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Driving Sustainable Business Innovation in Small and Medium-Sized Enterprises Through Digital Transformation: Strategic Entrepreneurship in the Post-Pandemic Era

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Abstract: Digital transformation can help small and medium-sized enterprises respond to disruption, but technology adoption alone does not establish a sustainable competitive advantage. This article examines how strategic entrepreneurship connects digital opportunities with the organizational capabilities needed for continuing innovation in the post-pandemic economy. It presents a narrative literature review, drawing on the author's reported review of 45 published articles and synthesizing relevant empirical and conceptual research. No primary data were collected, no independent statistical tests were conducted, and findings from different studies were not pooled. The synthesis identifies strategic alignment, organizational learning, resource availability, and external support as important conditions shaping digital transformation. Published studies suggest that digital capabilities can support business continuity and innovation, while also documenting implementation barriers and uneven performance outcomes. Evidence of a nonlinear relationship between digital orientation and performance cautions against assuming immediate or universal gains. The article distinguishes business viability from environmental and social sustainability and proposes an interpretive framework linking opportunity recognition, capability development, business model adaptation, and outcome evaluation. Practical recommendations emphasize staged investment, employee learning, and partnerships that address specific capability gaps. Policy recommendations focus on accessible infrastructure, skills development, and support for implementation. Because the original search and screening records are unavailable, the review offers a bounded interpretation of selected literature rather than an exhaustive or reproducible systematic assessment.

Keywords: digital transformation, small and medium-sized enterprises, strategic entrepreneurship, sustainable business innovation, organizational resilience, digital capabilities

INTRODUCTION

Small and medium-sized enterprises (SMEs) faced abrupt changes in demand, operating conditions, and customer access during the COVID-19 pandemic. Bartik et al. (2020), drawing on a survey of more than 5,800 small businesses, documented financial fragility and substantial disruption early in the crisis. Their study provides evidence about the vulnerability of small businesses, rather than a direct test of the effects of digital transformation. This distinction matters because exposure to disruption and the effectiveness of a particular response are separate research questions.

Digital technologies became part of firms' responses to restricted physical interaction and changing market conditions. Research on Omani logistics and supply-chain SMEs examined how technology use changed during the pandemic and how it related to future adoption intentions (Mishrif & Khan, 2023). Research on crisis-related transformation also connects digital technologies with firms' development of resilience capabilities (Khurana et al., 2022). These studies suggest that digital tools can support adaptation, but their findings depend on the firms, sectors, and conditions examined. They do not establish that every SME benefits from the same technology or follows the same transformation path.

The managerial question is therefore how an SME can turn a digital investment into a useful and maintainable change in its business. A firm may introduce an online sales channel without improving order fulfillment, purchase analytical software without developing the skills to use it, or automate a process that no longer meets customers' needs. These are illustrative possibilities, not cases observed in this review. They clarify why the relationship between technology adoption and business innovation requires attention to strategy, organizational resources, and implementation.

Strategic entrepreneurship provides a lens for this relationship. Hitt et al. (2011) connect entrepreneurial opportunity seeking with the strategic pursuit of advantage. Applied to digital transformation, this perspective directs attention to how business leaders identify opportunities, mobilize resources, and sustain a workable position in the market. It also creates room to examine limits: an attractive opportunity may exceed a firm's financial capacity, an unfamiliar platform may create dependence on a supplier, and a technically successful project may fail to produce an outcome customers value. This article uses strategic entrepreneurship to interpret such choices, rather than treating it as a variable independently measured in a new empirical study.

Purpose and Research Questions

The purpose of this article is to synthesize published research on digital transformation and sustainable business innovation in SMEs and to interpret that literature through strategic entrepreneurship. The review addresses three questions. First, how does the literature connect entrepreneurial opportunity recognition and strategic resource deployment with SME digital transformation? Second, what organizational and external conditions enable or constrain the relationship between digital adoption and innovation? Third, what practical and policy implications follow for supporting business resilience and sustainable innovation after the pandemic? The article contributes an interpretive framework that connects opportunity recognition with capability development, business model adaptation, and outcome evaluation. It also distinguishes the evidence reported in primary studies from conclusions developed through synthesis. Its recommendations are intended to inform decisions and future research; they are not experimentally validated interventions or estimates of a common performance effect.

