

Performance Path from Policy and Digital Literacy to SME Sustainability

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ABSTRACT

Objectives – This study examines how government policies and digital literacy shape SME sustainability through SME performance in Lampung Province, Indonesia, and investigates whether the two predecessors follow different paths towards long-term sustainability

Design/methodology/approach – A cross-sectional quantitative survey was conducted among 143 SME owners and managers selected through purposive sampling. This model is assessed using PLS-SEM with four reflective constructs: government policy, digital literacy, SME performance, and SME sustainability.

Findings/Results – **Government policies** have a positive impact on SME performance and SME sustainability, while digital literacy greatly improves SME performance but does not have a significant direct impact on sustainability. The performance of SMEs has a strong positive impact on sustainability. The mediation analysis showed that performance fully mediated the digital–sustainability relationship robustly, while performance mediation on the government–sustainability policy relationship was only supported on the full sample and became insignificant after a non-invariant response pattern was issued, so it should be interpreted as a tentative and sample-dependent (sensitivity-dependent) finding, rather than a generally supported finding. Sensitivity analysis showed that the digital–performance–sustainability literacy pathway remained strong and consistent, while the indirect government policy pathway was much more sensitive to screening for response quality

Originality/Value – This study identifies asymmetric resource conversion pathways towards SME sustainability, showing that external institutional support can operate directly, while internal digital capabilities generate sustainable value especially when transformed into superior business performance.

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1. Introduction

Small and medium enterprises (SMEs) are the center of Indonesia's economy, but the scale has not yet produced the same strong productivity and internationalization. By 2025, Indonesia will have more than 64 million micro, small, and medium enterprises, accounting for more than 60% of national GDP and nearly 97% of employment, while their export contribution remains around 15.7% (Coordinating Ministry of Economic Affairs of the Republic of Indonesia, 2025). The policy challenge now is not only increasing the number of companies, but strengthening their ability to transform support and capabilities into sustainable performance and long-term sustainability. Sustainability is particularly demanding for SMEs as financial, technological, managerial, and human resource constraints limit their capacity to absorb shocks and invest in social and environmental practices. Evidence from Mexico also shows that sustainability can strengthen the competitiveness of SMEs, not just increase compliance costs (Lopez-Torres, 2023).

Two forces are particularly relevant to this conversion problem. The first is government policy. Regulations, licensing, financing facilitation, training, public services, and digital ecosystem support can ease obstacles that are not easily solved by SMEs themselves. (Chen et al., 2021) shows that government intervention can facilitate digital transformation in small service companies by supporting digital platforms, payments, training, and collaborative ecosystems. (Aslam et al., 2023) Similarly, it found that government support strengthens financial literacy, access to finance, and environmentally friendly shared value creation, (Saeed, 2026) shows that government financial assistance improves the performance of SMEs and access to credit in turn. These findings suggest that policies can serve as external conditions that enable existence, but the value of such support at the enterprise level depends on how that support is used.

The second force is digital literacy, which is understood here as knowledge-based internal capabilities. Digital literacy is not limited to the use of basic devices; It involves accessing and evaluating digital information, selecting relevant technologies, using digital channels securely, and integrating them into business decisions and operations. (Zahoor et al., 2023) shows that managerial digital literacy supports the digital transformation of SMEs through the use of real technology, (Mikalef & Gupta, 2021) It shows more broadly that technology-related capabilities create value when combined into organizational capabilities that enhance creativity and performance. Digital transformation research also emphasizes that technology adoption relies on the interaction of human knowledge, leadership, organizational processes, and technological resources (Feliciano-Cestero et al., 2023). Local evidence from Bandar Lampung also shows that the need for SME digital development goes beyond online promotion, but also gaps in financial literacy and business licensing knowledge (Warsiyah, 2023).

However, previous evidence does not imply a single linear path to sustainability. Environmental regulation can encourage sustainable innovation in SMEs, but its effects are different across policy instruments and are reinforced by digitalization (Xu et al., 2023). Smart technology can improve the dimension of sustainable performance without having to operate through the mediation mechanism that was initially expected (AlZayani et al., 2024). In Indonesia, (Gimin et al., 2026) found that government support affects the sustainability of SMEs both directly and indirectly through online marketing technology innovations, while (Kurniasari et al., 2025) shows that financial literacy, FinTech adoption, access to financing, business performance, and sustainability constitute more complex serial mechanisms. The

general implication is that digital support and resources must be transformed into organizational outcomes before their long-term value becomes fully visible.

This study addresses these gaps by positioning the performance of SMEs in general as a resource conversion mechanism that links enabling external conditions (government policies) and internal capabilities (digital literacy) with the sustainability of SMEs. This argument combines Resource-Based Views (RBVs) with Dynamic Capabilities. RBV explains why heterogeneous knowledge resources are important, while Dynamic Capabilities explains how companies integrate and reconfigure resources to respond to change (Barney, 1991; Teece et al., 1997). This framework is relevant for Lampung, where the 2024 economy will reach IDR 483.88 trillion at current prices and grow by 4.57% (Lampung, 2025). Therefore, this study asks not only whether government policy and digital literacy are important, but how their effects are transmitted through performance. Its main contribution is the identification of asymmetric resource conversion pathways towards SME sustainability.

2. Literature Review & Hypothesis Development

2.1. Theoretical Basis

RBV attributes the difference in a company's results to heterogeneous resources and the ability to use them productively (Barney, 1991). For SMEs, this logic is particularly relevant because limited scale limits access to capital, technology, specialized labor, and knowledge. Digital literacy is therefore treated as an intangible internal resource embedded in owner-manager knowledge. In contrast, government policy is not an internal resource of the RBV; It is an external condition that makes it possible to expand access to strategic resources through regulation, financing, training, public services, and digital infrastructure. Dynamic capabilities complement RBV by describing the conversion process: companies create value when they can integrate, build, and reconfigure resources in response to environmental changes (Teece et al., 1997). Recent SME evidence supports this logic. Al Nuaimi et al. (2024) show that organizational learning ability strengthens open innovation and thus market effectiveness and profitability, while (Thomas & Douglas, 2024) found that surviving SMEs use ambidexterity, absorption capacity, and agility to reconfigure resources under disruption. In the current model, SME performance represents the results achieved from this conversion process, and sustainability represents long-term economic, social, and environmental outcomes.

The distinction between the possible conditions and the resources possessed is important for theory. Public policy can change the structure of opportunities that companies face by lowering transaction costs, reducing information asymmetry, increasing legitimacy, or expanding access to financing and training, but this does not become a company-specific advantage until SMEs absorb and use what the policy provides. Digital literacy is different because it lies in the knowledge and routines of owners and managers. These devices can move with companies across platforms and markets and can be re-combined with other resources. This difference means that the same outcome, i.e. sustainability, can emerge through structurally different pathways. The current model therefore does not treat policy support and digital literacy as interchangeable predecessors. Rather, it questions whether performance is the organizational point at which external opportunities and internal capabilities become economically productive. The framework also avoids over-expanding RBVs by labeling government policies themselves as internal resources; RBV is used to describe the deployment of resources at the enterprise level, while Dynamic Capabilities describes the conversion process that connects resources and opportunities to outcomes.

