaluated from full papers. Scopus/Web of Science indexing of D1-D2, D6, D5, D3 and D7 journals must be confirmed by the authors; other journals are widely indexed.

D1 (Abu Jaish et al., 2023) is a conceptual paper on survival, profitability, and dynamic capabilities, which has been coded from the full text and rated Limited. D2 (Yuen & Baskaran, 2023) is a conceptual framework for service-sector SMEs, defining three-pillar performance, coded from full text and rated Limited. D3 (Akhtar et

al., 2025) is a cross-sectional PLS-SEM survey of 360 manufacturing firms investigating financial performance using ESG as a mediator, and is therefore rated Moderate. D4 (Yadegaridehkordi et al., 2023) is a survey of 209 manufacturing SMEs examining environmental, financial, and social performance, but lacking any digital predictors, and is therefore rated Moderate. D5 (Teoh et al., 2022) is concerned with competitiveness via DBMI, while D6 (Ahmad et al., 2022) is concerned with DBMI and leadership and government support; the designs of both have not been extracted, and thus they are Not rated. D7 (Veeraya et al., 2024) is a review of digital leadership and digital culture, and the design type is Not rated.

Nine international papers can be found below. D8 (Chen & Wang, 2024) – a PLS-SEM and fsQCA survey of 215 SME executives regarding their organizations' ESG performance and it is rated Moderate. D9 (Rupeika-Apoga & Petrovska, 2022) is an empirical paper that evaluates seven barriers to sustainable digital transformation in micro, small, and medium enterprises and it is Not rated since the sample design was not extracted. D10 (Del Baldo et al., 2022) proposes a research model on funding, turnover, sustainability, and digital technologies, while D11 (Martínez-Peláez et al., 2024) is the development of a decision-making framework for sustainable digital transformation. The designs of both of these papers have not been extracted, thus Not rated. D12 (Hanelt et al., 2021; 279 articles), D13 (Ghobakhloo et al., 2021; 745 articles), D14 (Ching et al., 2022; a systematic literature review of Industry 4.0 and sustainable manufacturing) and D16 (Díaz-Arancibia et al., 2025; an umbrella review of 21 mappings on barriers and enablers) are reviews and rated Stronger. D15 (Trischler & Li-Ying, 2023) is a review which defines the DBMI construct and Not rated as its type was Not rated.

FINDINGS AND RECOMMENDATIONS

4.1 Findings

The analysis of the corpus established six conclusions. Findings 1 and 6 predominantly address RQ1, Findings 1, 2, and 5 pertain to RQ2, while Findings 3, 4, and 5 correspond to RQ3. Each discovery outlined below articulates the pattern, the corroborating evidence, and its implications for the relationship between digitisation and sustainability. The results delineate trends in available literature; they do not represent verified outcomes.

Finding 1: Digitalisation operates as a capability enabler, not a direct cause of sustainability (RQ1, RQ2)

Digitalisation is not seen as enhancing sustainability by itself. For instance, Abu Jaish et al. (2023) describe digitalisation in terms of dynamic capabilities and claim that the key to SME sustainability lies in whether there is enough and flexible resource, and thus, digitalisation enables companies to adapt to uncertainty. Yuen and Baskaran (2023) explore digital transformation of the business model as a way to achieve long-term performance alongside agility. Digital business model innovation is the context for digitalisation in research conducted by Teoh et al. (2022) and Ahmad et al. (2022), and Trischler and Li-Ying (2023) prove that the construct of digital business model innovation needs further clarification. Thus, the mechanism operating across the literature is indirectly connected to the use of digitalization. Namely, digital technologies assist SMEs in sensing changes in the environment, reacting faster and transforming their business models, and this process creates value. It follows that the studies considering just the technology adoption part can both underestimate and overestimate the impacts on sustainability.

Finding 2: Economic sustainability is the best-evidenced pillar; environmental and social pillars are under-integrated (RQ2)

Studies of digitalisation in the corpus largely focus on the relationship between technology and performance, competitiveness, and survivability (Abu Jaish et al., 2023; Teoh et al., 2022; Yuen & Baskaran, 2023). On the contrary, studies that examine environmental, financial, and social performance together are less prevalent in the context of emerging economies, as pointed out by Yadegaridehkordi et al. (2023), and in Malaysia-based studies presented here, such three-pillar models of performance are not based on digital variables. Industry 4.0 reviews do mention the sustainability value drivers, emphasizing that these value drivers will only be achieved depending on the implementation process (Ching et al., 2022; Ghobakhloo et al., 2021). It is important because digitalisation can be successful in a firm without any improvement in terms of environmental and social performance. If the three pillars of sustainability are not targeted intentionally, digitalisation can strengthen the economic pillar and

neglect others. Such interpretation is grounded on the balance of evidence in the corpus and needs further validation (propositions P2 and P3).

