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Digital Transformation and Innovation Capability as Determinants of Sustainable SME Performance: The Mediating Role of Organizational Agility

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Abstract. *Small and medium-sized enterprises (SMEs) face growing pressure to respond to rapid digitalization, market uncertainty, and sustainability demands. This study examines the effects of digital transformation and innovation capability on sustainable SME performance and evaluates the mediating role of organizational agility. A quantitative explanatory design was employed using a cross-sectional survey of 200 SME owners and managers in Indonesia selected through purposive sampling. Data were collected through a five-point Likert-scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling. The measurement model was evaluated through indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, while the structural model was assessed using path coefficients, explanatory power, effect sizes, predictive relevance, and bootstrapping. The findings demonstrate that digital transformation and innovation capability positively affect organizational agility and sustainable SME performance. Organizational agility also has a positive effect on sustainable performance and partially mediates the effects of digital transformation and innovation capability. These results indicate that digital technologies and innovative practices generate stronger economic, environmental, and social outcomes when supported by market sensing, rapid decision-making, flexible coordination, and resource reconfiguration. The study contributes to management and dynamic capability research by clarifying the organizational mechanism that converts digital and innovative resources into sustainable performance. SME managers should therefore integrate digital investment and innovation development with agile organizational practices to strengthen adaptability, competitiveness, resilience, and long-term sustainability.*

Keywords: *Digital transformation; Innovation Capability; Organizational Agility; SMEs; Sustainable Performance.*

1. INTRODUCTION

Small and medium-sized enterprises (SMEs) are facing increasingly complex pressures arising from accelerated digitalization, market uncertainty, and sustainability demands. In a VUCA business environment, maintaining conventional operating patterns is no longer sufficient because technological change, consumer behavior, and competition develop rapidly. Digital transformation enables SMEs to automate processes, integrate information, expand customer interactions, and support data-driven decision-making. However, its implementation is frequently constrained by limited resources, digital competencies, infrastructure, and organizational readiness (Gebauer et al., 2022). Ghobakhloo and Iranmanesh (2021) emphasized that successful digital transformation in SMEs requires a strategic direction that connects technology with business objectives rather than merely acquiring digital tools. At the same time, SMEs are expected to achieve economically, socially, and environmentally sustainable performance. Digitalization must therefore be understood as a means of

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strengthening competitiveness, resilience, and long-term sustainability. These conditions make the relationships among digital transformation, innovation capability, organizational agility, and sustainable performance increasingly important within contemporary management and business research.

The literature indicates that digital transformation can improve operational efficiency, customer relationships, decision-making speed, and growth opportunities for SMEs (Asa et al., 2026). Innovation capability also contributes to the development of products, services, processes, and business models that correspond with changing market needs. Al-kalouti et al. (2020) found that innovation capability is associated with improved organizational performance, while Goni and Van Looy (2022) identified process innovation as an important capability for improving less-structured business activities. However, evidence concerning the pathways connecting digitalization and innovation with sustainable SME performance remains fragmented. Recent studies have primarily addressed direct effects, digital maturity, or the determinants of technology adoption without fully explaining how these capabilities are converted into sustainability outcomes (Le et al., 2026). The novelty of this study lies in positioning organizational agility as a mediating mechanism that integrates digital transformation and innovation capability. This model extends the dynamic capabilities perspective by explaining how SMEs sense changes, reallocate resources, and respond to market opportunities to achieve sustainable performance.

Based on this research gap, the study aims to examine the direct and indirect effects of digital transformation and innovation capability on sustainable SME performance through organizational agility. Digital transformation is positioned as a strategic capability for integrating technology into business processes, customer interactions, and decision-making, whereas innovation capability reflects the ability to create and implement improvements in products, services, processes, and business models. Organizational agility is viewed as the capability of SMEs to recognize environmental changes, make rapid decisions, and flexibly adjust their resources. This position is supported by Jing et al. (2023), who demonstrated the relationships among digital competence, organizational agility, and green innovation performance. Accordingly, this study addresses whether digital transformation influences organizational agility and sustainable SME performance; whether innovation capability affects organizational agility and sustainable SME performance; whether organizational agility improves sustainable performance; and whether organizational agility mediates both relationships. Examining these questions is expected to provide a more comprehensive

empirical explanation of how SMEs convert digital investment and innovative capability into continuous economic, social, and environmental benefits.