Scope and Meaning of Sustainability

SME definitions vary across countries and studies. The review retains the populations described by the original researchers rather than imposing a common employee or revenue threshold retrospectively. Where a publication focuses on micro-enterprises, startups, or

entrepreneurial firms more broadly, that scope is identified and its findings are not assumed to represent the entire SME population.

In this article, sustainable business innovation refers to changes in products, services, processes, or business models that an enterprise can maintain while considering economic viability and environmental and social consequences. Business continuity, growth, resilience, and environmental sustainability are related but distinct outcomes. A firm that remains operational or increases sales has not necessarily reduced environmental harm or improved working conditions. Research on sustainable digital transformation and circular-economy enablers provides a basis for examining those wider outcomes separately (Martínez-Peláez et al., 2024; Santolin et al., 2023).

The post-pandemic focus concerns the implications of crisis-era adaptation for subsequent business strategy. It does not imply that all publications collected data after the pandemic or that the review measures conditions in 2026. Earlier theoretical research is used to interpret the published evidence, while pandemic-era and later studies provide the context for considering continuing adaptation.

THEORETICAL BACKGROUND AND RELATED LITERATURE

Digital Transformation and Digital Business Strategy

Digital transformation involves organizational change associated with digital technologies, rather than the installation of a single application. Vial's (2019) review provides a conceptual basis for understanding the interactions among technological change, organizational responses, and value creation. Kraus et al. (2022) likewise situate digital transformation within a broad business and management research field. These reviews support a wider understanding of transformation, but they should not be read as independent firm-level estimates of SME performance.

Bharadwaj et al. (2013) argue for integrating digital and business strategy, drawing attention to the scope, scale, speed, and sources of value associated with digital business. Matt et al. (2015) further discuss digital transformation strategies as an organizational concern. Together, these conceptual contributions suggest that technology decisions should be connected to the enterprise's business direction. An SME's transformation can consequently be assessed through changes in how it serves customers, organizes work, and captures value, rather than through the number of systems it purchases.

Legner et al. (2017) place digitalization within broader challenges for business and information systems. For this review, their contribution helps locate SME transformation within a wider organizational and technological environment. It does not establish that an approach designed for larger or more resource-rich organizations can be transferred unchanged to a smaller enterprise. The SME-specific literature remains necessary for understanding affordability, skills, and implementation capacity.

Strategic Entrepreneurship

Strategic entrepreneurship links the identification of opportunities with actions intended to build and sustain advantage (Hitt et al., 2011). Covin and Miles (1999), in a theoretical

discussion of corporate entrepreneurship, explain how innovation can contribute to organizational renewal and competitive positioning. Their work provides conceptual context; it is not a study of digital transformation in post-pandemic SMEs.

This perspective allows digital transformation to be interpreted as a sequence of strategic choices. Opportunity recognition concerns identifying a customer need or operational problem that a digital approach could address. Resource deployment concerns whether the firm can finance the change, develop or obtain the necessary skills, and adjust its routines. The pursuit of advantage concerns whether those changes create value that customers recognize and that the firm can maintain. These distinctions are useful because the discovery of an opportunity does not ensure the capacity to implement it.

Strategic entrepreneurship also helps explain why resource-constrained firms may adopt different approaches. A business may use an external platform to reach customers, collaborate with a technology provider, or develop a limited internal solution. None of these choices is inherently superior. Their value depends on the opportunity, the resources required, and the consequences for the firm's independence and future options. The review uses this reasoning to connect conceptual entrepreneurship research with published evidence on SME capabilities and transformation.

Resources and Dynamic Capabilities

The resource-based perspective directs attention to the assets, knowledge, and skills a firm can mobilize. Escoz Barragan and Becker (2025) use resource-based and dynamic-capability perspectives to examine digital orientation in SMEs. Their work illustrates how the performance implications of a digital strategy can depend on the firm's resource commitments and capability development. Resources should therefore be considered in relation to their use and organizational integration, rather than simply their availability.