These differences carry specific theoretical implications for how each antecedent is expected to achieve sustainability, and this is stated here before empirical results are presented, rather than deduced later from a pattern of significant and non-significant coefficients. Government policies are treated as institutional environment variables, not enterprise-level capabilities: when regulations, licensing, public services, training, and financing can function effectively, they can lower transaction costs, reduce uncertainty, and strengthen legitimacy with external stakeholders such as banks and buyers (Chen et al., 2021; Aslam et al., 2023). Because these effects work on the conditions surrounding the company, rather than on its internal routines, policy support can reasonably achieve sustainability—particularly through continuity, access to financing, and regulatory risk reduction—without first requiring measurable changes in the company's own operational performance. In contrast, digital literacy is theorized as a resource that exists within the company, embedded in the knowledge and habits of owners and managers. In keeping with the logic of Dynamic Capabilities in sensing, seizing, and reconfiguring (Teece et al., 1997), this kind of knowledge source has no sustainability value until it is enacted: owners must first use digital knowledge to sense opportunities, seize them through changes in pricing, marketing, or transactional practices, and reconfigure daily operations as needed. Only after this enactment is reflected in improved business performance, the resulting slack, legitimacy, and organizational capacity are expected to support long-term economic, social, and environmental outcomes. Based on this, the model anticipates *ex ante* that government policies are more likely to exhibit direct sustainability effects that are not entirely performance-dependent, while digital literacy is more likely to rely on performance as an organizational conversion stage. H1–H4, developed in the next two sections, is intended to test this anticipated asymmetry directly, rather than treating government policy and digital literacy as interchangeable and expected precursors to behave identically.

2.2. Government policy pathways

Government policies can improve the performance of SMEs by reducing structural constraints and expanding access to resources that are difficult to develop internally. Support for financing, legal compliance, training, technology, and market access can improve customer productivity, efficiency, innovation, and outcomes. (Chen et al., 2021) showing that government support can reduce barriers to digital transformation, (Aslam et al., 2023) demonstrate its role in building financial and green capabilities, and (Saeed, 2026) report on the positive effects of government financial assistance on revenues, profitability, and access to financing. These studies support the expectation that a more effective policy environment can improve firm-level performance.

H1: Government policies have a positive impact on the performance of SMEs.

Government policies can also affect sustainability more directly by reducing uncertainty, supporting continuity, improving access to finance, and strengthening the institutional environment in which SMEs operate. (Gimin et al., 2026) report both direct and indirect effects of government support on the sustainability of SMEs, while (Xu et al., 2023) It shows that regulation can drive sustainable innovation when policy instruments and digital contexts are aligned. Therefore, the immediate sustainability effect is expected to be positive even though part of the policy effect is transmitted through the company's internal results.

H2: Government policies have a positive impact on the sustainability of SMEs.

Another reason to separate the effect of policies on performance from the effects of policies on sustainability is that time horizons and domains of results are different. Some policy interventions are designed to change immediate operational conditions, such as licensing speed, credit availability, training access, or market facilitation. Others can affect long-term continuity by reducing legal uncertainty, strengthening formalization, improving access to networks, or signaling legitimacy to lenders and business partners. (Saeed, 2026) illustrates this difference in Ghana: government financial assistance is not only related to the income and profitability that occurred at the time, but also to increased access to private financing in the following period. Similarly, Indonesia's evidence of (Gimin et al., 2026) Showing that government support has a direct sustainability effect while operating through online marketing technology innovations. These findings justify testing both the direct path to sustainability and the indirect path through performance, rather than assuming that policies should run through only one mechanism.

2.3. Digital literacy pathway

Digital literacy can improve SME performance because it increases the capacity of companies to identify relevant information, use digital platforms, conduct secure transactions, communicate with customers, and integrate technology into routine decisions. (Zahoor et al., 2023) identify managerial digital literacy as the micro-foundation of digital transformation, and (Avelar et al., 2024) Indicates that investment in innovation and digitalization is linked to the growth of the company. (Abbas et al., 2024) Similarly, it connects digitalization and financial innovation with the performance of companies through innovation and competitive market mechanisms. Therefore, digital literacy should have economic value when translated into more efficient and adaptive business processes. The Bandar Lampung case study further documents that the adaptation of MSMEs during the COVID-19 disruption involves maximizing social media and delivery services along with cash flow discipline, product quality, and innovation (Saputeri et al., 2022).

H3: Digital literacy has a positive impact on the performance of SMEs.

Digital literacy can also support sustainability through market access, information search, adaptability, and resource efficiency. (Xu et al., 2023) found that digitalization reinforces the effects of environmental regulations on sustainable innovation, while (Haq et al., 2025) shows that technology adoption can improve operational performance and a sustainable environment if supported by organizational readiness and investment. Since some digital benefits may achieve sustainability before they are fully captured by conventional performance indicators, direct relationships are maintained in this model.

H4: Digital literacy has a positive impact on the sustainability of SMEs.

Digital literacy can also have diverse consequences across different performance domains. The ability to search and evaluate information can improve the quality of decision-making; digital security awareness can reduce the risk of transactions and fraud; e-commerce capabilities can expand market reach; and operational digital skills can shorten communication and processing times. However, these benefits do not automatically translate to the economic, social, and environmental dimensions used to define sustainability in this study. For example, stronger social media capabilities can increase customer acquisition but not necessarily improve waste management, community empowerment, or energy efficiency. These differences make the hypothesis of digital literacy direct to sustainability theoretically plausible but empirically uncertain, and makes the role of performance mediation very informative. An insignificant direct path means that digital knowledge requires organizational

conversion before it can impact long-term outcomes; A significant direct path means that some of the capabilities benefits go beyond conventional performance measures. Testing both possibilities is therefore more informative than assuming a complete mediation beforehand.

2.4. SME performance and mediation

SME performance captures financial and non-financial outcomes such as growth, operational efficiency, innovation, and customer outcomes. Sustainability is conceptually different because it relates to the ability to sustain economic activities while addressing social and environmental responsibilities over time. Stronger performance provides the financial and managerial leeway needed to invest in resilience, community engagement, environmental practices, and resource efficiency. (Kurniasari et al., 2025), using 469 Indonesian SMEs, reported a strong positive relationship between business performance and business sustainability. In the environment of Indonesian waste banks, (Warsiyah et al., 2025) Finding that community empowerment and digitalization of waste bank systems significantly support the sustainability of local economies, illustrates how social participation and digital mechanisms can strengthen sustainability outcomes. Evidence from Saudi entrepreneurs also suggests that entrepreneurial competence and financial literacy support sustainable performance, with entrepreneurial resilience acting as a mediating mechanism (Seraj et al., 2022), reinforcing the idea that enterprise-level capacity—not just policy or technology exposure—is the primary pathway to sustainability.

H5: The performance of SMEs has a positive impact on the sustainability of SMEs.

Performance is also expected to mediate the impact of government policies and digital literacy. Government programs may provide opportunities and resources, but they are unlikely to result in long-term sustainability unless companies turn them into better business outcomes. Similarly, digital knowledge becomes strategically invaluable when it comes to reducing costs, increasing productivity, expanding markets, or strengthening innovation. (Aslam et al., 2023) and (Gimin et al., 2026) provide evidence that government support achieves sustainability through internal financial, green, or technology mechanisms, while (Zahoor et al., 2023) shows that digital literacy operates through the use of technology. This study generalizes the mechanism by examining the performance of SMEs as a common conversion pathway.

H6: SME performance mediates the relationship between government policies and SME sustainability.

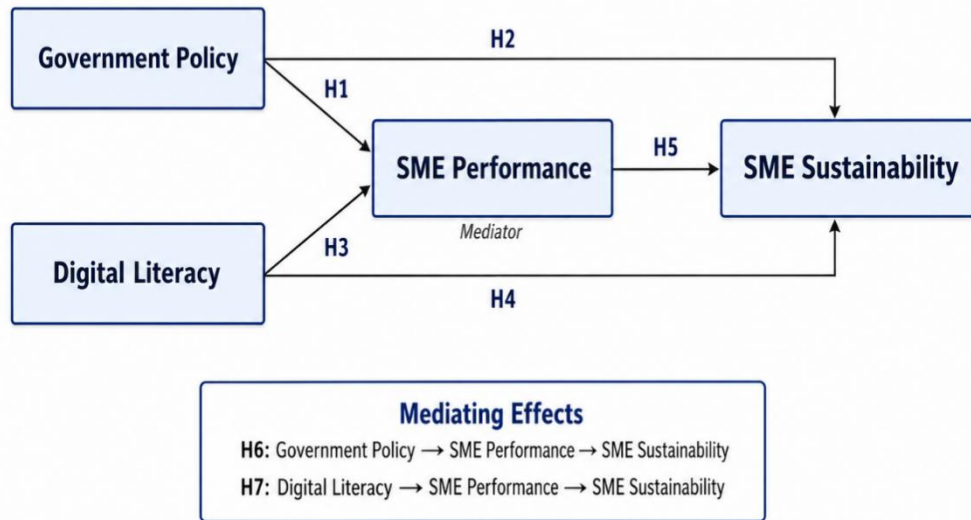
H7: SME performance mediates the relationship between digital literacy and SME sustainability.

