

ESG Practices and SME Performance in Surabaya: Moderating Effects of Digital Transformation and Government Support

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Abstract

This study examines the effect of Environmental, Social, and Governance (ESG) practices on SME performance in Surabaya, Indonesia, and evaluates the moderating roles of digital transformation and government support. Using a quantitative cross-sectional design, data from 100 Small and Medium-sized Enterprises (SME) owners and managers were collected through purposive sampling and analyzed using PLS-SEM with SmartPLS 4. The measurement model met reliability and validity criteria after removing two weak ESG indicators. ESG practices positively affected SME performance ($\beta=0.348$, $t=3.137$, $p=0.002$), and government support also had a significant effect ($\beta=0.342$, $t=3.621$, $p<0.001$), while digital transformation showed a positive but non-significant effect ($\beta=0.219$, $t=1.802$, $p=0.072$). The moderating effects of digital transformation ($\beta=0.108$, $t=1.423$, $p=0.155$) and government support ($\beta=-0.085$, $t=0.863$, $p=0.388$) were not significant. The model explained 51.3% of SME performance variance ($R^2=0.513$) and showed positive predictive relevance ($Q^2_{predict}=0.457$). This study is limited by its cross-sectional design and focus on SMEs in a single urban context, which may affect generalizability. The findings contribute to the resource-based and dynamic-capability perspectives by demonstrating that ESG and government support directly enhance SME performance, while digital transformation does not automatically strengthen ESG outcomes.

Keywords: Digital Transformation, ESG, Government Support, PLS-SEM, SME Performance

1. INTRODUCTION

In the current landscape of global market volatility and increasing environmental consciousness, the integration of Environmental, Social, and Governance (ESG) principles has evolved into a fundamental strategic framework necessary for long-term organizational survival and stakeholder trust (Putri, Widajantie, & Wilasittha, 2024; Shalhoob, & Hussainey, 2022). Modern enterprises must transition from traditional short-term financial objectives to comprehensive sustainability models to maintain organizational legitimacy in an era of strict global accountability standards (Putri et al., 2024). While ESG adoption was historically perceived as the primary domain of multinational corporations, Small and Medium Enterprises (SMEs) are facing intensifying pressure to align their operations with these sustainability imperatives to build resilient reputations (Garrido, & Santomil, 2024; Shalhoob and Hussainey, 2022). For smaller entities, adopting ESG practices is a critical mechanism for mitigating operational risks, enhancing resource efficiency, and ensuring business continuity in a highly competitive economic environment (Shalhoob & Hussainey, 2022).

In Indonesia, SMEs are vital to national economic growth. As of 2023, Indonesia had approximately 66 million MSMEs, representing 99% of all business units, contributing 61% to the national Gross Domestic Product equivalent to IDR9.58 quadrillion, and absorbing the vast majority of the national workforce. Despite their economic centrality, ESG adoption among Indonesian SMEs remains inconsistent and fragmented, often limited by resource constraints, low sustainability literacy, and informal dominance (Añón & Bonvin, 2024). The International Monetary Fund (IMF) notes that smaller firms face disproportionate barriers to governance compliance and strategic investment compared with their larger counterparts.

Surabaya provides a particularly relevant empirical setting for examining this issue because the city has developed a sustained commitment to sustainability and green urban development. Earlier estimates reported approximately 385,054 SMEs in Surabaya, reflecting the substantial scale of the local business ecosystem. Beyond the size of its SME sector, Surabaya has received both national and international recognition for its environmental initiatives. In 2017, the city was recognized under the

sustainable cities and human settlements awards in the global green city category, followed by regional recognition in 2021 through the ASEAN Environmentally Sustainable Cities program, in which Surabaya received a Certificate of Recognition for Clean Air in the Big Cities category. Surabaya was ranked second overall in the UI GreenCityMetric 2025 and was recognized as the leading city in the Water Management and Governance categories. These achievements are consistent with the city's continuing policy orientation toward sustainable urban development, as reflected in the Surabaya *Rencana Pembangunan Jangka Menengah Daerah/RPJMD 2025–2029*, which emphasizes the transformation toward a sustainable city, including environmental quality, circular economy approaches, and environmentally oriented urban infrastructure. However, strong sustainability performance at the city level does not necessarily imply that SMEs have internalized ESG principles equally. Differences in financial capacity, sustainability knowledge, digital readiness, and access to government support may create a gap between city-level sustainability ambitions and firm-level ESG implementations. This gap makes Surabaya a particularly relevant context for examining whether ESG practices translate into improved SME performance and whether this relationship is dependent on digital transformation and government support [Bahtiar, Rabbany, Bele, Husna, and Matulessy \(2025\)](#).

Theoretically, the link between sustainability practices and business success is rooted in stakeholder theory, which posits that organizations are accountable to a broad spectrum of interests beyond mere shareholders, including employees, communities, and the environment [\(Nasution, Yudianto, & Mulyani, 2025\)](#). From this perspective, meeting stakeholders' ethical expectations enhances long-term performance and reinforces organizational credibility. Complementing this, the Resource-Based View (RBV) suggests that ESG capabilities function as valuable, rare, and inimitable intangible assets that provide a sustainable competitive advantage in a crowded marketplace [\(Barney, 1991\)](#). Furthermore, dynamic capabilities theory emphasizes the necessity for firms to integrate and reconfigure internal competencies, such as digital readiness, to effectively respond to shifting regulatory environments and sustainability challenges [\(Akhtar, Senadiki, & Vija, 2025\)](#). However, the successful implementation of these frameworks often depends on whether internal management systems can transition toward a long-term sustainability orientation [\(Putri et al., 2024\)](#).