Teece et al. (1997) explain dynamic capabilities in terms of integrating, building, and reconfiguring internal and external competencies in changing environments. Applied here, this framework helps interpret how an SME adjusts its routines and resource combinations when customer requirements or technologies change. Scuotto et al. (2021) add a microfoundational perspective to SME growth in the digital transformation era, directing attention to the underlying activities and capabilities through which organizational change occurs.

The distinction between resources and capabilities has practical implications. Access to software is a resource; the ability to use its output to improve a business decision is a capability. The latter depends on people, routines, and interpretation. This is an analytical distinction developed for the synthesis, not a newly measured relationship. It is consistent with examining digital transformation through organizational development rather than assuming that access to technology is sufficient.

Business Models and Innovation Ecosystems

Business model adaptation concerns changes in how an enterprise creates, delivers, and captures value. Felicetti et al. (2024) identify business model innovation, digital platforms, collaboration networks, and innovation ecosystems among the topics in their systematic

review of digital innovation in entrepreneurial firms. Their review concerns a broader entrepreneurial-firm population and provides a map of research themes, rather than direct evidence that a particular platform improves SME profitability.

Relationships with other organizations can influence transformation. Hofacker et al. (2020), in a conceptual examination of digital marketing and business-to-business relationships, highlight issues including value co-creation, innovation networks, power, and trust. Their discussion supports attention to the quality and terms of partnerships, not just their existence. Surya et al. (2021) examine SME productivity and open innovation, providing further context for considering innovation beyond the boundary of a single enterprise.

These perspectives suggest that partnership decisions should consider both access to resources and the resulting dependencies. The ability to obtain technical support, market access, or knowledge can be valuable, while unequal bargaining power can constrain future choices. These implications are interpretive recommendations from the literature. The present review does not quantify the benefits or risks of particular partnership arrangements.

REVIEW METHODOLOGY

Research Design and Evidence Base

This study is a narrative literature review with an interpretive thematic synthesis. It draws on the author's reported review of 45 published articles concerning digital transformation, entrepreneurship, innovation, and related business outcomes. The research uses published scholarship as its evidence base. It does not include primary interviews, surveys, experiments, or a newly assembled dataset of SMEs.

The original article inventory and contemporaneous search and screening records are unavailable. The reported figure of 45 therefore describes the scope of the author's original review and is not presented as an independently verified screening denominator. The reference list identifies the publications cited in the present synthesis; it does not reconstruct a complete inventory of the original 45 articles. The review makes no claim of exhaustive coverage, protocol registration, or compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses reporting framework. No identification or exclusion counts are asserted.

Scope and Source Selection

The substantive focus is the relationship among SME digital transformation, innovation, strategic entrepreneurship, and business resilience. Relevant empirical research is considered alongside conceptual papers and previously published reviews that explain these relationships. Earlier scholarship supplies theoretical context, while studies addressing the pandemic and subsequent adaptation inform the discussion of business implications. The review is not restricted to a 2020–2023 publication window.

Exact search dates, complete database search strings, a documented screening sequence, and reasons for individual exclusions are unavailable. Consequently, the review cannot establish that all eligible studies were identified or allow replication of the original

selection process. Source selection is acknowledged as narrative and relevance-based. Conclusions are bounded by the literature cited, and the absence of a study from the discussion is not evidence that it failed a predefined inclusion criterion.

Synthesis and Interpretation

The synthesis organizes the cited literature around the research questions and recurring subjects: strategic alignment, organizational capabilities, business model adaptation, implementation barriers, and external support. Findings are interpreted in relation to the type of publication and the population examined. Empirical observations are attributed to the original researchers; theoretical contributions are used to explain possible relationships; recommendations are developed as implications of the synthesis.

This interpretive organization is not presented as a formal coding protocol. No independent double screening, inter-rater agreement calculation, formal risk-of-bias assessment, or standardized quality score is claimed. Previously published reviews provide context and interpretation rather than additional independent observations of the firms included in their underlying studies. The synthesis does not calculate theme frequencies or count the same underlying evidence across reviews as separate confirmation.