2.5. Conceptual Framework

Figure 1. Conceptual framework

Conceptual Framework

Theoretical Foundation: Resource-Based View and Dynamic Capabilities



Source: Author's Conceptualization

3. Methodology

3.1. Research design and sampling

This study uses quantitative and cross-sectional explanatory survey designs to examine the structural relationship between government policies, digital literacy, SME performance, and SME sustainability. Primary data was collected from SME owners or managers in Lampung Province through direct distribution and Google Forms using a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree. The cross-sectional explanation design is very appropriate because this study tests structural models derived from theory, not just describing the characteristics of respondents (Creswell & Creswell, 2018). The target population consists of SMEs active in Lampung. Purposive sampling is used to select respondents who have been operating SMEs for at least two years and have experience with government programs and/or digital business platforms, according to the purposive sampling logic (Etikan et al., 2016). A total of 150 questionnaires were distributed directly and through Google Forms to SMEs in Lampung, and all (150) returned, so that the response rate to distribution was 100%. Of the 150 questionnaires returned, 7 were excluded because they did not meet the sample criteria (less than two years of business experience) and/or incomplete data, leaving 143 answers that were declared usable for analysis—equivalent to a usable-response rate of 95.3% of the returned questionnaires. The final sample exceeded the original statistical power requirement of approximately 85–92 observations, calculated using a priori power analysis (G*Power 3.1) for multiple regression tests (F-test, R^2 increase), assuming intermediate effect size ($f^2=0.15$, Cohen convention), significance level $\alpha=0.05$, and statistical power (power) 0.80, resulting in a minimum sample requirement that varied (85–92) depending on the number of predictors in each structural equation in the model (4–5 predictors). The study did not rely on the 10 times rule as the primary reason because the rule could provide an inaccurate minimum sample estimate (Kock & Hadaya, 2018).

3.2. Measures and development of instruments

The initial instrument contained 20 reflective indicators, five for each construct. Government policies include regulation, incentives/support, public services and licensing, development and training, and access to financing. Digital literacy includes digital knowledge, technology access, operational digital skills, digital security, and the use of e-commerce. SME performance represents financial growth, operational efficiency, innovation, customer satisfaction, and technology/market adaptation. SME sustainability uses the actual contents of the questionnaire: sustainable profitability, social responsibility towards the community, environmentally responsible waste management, local community empowerment, and energy efficiency. The validity of the content was reviewed by academics and practitioners, and a trial with 30 SME respondents outside the main sample was used to refine the wording and contextual clarity. The purification of the measurement is carried out only after evaluating the measurement model; one SME performance indicator (Z5) was eventually removed for contributing to inadequate discriminant validity.

Each construct is determined reflectively, not formatively. This choice was made because, within each construct, the five (or four) dimensions are designed as a largely interchangeable alternative expression of one basic common capacity, rather than the independent components that collectively define them: for government policy, SMEs experiencing a more supportive institutional environment are expected to report on regulations, incentives, licenses, comparably higher training, and finance perceptions together, rather than achieving high values in one dimension while remaining unaffected in the other. The same exchange logic is intended for SME digital literacy and sustainability, and is empirically supported by the loading, reliability, and AVE results reported below, which suggest that the indicators in each construct are strongly correlated enough to be considered a manifestation of the same factor. Nevertheless, the authors acknowledge that regulations, incentives, licensing, training, and access to finance can be considered government policy as a whole, rather than simply reflecting government policy, and that formative or higher-level specifications remain reasonable alternatives; This possibility is discussed again in the Limitations and Future Research section.

Table 1. Construct Measurement

Construct	Indicators/dimensions	Beginning	Final	Measurement basis
Government policy	Regulation; incentives/supports; public services/licenses;5 development/training; Access to financing		5	Government support literature
Digital literacy	Digital knowledge; access to technology; operational skills; digital5 security; E-commerce usage		5	Digital literacy literature

SME Performance	financial growth; operational efficiency; innovation; customer satisfaction; 5	4	Organizational performance literature
SME Sustainability	Technology/market adaptation Sustainable profitability; social responsibility; waste management; 5 community empowerment; Energy Efficiency	5	Three-layered sustainability literature

Note: The initial instrument contains 20 reflective indicators. The Z5 was removed during the refinement of the measurement model, resulting in 19 final indicators.

3.3. PLS-SEM Assessment

The final structural model was estimated using the Mode A PLS path-modeling procedure. Reflective measurement quality was assessed via external load, Cronbach alpha, composite reliability, extracted mean variance (AVE), and heterotrait-monotrait ratio (HTMT). Loading is about 0.70, reliability above 0.70, and AVE above 0.50 are used as general benchmarks (Sarstedt et al., 2022; Shmueli et al., 2019). HTMT was evaluated using the 0.90 criterion for conceptually related constructs, while values close to the threshold were interpreted carefully (Henseler et al., 2015). Structural models were evaluated using path coefficients, R^2 , f^2 , and bootstrapping significance. Indirect and specific effects were tested with 5,000 bootstrap resamples. The mediation classification considers the significance and direction of direct and indirect effects, rather than requiring significant direct effects as a prerequisite (Nitzl et al., 2016). Sensitivity analysis reestimates the model after excluding invariant response patterns to assess resilience. Since all focus variables come from the same respondent source, additional common method diagnostics are also carefully examined and interpreted, rather than being considered definitive evidence of the absence of bias.

The analysis takes place in a gradual sequence. First, the data is filtered for completeness, scale range errors, and unchanging response patterns. Second, reflective measurement models are evaluated before making any interpretation of the structural pathway. Indicator retention is based on a combination of load quantity, construct reliability, AVE, discriminant validity, and content coverage, not mechanical deletion rules. Third, structural models are assessed using the described variances, effect sizes, and bootstrap inference for direct and indirect relationships. Finally, robustness is checked by comparing the full sample estimate with the sensitivity specification that excludes invariant responses. This sequence is intended to separate measurement decisions from hypothesis testing and make sensitivity in structural conclusions explicit, rather than hidden through post-hoc data removal.

3.4. Ethical Statement

The study involved SME owners and managers as human respondents and therefore followed basic research ethical principles. Access to respondents was facilitated through coordination with the Waste Bank community and the Metro City Environmental Agency, which helped reach SMEs in the region. Participation is voluntary, and respondents are informed of the purpose of the study, the right to refuse to participate or to stop at any time without

consequence, before filling out the questionnaire (informed consent). No personally identifiable information (such as name or contact number) was collected in the questionnaire; All data is analyzed and reported in aggregate form to maintain confidentiality. Raw data is stored securely and can only be accessed by the research team.

4. Results and Discussion

4.1. Respondent profiles and measurement models

The final sample consisted of 143 respondents. Women represented 80.0% of respondents and men 20.0%. The largest age group was 31–40 years old (60.0%), followed by 41–50 years old (25.0%). The culinary business accounted for 45.5% of the sample, followed by the fashion business (21.7%) and the handicrafts/decorative business (12.6%). Most respondents have used digital technology in business activities, while 62.9% reported accessing information about government programs such as licensing, training, or People's Business Credit (KUR). Because nearly two-thirds of respondents confirmed such contacts, the government policy scores reported below should be read as a measure of the perceived policy environment—public awareness and impression of regulations, incentives, licensing, training, and access to finance—not as verified participation in a particular program; The sampling criteria require experience with government programs and/or digital business platforms, so not all respondents need to have direct exposure to specific government support. These characteristics provide the right context to test institutional exposure and digital capabilities among this Lampung-based women-focused sample and culinary business, and the following results are presented as evidence of this surveyed segment, rather than generalized to all SMEs in Lampung or Indonesia.