This study argues that digital technologies and innovation do not automatically generate sustainable performance unless SMEs can translate them into rapid and purposeful organizational responses. Digital transformation provides information, connectivity, and efficiency, while innovation capability generates alternative solutions to changing market conditions. Organizational agility subsequently connects these capabilities through opportunity sensing, decision-making speed, process flexibility, and resource reconfiguration. This argument is consistent with the view that digital transformation must develop organizational dynamic capabilities to create strategic value (Kohli et al., 2025). Theoretically, this study proposes an integrated model that clarifies the mediating role of organizational agility in the relationships among digital transformation, innovation capability, and sustainable SME performance. Empirically, it extends SME sustainability research by explaining the internal mechanisms underlying performance creation (Le et al., 2026). Practically, the findings are expected to assist SME owners and managers in prioritizing technology investment, innovation development, flexible work structures, and adaptive decision-making. They may also support governments and business-support institutions in designing SME digitalization programs oriented toward long-term resilience and sustainability.

2. LITERATURE REVIEW

Digital Transformation in SMEs

Digital transformation refers to the strategic integration of digital technologies into business processes, organizational structures, customer interactions, and value-creation activities. In SMEs, digital transformation extends beyond the adoption of individual technologies because it requires coordinated changes in operational routines, managerial practices, employee capabilities, and business models. Ghobakhloo and Iranmanesh (2021) emphasized that successful digital transformation requires SMEs to align technological investment with organizational strategy and operational requirements. This alignment enables digital technologies to generate business value rather than function merely as administrative tools. Similarly, Kargas et al. (2026) explained that SME digital transformation develops through interconnected stages involving technological adoption, process integration, organizational readiness, and strategic adaptation. Therefore, digital transformation should be understood as an organizational change process that combines technology, people, processes, and strategic direction.

The adoption of digital technologies enables SMEs to automate routine activities, integrate information, reduce operational costs, and improve productivity. Digital platforms also allow firms to access broader markets, develop closer customer relationships, and provide services that respond more effectively to changing consumer expectations. At the managerial level, real-time information and data analytics improve the accuracy and speed of decision-making. Alsmadi et al. (2026) demonstrated that firm digitalization can strengthen performance when supported by appropriate organizational and risk-management mechanisms. Digital transformation can also improve competitiveness and financial growth by expanding market access and enhancing organizational efficiency (Kumar et al., 2026). However, these benefits depend on digital literacy, technological readiness, financial resources, employee competence, and a culture that supports organizational change. SMEs with limited infrastructure and managerial capability may experience difficulties integrating digital technologies into their core activities (Gebauer et al., 2022).

Innovation Capability

Innovation capability represents an organization's ability to generate, evaluate, develop, and implement new ideas in the form of products, services, processes, marketing practices, or business models. For SMEs, this capability is essential because limited resources require them to identify creative and efficient approaches to meeting market demands. Innovation capability is not limited to research and development activities; it also includes knowledge acquisition, employee involvement, organizational learning, experimentation, and the commercialization of new ideas. Al-kalouti et al. (2020) found that innovation capability improves organizational performance by supporting service development, process improvement, and value creation. Evidence from manufacturing enterprises similarly indicates that firms capable of converting knowledge and ideas into practical innovations achieve stronger operational and market performance (Hung et al., 2020).

Digital transformation can strengthen innovation capability by providing access to information, analytical tools, digital collaboration, and more flexible production systems. These resources enable SMEs to identify customer needs, experiment with alternative solutions, and shorten product-development cycles. Process innovation is particularly important because it allows firms to redesign inefficient activities and improve the coordination of less-structured business processes (Goni & Van Looy, 2022). Furthermore, digital transformation and innovation capability can jointly support environmental, social, and governance performance by enabling cleaner production, efficient resource utilization, and

more responsive stakeholder management (Chen & Wang, 2024). Innovation capability consequently provides SMEs with a foundation for differentiation, adaptability, and sustainable competitive advantage. Its performance benefits, however, depend on whether the organization can rapidly mobilize its innovative resources in response to emerging opportunities and threats.