Empirical evidence regarding the impact of ESG on performance remains varied and context-dependent, particularly in emerging Southeast Asian economies [\(Akhtar et al., 2025; Wang, & Esperança, 2023\)](#). In Malaysia, ESG implementation bolstered financial performance through its strategic alignment with digital organizational culture and public policy support [\(Akhtar et al., 2025\)](#). Similarly, evidence from China indicates that digital transformation can improve market performance and enhance the transparency of ESG reporting [\(Chen, Zhuo, Huang, & Li, 2022; Wang and Esperança, 2023\)](#). Nevertheless, the effectiveness of external facilitators, such as e-government and public subsidies, is often questioned, as they may focus predominantly on administrative functions rather than strategic value creation [\(Nasution et al., 2025; Zhu, Hu, Wu, & Zhang, 2025\)](#). In Indonesia, the limited reach of government support programs and uneven technological infrastructure often hinder the potential synergy between digitalization and sustainability adoption [\(Nasution et al., 2025\)](#).

A significant research gap persists regarding the simultaneous integration of ESG, digital transformation, and government support within a single empirical model in the Indonesian urban context [\(Akhtar et al., 2025\)](#). Most existing studies focus on the manufacturing sectors in countries with more developed digital infrastructures, leaving a deficit of evidence regarding diverse urban SMEs in middle-income economies [\(Budhwar, Varma, & Patel, 2016; Wang and Esperança, 2023\)](#). There is also a notable inconsistency regarding the role of digital transformation; while theorized as an accelerator, many urban SMEs adopt digital tools only superficially for marketing rather than for deep system integration [\(Kraus, Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022; Nasution et al., 2025\)](#). Furthermore, the effectiveness of government support in strengthening the ESG-performance link is often questioned because of misalignments between top-down policies and the actual resource constraints of local business owners [\(Budhwar et al., 2016; Nasution et al., 2025\)](#). Prior studies have often neglected how these factors interact to shape the long-term resilience of small firms in rapidly

evolving metropolitan settings. To the best of our knowledge, limited empirical research has simultaneously evaluated the moderating roles of digital transformation and government support in the relationship between ESG practices and SME performance, particularly among heterogeneous urban SME populations in Indonesia. This limited evidence represents an important theoretical and contextual gap that this study seeks to address.

This study makes four distinct contributions to the ESG and SME performance literature. First, it provides empirical evidence of the simultaneous moderating roles of digital transformation and government support in the ESG-performance relationship among diverse urban SMEs in Indonesia, an area that remains relatively underexplored in the existing literature. Second, theoretically, it extends the application of RBV and dynamic capabilities theory by treating ESG as an internal strategic asset whose performance effects may depend on complementary internal technological capabilities and external institutional support, advancing beyond frameworks that examine these enabling conditions separately. Third, empirically, this study broadens the evidence base on ESG and SME performance by providing primary survey evidence from heterogeneous urban SMEs in Indonesia, complementing prior findings from SMEs in other national and sectoral contexts ([Garrido and Santomil, 2024](#); [Wang and Esperança, 2023](#)). Fourth, contextually, the focus on Surabaya provides evidence from an urban setting characterized by a strong city-level sustainability orientation but heterogeneous firm-level capabilities, enabling the study to examine whether broader sustainability ambitions are translated into ESG-related business outcomes among SMEs.

Based on these considerations, the primary objective of this study is to analyze the influence of ESG practices on the business performance of SMEs in Surabaya. Specifically, this study aims to evaluate whether digital transformation and government support moderate the relationship between ESG practices and firm performance. This study seeks to determine whether ESG integration acts as a stand-alone driver of success or whether its benefits are contingent upon internal technological maturity and external institutional support ([Nasution et al., 2025](#)). Ultimately, this study aims to advance the discourse on how small businesses can achieve long-term resilience and legitimacy in an increasingly digital and sustainability-conscious global economy ([Putri et al., 2024](#)).

2. LITERATURE REVIEW

2.1 ESG and SME Performance

The Environmental, Social, and Governance (ESG) framework has become an integral part of corporate sustainability, although its application in the Micro, Small, and Medium Enterprises (MSME) sector has not been explored in depth. In developing economies, SMEs often take the form through practical and localized actions rather than complex corporate sustainability strategies. The Environmental (E) dimension generally includes energy efficiency, responsible waste management, and resource conservation. The Social (S) dimension emphasizes employee welfare and community engagement, whereas the Governance (G) dimension focuses on transparency, accountability, and ethical business conduct ([Shalhoob, & Hussainey, 2022](#); [Van, Plantinga, & Scholtens, 2016](#)). ESG practices can contribute to SME performance through various mechanisms. Environmentally responsible practices may improve resource efficiency and reduce operational costs, social practices can strengthen relationships with employees and communities, and governance practices improve transparency and managerial accountability ([Aliyevna, 2025](#); [Olewi, 2026](#)). Previous studies have indicated that ESG implementation may improve risk management, stakeholder relationships, organizational legitimacy, and firm resilience ([Garrido, & Santomil, 2024](#); [Shalhoob and Hussainey, 2022](#)).