The early 20-indicator model shows satisfactory loadings for most items. Two government policy indicators have marginal loadings of 0.697 and 0.698 and are maintained because the reliability of the construct level and AVE remains adequate and their removal will reduce the coverage of the content. Z5 measures technology-based product/market adaptation as one of the five early indicators of SME Performance; this indicator was removed not because the load was weak, but because of its specific contribution to the overlap with the content of SME Sustainability (HTMT Performance–Sustainability dropped from around 0.910 to 0.896 after its removal). The authors acknowledge that this decision is vulnerable to concerns that the removal of the indicator was motivated by attempts to cross the 0.90 numerical threshold, not purely by theoretical or psychometric reasons; therefore, a robustness model that retains Z5, along with bootstrapped HTMT confidence intervals, is recommended as additional analysis before this manuscript is considered final ideally reported alongside the final model, rather than replacing it. A more substantial issue relates to the discriminatory validity between SME performance and SME sustainability. With all five performance indicators maintained, the HTMT is around 0.910. The removal of Z5 reduced the Performance–Sustainability HTMT to 0.896, resulting in a final model of 19 indicators: five government policy items, five digital literacy items, four performance items, and five sustainability items. All constructs meet the criteria of internal consistency and convergent validity. Cronbach's alpha ranges from 0.841 to 0.929, composite reliability from 0.888 to 0.948, and AVE from 0.615 to 0.784. All HTMT final values are below 0.90, although the 0.896 value between performance and sustainability remains close to the threshold and is therefore interpreted carefully; this 0.896 value is the point estimate from the final 19-indicator model, with a 95% bootstrap confidence interval of [0.794–0.974] (5,000 subsamples)—the upper limit of which clearly exceeds the 0.90 threshold,

confirming that discriminant-validity uncertainty between these two constructs remains relevant even in the final model, not only in the robustness model with Z5 retained. Threshold-based decisions alone are not sufficient evidence that the two constructs are substantially different, so this proximity is also conceptually discussed. This concern is confirmed by the robustness model with the Z5 maintained (see Table 7, Section 4.3.1), which shows a 95% bootstrap confidence interval for HTMT Performance–Sustainability of 0.826–0.977—the upper limit of which clearly exceeds the 0.90 threshold. Given that the final model's point estimate (0.896) is also very close to the threshold, removing a single indicator (Z5) does not conclusively establish discriminant validity between these two constructs; this interpretation is retained as an important measurement limitation, not as a resolved issue. The four maintained performance indicators (Z1–Z4) describe the achieved and relatively short-term business outcomes—financial growth, operational efficiency, innovation, and customer satisfaction—that can shift in a single operational cycle. The five sustainability indicators (Y1–Y5) instead describe a company's sustainable capacity to maintain profitability while meeting social and environmental commitments over time, including community empowerment and environmentally responsible waste management, dimensions that performance indicators do not address at all. These two constructs are therefore expected to be correlated, as better-performing SMEs are more likely to have the financial and managerial leeway that sustainability requires, but this kind of correlation is conceptually different from item-level redundancy. This interpretation is further examined, along with the sensitivity results, in Section 4.4.2.

Table 2. Measurement model results

Construct	Indicator	Loading	Cronbach α	CR	AVE
Government policy	X1-1	0.697	0.841	0.888	0.615
	X1-2	0.821			
	X1-3	0.834			
	X1-4	0.855			
	X1-5	0.698			
Digital literacy	X2-1	0.812	0.929	0.948	0.784
	X2-2	0.883			
	X2-3	0.906			
	X2-4	0.912			
	X2-5	0.909			
SME Performance	Z1	0.819	0.865	0.910	0.716
	Z2	0.853			
	Z3	0.848			
	Z4	0.863			
SME Sustainability	Y1	0.735	0.859	0.899	0.641
	Y2	0.859			
	Y3	0.771			
	Y4	0.830			

Y5

0.803

Source: Reestimation of primary survey data, $n = 143$.**Table 3.** HTMT discriminant validity results

Construct relationships	HTMT
Government policy – Digital literacy	0.631
Government policy – SME performance	0.590
Government policy – SME sustainability	0.769
Digital literacy – SME performance	0.751
Digital literacy – SME sustainability	0.701
SME Performance – SME Sustainability	0.896 [0.794–0.974]

Source: Reestimation of primary survey data, $n = 143$ **4.2. Structural and mediation models**

This model explains the 49.2% variance in SME performance ($R^2 = 0.492$; Adjusted $R^2 = 0.484$) and 71.0% variance in SME sustainability ($R^2 = 0.710$; Adjusted $R^2 = 0.703$). Four of the five direct effect hypotheses are supported. Government policies have a positive impact on the performance of SMEs ($\beta = 0.196$, $p = 0.031$) and sustainability ($\beta = 0.344$, $p < 0.001$). Digital literacy greatly affects the performance of SMEs ($\beta = 0.571$, $p < 0.001$), but its direct effect on sustainability is not significant ($\beta = 0.051$, $p = 0.594$). The performance of SMEs greatly affects sustainability ($\beta = 0.571$, $p < 0.001$). Effect sizes reinforce this asymmetric pattern: digital literacy has a large influence on performance ($f^2 = 0.438$) but very small direct effects on sustainability ($f^2 = 0.004$), government policies have a small influence on performance ($f^2 = 0.052$) and moderate effects on sustainability ($f^2 = 0.264$), and performance has the greatest influence on sustainability ($f^2 = 0.570$).

Table 4. Structural path results.

Hyp.	Relationships	b	t	P	95% CI	f^2	Verdict
H1	GP $\rightarrow$ PERF	0.196	2.155	0.031	[0.017, 0.367]	0.052	Supported
H2	GP $\rightarrow$ SUST	0.344	4.378	<0.001	[0.191, 0.495]	0.264	Supported
H3	DL $\rightarrow$ PERF	0.571	6.540	<0.001	[0.385, 0.727]	0.438	Supported
H4	DL $\rightarrow$ SUST	0.051	0.534	0.594	[-0.127, 0.245]	0.004	Not supported
H5	PERFORMANCE $\rightarrow$ SUSTAINABILITY	0.571	7.394	<0.001	[0.409, 0.710]	0.570	Supported

Note: GP = government policy; DL = digital literacy; PERF = SME Performance; SUST = Sustainability of SMEs. $R^2 = 0.492$ for SME performance and 0.710 for SME sustainability. Source: Reestimation of primary survey data; 5,000 resample bootstrap.

Mediation analysis reveals two different mechanisms. Government policies have a significant indirect impact on sustainability through performance ($\beta = 0.112$, $p = 0.045$), while their direct effects on sustainability remain significant and positive. However, as further discussed in Sections 4.3 and 4.3.1, this indirect effect became non-significant after 16 invariant response patterns were excluded from the sample; this finding is therefore treated as a sample-sensitive

indirect association requiring independent replication, rather than a confidently supported partial mediation for H6. Digital literacy has a much stronger indirect effect through performance ($\beta = 0.326$, $p < 0.001$), whereas its direct effect on sustainability is insignificant, suggesting indirect/full mediation and supporting H7. The estimated total effect is around 0.456 for government policies and 0.377 for digital literacy.

Table 5. Mediation results

Hyp.	Indirect relationships	b	t	P	95% CI	Mediation
H6	GP → PERF → SUST	0.112	2.001	0.045	[0.009, 0.228]	Sample-sensitive (requires replication)
H7	DL → PERF → SUST	0.326	4.764	<0.001	[0.190, 0.462]	Full (indirect only)

Note: GP = government policy; DL = digital literacy; PERF = SME Performance; SUST = Sustainability of SMEs. *Source:* Reestimation of primary survey data; 5,000 resample bootstrap.