Finding 3: Leadership and institutional support are consistent enablers (RQ3)

Leadership commitment proved to be the most significant predictor of environmental and social performance among the 209 manufacturing organizations in Malaysia examined by Yadegaridehkordi et al. (2023), whereas the role of green entrepreneurial orientation was highest in explaining financial performance. In the digital world, the work of Ahmad et al. (2022) places entrepreneurial leadership and government support at the heart of DBMI in SMEs. Collectively, these studies imply that leadership determines whether digital investment is made for sustainable purposes, and that support decreases the cost of such investment. A logical inference from these findings is that one and the same technology leads to different sustainability outcomes in two different firms, based on whether the owner-manager considers sustainability objectives as an integral part of their business strategy.

Finding 4: Financial constraints and awareness gaps are persistent barriers (RQ3)

According to Yuen and Baskaran (2023), they provide analysis of the Malaysian SMEs based on surveys conducted, one can find data indicating that around half of the surveyed companies identified finance as the biggest barrier, while around 60% were unaware of the available means of assistance. Rupeika-Apoga and Petrovska (2022) identify barriers for sustainable digital transformation of micro, small and medium enterprises as well. Meanwhile, Del Baldo et al. (2022) define funding and turnover as the key factors in their model of the SMEs operating in the challenging environment. These barriers are interdependent: lack of resources makes it difficult to seek any help, and lack of information makes it impossible to use it. This means that the problem is not just lack of money but also lack of information as well, which means that awareness and advisory tools can play the same role as incentives.

Finding 5: The digitalisation–sustainability link is conditional (RQ2, RQ3)

There is consensus on the view that digital transformation does not automatically lead to sustainability gains. Hanelt et al. (2021), through a review of 279 papers, find out that digital transformation is partially understood through existing organizational change theories, implying that businesses cannot only depend on organizational change processes. Ghobakhloo et al. (2021), having conducted a review of 745 articles, find the criteria for a successful digital industrial transformation and describe sustainability value drivers for the process. Abu Jaish et al. (2023) echo the same point by emphasizing resources and dynamic capabilities in the face of uncertainties. This finding suggests that the adoption of technology without complementary organizational capability, resource and leadership is unlikely to provide sustainability gains and supports modeling capability as a mediator and context as a moderator.

Finding 6: The evidence base is concentrated in manufacturing and relies largely on survey designs (RQ1)

In the body of research literature examined, three-pillar evidence for Malaysian SMEs is based mostly on manufacturing businesses (Yadegaridehkordi et al., 2023), as well as Industry 4.0 research which is also manufacturing-based (Ching et al., 2022). There is less research evidence regarding services, retail and agrifood SMEs in this body of research literature. Empirical evidence seems to have been gathered using survey methods, which does not allow one to draw conclusions about causation.

4.2 Recommendations

The recommendations follow directly from the findings above. They are the authors' practical interpretation of the evidence and should be suit the particular industry and size of the firms.

4.2.1 For SME owner-managers

The owner-managers should see digitalisation as a capability development project instead of as a technology acquisition (Findings 1 and 5). The application of each of these tools should be followed by employee training

and a process change, such that it impacts the manner in which the organisation perceives the external environment. Since leadership commitment emerged as the single most important determinant of performance on both the environmental and the social fronts (Yadegaridehkordi et al., 2023), it would make sense to assign the responsibility of aligning these digital projects with the sustainability goals to a senior official, who would not delegate this responsibility to IT personnel (Finding 3). It would be wise to choose use cases for digitalisation that can help achieve multiple pillars, such as monitoring inventories and logistics in a manner that cuts costs and waste, and monitor a handful of key indicators for each pillar such as cost savings, energy or waste reduction, and employee outcomes, and not merely profit (Finding 2). Finally, since funding is the main constraint (Yuen & Baskaran, 2023), it makes sense to approach investments sequentially, starting with the low-cost high-impact projects first.