Recent cross-national evidence further demonstrates that the relationship between ESG and firm performance is context dependent. [Garrido and Santomil \(2024\)](#) show that individual ESG dimensions, particularly social and labor practices, influence firm resilience during periods of disruption. Stronger ESG practices may also improve corporate governance, reduce agency-related problems, and increase stakeholder satisfaction in emerging markets ([Narula, Rao, & Rao, 2023](#)). Evidence from ASEAN countries indicates that governance-related practices may have particularly important implications for firm performance, highlighting the relevance of transparency and

accountability for businesses in developing economies ([Chopra, Senadheera, Dissanayake, Withana, Chib, Rhee, and Ok \(2024\)](#)). Taken together, these findings suggest that ESG practices can function as strategic organizational resources that enhance efficiency, stakeholder relationships, legitimacy, and continuity.

H₁: ESG practices positively affect SME performance in Surabaya

2.2 Digital Transformation and SME Performance

Digital transformation has become an important determinant of SME competitiveness, particularly in developing economies, where technology can help firms overcome limitations in financial, human, and organizational resources. Digital technologies allow SMEs to automate routine activities, improve information processing, strengthen financial and inventory management, expand market access, and interact more efficiently with customers and suppliers ([Kraus, Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022](#); [Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, & Haenlein, 2021](#)). Digitalization can also improve the speed and quality of decision-making. The use of digital platforms, integrated information systems, and data analytics enables firms to obtain timely information and coordinate operational activities more effectively. Such capabilities can improve productivity, reduce transaction costs, strengthen market responsiveness and enhance organizational resilience ([Dubey, Gunasekaran, Childe, Luo, Wamba, Roubaud, & Foropon, 2018](#); [Sagala, & Ōri, 2025](#)).

However, digital readiness varies significantly across SMEs. Successful digital transformation requires more than simply adopting technological tools, it also depends on managerial awareness, organizational culture, employee capabilities, and the integration of technology and business processes ([Kraus et al., 2022](#)). In this sense, digital transformation represents a strategic organizational capability that can directly improve SME competitiveness and their performance.

H₂: Digital transformation positively affects SME performance

2.3 Government Support and SME Performance

Government support is an important external resource for SMEs, particularly because smaller firms frequently experience financial, technological, managerial, and institutional constraints. Government interventions may include financial assistance, subsidies, business training, regulatory facilitation, digitalization programs, market access initiatives, and infrastructure support ([Chen, Zhuo, Huang, & Li, 2022](#); [Zhu, Hu, Wu, & Zhang, 2025](#)). Such support can directly contribute to business performance by reducing resource constraints and strengthening the managerial capabilities. Financial assistance can improve access to working capital and productive resources, whereas training and mentoring programs can enhance managerial knowledge and entrepreneurial competence ([Frimpong, 2023](#); [Putri, & Septiyanti, 2026](#)). Regulatory facilitation can reduce administrative burdens, whereas government-supported digital and market development programs can increase firms' access to information, technologies, customers, and business opportunities. [Hossain, Ibrahim, and Uddin \(2023\)](#) further indicate that government financial assistance can contribute to business growth when accompanied by programs that enhance SME owners' financial literacy and managerial capabilities. Thus, government support can function as an external institutional resource that strengthens the operating environment and resource position.

H₃: Government support positively affects SME performance

2.4 Moderating Role of Digital Transformation

In addition to its direct effect on SME performance, digital transformation determines how effectively firms translate ESG practices into business outcomes. Dynamic capabilities theory provides an appropriate explanation for this moderating mechanism because it emphasizes firms' ability to sense environmental changes, seize emerging opportunities, and reconfigure organizational resources in response to changing conditions ([Paul, Ueno, Dennis, Alamanos, Curtis, & Foroudi, 2024](#)). From this perspective, the strategic value of digital transformation lies not merely in the adoption of technology but in its ability to help SMEs acquire, process, integrate, and operationalize sustainability-related information. Digital systems facilitate the collection and interpretation of

ESG-related data, improve communication with stakeholders, support the integration of sustainability considerations into managerial decision-making, and enable firms to monitor environmental, social, and governance activities more systematically ([Tregidga & Laine, 2022](#)).

This mechanism is closely related to absorptive capacity, which refers to a firm's ability to acquire, assimilate, transform, and exploit external knowledge. Digital technologies can strengthen SMEs' ability to absorb ESG-related knowledge from regulators, customers, suppliers, and other stakeholders, and subsequently convert this knowledge into operational practices ([Wirdiyanti, Yusgiantoro, Sugiarto, Harjanti, Mambea, Soekarno, & Damayanti, 2023](#)). For example, an SME with stronger digital capabilities may use digital accounting systems to improve governance transparency, digital monitoring tools to track resource efficiency, and digital communication platforms to strengthen stakeholder engagement. Consequently, the same level of ESG commitment may generate stronger performance benefits for digitally mature SMEs than for firms where digital adoption remains limited. The Indonesian SME context supports this argument. Many SMEs continue to use digital technologies primarily for basic communication and marketing rather than for integrated financial, operational, and managerial processes ([Purnomo, Nurmalitasari, & Nurchim, 2024](#); [Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, & Haenlein, 2021](#)). Such differences in digital maturity may explain the variation in the performance benefits derived from ESG practices across firms.