4.3. Robustness assessment

Data screening identified 16 invariant response patterns in which respondents chose the same Likert category across all 20 initial items. This response was maintained in the main analysis because a uniform response pattern did not in itself prove invalidity. As a robustness check, these models were reestimated after their exclusion ($n = 127$). The main conclusions remain stable for government policies → sustainability, digital literacy → performance, performance → sustainability, as well as indirect digital sustainability → → pathways. However, government policies → performance and its indirect effects through performance become insignificant, suggesting that H1 and especially H6 is more dependent on sensitivity than other relationships. Additional general method diagnostics also require caution: the first factor accounts for approximately 50.1% of variance in the full sample and 42.0% after the invariant response is excluded; The full collinearity VIF value ranges from 1.95 to 3.44. This diagnostic does not justify the claim that general method bias does not exist, but it supports a transparent interpretation along with sensitivity analysis.

These endurance exercises are substantially, not just technical. The stable coefficients show that the central digital literacy pathway does not depend on an unchanged response: digital literacy continues to predict performance, performance continues to predict sustainability, and their indirect relationships remain significant. Instead, the weaker policy-to-performance route changes under alternative filtering rules. This difference is why the article reports sensitivity analysis explicitly, rather than simply selecting the specification with the most favorable level of significance. Diagnostic methods are generally interpreted in an equally conservative way. The share of the first factor that is close to half and the sustainability VIF slightly above the conservative benchmark of 3.3 does not prove widespread general method bias, but nor does it justify the categorical claim that bias does not exist. The convergence of the main model and the sensitivity to the strongest relationships provide evidence of resilience that is more useful than a single diagnostic statistic.

Table 6. Sensitivity analysis

Relationships	Main sample n=143	Sensitivity n=127	Rating
GP → PERF	0.196*	0.153 ns	Sensitive

GP → SUST	0.344***	0.347***	Robust
DL → PERF	0.571***	0.526***	Robust
DL → SUST	0.051 ns	0.046 ns	Robust
PERFORMANCE SUSTAINABILITY →	0.571***	0.548***	Robust
GP → PERF → SUST	0.112*	0.084 ns	Sensitive
DL → PERF → SUST	0.326***	0.289***	Robust

Note: GP = government policy; DL = digital literacy; PERF = SME Performance; SUST = Sustainability of SMEs. * $p < 0.05$; $p < 0.001$; ns = insignificant. Source: Sensitivity reassessment.

4.3.1. Robustness Model with Z5 Indicator Maintained (Response to Reviewer Points on Z5 Removal)

Table 7. The robustness model with the Z5 is maintained (bootstrap 5,000 resamples), compared to the final model

Relationships	With Z5 (n=143)	Final model without Z5 (n=143)	Remarks
GP → PERF	0.201* (t=2.214)	0.196*	Consistent
GP → SUST	0.329*** (t=4.567)	0.344***	Consistent
DL → PERF	0.567*** (t=6.519)	0.571***	Consistent
DL → SUST	0.023 ns (t=0.254)	0.051 ns	Consistent (non-significant on both models)
PERFORMANCE SUSTAINABILITY →	0.625*** (t=8.587)	0.571***	Consistent
GP → PERF → SUST (H6, indirect)	0.126* (t=2.108, p=.035)	0.112* (p=.045)	Consistent direction & significance in the full sample
DL → PERF → SUST (H7, indirect)	0.355*** (t=4.902)	0.326***	Consistent
HTMT PERF↔SUST	0.910, 95% CI [0.826–0.977]	0.896, 95% CI [0.794–0.974]	Both CIs exceed the 0.90 threshold at the upper end; removing Z5 slightly lowers the point estimate and CI but does not negate discriminant-validity concerns in either model

Note: GP = government policy; DL = digital literacy; PERF = SME performance (Z, 5 indicators including Z5); SUST = sustainability of SMEs (Y). * $p < 0.05$; ** $p < 0.01$; $p < 0.001$; ns = insignificant. Source: SmartPLS re-estimation with full 20-indicator model, bootstrap 5,000 resamples.

This robustness model answers two things directly. First, all hypothetical conclusions (H1–H7) remained consistent whether Z5 was included or not, so the decision to remove Z5 did not change the substantive conclusions of the study. Second, reviewer concerns about the discriminatory validity between Performance and Sustainability are well-founded: the 95% bootstrap confidence interval for the Sustainability Performance↔HTMT when Z5 is maintained is 0.826–0.977, whose upper limit exceeds the 0.90 threshold. Even on the final models that have removed the Z5, the HTMT point value (0.896) remains very close to that threshold. The elimination of a single indicator therefore does not conclusively resolve the

conceptual overlap between these two constructs, and a more fundamental conceptual restructuring for example separating profitability from the construct of Sustainability, or modeling Sustainability as a high-level construct remains necessary as a further research agenda, as noted in the Limitations section.

4.3.2. Multi-Group Analysis Based on Policy Exposure (Response to Reviewer Concerns about Government Policy Measurement)

To answer empirically whether structural relationships differ between respondents who have received direct government assistance (training or financing) and those who have not, an additional exploratory analysis was conducted using an independent sample (n=156). This sample was collected using an identical Google Form questionnaire instrument to the main sample (the same 20 indicators), through the same recruitment channel (coordination with the Waste Bank community and the Metro City Environmental Agency), and following the same purposive sampling criteria and ethical procedures (informed consent, confidentiality, voluntary participation) as the main sample described in Sections 3.1 and 3.4. This sample was collected during a continuous data-collection period, partly overlapping with and partly following the finalization of the n=143 sample used for the main model; because of this difference in collection period and screening process, the n=156 sample is treated as independent data for supplementary exploratory analysis rather than merged directly into the main n=143 sample. Results from this analysis are reported separately and explicitly as exploratory supporting evidence, not as part of the main confirmatory model, given the difference in collection period and the unbalanced subgroup sizes (137 versus 19) that limit the generalizability of its findings. This sample was analyzed using bootstrap Multi-Group Analysis (PLS-MGA; 5,000 subsamples) in SmartPLS, with the grouping variable based on the self-reported status of government assistance receipt. It should be noted as a methodological point: path coefficients for both groups on Table 8 were obtained directly from SmartPLS PLS Algorithm results per group (accessible via the “Group” link on the Bootstrap MGA output), except for one cell (Digital Literacy→Sustainability for the “Receiving assistance” group) that was derived from the difference because its base value was not recorded during the initial exploration, as noted in Table 8. The significance of path-coefficient differences was tested using the standard two-tailed p-value from the Bootstrap PLS-MGA procedure (5,000 subsamples), not from separate per-group t-tests. Given the small and unbalanced subgroup sizes (137 versus 19), this MGA result should still be read as supporting exploratory evidence with limited confidence, not as an independent confirmation equivalent to the main model.

Table 8. PLS-MGA results based on the status of government aid receipts

Relationships	Receiving (n=137)	help Not (n=19)	receiving Difference	P value (2- tails)
GP → Performance	0.225	0.614	−0.389	0.438
GP → Sustainability	0.236	0.493	−0.258	0.438
DL → Performance	0.641	−0.168	+0.810	0.060
DL → Sustainability	−0.013*	0.174	−0.187	0.487
Performance → Sustainability	0.741	0.357	+0.384	0.290

*Note: All coefficients for both groups were exported directly from SmartPLS PLS Algorithm results per group (Group_Receiving assistance and Group_Not receiving), except one cell marked *—the Digital Literacy→Sustainability value for the “Receiving assistance” group (−0.013), which was derived by subtracting the confirmed difference from the confirmed “Not receiving” group value (0.174), because the base value was not*

recorded during the initial exploration. GP = government policy; DL = digital literacy. Source: PLS Algorithm and Bootstrap PLS-MGA, 5,000 subsamples, independent sample $n=156$ (137 vs 19).