Organizational Agility

Organizational agility refers to an organization's ability to detect environmental changes, make timely decisions, and rapidly reconfigure its resources, processes, and strategies. This capability is increasingly important in business environments characterized by volatility, uncertainty, complexity, and ambiguity. Organizational agility enables SMEs to recognize changes in customer preferences, competitor behavior, technology, and regulations before these changes significantly disrupt existing operations. Mrugalska and Ahmed (2021) described organizational agility as a multidimensional capability involving responsiveness, flexibility, speed, and technological integration. Werder et al. (2021) further explained that agility requires complementary capabilities across strategic, operational, and technological dimensions. Thus, agility is not simply the ability to act quickly but the capacity to respond accurately and coherently to environmental changes.

Organizational agility comprises several interrelated elements, including market sensing, rapid decision-making, resource flexibility, cultural adaptability, and digital integration. Market sensing enables SMEs to recognize emerging opportunities and threats, while rapid decision-making allows managers to formulate appropriate responses. Resource flexibility supports the reallocation of financial, human, and technological resources toward activities with greater strategic value. Cultural adaptability encourages continuous learning, experimentation, and openness to change. Franco et al. (2024) identified organizational agility as a source of competitive advantage because it helps firms align internal capabilities with changing market conditions. In fast-growing ventures, agility also supports the balance between expansion, organizational coordination, and market responsiveness (Hagen et al., 2024). Consequently, agile SMEs are better positioned to utilize digital technologies and innovation capabilities effectively rather than allowing these resources to remain disconnected from strategic execution.

Sustainable SME Performance

Sustainable SME performance reflects an organization's ability to achieve balanced economic, environmental, and social outcomes while maintaining long-term business continuity. The economic dimension concerns profitability, productivity, market growth, competitiveness, and stakeholder value creation. The environmental dimension includes

energy efficiency, waste reduction, responsible resource utilization, emissions control, and compliance with environmental standards. The social dimension encompasses employee welfare, ethical business practices, customer responsibility, community involvement, and positive relationships with other stakeholders. Sukuntho and Pankham (2025) emphasized that SME sustainability requires an integrated framework because business survival cannot be separated from environmental responsibility, organizational resilience, and social value creation.

Sustainable performance differs from short-term financial performance because it evaluates whether an SME can maintain its competitiveness without undermining future resources or stakeholder interests. SMEs may encounter difficulties implementing sustainability practices because of limited capital, knowledge, technology, and managerial capacity. Nevertheless, sustainable competitiveness can be strengthened through strategic practices that align operational efficiency, innovation, stakeholder interests, and environmental responsibility (Ghag et al., 2024). Digital orientation also contributes to sustainable performance by improving information use, resource efficiency, and organizational responsiveness (Li & Zhang, 2026). Moreover, digital transformation can support the achievement of sustainable development objectives when technological initiatives are deliberately connected to environmental and social priorities (Verhovnik et al., 2026). Sustainable SME performance therefore depends on the effective combination of technological, innovative, and organizational capabilities.

Relationships Among the Research Constructs

Digital Transformation and Organizational Agility

Digital transformation provides the information infrastructure, connectivity, automation, and analytical capacity required for organizations to recognize and respond to market changes. Integrated digital systems reduce information fragmentation and allow decision-makers to access operational and market data more rapidly. Digital tools also improve communication across organizational functions, thereby supporting faster coordination and resource reconfiguration. Ciampi et al. (2022) described digitalization and organizational agility as co-evolving capabilities because digital technologies facilitate agile responses, while organizational agility helps firms continuously adjust their digital resources. A digital transformation framework based on dynamic capabilities similarly positions technology as a mechanism for strengthening sensing, learning, integration, and organizational responsiveness

(Kohli et al., 2025). Accordingly, SMEs with stronger digital transformation are expected to possess greater organizational agility.

H1: Digital transformation has a positive effect on organizational agility.