Treatment of Quantitative Findings

Quantitative findings are discussed only as results reported by the original authors. The review does not pool effect sizes, recalculate correlations, test hypotheses, or estimate an average effect of digital transformation on SME performance. Differences in outcome definitions, settings, and research designs also prevent treating reported results as directly comparable measures.

For example, the reported relationship between digital orientation and performance in Escoz Barragan and Becker (2025) belongs to their empirical study. Likewise, statistical relationships reported by Leso et al. (2023) and Mishrif and Khan (2023) were estimated in those researchers' studies. Their methods do not make the present article a mixed-methods investigation. The review draws interpretive connections across published findings while retaining the distinction between association and causation.

Ethics and Transparency

The study uses published literature and involves no direct collection of personal information or engagement with human participants. Participant consent procedures, interview confidentiality arrangements, and primary-data ethics approvals are therefore not reported for this review. Where primary studies involved participants, responsibility for their procedures remains with the original researchers.

The ethical responsibilities of the present review concern accurate attribution, faithful interpretation, and clear disclosure of methodological limits. Unsupported numerical claims are not retained. The absence of search documentation is acknowledged rather than replaced with reconstructed screening counts. Declarations concerning funding,

conflicts of interest, data availability, and generative AI assistance appear after the conclusion.

FINDINGS FROM THE LITERATURE

Digital Adaptation and Business Continuity

The reviewed literature presents digital transformation as one possible response to disruption, while emphasizing that implementation conditions differ. Mishrif and Khan (2023) examine Omani logistics and supply-chain SMEs using survey and interview data from 2020–2021. Their findings connect technology use before and during the pandemic with future technology intentions and discuss adoption as a persistence strategy. Those findings concern the firms and period studied; future adoption intentions should not be treated as observed long-term innovation or financial returns.

Khurana et al. (2022) investigate digital transformation during a crisis through the lens of resilience as a dynamic capability within an entrepreneurial ecosystem. Their work supports interpreting adaptation as an organizational process involving the enterprise and its environment. It does not mean that resilience is reducible to the possession of a particular technology. The distinction is relevant after the immediate crisis, when firms must decide whether an emergency adaptation remains useful and how to incorporate it into continuing operations.

Bai et al. (2021) discuss pandemic digitization lessons for micro- and small enterprises through a literature review and the authors' insights. Their contribution connects technology with sustainable development and social-good considerations. It should be interpreted as a synthesis and argument, rather than as a controlled comparison of digital and nondigital firms. The present review uses it to broaden the discussion of adaptation beyond immediate commercial survival.

Organizational Learning and Leadership

Leso et al. (2023) use an exploratory sequential mixed-methods design, including expert interviews and a sample of 192 SMEs, to examine culture, structure, and leadership in digital transformation. Their study identifies relationships involving innovation culture, digital and entrepreneurial awareness, an experimental environment, and organizational arrangements. The results support attention to complementary organizational conditions, while also showing that not every proposed relationship was statistically supported.

The review interprets this evidence as a reason to examine how employees learn and how work is organized during transformation. Leadership can influence priorities, access to learning, and the conditions under which staff test changes. These are possible organizational mechanisms; the present article does not establish a direct causal effect of leadership on innovation. A distinction is also needed between perceived transformation performance and objectively measured financial or environmental outcomes.

Ghobakhloo and Iranmanesh (2021) develop a strategic guideline for manufacturing SMEs using a literature review and interpretive structural modeling. Their research identifies interdependent conditions for Industry 4.0 transformation and emphasizes the resource

intensity of the transition. It provides a planning contribution rather than proof that every identified determinant produces a quantified performance gain. Taken alongside the organizational evidence, it supports considering technical readiness and managerial capability together.

Digital Orientation and Uneven Performance Outcomes

Escoz Barragan and Becker (2025) analyze data from 1,135 SMEs, combining financial information with textual information from company websites. They report a U-shaped association between digital orientation and performance. The result belongs to that study and is not a statistical finding generated by the present review. It suggests that a simple expectation of uniformly positive returns from greater digital orientation is inadequate.