H₄: Digital transformation positively moderates the relationship between ESG practices and SME performance

2.5 Moderating Role of Government Support

Government support may also influence the extent to which ESG practices benefit business performance. Although SMEs may recognize the importance of sustainability, implementing environmental, social, and governance practices frequently requires financial resources, knowledge, institutional access, and managerial capabilities that smaller firms do not always possess. Government support can help overcome these constraints. Financial incentives may reduce the cost of adopting environmentally responsible technologies, and training programs can improve knowledge of sustainability practices. Regulatory assistance can facilitate compliance with business and environmental requirements, and digital or market access programs can help SMEs communicate sustainability initiatives to customers and other stakeholders ([Budhwar et al., 2016](#); [Zhu et al., 2025](#)).

However, the effectiveness of government intervention depends substantially on the relevance and accessibility of the support programs. In the Indonesian context, public programs may not always correspond to the actual strategic and sustainable needs of SMEs ([Nasution et al., 2025](#)). Firms also differ in their levels of formalization, institutional connectivity, and ability to access government assistance. Consequently, ESG practices may produce stronger performance outcomes when firms operate in a supportive institutional environment. Conversely, when government assistance is limited, inaccessible, or poorly aligned with business needs, SMEs may find it more difficult to transform their ESG commitments into measurable performance benefits.

H₅: Government support positively moderates the relationship between ESG practices and SME performance

2.6 Theoretical Foundations

This study integrates four complementary theoretical perspectives. Stakeholder theory ([Freeman, Harrison, & Zyglidopoulos, 2018](#)) explains why firms must address stakeholder expectations beyond shareholders, including employees, customers, communities, governments, and the natural environment. ESG practices serve as mechanisms through which SMEs respond to these expectations. By improving environmental responsibility, social engagement, transparency, and ethical governance, ESG practices can strengthen stakeholder trust and organizational legitimacy, providing a theoretical foundation for *H₁*.

The Resource-Based View (RBV) [Barney \(1991\)](#) explains how valuable organizational resources and capabilities can generate competitive advantages. ESG-related practices may function as intangible strategic resources by strengthening reputation, stakeholder relationships, governance quality, and operational discipline. Digital capabilities also provide strategic value by improving information processing, operational efficiency, market responsiveness, and organizational coordination. Therefore, RBV provides theoretical support for the direct effects proposed in H_1 and H_2 .

Dynamic capabilities theory explains how firms sense environmental changes, seize emerging opportunities, and reconfigure resources in dynamic environments. Digital transformation represents a complementary dynamic capability because it enables SMEs to acquire, process, integrate, and operationalize ESG-related knowledge. Consequently, firms with stronger digital capabilities should be better positioned to transform ESG practices into improved business performance, providing a theoretical foundation for H_4 .

Government support complements internally generated capabilities by providing external resources, including financial assistance, training programs, regulatory facilitation, infrastructure development, and policy incentives. These forms of support can directly enhance SME performance, providing the rationale for H_3 , while also reducing barriers to ESG implementation and strengthening the effectiveness of ESG practices, providing the rationale for H_5 . Taken together, this theoretical framework suggests that SME performance is influenced not only by ESG practices but also by internal technological capabilities and external institutional resources. ESG provides a sustainability-oriented strategic foundation, digital transformation provides the capability to operationalize and reconfigure ESG-related knowledge, and government support creates an institutional environment that facilitates business development and ESG implementation.

Based on the literature discussed above, this study proposes a research model that examines the effect of Environmental, Social, and Governance (ESG) practices on SME performance, with digital transformation and government support as potential moderating variables. ESG is theorized to enhance SME performance through improved transparency, stakeholder alignment and operational ethics ([Freeman et al., 2018](#)). However, previous findings indicate that contextual enablers, such as technology adoption and institutional support, may shape the strength of this relationship ([Akhtar, Senadjki, & Vija, 2025](#); [Hossain, Ibrahim, & Uddin, 2023](#)). In particular, digital transformation is expected to strengthen the ESG-performance relationship by enhancing firms' capacity to absorb sustainability-related knowledge, process ESG information, embed it into organizational routines and decision-making, and translate ESG commitments into measurable business outcomes ([Dubey, Gunasekaran, Childe, Luo, Wamba, Roubaud, & Foropon, 2018](#); [Sagala, & Öri, 2025](#)). Government support provides an external institutional environment that may facilitate the effective implementation of ESG practices.