None of the path coefficient differences reached conventional significance ($p<0.05$) in the two-tailed test, including the Government Policy→Performance and Government Policy→Sustainability pathways that were the main concerns of the reviewer. The Digital Literacy→Performance pathway approaches significance ($p=0.060$) with a large difference, indicating that digital literacy may have a stronger impact on performance in groups that have received government assistance—a pattern that makes theoretical sense (government assistance can strengthen SMEs' capacity to convert digital capability into operational outcomes) but cannot yet be concluded definitively. These results do not support the hypothesis that structural relationships differ drastically between the directly exposed group and the non-exposed group. However, given the limitations outlined above—an independent sample from a different collection period, a small "Not receiving" subgroup ($n=19$) with limited statistical power, and one coefficient value derived from a difference rather than exported directly—this analysis should be read solely as supporting exploratory evidence, not as a definitive confirmation, that the Government Policy score consistently measures perceived policy environment regardless of direct experience of aid receipt. Replication with a larger, more balanced sample, and direct data export from SmartPLS for both groups, is needed before stronger conclusions can be drawn.

4.3.3. Robustness Test of Formative Specification for Government Policy Construct (Response to Reviewer's Point on GP Reflective Specification)

To test whether the research conclusions depend on the choice of reflective measurement specification for Government Policy constructs, an alternative robustness model was estimated by specifying Government Policies as formative constructs (Mode B), while other constructs (Digital Literacy, Performance, Sustainability) remained reflective (Mode A), using an identical primary sample of $n=143$.

Table 9. Outer weights of Government Policy formative indicators

Indicator	Outer Weight	T-statistics	p-value	VIF
X1-1 (access to financing/KUR)	-0.006	0.048	0.962	1.570
X1-2 (business licensing)	0.299	1.933	0.053	2.305
X1-3 (entrepreneurship training)	0.628	3.883	0.000	1.900
X1-4 (Digital Infrastructure)	0.188	1.133	0.257	2.649
X1-5 (fiscal/non-fiscal incentives)	0.050	0.376	0.707	1.579

Note: bootstrap 5,000 subsamples, Mode B formative model, $n=143$. The VIF of all indicators is well below the threshold of 3.3, indicating no problem of multicollinearity between formative indicators.

Only the X1-3 indicator (entrepreneurship training) showed a significant weight individually ($p<0.001$); Other indicators are not significant on their own. Consistent with formative indicator conventions, the insignificance of individual weights does not necessarily cause the indicators to be removed from the model, as each formative indicator is considered to contribute to the content coverage of the construct collectively, rather than being assessed based on their correlation to each other.

Table 10. Comparison of path coefficients: final reflective model vs robustness formative model

Relationships	Reflective (final)	model Formative (robustness)	model Consistent?
GP → Performance	0.196*	0.251** (p=0.007)	Yes
GP → Sustainability	0.344***	0.334*** (p=0.000)	Yes
DL → Performance	0.571***	0.541*** (p=0.000)	Yes
DL → Sustainability	0.051 ns	0.040 ns (p=0.656)	Yes (consistently insignificant)
Performance → Sustainability	0.571***	0.600*** (p=0.000)	Yes

Note: * $p<0.05$; ** $p<0.01$; $p<0.001$; ns = insignificant. GP = government policy; DL = digital literacy. Source: Bootstrap 5,000 subsamples, $n=143$ for both models.

The five structural relationships are consistent in both direction and pattern of significance between reflective and formative models including the Government Policy pathway that is the main concern of the reviewer, which actually shows a slightly stronger significance in the formative model (GP→Performance: $p=0.007$ vs $p<0.05$ in the reflective model). This overarching consistency provides strong evidence that the substantive conclusions of the study do not depend on the choice of reflective vs formative specification for Government Policy constructs, so reviewers' concerns about potential measurement directional bias can be answered empirically: both specifications lead to the same conclusion.

4.3.4. Additional Analysis: Decomposition of the Sustainability Dimension of SMEs (Response to the Reviewer's Point on the Reconstruction of Sustainability Constructs)

To test whether Government Policy and Digital Literacy have different effects across different sustainability domains, as suggested by the reviewer, five indicators of SME Sustainability are decomposed into three conceptual dimensions following the logic of the Triple Bottom Line: Economy (Y-1, sustainable profits), Social (average Y-2 and Y-4, social responsibility and community empowerment), and Environment (average Y-3 and Y-5, waste management and energy efficiency). Due to the complexity of fully reconstructing the multi-construct model in PLS-SEM for this additional analysis, all three dimensions were tested using multiple regressions with standardized coefficients (mean composite scores for GP, DL, and Performance as predictors, $n=143$) as a faster executed supporting analysis; These results are exploratory and are recommended to be replicated with formal PLS-SEM models (including bootstrapping) in subsequent studies.

Table 11. Standardized regression coefficient per dimension of Sustainability (supporting OLS analysis, $n=143$)

Predictors	Economy ($R^2=0.604$)	Social ($R^2=0.519$)	Environment ($R^2=0.505$)
Government Policy (GP)	0.106 ns (p=0.111)	0.369*** (p<0.001)	0.325*** (p<0.001)
Digital Literacy (DL)	0.067 ns (p=0.381)	0.031 ns (p=0.717)	0.070 ns (p=0.415)
SME Performance (PERF)	0.670*** (p<0.001)	0.434*** (p<0.001)	0.431*** (p<0.001)

Note: the standardized beta coefficients of the OLS multiple regression are separate for each dimension. * $p<0.05$; ** $p<0.01$; $p<0.001$; ns = insignificant. Source: Reestimation of primary survey data, $n=143$.

These results reveal a hidden pattern in the aggregate model: Government policies do not have a significant effect on the economic dimension (sustainable profitability), but have a significant effect on the social and environmental dimensions. This pattern makes sense theoretically—policy support such as training, licensing, and infrastructure is often linked to government

program terms or incentives that encourage socially responsible practices and environmental management, while long-term profitability is more determined by operational efficiency. Digital Literacy is consistently insignificant in all three dimensions, in line with non-significant findings in the aggregate model (H4). SME performance remains a significant and strong predictor in all three dimensions, supporting its role as a central resource conversion mechanism. These decomposition findings reinforce the argument that aggregating Sustainability into a single construct can hide a heterogeneity of effects that are both theoretically and practically important, and support the reviewer's recommendation that domain-specific modeling is a valuable follow-up research agenda.

4.4. Discussion

Before moving on to each path, two design features should be kept in mind as they qualify the power of causal language used below. All focus constructs were measured from the same respondents at the same point in time, so the time sequence assumed by the mediation—policy or digital literacy first, performance second, sustainability third—was consistent with the model but not directly observed. It is still plausible that more sustainable or better-performing SMEs then report stronger digital literacy or policy engagement, or that immeasurable factors such as owner-manager competence, company age, access to financing, market orientation, or sector conditions affect performance, digital literacy, and sustainability simultaneously. General-method diagnostics reinforce this caution: the first factor accounts for about 50.1% of variance in the full sample, and the sustainability-related VIF of 3.44 slightly above the conservative benchmark of 3.3. The discussion below describes the outcome pattern as consistent with the mechanism of resource conversion, rather than as evidence of the causal sequence itself, and separates relationships that were robust to the sensitivity re-estimation from those that were not.