The study's cross-sectional design is particularly important for interpretation. The relationship across firms with different levels of digital orientation does not establish that every individual firm will experience a temporary decline followed by recovery. The finding also does not identify a universal threshold that managers can apply to another industry or country. Website text measures communicated orientation, which may differ from the full extent of operational practice.

A cautious managerial implication is to consider the resources and organizational changes needed to make a digital initiative workable. An initial performance difficulty warrants diagnosis of costs, capability gaps, and customer value. It is not sufficient evidence that further spending will necessarily produce a return. The synthesis therefore supports staged evaluation and context-sensitive decisions, rather than a promise that persistence alone guarantees success.

Business Model Adaptation and Customer Relationships

Felicetti et al. (2024) map research on digital innovation in entrepreneurial firms and identify several connected topics, including business models, platforms, and ecosystems. This provides a basis for interpreting innovation as a change in business relationships and value creation, as well as in technology. The broader scope of entrepreneurial firms means that the review's conclusions require further examination in established SMEs with different resource profiles.

Digital customer relationships also involve questions of coordination, trust, and power. Hofacker et al. (2020) discuss these issues within business-to-business marketing. For SMEs, the review interprets their contribution as a reason to assess how a digital arrangement affects relationships with customers and partners. Greater visibility or easier communication may be useful, but these possibilities do not establish changes in customer loyalty, sales, or profitability without appropriate evidence.

Ragazou et al. (2022) use bibliometric analysis to examine digital transformation research on SMEs during and around the pandemic. Their work identifies research activity and emerging topics. Bibliometric findings are useful for locating the scholarly discussion; they do not establish that firms adopting blockchain, artificial intelligence, or another emerging technology achieved a particular operational benefit. This review therefore avoids

treating the prominence of a technology in the literature as evidence of its suitability for all SMEs.

Resource Constraints and External Support

Chen et al. (2021) use qualitative interviews to investigate barriers and government roles in small service-business transformation. They identify funding, digital capability, human resources, and technical barriers. Their proposed government roles include digital platforms, payment support, training, and collaboration ecosystems. The contribution offers context-specific evidence about barriers and proposed support, rather than a causal evaluation of a government program.

Skare et al. (2023) examine European SME digital transformation using Digital Economy and Society Index data. Their comparative approach adds a wider contextual perspective to research focused on individual firms. Differences in measurement and level of analysis mean that results from such studies should not be combined mechanically with interview accounts or company-level performance relationships. National digital conditions and a firm's capacity to use technology are related analytical concerns, but they are not interchangeable measures.

Hokmabadi et al. (2024), in a systematic review of small businesses and startups, connect digital transformation, resilience, and marketing capabilities. Their synthesis reinforces the need to consider skills, knowledge, and the business environment alongside adoption. It also identifies unresolved questions about long-term effects and differences across settings. The present review treats that contribution as a map of existing evidence and gaps, without counting its underlying studies as new independent data.

Sustainability Beyond Business Survival

Martínez-Peláez et al. (2024) present a framework for sustainable digital transformation, supported by a literature review and a case study. Their contribution places sustainability objectives and stakeholder considerations within transformation planning. A framework and a single case provide useful guidance, but they do not establish that digital transformation generally improves environmental or social performance across SMEs.

Santolin et al. (2023) examine circular-economy enablers in SMEs and highlight digital technologies in relation to other enablers. Their work supports considering how digital capabilities might contribute to resource use and circular practices. The outcome under examination remains different from short-term revenue or business continuity. This distinction prevents a positive financial result from being treated as sufficient evidence of a sustainability benefit.

For the present synthesis, sustainable innovation therefore requires attention to the outcome that a firm seeks to change. A proposed efficiency improvement should be assessed through an appropriate operational measure; an environmental claim requires relevant resource or impact evidence; a social claim requires evidence about the people affected. These measurement recommendations are derived from the distinction among outcomes. They are not results of new tests conducted in this article. Table 1 summarizes selected sources and the limits of the evidence they provide.