4.2.2 For policymakers and support agencies

The policymakers and the support agencies need to integrate financial assistance with guidance. Since there is a combination of budget constraints and knowledge gap, any financial aid or grants are likely to be more effective when combined with guidance services and a single source of information about the programmes (Finding 4). Government assistance is a known factor that facilitates digital business model innovation (Ahmad et al., 2022), hence, the eligibility requirements and reporting guidelines can incorporate indicators of environmental and social performance to ensure that government support is not just economically beneficial (Findings 2 and 3). Since the barriers to sustainability in digital business transformation are not similar among micro, small and medium businesses (Rupeika-Apoga & Petrovska, 2022), the support needs to be tiered by the firm size (Finding 4). Programs based on manufacturing experience need to be tested and assessed in services, retail and agribusiness before scale-up (Finding 6).

4.2.3 For industry bodies and educators

Training initiatives by industry organizations and academia need to incorporate digital and sustainability training so that managers learn how analytics, automation, and the internet can be linked to sustainability goals instead of being taught separately (Findings 1 and 5). Industry organizations can also collate and disseminate case studies related to SMEs which operate outside manufacturing since this is where there is the least evidence base (Finding 6), and peer networks can help overcome awareness gaps at relatively low cost (Finding 4).

4.2.4 For researchers

The integration of digital concepts alongside those of sustainability within the same model while measuring the three components of sustainability (Finding 2) is needed. The concept of digital readiness should ideally be modelled as a mediating variable while leadership, finance and government interventions as moderators (Findings 3-5). Sample sizes can also be expanded beyond manufacturing sectors by adopting better research designs (Finding 6).

4.2.5 Implementation priorities

From a practical point of view, the suggested recommendations can be prioritized. On a short-term basis, owner-managers need to delegate the responsibility for leadership ownership and identify one or two use cases which benefit more than one pillar, and on the part of the agencies, they need to increase awareness about their existing schemes. On a medium-term basis, companies will need to focus on capability development and the agencies must include environment and social parameters in their schemes.

CONCEPTUAL FRAMEWORK AND PROPOSITIONS

5.1 Conceptual framework

The model incorporates ideas from dynamic capabilities theory and the resource-based view, two theoretical perspectives that underlie the capability-oriented articles in the corpus (Abu Jaish et al., 2023; Yuen & Baskaran, 2023). In order to eliminate the overlap between capability variables identified in Section 4.1, the model employs one mediating chain in which each variable is defined only once. Digital adoption (technologies used) is expected

to generate digital capability (the skill to make use of the technologies effectively, meaning their sensing, seizing and reconfiguration, with agility being one form of digital capability). Digital capability, in turn, is supposed to drive digital business model innovation (DBMI), which can be defined as a strategic shift in the way the company creates and extracts value (Teoh et al., 2022; Trischler & Li-Ying, 2023). DBMI is then supposed to influence three outputs: economic, environmental and social sustainability (Hadi & Baskaran, 2021; Yadegaridehkordi et al., 2023). As ESG metrics encompass governance, ESG outcomes (Akhtar et al., 2025; Chen & Wang, 2024) will be considered indicators of the environmental and social dimensions only. The connection between adoption and outputs should be quite weak in the presence of mediators.

These paths are defined as four. Path A leads from digital adoption to digital capability. Path B goes from digital capability to DBMI. Path C leads from DBMI to the three sustainability outcomes. Path D represents the direct effect of adoption on outcomes. Moderators impact these paths in the following way.

Financial resources and knowledge support impact Path A, based on the findings of D2 about the gaps in the financial support and knowledge, and barriers stated in D1 and D9 (P5). Path B is tested directly, with the support of D5, D6 and D15 (P1 to P3). Leadership commitment impacts Path C for the environmental and social outcomes, based on D4, where leadership commitment was shown to be the strongest predictor of the environmental and social performance (P4). Government support impacts the link between DBMI or capability and sustainable performance, based on D3 and D6 (P6). Path D, the direct effect of adoption on outcomes, has no moderator and is expected to be weak due to D12 and D13.

5.2 Propositions

Six propositions emerge from the framework, with varying degrees of supporting evidence. The first proposition (P1) is that digital adoption is positively linked to SME economic sustainability via digital capability and DBMI, sequentially. P1 is the most strongly supported proposition, as economic outcomes dominate the literature corpus (D1, D3, D5). The second proposition (P2) is that digital adoption is positively correlated with environmental sustainability via the same chain, but only when digital use targets environmental processes. The support here is also indirect and based on ESG composite findings (D3, D8). The third proposition (P3) is explicitly exploratory and non-directional: digital adoption may be linked to social outcomes, including employee and community effects, depending on workforce-related uses of technology. However, as there are no separate measures for social outcomes in any document in the corpus, no statements are made regarding the magnitude of this association compared with the economic and environmental ones. Proposition 4 (P4) states that leadership commitment amplifies the relationship between DBMI and environmental or social outcomes, supporting D4. Proposition 5 (P5) states that finance and awareness of available resources amplify the relationship between digital adoption and digital capability, supporting D2. Proposition 6 (P6) is stated that governmental support is an amplifier of the relationship between capability/DBMI and sustainable performance, supporting D3 and D6. Sector (manufacturing/services) is a boundary condition to be examined, as per Finding 6. These propositions are derived from the synthesis and have not been empirically tested in this paper.