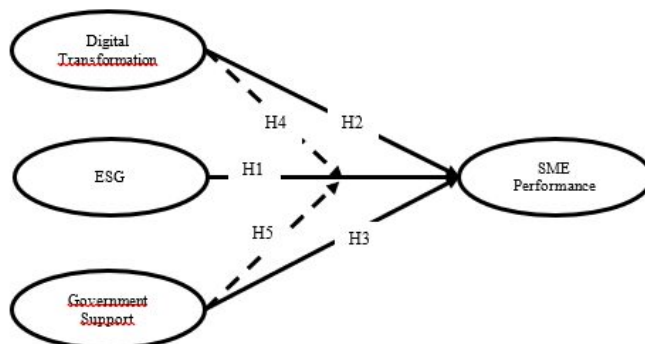


Figure 1. Conceptual framework

Figure 1 presents the conceptual framework illustrating the relationships between Environmental, Social, and Governance (ESG) practices, digital transformation, government support,

and SME performance. The framework proposes that ESG, digital transformation, and government support directly influence SME performance, while digital transformation and government support are also examined as potential moderating factors that strengthen or weaken the effect of ESG practices on performance. The model provides the theoretical basis for testing the direct and moderating relationships represented by the proposed hypotheses (H_1 – H_5).

3. RESEARCH METHODOLOGY

3.1 Research Design and Approach

This study adopts a quantitative research design with a causal-comparative approach to examine the influence of ESG practices on SME performance and test the moderating roles of digital transformation and government support. The choice of a quantitative method is aligned with prior SME studies in emerging markets that seek to generalize their findings through empirical modeling ([Creswell & Creswell, 2017](#)). The theoretical model is grounded in stakeholder theory, Resource-Based View (RBV), and dynamic capabilities theory, enabling the formulation and empirical testing of structural relationships. To analyze the complex interdependencies among latent variables and test moderation effects, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed using SmartPLS 4.0. This method is particularly suitable for studies with relatively small sample sizes, non-normal data distributions, and exploratory objectives that involve multiple constructs ([Hair, Hult, Ringle, Sarstedt, Danks, & Ray, 2021](#)).

3.2 Variable Definition and Measurement

The model includes four main constructs, such as ESG practices (exogenous variable), SME performance (endogenous variable), and two moderating variables, digital transformation, and government support. Each construct was measured using a multi-item Likert-type scale (1 = Strongly Disagree to 5 = Strongly Agree), based on validated instruments from previous studies and adapted to the local SME context. This study employed a structured questionnaire with Likert scales, in accordance with the recommended practices in business research design.

Table 1. Construct definitions, dimensions, sources, and example indicators

Construct	Dimensions	Source	Example Indicator
ESG	Environmental, social, and governance	Shalhoob and Hussainey (2022) , Akhtar, Senadjki, and Vija (2025) , and Van, Plantinga, and Scholtens (2016)	ESG1: “This business separates and manages its waste responsibly.”
SME Performance	Financial, operational, customer, and continuity	Akhtar, Senadjki, and Vija (2025) and Garrido and Santomil (2024)	SE1: “Our business has shown increased sales growth.”
Digital Transformation	Tools, digital presence, and readiness	Wang and Esperança (2023) and Kraus, Durst, Ferreira, Veiga, Kailer, and Weinmann (2022)	DT2: “We use social media to promote products/services.”
Government Support	Training, policy-fit, legal & subsidy access	Chen, Zhuo, Huang, and Li (2022) and Zhu, Hu, Wu, and Zhang (2025)	GS2: “Obtaining business licenses is easy for us.”

Table 1 shows the measurement constructs used in this study, including ESG, SME performance, digital transformation, and government support. Each construct is operationalized through relevant dimensions and indicators adapted from previous studies to ensure theoretical consistency and measurement validity. The table also provides representative indicators illustrating how each variable is measured in the context of SMEs.

Table 2. Measurement items for research variables

Variables	Code	Measurement Item
ESG	ESG1	"This business manages its waste responsibly and does not dispose of it carelessly."
	ESG2	"This business strives to save water and electricity during operations."
	ESG3	"This business provides decent wages and reasonable working hours to its employees."
	ESG4	"This business participates in social activities or helps the surrounding community."
	ESG5	"This business discusses with others (family, employees, or partners) before making important decisions."
	ESG6	"This business records all financial inflows and outflows consistently."
SME Performance	SE1	"Sales or turnover has increased from the previous year."
	SE2	"This business generates sufficient profit and income."
	SE3	"The number of customers is increasing and they make repeat purchases."
	SE4	"This business is able to manage business expenses effectively."
	SE5	"I am confident that my business can continue to operate in the future."
	SE6	"I am satisfied with the business I am running now."
Digital Transformation	DT1	"This business uses mobile phones or computers to assist operations."
	DT2	"This business sells products through social media or digital applications (WhatsApp, FB, IG, TikTok)."
	DT3	"This business uses digital applications (e.g., Excel, digital POS) for financial or stock records."
	DT4	"The owner is willing to learn new technologies that can help the business."
	DT5	"Digital technology makes business operations easier and faster."
Government Support	GS1	"Government training programs align with my business needs."
	GS2	"Obtaining business licenses (e.g., NIB, SIUP) is easy for us."
	GS3	"The government cares about small businesses."
	GS4	"Government assistance available for small businesses or SMEs."
	GS5	"I have received business assistance from the government, and it has been beneficial."
	GS6	"Government digital programs help modernize my business operations."
	GS7	"The government encourages SMEs to run businesses that care for the environment."