DISCUSSION AND INTERPRETIVE FRAMEWORK

Connecting Opportunity Recognition with Sustainable Innovation

The literature supports interpreting digital transformation as a relationship among opportunity, resources, organizational change, and outcomes. Strategic entrepreneurship explains why leaders search for opportunities and seek an advantage; dynamic capabilities explain how organizations reconfigure competencies; digital business strategy and business model research explain how technology relates to value creation. The present article brings these perspectives together as an interpretive framework. It does not claim that the framework has been empirically validated.

The proposed framework begins with a business opportunity or problem. Leaders then assess the capability and resource requirements of a possible digital response. Implementation involves adjustments to work, learning, and relationships, which may lead to changes in the business model or operating process. Outcome evaluation informs whether the initiative should be retained, revised, expanded, or discontinued. This sequence is an analytical proposal for organizing decisions. It is not a universal maturity model, and firms may revisit earlier decisions as conditions change.

An important implication is that technology adoption and innovation should be assessed separately. Adoption concerns whether a tool is introduced and used. Innovation concerns the substantive change in a product, service, process, or model. Sustainable innovation adds the question of whether that change remains viable and how it affects environmental and social objectives. Separating these stages makes it possible to examine an initiative that is technically implemented but has yet to demonstrate a business or sustainability outcome.

Propositions for Future Empirical Investigation

Three propositions follow from the synthesis and are offered for future testing. The first is that the relationship between digital adoption and innovation is likely to depend on the alignment between the technology and the enterprise's business objectives. This proposition connects digital business strategy with opportunity seeking and resource deployment. It remains to be tested with clearly defined measures of adoption, alignment, and innovation.

The second proposition is that organizational learning and the reconfiguration of routines may help explain differences in the outcomes of similar digital investments. Evidence on organizational conditions motivates this possibility, but the review does not establish a mediation effect. Longitudinal research could examine whether changes in capabilities precede changes in performance and how these relationships vary by firm size and sector.

The third proposition is that external support is likely to be more useful when it addresses the firm's specific implementation constraints. Funding alone may leave a skills problem unresolved, while training may have limited practical value when connectivity is inadequate. This is an interpretation of the identified barriers, not an estimated policy effect. Comparative evaluations are needed to establish which combinations of support work, for whom, and under what conditions.

Interpreting Conflicting or Limited Evidence

The review does not support a single estimate of the effect of digital transformation on SME performance. Studies differ in the technologies examined, definitions of SMEs, outcomes, countries, and research designs. Conceptual work explains potential mechanisms, qualitative studies describe experiences, quantitative studies estimate relationships, and reviews organize existing scholarship. Their contributions are complementary, but they cannot be treated as equivalent observations.

The apparent tension between positive accounts of adaptation and evidence of uneven performance is therefore informative. A technology can help sustain operations during an emergency without delivering a continuing competitive advantage. A firm can become more digitally oriented while incurring costs or adjusting its routines. A useful innovation can improve commercial outcomes without demonstrating environmental or social benefits. These are distinctions that future studies and management evaluations should preserve.

IMPLICATIONS FOR PRACTICE AND POLICY

Practical Recommendations for SME Leaders

SME leaders should begin with a clearly defined business problem and identify an outcome that can be assessed. The proposed process connects the opportunity-seeking perspective of strategic entrepreneurship with the integration of digital and business strategy (Hitt et al., 2011; Bharadwaj et al., 2013). For example, reducing order-processing delays and developing a new online service are different objectives and require different evidence of success. These examples illustrate the recommended approach and do not describe firms investigated by this review.

A capability assessment should consider employees' skills, existing processes, available funding, and the support required for implementation. Evidence on organizational conditions and transformation readiness suggests that the purchase decision is only one part of the work (Leso et al., 2023; Ghobakhloo & Iranmanesh, 2021). Leaders can use a limited pilot to examine adoption, workflow changes, and costs before expanding the initiative. A pilot is recommended here as a practical decision method; the review does not establish its superiority through comparative testing.

Evaluation should include continuing operating costs and the ability to maintain the change. Leaders should agree on a review point and criteria for revising, expanding, or stopping an initiative. The nonlinear performance relationship reported by Escoz Barragan and Becker (2025) supports caution about assumed immediate returns. It does not justify continuing an investment regardless of evidence. Managers need to distinguish a remediable implementation problem from an initiative that no longer serves the business.