Innovation Capability and Organizational Agility

Innovation capability enables SMEs to generate alternative products, processes, and business models when existing approaches no longer correspond with market conditions. This capacity supports organizational agility because firms with stronger innovation capabilities can respond to environmental changes through experimentation and rapid solution development. Innovation also creates organizational knowledge that improves the ability to evaluate emerging opportunities and adjust business activities. Shaikh (2024) argued that agility and innovation potential jointly transform organizational structures and processes by encouraging flexibility, learning, and responsiveness. Although innovation capability provides potential solutions, organizational agility determines how rapidly these solutions can be selected, implemented, and scaled. Their relationship is therefore complementary: innovation capability expands the range of possible responses, while agility accelerates their organizational application.

H2: Innovation capability has a positive effect on organizational agility.

Organizational Agility and Sustainable SME Performance

Organizational agility allows SMEs to maintain performance by adjusting their strategies and operations when market, technological, social, or environmental conditions change. Agile firms can identify inefficiencies, redirect resources, and implement timely responses before external disruptions threaten organizational continuity. Agility can also improve sustainable performance by helping firms adopt environmentally responsible processes, respond to stakeholder expectations, and exploit emerging green-market opportunities. Jing et al. (2023) demonstrated that organizational agility plays an important role in connecting digital competence with green innovation performance. Organizational agility also strengthens market performance by enabling firms to combine rapid responses with knowledge absorption and international-market adaptation (Cho et al., 2023). These findings indicate that agility supports not only immediate responsiveness but also long-term competitiveness and organizational resilience.

H3: Organizational agility has a positive effect on sustainable SME performance.

Digital Transformation and Sustainable SME Performance

Digital transformation can directly improve sustainable SME performance by increasing efficiency, reducing operating costs, enhancing market access, and supporting data-

driven decision-making. Digital systems may also help SMEs monitor resource use, reduce waste, improve transparency, and coordinate sustainability-related activities. Chen and Wang (2024) found that digital transformation contributes to ESG performance by strengthening the organizational capabilities required to implement sustainable practices. A systematic review by Le et al. (2026) similarly indicated that digital transformation can support SME sustainable development, although its benefits depend on organizational context and implementation mechanisms. Therefore, digital transformation is expected to improve the economic, environmental, and social dimensions of SME performance when digital initiatives are aligned with strategic sustainability objectives.

H4: Digital transformation has a positive effect on sustainable SME performance.

Innovation Capability and Sustainable SME Performance

Innovation capability supports sustainable performance by enabling SMEs to develop products, processes, and business models that create economic value while responding to environmental and social challenges. Product innovation may provide more sustainable alternatives for consumers, whereas process innovation can reduce resource consumption, production costs, and waste. Business-model innovation enables SMEs to identify new sources of value and develop market approaches consistent with changing stakeholder expectations. Al-kalouti et al. (2020) confirmed that innovation capability contributes to improved organizational performance through more effective value creation. Chen and Wang (2024) further demonstrated that innovation capabilities can support ESG performance in manufacturing SMEs. Consequently, SMEs with stronger innovation capabilities are more likely to maintain competitiveness, improve operational continuity, and achieve balanced sustainability outcomes.

H5: Innovation capability has a positive effect on sustainable SME performance.

The Mediating Role of Organizational Agility

The direct adoption of digital technologies does not necessarily produce sustainable performance because SMEs may lack the ability to convert digital information and infrastructure into timely organizational action. Organizational agility provides this conversion mechanism by allowing firms to sense changes, interpret digital information, accelerate decisions, and reconfigure resources. Iplik and Ülbeği (2022) positioned organizational agility as an important intermediary through which digital transformation improves organizational performance. Rizana et al. (2025) similarly proposed that digital dynamic capabilities and digital transformation enhance sustainability performance by strengthening organizational

agility. These arguments indicate that digital transformation contributes more effectively to sustainable performance when it improves the SME's capacity to respond flexibly to market and sustainability demands.

H6: Organizational agility mediates the effect of digital transformation on sustainable SME performance.

Organizational agility may also mediate the relationship between innovation capability and sustainable SME performance. Innovation capability generates ideas and alternative solutions, but its performance value depends on the organization's ability to implement them quickly and appropriately. Agile SMEs can prioritize viable innovations, coordinate implementation, and adjust resources according to market feedback. Bennett et al. (2025) demonstrated the close interdependence among organizational agility, digital innovation capability, and organizational performance, although the direction of mediation examined in their context differs from the present model. This evidence supports the broader argument that agility and innovation operate as complementary organizational capabilities. In the proposed framework, innovation capability provides the content of organizational responses, whereas agility facilitates the speed, flexibility, and effectiveness of their execution.