Table 2 shows each construct is measured through multiple indicators representing its underlying dimensions, with items designed to capture environmental, social, governance, business performance, digital capability, and institutional support aspects. The indicators are adapted to the SME context to ensure the relevance and accuracy of variable measurement. All measurement items were assessed using a Likert-scale approach to obtain respondents' perceptions regarding the implementation of each construct within their business operations.

3.3 Population, Sampling, and Data Collection

The population comprises active Small and Medium Enterprises (SMEs) in Surabaya, Indonesia, the nation's second-largest urban business hub. Using purposive sampling, this study targeted owners or managers responsible for strategic decision-making with at least one year's operational experience. A total of 100 valid responses were collected via online surveys and direct distribution through local government SME networks in South Korea. This sample size is scientifically adequate for Partial Least Squares Structural Equation Modeling (PLS-SEM) in

emerging market contexts (Hair et al., 2021). An a priori statistical power analysis was conducted using G*Power to determine the minimum sample size required for the structural model (Faul et al., 2009). Using a medium effect size ($f^2=0.15$), as recommended by Cohen (1988), a significance level of $\alpha = 0.05$, statistical power of 0.80, and five predictors directed toward SME performance, the analysis indicated a minimum required sample of approximately 92 observations. Therefore, the final sample of 100 valid responses exceeded the minimum requirement and was considered adequate for estimating the proposed structural relationship.

3.4 Data Analysis Procedure

The PLS-SEM analysis included both measurement and structural model assessments. Measurement model (Outer model), indicator reliability was evaluated using outer loadings, while internal consistency reliability was assessed using Cronbach's Alpha, rho_A, and Composite Reliability (rho_c). Convergent validity was evaluated using the Average Variance Extracted (AVE), with values of at least 0.50 considered acceptable. Indicators with weak loadings were evaluated for removal when their exclusion improved construct validity while preserving the content coverage. Discriminant validity was assessed using the Heterotrait-Monotrait ratio (HTMT) and its bootstrap confidence intervals.

Structural model (inner model), the structural model was assessed using inner VIF values, R^2 and adjusted R^2 , standardized path coefficients (β), bootstrap t -statistics and p -values, and effect sizes (f). The analysis evaluated five paths, such as ESG $\rightarrow$ SME performance (H_1), digital transformation $\rightarrow$ SME performance (H_2), government support $\rightarrow$ SME performance (H_3), digital transformation $\times$ ESG $\rightarrow$ SME performance (H_4), and government support $\times$ ESG $\rightarrow$ SME performance (H_5). Predictive relevance, out-of-sample predictive relevance was evaluated using the PLSpredict procedure in SmartPLS 4. Q^2 predict values greater than zero indicate predictive relevance for the endogenous construct, whereas Root Mean Square Error (RMSE) and Mean Absolute Error (MAE) are reported as prediction-error measures. Collinearity was evaluated using the inner VIF statistics.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

Table 3. Descriptive statistics of respondent characteristics (n=100)

Variables	Category	Frequency	Percentage (%)
Gender	Male	39	39.0
	Female	61	61.0
Business Sector	Food & Beverage	71	71.0
	Fashion	15	15.0
	Retail	8	8.0
	Creative & Others	6	6.0
Business Age	<1 year	12	12.0
	1–3 years	21	21.0
	>3 years	67	67.0
Use of Social Media	Yes	93	93.0
	No	7	7.0
Legal Registration	Registered (Formal)	42	42.0
	Not Registered (Informal)	58	58.0

Table 3 shows the descriptive analysis provides insights into the characteristics of the sampled SMEs. The descriptive analysis provides insights into the characteristics of the sampled SMEs. Most respondents (61%) were women-owned businesses, and the majority (67%) had been operating for more than three years. The predominant sector was food and beverage (71%), followed by fashion, retail, and creative services. Social media use was widespread (93%), while 58% of the sampled businesses were not formally registered. These characteristics indicate a heterogeneous urban SME

sample that combines substantial digital engagement with varying degrees of business formalization.

4.2 Measurement Model Evaluation

Table 4. Outer loadings of indicators

Construct	Indicator	Loading
ESG	ESG1	0.766
	ESG2	0.809
	ESG3	0.806
	ESG4	0.706
	ESG5	0.655
	ESG6	0.712
Digital Transformation	DT1	0.833
	DT2	0.823
	DT3	0.612
	DT4	0.777
	DT5	0.824
Government Support	GS1	0.708
	GS2	0.713
	GS3	0.763
	GS4	0.794
	GS5	0.755
	GS6	0.860
	GS7	0.770
SME Performance	SP1	0.762
	SP2	0.797
	SP3	0.773
	SP4	0.686
	SP5	0.773
	SP6	0.754

Table 4 shows the measurement model was re-estimated after removing two weak ESG indicators from the initial specification. In the final model, the outer loadings ranged from 0.612 to 0.860, indicating that all retained indicators achieved acceptable levels of indicator reliability. The results confirm that the remaining indicators adequately represent their respective constructs and provide a valid basis for further structural model evaluation.