FUTURE RESEARCH

First, the hypotheses should be tested using survey-based structural equation modelling with constructs for all three pillars of sustainability measured individually, as the existing literature uses composite ESG indicators. Second, the Scopus and Web of Science procedure outlined in Section 3.2 needs to be implemented fully as a systematic review with a PRISMA flow chart and double-coding of articles along with reporting an agreement statistic. Third, the 14 articles coded from abstracts need to be coded using full texts. Fourth, there should be a longitudinal study design, as the confirmed primary evidence from Malaysia was done using a cross-sectional research design. Fifth, comparison of results across manufacturing, services and retail sectors would help in understanding differences in mechanism between different sectors. Sixth, qualitative case studies might shed light on how the owner-managers use digital technology to engage in practices related to environmental and social aspects of sustainability.

LIMITATIONS

There are various limitations of this study. The coding was conducted by one researcher alone, and inter-coder reliability has not been mentioned in the study, which indicates that coding depends on personal judgement. Out

of 16 documents, fourteen were coded based on abstracts and bibliographies, so any mechanism or moderator discussed in full text may be overlooked, and appraisals are still tentative. The identification was targeted and iterative, through web searches, not through a Scopus or Web of Science search directly, the total screened records were not recorded, and no flow chart is available, so coverage is incomplete, and the Scopus or Web of Science nature of some outlets needs to be confirmed. The number of documents is very small, and the numbers per theme are descriptive but not effect sizes. Two primary studies related to Malaysia have been identified, which are manufacturing studies only and cross-sectional in design, so findings are not generalizable to services and other designs. Barrier statistics of Malaysia are based on a 2018 survey before the outbreak of pandemic.

CONCLUSION

The synthesis undertaken in this paper identified the most relevant recent evidence on digitalisation and sustainability in small and medium-sized enterprises (SMEs), using an open and purposive approach. The documents examined show that digital technology enables sustainability by fostering capability development and business model innovation, and through factors such as leadership, culture, government support, financing and awareness. Economic outcomes are the best documented among the three dimensions of sustainability, while environmental and social outcomes are the least developed, with no single study empirically testing the effect of digitalisation in isolation, and insufficient empirical evidence from Malaysia in non-manufacturing businesses. This paper indicates to practitioners that digital technology effectively supports sustainability when accompanied by capability development, leadership engagement and other external factors. Policymakers are informed that financing, alongside advisory services and criterion-based evaluation, can enable SMEs to achieve sustainability through digitalisation.

ETHICAL CONSIDERATION

Ethical approval

This study analyses published literature and publicly available official statistics. It involves no human participants, personal data or interventions. Formal ethical approval was therefore not required under the typical policies of institutional review boards.

Conflict of interest

The authors declare no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Other statements

All sources are acknowledged through citation, and the study follows principles of research integrity and transparent reporting.

REFERENCES

1. Abu Jaish, A., Murdipi, R., Abdul Razak, D., & Mohd Alwi, N. (2023). The effect of digitalization on the sustainability of Malaysian SMEs. *International Journal of Academic Research in Business and Social Sciences, 13*(1), 655–668. https://doi.org/10.6007/IJARBSS/v13-i1/15994
2. Ahmad, N. H., Teoh, M. F., Ramayah, T., & Abdul Halim, H. (2022). Digital business model innovation in SMEs: The roles of entrepreneurial leadership and government support. *Journal of Applied Structural Equation Modeling, 6*(1), 1–25. https://doi.org/10.47263/JASEM.6(1)04
3. Akhtar, F., Senadjki, A., & Kumaran, V. V. (2025). Sustainability meets digital culture: The influence of ESG on financial performance in Malaysian manufacturing SMEs. *Journal of Innovative Digital Transformation, 2*(1), 90–108. https://doi.org/10.1108/JIDT-10-2024-0031
4. Chen, D., & Wang, S. (2024). Digital transformation, innovation capabilities, and servitization as drivers of ESG performance in manufacturing SMEs. *Scientific Reports, 14*(1). https://doi.org/10.1038/s41598-024-76416-8