H7: Organizational agility mediates the effect of innovation capability on sustainable SME performance.

Conceptual Synthesis

The proposed framework positions digital transformation and innovation capability as strategic antecedents of sustainable SME performance, with organizational agility serving as the principal mediating mechanism. Digital transformation provides technological connectivity, real-time information, automation, and analytical support. Innovation capability allows SMEs to develop new products, processes, services, and business models. Organizational agility integrates these resources by supporting environmental sensing, rapid decision-making, organizational flexibility, and resource reconfiguration. Sustainable performance emerges when these capabilities collectively generate long-term economic value, environmental responsibility, and social benefits. This framework therefore explains not only whether digital transformation and innovation capability influence sustainable performance but also how their effects are transmitted through organizational agility.

3. RESEARCH METHOD

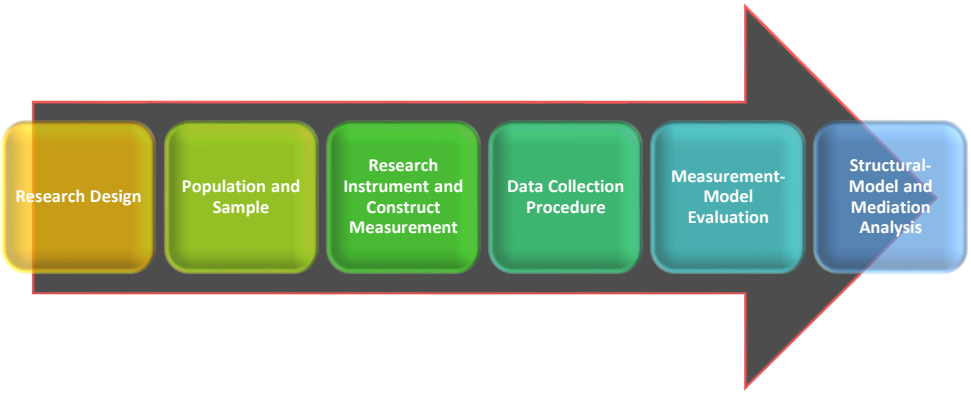


Figure 1. The structure of the research flow diagram.

Research Design

This study employed a quantitative approach with an explanatory research design to test the relationships among digital transformation, innovation capability, organizational agility, and sustainable SME performance. Digital transformation and innovation capability were specified as exogenous constructs, organizational agility as the mediating construct, and sustainable SME performance as the endogenous construct. The unit of analysis was an SME represented by an owner or manager who understood its strategic and operational activities. Data were collected through a cross-sectional survey to obtain standardized information from respondents at one point in time. The research stages included instrument development, preliminary testing, questionnaire distribution, data screening, measurement-model evaluation, structural-model evaluation, and mediation analysis. This design enabled the study to explain both the direct effects of digital and innovation capabilities on sustainable performance and their indirect effects through organizational agility.

Population and Sample

The study population consisted of owners and managers of SMEs operating in Indonesia. Respondents were selected through purposive sampling because the research required individuals with sufficient knowledge of organizational strategy, technology adoption, innovation, and business performance. Eligible respondents had to be an owner or manager involved in decision-making, represent an SME operating for at least two years, and confirm the use of at least one digital technology in operations, marketing, finance, or customer service. The study targeted at least 200 valid responses to support estimation of the proposed PLS-SEM model. Only one response was accepted from each SME to avoid duplicated assessments. SMEs from manufacturing, trade, and service sectors were included. Questionnaires with

substantial missing data, ineligible respondents, duplicated entries, or uniform response patterns were excluded from the final analysis.

Research Instrument and Construct Measurement

Data were collected using a structured questionnaire consisting of respondent characteristics and measurement items for the four constructs. Each item was assessed on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Digital transformation was measured through digital-technology integration, process digitalization, customer interaction, and data-based decision-making. Innovation capability included product or service, process, marketing, and business-model innovation. Organizational agility was measured through market sensing, decision speed, resource flexibility, coordination, and organizational responsiveness. Sustainable SME performance covered economic, environmental, and social outcomes, including business growth, operational continuity, resource efficiency, employee welfare, and stakeholder value creation. All constructs were specified as reflective because their indicators represented manifestations of the corresponding capabilities or performance dimensions. Higher scores indicated stronger levels of the constructs evaluated in the study.