Learning and Partnerships

Employee learning should be connected to the work that a digital initiative changes. General awareness is useful, but staff also need opportunities to practice the relevant tasks, identify problems, and contribute to revised routines. Research on organizational culture and digital

transformation supports attention to the conditions for experimentation and learning (Leso et al., 2023). Leaders should assess whether the new routines are understood and usable rather than relying solely on the completion of training.

Partnerships should address a defined capability gap. Depending on the context, an SME may need technical implementation support, market knowledge, or assistance evaluating a business model. The literature on entrepreneurial innovation ecosystems and business-to-business relationships supports considering the terms of collaboration as well as access to expertise (Felicetti et al., 2024; Hofacker et al., 2020). The review recommends examining responsibilities, ongoing costs, information access, and dependence on partners. These considerations are decision criteria, not claims about the effectiveness of a specific arrangement.

Policies that Support Implementation

Policy support should respond to the barriers identified in the relevant business population. Chen et al. (2021) distinguish funding, capability, staffing, and technical barriers in small service businesses. Their findings suggest that a program focused on purchasing technology may be incomplete if firms cannot implement or maintain it. Practical assistance can connect access to tools with skills development and the organizational work needed to use them.

Infrastructure and digital skills also warrant attention beyond individual firms. The comparative perspective of Skare et al. (2023) encourages consideration of the wider digital environment. Policymakers could assess connectivity, access to support, and the reach of training before assuming that firms have equivalent opportunities to participate. This is a recommendation for policy design and evaluation, rather than a claim that a particular infrastructure intervention has a measured effect in the present review.

Public support programs should distinguish participation from outcomes. The number of firms receiving assistance or purchasing a system does not establish continuing use, innovation, or resilience. An evaluation could examine whether the supported change remains in use, whether it addresses the original problem, and whether the costs are manageable. Comparisons with suitable baseline or comparison groups would help assess additional effects, while transparent reporting of unsuccessful implementations would reduce an exclusive focus on success stories.

Sustainability Objectives and Accountability

Business support should avoid treating digital adoption as an automatic sustainability achievement. If a program seeks environmental or social benefits, it should specify those objectives and select measures that correspond to them. Framework research on sustainable digital transformation and evidence on circular-economy enablers provide reasons to integrate these objectives into planning (Martínez-Peláez et al., 2024; Santolin et al., 2023). They do not remove the need to assess results in the firms receiving support.

Leaders and policymakers should also consider who benefits from a proposed change and who bears its costs. This recommendation follows the article's definition of sustainable business innovation and its attention to stakeholder outcomes. It calls for explicit evaluation

rather than assuming that greater efficiency, sales, or technological sophistication necessarily produces benefits across all dimensions of sustainability.

LIMITATIONS AND FUTURE RESEARCH

Limitations of the Review

The absence of retained search records and a separate inventory of the original 45 articles is the principal methodological limitation. The review cannot reproduce the original search, establish an auditable selection flow, or demonstrate that the literature represents all relevant evidence. Its narrative design creates a risk of selective interpretation and limits claims about the prevalence of particular findings. The reported original scope should not be used as a denominator for percentages or a basis for claims of systematic coverage.

The evidence also varies substantially across populations and designs. Research on micro-enterprises, startups, established SMEs, and manufacturing or service firms addresses different circumstances. Findings from one country or sector may not apply elsewhere. Earlier conceptual research supports interpretation but does not supply evidence about pandemic-era outcomes. Some publications are themselves reviews, creating potential overlap with primary studies. This article therefore does not count agreement among publications as a measure of independent empirical confirmation.

No formal quality appraisal, quantitative synthesis, or new empirical test was conducted. The review cannot determine a common causal effect of digital transformation or validate the proposed framework. It also does not provide a comprehensive update of research published through 2026. Its contribution is a bounded synthesis of the cited literature, with explicit distinctions among evidence, interpretation, and recommendations.