5. Ching, N. T., Ghobakhloo, M., Iranmanesh, M., Maroufkhani, P., & Asadi, S. (2022). Industry 4.0 applications for sustainable manufacturing: A systematic literature review and a roadmap to sustainable development. *Journal of Cleaner Production, 334*, Article 130133. https://doi.org/10.1016/j.jclepro.2021.130133
6. Del Baldo, M., Sitnikov, C., Vasilescu, L., Mandache, L., Ogarcă, R., Băndoi, A., & Ganea, E. (2022). Funding, turnover, sustainability and digital technologies: A multicriteria research model for SMEs facing a challenging context. *Sustainability, 14*(7), Article 3953. https://doi.org/10.3390/su14073953
7. Department of Statistics Malaysia. (2024). *Micro, small & medium enterprises (MSMEs) performance 2022*. https://www.dosm.gov.my/portal-main/release-content/micro-small--medium-enterprises-msmes-performance-2022
8. Díaz-Arancibia, J., Bustamante-Mora, A., Hochstetter-Diez, J., & Ramírez Villegas, G. M. (2025). Systematic mappings on technology adoption in small and medium-sized enterprises from developing countries: An umbrella review. *PeerJ Computer Science, 11*, Article e3395. https://doi.org/10.7717/peerj-cs.3395
9. Ghobakhloo, M., Fathi, M., Iranmanesh, M., Maroufkhani, P., & Morales, M. E. (2021). Industry 4.0 ten years on: A bibliometric and systematic review of concepts, sustainability value drivers, and success determinants. *Journal of Cleaner Production, 302*, Article 127052. https://doi.org/10.1016/j.jclepro.2021.127052
10. Hadi, S., & Baskaran, S. (2021). Examining sustainable business performance determinants in Malaysia upstream petroleum industry. *Journal of Cleaner Production, 294*, Article 126231. https://doi.org/10.1016/j.jclepro.2021.126231
11. Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: Insights and implications for strategy and organizational change. *Journal of Management Studies, 58*(5), 1159–1197. https://doi.org/10.1111/joms.12639
12. Martínez-Peláez, R., Escobar, M. A., Félix, V. G., Ostos, R., Parra-Michel, J., García, V., Ochoa-Brust, A., Velarde-Alvarado, P., Félix, R. A., Olivares-Bautista, S., et al. (2024). Sustainable digital transformation for SMEs: A comprehensive framework for informed decision-making. *Sustainability, 16*(11), Article 4447. https://doi.org/10.3390/su16114447
13. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372*, Article n71. https://doi.org/10.1136/bmj.n71
14. Rupeika-Apoga, R., & Petrovska, K. (2022). Barriers to sustainable digital transformation in micro-, small-, and medium-sized enterprises. *Sustainability, 14*(20), Article 13558. https://doi.org/10.3390/su142013558
15. Teoh, M. F., Ahmad, N. H., Abdul-Halim, H., & Ramayah, T. (2022). Is digital business model innovation the silver bullet for SMEs' competitiveness in the digital era? Evidence from a developing nation. *Vision*. https://doi.org/10.1177/09722629221074771
16. Trischler, M. F. G., & Li-Ying, J. (2023). Digital business model innovation: Toward construct clarity and future research directions. *Review of Managerial Science, 17*(1), 3–32. https://doi.org/10.1007/s11846-021-00508-2
17. Veeraya, S., Raman, M., Gopinathan, S., & Singh, J. (2024). Digital business transformation of Malaysian small and medium-sized enterprises: A review on digital leadership and digital culture. *International Journal of Organizational Leadership, 13*(4), 703–721. https://doi.org/10.33844/ijol.2024.60439
18. Yadegaridehkordi, E., Foroughi, B., Iranmanesh, M., Nilashi, M., & Ghobakhloo, M. (2023). Determinants of environmental, financial, and social sustainable performance of manufacturing SMEs in Malaysia. *Sustainable Production and Consumption, 35*, 129–140. https://doi.org/10.1016/j.spc.2022.10.026
19. Yuen, T. M., & Baskaran, S. (2023). Going digital for SMEs: Adapting business model and seizing opportunities to achieve sustainable business performance. *International Journal of Academic Research in Business and Social Sciences, 13*(2), 422–433. https://doi.org/10.6007/IJARBSS/v13-i2/16370