Data Collection Procedure

Before the main survey, the questionnaire was reviewed to ensure clarity, relevance, and consistency with the conceptual definition of each construct. A pilot test involving 30 SME owners or managers was conducted to identify ambiguous statements, response difficulties, and excessive completion time. Feedback was used to refine the questionnaire without changing its conceptual coverage. The final instrument was distributed online and directly to eligible respondents to accommodate SMEs with different levels of digital access. Participants received information about the research purpose, voluntary participation, confidentiality, and academic use of the collected data. Returned questionnaires were screened for eligibility, missing values, duplicated submissions, unreasonable completion times, and suspicious response patterns. Valid responses were coded consistently before analysis. Descriptive statistics were then used to summarize respondent profiles, SME characteristics, and the distribution of scores for each research construct.

Measurement-Model Evaluation

The data were analyzed using PLS-SEM with SmartPLS 4. Measurement-model evaluation began with indicator reliability, assessed through outer loadings, with values of at least .70 considered preferable. Indicators loading between .40 and .70 were removed only when their exclusion improved construct quality without reducing content validity. Internal

consistency reliability was evaluated using Cronbach's alpha, rho_A, and composite reliability, with acceptable values ranging from .70 to .95. Convergent validity was established when the average variance extracted for each construct reached at least .50. Discriminant validity was assessed using the heterotrait-monotrait ratio and supported by an examination of cross-loadings. Heterotrait-monotrait values below .85 indicated strong discriminant validity, while values below .90 remained acceptable for conceptually related constructs. Structural-model testing proceeded only after all measurement-model requirements were adequately satisfied.

Structural-Model and Mediation Analysis

Structural-model evaluation included collinearity, path significance, explanatory power, effect size, predictive relevance, and mediation testing. Inner variance inflation factor values below 3 were preferred, although values below 5 remained acceptable. Hypothesized effects were assessed using standardized path coefficients and bootstrapping with 5,000 resamples at a two-tailed significance level of .05. Explanatory power was evaluated using the coefficient of determination (R^2), while effect size (f^2) indicated the contribution of each predictor. Predictive relevance was examined using Q^2_predict through the PLSpredict procedure. Mediation was tested through the specific indirect effects of digital transformation and innovation capability on sustainable SME performance via organizational agility. An indirect effect was significant when its bootstrapped confidence interval excluded zero. Direct and indirect effects were compared to identify complementary, competitive, indirect-only, or absent mediation.

4. RSELUTS AND DISCUSSION

The analysis included 200 valid responses obtained from SME owners and managers. As presented in Table 1, owners constituted 59.0% of the respondents, while managers represented 41.0%. Participating SMEs were distributed across the trade, manufacturing, and service sectors, with trade businesses forming the largest group. Most SMEs had operated for between two and five years, indicating that the sample primarily represented businesses that had passed the early establishment stage but were still developing their organizational capabilities. Table 2 shows that organizational agility produced the highest mean score (M = 3.90, SD = 0.56), followed by digital transformation, sustainable SME performance, and innovation capability. All indicator loadings exceeded .70, while Cronbach's alpha, rho_A, and composite reliability values were above .70. Average variance extracted values exceeded .50,

and all heterotrait-monotrait ratios remained below .85. These findings confirmed satisfactory indicator reliability, internal consistency, convergent validity, and discriminant validity.

Table 1. Characteristics of Respondents and Participating SMEs.

Characteristic	Category	Frequency	Percentage
Respondent position	Owner	118	59.0
	Manager	82	41.0
Business sector	Manufacturing	64	32.0
	Trade	78	39.0
	Services	58	29.0
Business age	2–5 years	84	42.0
	6–10 years	71	35.5
	More than 10 years	45	22.5
Digital technology use	1–3 technologies	112	56.0
	More than 3 technologies	88	44.0

Note. N = 200. Only one owner or manager represented each participating SME.

Table 2. Descriptive Statistics and Measurement-Model Evaluation.