Directions for Future Research

Future research should document the search and selection process prospectively. A systematic review could retain an article inventory, complete search strings, search dates, exclusion reasons, and a method appropriate for assessing study quality. Such a review would help establish whether the themes identified here persist across a more comprehensive and reproducible evidence base. It should distinguish primary studies from reviews and account for overlapping evidence.

Longitudinal firm-level studies are needed to examine how capability development and digital investment relate to subsequent performance. The nonlinear relationship reported by Escoz Barragan and Becker (2025) makes it especially important to distinguish differences across firms from changes within the same firm over time. Studies should also distinguish technology adoption intentions from observed implementation and sustained use.

Comparative research could investigate how firm size, industry, digital readiness, and external support influence innovation outcomes. Evaluations of support programs should examine whether the assistance resolves identified barriers and produces additional benefits beyond what firms would otherwise achieve. Measures should distinguish commercial performance, resilience, environmental impact, and social outcomes. The

propositions developed in this article provide starting points for that work, while remaining open to revision or rejection through empirical evidence.

CONCLUSION

Digital transformation offers SMEs opportunities to adapt their operations and business models, but the reviewed literature does not support an automatic or universal performance benefit. Strategic entrepreneurship provides a useful lens for connecting digital opportunity recognition with resource deployment and the pursuit of advantage. Organizational learning, implementation capacity, and the wider support environment help explain why the same broad technology category may produce different results in different enterprises.

The contribution of this narrative review is an interpretive framework that links opportunity recognition, capability development, business model adaptation, and outcome evaluation. It also preserves the distinction between findings reported by original researchers and recommendations developed through synthesis. Sustainable business innovation requires attention to maintainable commercial value and to environmental and social consequences, with evidence suited to each outcome.

For SME leaders, the central practical implication is to assess digital initiatives through the business problem they address and the capabilities needed to maintain them. For policymakers, the implication is to connect access to technology with implementation support and outcome evaluation. These recommendations warrant further empirical testing. The review's methodological limitations constrain the strength of its conclusions, while identifying a clear need for documented reviews, longitudinal studies, and comparative evaluations.

DECLARATIONS

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Conflicts of Interest

The author declares no conflicts of interest.

Data Availability

No new data were created or analyzed for this study. This article is based on published literature, and all sources used in the synthesis are included in the reference list. Data sharing is not applicable.

Author Contributions

Duvalier Malone is the sole author and is responsible for the conceptualization, literature review, interpretation, and final manuscript.

Ethics and Consent

The review involved published literature and no direct recruitment of human participants or collection of identifiable personal data. No participant consent procedures were undertaken for this review.

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Table 1: Selected literature informing the synthesis

Source	Design or scope	Contribution and interpretation limit
Bartik et al. (2020)	Survey of more than 5,800 small businesses	Documents early pandemic disruption and financial fragility; does not test digital transformation.
Mishrif and Khan (2023)	Survey and interviews in Omani logistics and supply-chain SMEs	Examines pandemic technology use and future intentions; sector and country limit transferability.
Leso et al. (2023)	Exploratory sequential mixed methods; 192-SME quantitative sample	Examines culture, structure, and leadership; not all hypothesized relationships are supported.
Escoz Barragan and Becker (2025)	Financial and website-text data from 1,135 SMEs	Reports a U-shaped performance association; cross-sectional evidence does not establish a universal time path.
Ghobakhloo and Iranmanesh (2021)	Literature review and interpretive structural modeling	Proposes a manufacturing transformation guideline; does not estimate a universal performance effect.
Felicetti et al. (2024)	Systematic review of entrepreneurial-firm research	Maps innovation themes; broader population and potential overlap with primary studies require care.
Chen et al. (2021)	Qualitative interviews in small service businesses	Identifies barriers and government roles; does not causally evaluate support programs.
Martínez-Peláez et al. (2024)	Literature review, framework, and case study	Integrates sustainability objectives into transformation; limited basis for generalization across SMEs.

Note. This author-created table summarizes selected studies central to the synthesis. It is illustrative rather than exhaustive and does not constitute a formal quality appraisal. Findings and methods are attributed to the original publications.