Table 5. Construct reliability and convergent validity

Variables	Cronbach Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	Average Variance Extracted (AVE)
ESG	0.837	0.843	0.881	0.554
Government Support	0.883	0.886	0.909	0.589
SME Performance	0.852	0.854	0.890	0.575
Digital Transformation	0.833	0.845	0.884	0.606

Table 5 shows the ESG construct achieved AVE=0.554, Cronbach's α =0.837, rho_A=0.843, and composite reliability (rho_c)=0.881, thereby resolving the convergent validity deficit identified in the initial model. Government support (AVE=0.589, rho_c=0.909), SME performance (AVE=0.575,

rho_c=0.890), and Digital transformation (AVE=0.606, rho_c=0.884) also satisfied the recommended reliability and convergent validity criteria. Although ESG5 (0.655), DT3 (0.612), and SE4 (0.686) remained below the preferred loading of approximately 0.708, they were retained because the corresponding constructs achieved acceptable AVE and composite reliability, and the indicators preserved relevant content coverage.

Table 6. HTMT discriminant validity with 95% bootstrap confidence intervals

Construct Pair	HTMT	2.5%	97.5%
Government Support ↔ ESG	0.520	0.336	0.698
SME Performance ↔ ESG	0.713	0.563	0.835
SME Performance ↔ Government Support	0.666	0.511	0.801
Digital Transformation ↔ ESG	0.746	0.557	0.891
Digital Transformation ↔ Government Support	0.656	0.478	0.815
Digital Transformation ↔ SME Performance	0.698	0.511	0.863

Table 6 shows discriminant validity was assessed using the Heterotrait-Monotrait (HTMT) criterion. All HTMT estimates were below 0.85, ranging from 0.520 to 0.746, and none of the 95% bootstrap confidence intervals included 1.00. These results support adequate discriminant validity among ESG, government support, SME Performance and digital transformation.

4.3 Structural Model Results

Table 7. Structural collinearity and effect sizes

Predictor/Interaction	Inner VIF	f^2	Effect Interpretation
ESG	1.961	0.127	Small
Digital Transformation	2.018	0.049	Small
Government Support	1.687	0.142	Small, approaching medium
Digital Transformation × ESG	3.043	0.018	Negligible/very small
Government Support × ESG	3.032	0.008	Negligible

Table 7 shows the assessment of collinearity and effect size was conducted to evaluate the predictive relationships among constructs in the structural model. The inner VIF values ranged from 1.687 to 3.043, remaining below the commonly applied threshold of 5, indicating that multicollinearity was not a critical concern among the predictor and interaction variables. The effect size analysis (f^2) showed that ESG ($f^2=0.127$), digital transformation ($f^2=0.049$), and government support ($f^2=0.142$) demonstrated small effect sizes on SME performance, with government support showing the strongest contribution among the direct predictors. Meanwhile, the interaction effects of digital transformation × ESG ($f^2=0.018$) and government support × ESG ($f^2=0.008$) demonstrated negligible or very small effects, indicating limited practical influence in strengthening the ESG–SME performance relationship.

Table 8. Path coefficients and hypothesis testing

H	Structural Path	β	M	SD	t	p	Decision
H_1	ESG → SME Performance	0.348	0.342	0.111	3.137	0.002	Supported
H_2	Digital Transformation → SME Performance	0.219	0.222	0.122	1.802	0.072	Not supported
H_3	Government Support → SME Performance	0.342	0.344	0.094	3.621	<0.001	Supported
H_4	Digital Transformation × ESG → SME Performance	0.108	0.107	0.076	1.423	0.155	Not supported
H_5	Government Support × ESG → SME Performance	-0.085	-0.100	0.099	0.863	0.388	Not supported

Table 8 shows the structural path analysis was performed to examine the direct and moderating effects among the research constructs. ESG demonstrated a positive and significant direct effect on SME performance ($\beta=0.348$, $t=3.137$, $p=0.002$), supporting H_1 . Digital transformation showed a positive but statistically non-significant effect on SME performance ($\beta=0.219$, $t=1.802$, $p=0.072$), indicating that H_2 was not supported. Government support had a positive and significant direct effect

on SME performance ($\beta=0.342$, $t=3.621$, $p<0.001$), supporting H_3 . The moderating effect of Digital Transformation $\times$ ESG was positive but non-significant ($\beta=0.108$, $t=1.423$, $p=0.155$), indicating that H_4 was not supported. Similarly, government support $\times$ ESG produced a negative and non-significant moderating effect ($\beta=-0.085$, $t=0.863$, $p=0.388$), resulting in the rejection of H_5 .

Table 9. Coefficient of determination (R^2)

Variable	R-square	R-square adjusted
SME Performance	0.513	0.487

Table 9 shows the coefficient of determination was assessed to evaluate the explanatory power of the structural model. The results showed that SME performance obtained an R^2 value of 0.513 and an adjusted R^2 value of 0.487, indicating that the proposed model explains 51.3% of the variance in SME performance. This finding demonstrates moderate explanatory power, suggesting that ESG practices, digital transformation, government support, and their interaction effects collectively contribute to explaining variations in SME performance.

Table 10. PLSpredict predictive relevance

Endogenous Construct	Q^2 predict	RMSE	MAE	Interpretation
SME Performance	0.457	0.754	0.591	Positive predictive relevance

Table 10 shows the predictive relevance of the model was evaluated using the Q^2 predict procedure. The results showed that SME performance achieved a Q^2 predict value of 0.457, with RMSE of 0.754 and MAE of 0.591. The positive Q^2 predict value indicates that the model has adequate out-of-sample predictive relevance and demonstrates acceptable predictive capability in estimating SME performance outcomes.