Construct	*M*	*SD*	Loading Range	Cronbach's α	rho_A	CR	AVE
Digital transformation	3.87	0.61	.734–.881	.862	.866	.900	.643
Innovation capability	3.82	0.58	.748–.887	.875	.879	.909	.667
Organizational agility	3.90	0.56	.762–.902	.889	.892	.918	.691
Sustainable SME performance	3.85	0.55	.731–.895	.884	.888	.915	.683

Note. CR = composite reliability; AVE = average variance extracted. Heterotrait-monotrait ratios ranged from .612 to .823.

Structural-model evaluation showed no critical collinearity because inner variance inflation factor values ranged from 1.48 to 2.31. The model explained 61.2% of the variance in organizational agility and 68.4% of the variance in sustainable SME performance. Positive Q^2_predict values also indicated adequate predictive relevance. Table 4 demonstrates that digital transformation and innovation capability positively affected organizational agility, supporting H1 and H2. Organizational agility positively affected sustainable SME performance, supporting H3. Digital transformation and innovation capability also retained significant direct effects on sustainable performance, supporting H4 and H5. The specific indirect effect of digital transformation through organizational agility was significant, as was the indirect effect of innovation capability through organizational agility. Because the corresponding direct and indirect effects were significant and had the same direction, organizational agility provided complementary partial mediation. These results supported H6 and H7 and indicated that organizational agility strengthened, but did not completely replace, the direct performance contributions of digital transformation and innovation capability.

Table 3. Structural-Model Explanatory Power and Predictive Relevance.

Endogenous Construct	R^2	Adjusted R^2	Q^2_predict
Organizational agility	.612	.608	.428
Sustainable SME performance	.684	.679	.501

Note. Positive Q^2_predict values indicate that the model possesses predictive relevance for both endogenous constructs.

Table 4. Direct and Indirect Effect Testing.

Hypothesis	Relationship	β	*t*	*p*	95% CI	f^2	Decision
H1	Digital transformation → Organizational agility	.421	6.72	< .001	[.299, .535]	.221	Supported
H2	Innovation capability → Organizational agility	.389	6.08	< .001	[.267, .503]	.189	Supported
H3	Organizational agility → Sustainable SME performance	.446	7.11	< .001	[.327, .562]	.246	Supported
H4	Digital transformation → Sustainable SME performance	.213	3.62	< .001	[.098, .327]	.071	Supported
H5	Innovation capability → Sustainable SME performance	.198	3.28	.001	[.079, .315]	.062	Supported
H6	Digital transformation → Organizational agility → Sustainable SME performance	.188	4.99	< .001	[.121, .263]	—	Supported
H7	Innovation capability → Organizational agility → Sustainable SME performance	.173	4.73	< .001	[.107, .249]	—	Supported

Note. β = standardized path coefficient; CI = bootstrapped confidence interval. Bootstrapping was performed using 5,000 resamples.

Discussion

The positive effect of digital transformation on organizational agility indicates that integrated digital technologies help SMEs recognize market changes, coordinate information, and make decisions more rapidly. Digital infrastructure provides timely information and operational connectivity, allowing SMEs to reorganize their resources when customer needs, technological developments, or competitive conditions change. Innovation capability also strengthened organizational agility because SMEs capable of creating new products, services, processes, and business models possessed more strategic alternatives for responding to environmental changes. Innovation expands the range of possible organizational responses, while agility accelerates the selection and implementation of the most relevant solutions. These findings demonstrate that digitalization and innovation should not be managed as separate initiatives. Both capabilities need to be integrated into flexible organizational structures, collaborative work processes, continuous learning activities, and responsive decision-making systems. Such integration enables SMEs to convert technological resources and innovative ideas into practical actions that improve adaptability in dynamic business environments.

Organizational agility produced the strongest direct effect on sustainable SME performance, demonstrating that market sensing, decision-making speed, resource flexibility, and organizational responsiveness are essential for achieving balanced economic, environmental, and social outcomes. Agile SMEs can detect changing market demands, identify operational inefficiencies, and redirect resources toward activities that create greater strategic value. Digital transformation and innovation capability also maintained significant direct effects on sustainable performance. Digital technologies improve operational efficiency,

market access, information quality, customer engagement, and resource monitoring. Meanwhile, innovation capability enables SMEs to develop products, processes, services, and business models that address commercial requirements and sustainability challenges. These findings indicate that sustainable performance cannot be achieved solely through technology adoption or innovation activities. SMEs must coordinate digital resources, innovation processes, and organizational responsiveness to improve productivity, reduce waste, support employee welfare, satisfy stakeholder expectations, and maintain long-term business continuity.