4.4.1. Government policy pathways

Policy outcomes show that institutional support can operate through both direct sustainability pathways and smaller performance-mediated pathways. Direct government policy → Sustainability Effects ($b = 0.344$) is stronger and more powerful than the policy → Performance Effects ($b = 0.196$). This pattern is consistent with (Gimin et al., 2026), who reports on the effects of direct and indirect government support on the sustainability of SMEs, and with Saeed (2026), who shows that state aid can strengthen future performance and access to finance by reducing liquidity constraints and information asymmetry. (Aslam et al., 2023) Provide a complementary explanation: government support helps SMEs gain financial, financial, and green value creation skills. Overall, policies can create continuity, access, legitimacy, and a reduction in uncertainty even before all the benefits are reflected in the company's short-term performance. The sensitivity of H1 and H6 also implies that the effect of the policy depends on the quality of implementation and enterprise-level capacity; Therefore, policy should be seen as an enabling condition, not as a dominant internal performance driver.

The contrast between H1 and H2 sharpens this interpretation. Policy support has a moderate substantial effect on sustainability but little on performance. One explanation is that some of the benefits of a supportive policy environment are not directly reflected in the four performance indicators maintained. Formalization, regulatory certainty, access to public services, financing opportunities, and participation in government programs can lower business risks or improve continuity even if short-term financial growth, operational efficiency, innovation, and customer outcomes change more slowly. In this case, a direct policy path towards sustainability can capture institutional stabilization that is only partially

mediated by current business performance. This interpretation is consistent with the government-supported literature without implying that each program is effective. Sensitivity analysis is important here: when unchanged response patterns are excluded, policy-to-performance and policy-mediated effects lose significance, while the direct effects of policy-sustainability remain stable. A more tenable conclusion is that the role of policies that support sustainability is particularly strong in this sample, while claims that policies systematically improve performance are more contingent.

For policy evaluation, this distinction is important. Program implementation metrics such as the number of training events, financing schemes, licenses issued, or participants achieved are necessary administrative indicators but do not establish business impact. A stronger evaluation architecture will link each intervention to post-program outcomes, such as better formalization, continuity, access to financing, productivity, market expansion, or adoption of sustainable practices. The report will also distinguish between interventions that are expected to change performance quickly and those designed to improve the institutional environment over a longer period of time. This kind of approach reduces the risk of assessing all SME policies through a single short-term performance metric and is consistent with evidence that external support can create direct resources as well as credibility or long-term access effects (Aslam et al., 2023; Saeed, 2026).

4.4.2. Digital capabilities and performance conversion pathways

The digital path is different. Digital literacy has a large and strong impact on SME performance, but it does not have a significant direct impact on sustainability. These findings show that digital knowledge is not sustainability in itself. Its strategic value arises when owners and managers use digital capabilities to improve transactions, information processing, market reach, customer interaction, innovation, or operational efficiency. (Zahoor et al., 2023) Similarly, it shows that managerial digital literacy works through the use of real technology in the digital transformation process. (Avelar et al., 2024) linking digitalization and innovation investment with company growth, while (Abbas et al., 2024) Demonstrating that financial innovation and digitalization contribute to performance through innovation and competitive market mechanisms. The study expands on these arguments by showing that conversion seems to continue one step further: the results are consistent with performance that serves as a mechanism for digital capabilities to achieve sustainability, even though cross-sectional design cannot rule out inverse or reciprocal influences among those variables.

The absence of the direct effect of digital literacy on sustainability should not be interpreted as proof that digital capabilities are not important. On the contrary, it is more consistent with this model: digital literacy is one of the strongest predecessors, but its effect is focused on performance. This concentration is theoretically meaningful because sustainable construct encompasses sustainable profitability, social responsibility, environmentally responsible waste management, community empowerment, and energy efficiency. Digital knowledge can facilitate those outcomes, but it does not replace the operational, financial, and managerial changes needed to make them happen. An SME owner may understand e-commerce, digital security, and online communication without having to achieve stable profitability or invest in social and environmental practices. Full mediation through performance is consistent with a series in which digital literacy increases a company's capacity to act, that capacity is associated with better business outcomes, and stronger outcomes create room for sustainability; Because the data are cross-sectional and single-source, these sequences should be read as patterns consistent with the results, not as a causal sequence that is directly observed.

This sequence is consistent with the micro-basic reading of digital transformation. (Zahoor et al., 2023) Placing managerial digital literacy at the upstream of the actual use and transformation of technology, while (Feliciano-Cestero et al., 2023) Emphasize that digital transformation depends on the interaction of managerial, organizational, and technological factors. (Haq et al., 2025) reach similar conclusions in different technology contexts: Green AI adoption contributes to sustainable performance when an organization's investment and readiness help transform adoption into usable capabilities. This study extends the logic of this conversion to the digital literacy of SMEs in general. The implication is that the effectiveness of training should be assessed through post-training behavior and outcomes, not just knowledge acquisition. Programs must connect digital skills with pricing, customer analytics, digital bookkeeping, inventory control, secure transactions, channel integration, and innovation routines, because it is the mechanisms that enable literacy to become performance and, ultimately, sustainability.

SME performance is therefore the main resource conversion mechanism in this model. Its direct impact on sustainability ($\beta = 0.571$; $f^2 = 0.570$) was the largest substantive relationship. Better financial and operational outcomes provide companies with the flexibility they need to absorb shocks, invest in innovation, maintain relationships with customers, support communities, and improve environmental efficiency. This is consistent with (Kurniasari et al., 2025), which reports a strong performance–sustainability relationship among Indonesian SMEs. It is also in line with dynamic capability evidence that shows that organizational learning, open innovation, ambidexterity, absorption capacity, and agility enable SMEs to transform resources into market effectiveness, profitability, and growth (Al Nuaimi et al., 2024; Thomas & Douglas, 2024). The results support the treatment of performance not only as an intermediate statistical variable but as a realized value of resource placement.

The magnitude of the performance-sustainability pathway also helps determine the conceptual proximity between the two constructs. Their HTMT value of 0.896 is close to the adopted 0.90 threshold, which is not surprising since successful companies are more likely to have the resources needed for continuity. Nevertheless, the content of the measurement remains different. Performance captures achieved business outcomes such as financial growth, operational efficiency, innovation, and customer-related outcomes, while sustainability captures sustainable profitability along with social and environmental responsibility. Therefore, the coefficient of strong paths should be interpreted as a substantial dependency, not evidence that the constructs are identical. The sensitivity results support this reading because the performance-sustainability relationship remains strong after the invariant response is eliminated.

This difference has practical consequences for SME management. Sustainability initiatives are sometimes presented separately from 'core' business performance, but the results suggest that weak performance can limit the ability to maintain social or environmental commitments. Instead, improved performance can create financial leeway, managerial attention, and operational discipline that make sustainability investing more feasible. The interpretation of resource conversion does not reduce sustainability to profit; Instead, it identifies performance as an organizational platform that allows economic, social, and environmental commitments to endure. For resource-constrained SMEs, this sequencing is crucial because managers often face a compromise between immediate survival and long-term investment. Strengthening performance can mitigate those compromises and expand the set of sustainable actions that companies can realistically maintain.

4.4.3. Theoretical and practical synthesis

The study's main theoretical contribution is the identification of asymmetric resource conversion pathways. Government policies are enabling external conditions that can directly reduce structural barriers and also, in some conditions, improve performance. Digital literacy is an internal source of knowledge whose sustainability value depends primarily on performance. This difference refines the simple logic of 'more support and better digitization'. RBV explains why digital literacy can be strategically valuable, while Dynamic Capabilities explains why value only emerges when those resources are integrated and reconfigured into superior performance. The finding that H4 is not supported, along with strong H7 mediation, is crucial because it suggests that digital skills training should be evaluated based on business outcomes, not just indicators of participation or tool use.

Practically, the results show two different agendas. Government agencies should evaluate SME programs using outcome-based indicators such as business continuity, access to financing, productivity, market access, and sustainability practices, not just the number of licenses, training sessions, or financing schemes provided. At the same time, digital literacy programs must move away from using basic applications to developing performance-oriented capabilities, including digital marketing analytics, secure transactions, the use of customer data, process digitization, financial management, and technology-based innovation. This approach is consistent with broader evidence that the benefits of technology require organisational readiness, investment, and a supporting ecosystem (Haq et al., 2025). This performance-oriented direction is also consistent with community-based assistance in Lampung, where direct optimization of digital media is used to help MSMEs market products online in a more sustainable manner (Warsiyah et al., 2023).

The asymmetrical pattern also contributes to the integration of RBV and Dynamic Capabilities. RBV alone can raise a broad expectation that valuable resources should improve yields, but this does little to explain why these routes differ across different resource types. The results show that the internally embedded knowledge source and the externally provided driving conditions are not functionally equivalent. Digital literacy requires a conversion stage before its sustainability value emerges, while government policies can directly reduce structural constraints. Dynamic capabilities provide process explanations for digital pathways: sensing information and opportunities, seizing them through technology-enabled actions, and reconfiguring processes are activities where knowledge becomes performance. For policy paths, enterprise-level dynamic capabilities remain relevant but not the only mechanism, as policies can also change the environment around the company. The division of explanatory work between these two theories is more appropriate than treating all the predecessors as generic sources.

The empirical contribution of this study is not only because policy, digital literacy, performance, and sustainability are statistically intertwined. It identifies where conversions occur and where they don't. The robust H3–H5–H7 sequence indicates a performance-dependent digital sustainability pathway. A strong H2 pathway indicates a direct institutional sustainability pathway. H1 and H6 add smaller, sensitivity-dependent conversion routes for policy support. This pattern shows a contingent, rather than universal, model of SME sustainability: external institutional support can stabilize the business environment directly, while internal digital capabilities must be realized through business performance. Future research can test whether these asymmetry changes across different sectors, regions, levels of digital maturity, or types of policy exposure.

The managerial implications arise from treating conversion capabilities as a measurable organizational process. SMB owners can use a small set of outcome indicators to determine whether digital knowledge is truly creating value: changes in customer acquisition and retention, transaction speed, cost efficiency, sales channel diversification, inventory accuracy, frequency of innovation, and quality of cash flow. Tracking such indicators before and after digital interventions will help differentiate tangible capability development from mere platform adoption. The same logic applies to public programs. Government agencies can combine administrative monitoring with enterprise-level follow-up at three or six months after training, financing, or licensing interventions. This will provide evidence of whether a program improves business outcomes, creates only a brief participation effect, or primarily works by reducing institutional barriers. Such monitoring also allows for additional mentoring targeting to companies that receive support but fail to convert it into performance.

For Lampung, where SMEs operate in urban, peri-urban, and rural environments and differ significantly in sector and digital maturity, the conversion-oriented approach also opposes one-size-fits-all interventions. Culinary SMEs that use social commerce may need support in digital customer analytics, secure payments, and inventory integration, while craft businesses may benefit more from market access, product content capabilities, and logistics coordination. Similarly, companies with weak financial management may not be able to capitalize on digital sales growth unless bookkeeping and cash flow capabilities increase simultaneously. The empirical asymmetry in this study therefore favors coordinated interventions: policies should reduce structural constraints, while capability programs should help companies translate digital knowledge into performance. Sustainability becomes more likely when these two agendas reinforce each other, not replace each other.

Table 12. Hypothesis testing summary

Hypothesis	Relationships	Conclusion
H1	GP → PERF	Supported in the main sample; Depends on sensitivity
H2	GP → SUST	Supported and robust
H3	DL → PERF	Supported and robust
H4	DL → SUST	Not supported; robust non-significance
H5	PERFORMANCE SUSTAINABILITY	→ Supported and robust
H6	GP → PERF → SUST	Sample-sensitive indirect association; non-significant after excluding invariant responses; requires independent replication
H7	DL → PERF → SUST	Supported and robust; Indirect/full mediation

Note: GP = government policy; DL = digital literacy; PERF = SME Performance; SUST = Sustainability of SMEs. *Source:* Author's analysis based on the final model.

5. Conclusions and Suggestions

The study provides evidence that government policies and digital literacy achieve SME sustainability through different mechanisms, although the two pathways carry different levels of confidence. The digital-literacy-performance-sustainability sequence (H3, H5, H7) was particularly strong across the main sample and sensitivity reestimates, and was the most tenable study finding: digital literacy greatly improved SME performance but did not have a significant direct impact on sustainability, so its sustainability contribution was primarily realized through performance. Government policies have a strong direct positive effect on sustainability (H2), but smaller, performance-mediated routes (H1, H6) lose significance after invariant response patterns are excluded and should be treated as tentative and sample-sensitive pending independent replication, rather than being established with the same confidence as the digital pathway. SME performance is therefore the main resource conversion mechanism in this model.

In theory, these findings extend the RBV-based explanation of SME sustainability by separating enabling external conditions from internal knowledge capabilities and showing that the two are not functionally equivalent. Dynamic capabilities add process logic: resources create sustainable value when companies can mobilize and reconfigure them into productive outcomes. Economically and managerially, the findings support a shift from resource provision to resource conversion. Government support should be linked to measurable post-program outcomes, while SME managers should turn digital knowledge into operational efficiency, innovation, customer value, and financial performance. The sustainable development of SMEs depends not only on access to policies or technologies, but also on the capacity of the organization to transform those inputs into superior performance.

6. Limitations and Future Research

Several limitations qualify such conclusions. First, cross-sectional design supports theoretical foundational structural associations but cannot establish longitudinal causality. Future studies should use panel or longitudinal data to examine whether changes in policy exposure and digital capabilities precede changes in performance and sustainability. Second, purposive sampling and the Lampung-based setting limit statistical generalization to all Indonesian SMEs; multi-province and cross-country replication would test contextual robustness. Third, all focus constructs were self-reported by the same respondents, creating potential for general method bias and perception. Future studies should combine survey size with objective indicators such as revenue, profitability, employability, digital transactions, energy use, or company viability. Fourth, 16 out of 143 respondents (about 11.2%) chose the same Likert category on all 20 items of the initial questionnaire. A complete straightlining of these conceptually distinct items deserves further investigation rather than simply being defended on the grounds that invalidity cannot be proven; ideally fill duration, duplicate identity, IP/device information (if available), missing data patterns, unreasonable fill speeds, and consistency with demographic answers are examined to support retention/exclusion decisions. The authors acknowledge that the response quality screening rules in this study were determined after seeing significant changes, rather than being established prospectively before analysis—a methodological limitation that should be corrected in future studies by establishing a priori data screening protocol. Because H1 and H6 are no longer significant after these 16 cases are issued, the government's policy-related findings depend in part on potentially low-information response patterns, and this sensitivity analysis should be treated

as a central part of the interpretation—not just an additional supplemental resilience check. Fifth, the discriminatory validity of performance and sustainability close to the HTMT threshold, suggests that future measurements should distinguish short-term economic and operational performance more sharply from long-term economic, social, and environmental sustainability. Finally, future models can test innovation capabilities, access to finance, entrepreneurial orientation, organizational resilience, environmental orientation, market turmoil, and ecosystem collaboration as additional mechanisms or boundary conditions.

The study also measured policy as perceived support, rather than as independently verified program intensity or expenditure. Perceptions are relevant because companies respond to the accessibility and usability of the policy as they experience it, but future studies may associate respondent data with administrative records about training participation, funding amounts, licensing services, or program duration. Such linkages will distinguish policy availability from effective exposure. In addition, sustainability is measured as a reflective, perception-based construct that includes economic, social, and environmental practices. Future research could model these domains separately or as high-level constructs and compare whether government policies and digital capabilities have different effects on economic, social, and environmental sustainability. This expansion will help determine whether the asymmetric pathways observed here reflect a common or stronger sustainability mechanism for a particular sustainability dimension.

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Declaration of AI and AI technology in the writing process

During the preparation of this manuscript, the authors used OpenAI ChatGPT to help with language refinement, manuscript organization, and presentation clarity. The authors then review, verify, and edit the content and take full responsibility for the accuracy, integrity, analysis, interpretation, and final content of the manuscript.

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