The significant indirect effects confirm that organizational agility functions as a mechanism through which digital transformation and innovation capability improve sustainable SME performance. Complementary partial mediation indicates that digital transformation and innovation capability directly create performance value while also providing additional benefits by strengthening organizational responsiveness. Theoretically, these findings clarify how technological and innovative resources are converted into sustainable outcomes through market sensing, rapid decision-making, flexible coordination, and resource reconfiguration. From a managerial perspective, SME owners and managers should combine investments in digital technologies with employee competence development, cross-functional collaboration, decentralized decision-making, and flexible resource allocation. Innovation programs should prioritize solutions that simultaneously enhance commercial value, operational efficiency, environmental responsibility, and social benefits. Government institutions and SME-support organizations should provide integrated assistance covering digital infrastructure, innovation mentoring, sustainability assessment, and agile management practices. This integrated approach can strengthen SME adaptability, competitiveness, resilience, and long-term sustainability in uncertain business environments.

5. CONCLUSIONS AND RECOMMENDATION

This study concludes that digital transformation and innovation capability are important determinants of sustainable SME performance. Digital transformation enables SMEs to improve process efficiency, integrate information, strengthen customer interactions, and accelerate data-based decision-making. Innovation capability allows SMEs to develop and implement new products, services, processes, marketing practices, and business models in response to changing market conditions. Both capabilities directly improve the economic, environmental, and social dimensions of SME performance. However, their contribution depends on how effectively SMEs align technological resources and innovation activities with

organizational priorities. The simultaneous development of digital transformation and innovation capability therefore provides a stronger foundation for maintaining competitiveness, operational continuity, stakeholder value, and long-term business sustainability.

Organizational agility was confirmed as a strategic mediating capability that strengthens the effects of digital transformation and innovation capability on sustainable SME performance. Its complementary partial-mediating role indicates that digital and innovative capabilities generate direct performance benefits while also improving sustainability through market sensing, rapid decision-making, flexible coordination, and resource reconfiguration. Theoretically, these findings clarify the internal mechanism through which technological and innovative resources are transformed into sustainable outcomes, thereby contributing to management, innovation, and dynamic-capability studies. Managerially, the study demonstrates that technology adoption alone is insufficient without responsive organizational practices. SMEs achieve stronger sustainable performance when digital investment and innovation are supported by adaptable employees, flexible structures, timely managerial decisions, and the ability to respond effectively to emerging opportunities and threats.

SME owners and managers should integrate digital technology with innovation-oriented organizational practices rather than implementing digitalization as an isolated technical initiative. Investment should prioritize technologies that improve operational integration, customer engagement, information quality, and managerial decision-making. At the same time, managers should strengthen market-sensing capabilities, employee responsiveness, cross-functional collaboration, and flexible resource allocation. Employees should receive continuous training to improve digital competence, innovative thinking, and readiness to manage organizational change. Managers should also establish shorter decision-making processes and provide employees with sufficient authority to respond quickly to customer needs and market developments. Sustainability objectives should be incorporated into digital and innovation programs so that technological improvements contribute simultaneously to business growth, resource efficiency, employee welfare, and stakeholder value.

Policymakers and SME-support institutions should develop integrated programs combining digital infrastructure, technological assistance, innovation mentoring, agile-management training, and sustainability assessment. Financial support should be accompanied by practical guidance so that SMEs can select and implement technologies appropriate to their

business scale, sector, and capabilities. Collaboration among government institutions, universities, industry associations, financial organizations, and digital-platform providers should also be strengthened to create an accessible and inclusive SME digital ecosystem. Future studies should examine digital leadership, environmental dynamism, artificial intelligence adoption, digital maturity, and ecosystem support as additional predictors or moderating variables. Longitudinal and comparative research across industries and regions is recommended to determine how these relationships develop over time and whether organizational agility produces different sustainability outcomes under varying technological and market conditions.

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