4.4 Moderation Effects

Two interaction terms were included to examine the moderating effects in the structural model. The interaction effect of ESG $\times$ Digital Transformation was positive but statistically non-significant ($\beta=0.108$, $t=1.423$, $p=0.155$), while the interaction effect of ESG $\times$ government support was negative and also non-significant ($\beta=-0.085$, $t=0.863$, $p=0.388$). Neither interaction term reached statistical significance at the 5% level; therefore, H_4 and H_5 were not supported. These findings indicate that digital transformation and government support did not significantly strengthen or weaken the relationship between ESG practices and SME performance among the sampled firms.

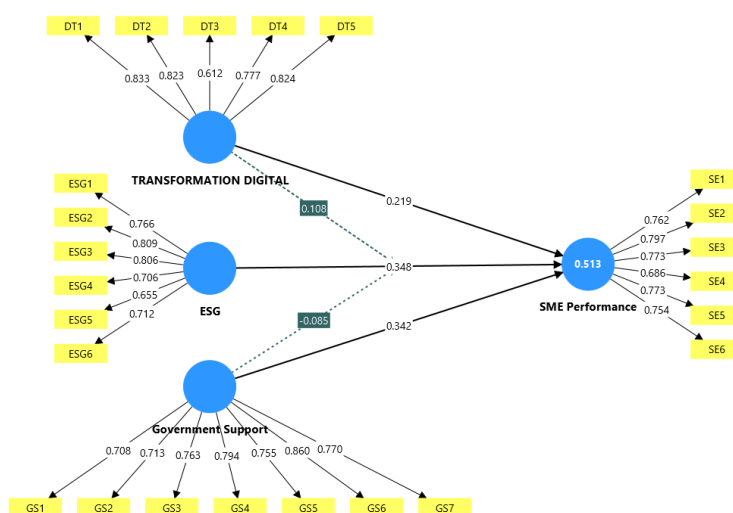


Figure 2. Final PLS-SEM structural model and moderation effects

Figure 2 illustrates the PLS-SEM structural model showing the relationships among ESG, digital transformation, government support, and SME performance. The model indicates that ESG,

digital transformation, and government support have positive direct relationships with SME performance, with path coefficients of 0.348, 0.219, and 0.342, respectively. The moderating paths of digital transformation $\times$ ESG and government support $\times$ ESG are represented by dashed lines, showing coefficients of 0.108 and -0.085, respectively. The model explains 51.3% of the variance in SME performance ($R^2=0.513$), indicating moderate explanatory power.

4.5 Discussion

The empirical evidence that ESG practices significantly and positively influence SME performance ($\beta=0.348$, $t=3.137$, $p=0.002$) reinforces the theoretical foundations of stakeholder theory and the resource-based view ([Barney, 1991](#)). This finding suggests that SMEs that prioritize ethical conduct, community engagement, environmental responsibility, and transparent governance can transform sustainability-oriented practices into strategically valuable resources ([Shalhoob & Hussainey, 2022](#)). Such practices may strengthen stakeholder trust, reduce operational and reputational risks, and improve organizational resilience ([Garrido & Santomil, 2024](#)). In an urban environment where sustainability expectations are increasingly institutionalized, ESG can contribute to business continuity and organizational legitimacy ([Putri, Widajantie, & Wilasittha, 2024](#)).

Digital transformation showed a positive but statistically non-significant direct effect on SME performance ($\beta=0.219$, $t=1.802$, $p=0.072$), therefore, H_2 was not supported at the 5% significance level. This suggests that the presence of digital tools alone may not be sufficient to generate measurable performance improvements when their use remains concentrated on basic communication, promotion, or isolated administrative activities. Prior research emphasizes that digital transformation creates strategic value when technology is integrated with organizational routines, decision-making, human capabilities, and business processes rather than being adopted as a stand-alone tool ([Kraus, Durst, Ferreira, Veiga, Kailer, & Weinmann, 2022](#); [Verhoef, Broekhuizen, Bart, Bhattacharya, Dong, Fabian, & Haenlein, 2021](#)). Therefore, this finding is consistent with a capability-based interpretation in which digital maturity, rather than simple technology access, determines whether digitalization produces performance gains.

The moderating effect of digital transformation on the ESG-performance relationship was also not significant ($\beta=0.108$, $t=1.423$, $p=0.155$), so H_4 is not supported. This result indicates that higher levels of digital transformation do not significantly change the strength of the positive ESG-performance relationship in the sampled SMEs. One plausible explanation is that the digital adoption of urban SMEs remains insufficiently integrated with ESG-related information processing and decision-making. Dynamic capabilities theory suggests that technology becomes strategically valuable when it strengthens firms' ability to sense, seize, absorb, and reconfigure resources, therefore, fragmented digital use may be unable to operationalize ESG knowledge into additional performance gains. This interpretation is consistent with studies emphasizing the importance of organizational competence and deep process integration for a meaningful digital transformation ([Gonzalez-Varona, López-Paredes, Poza, & Acebes, 2024](#); [Sagala, & Öri, 2025](#)).

Government support has a significant positive direct effect on SME performance ($\beta=0.342$, $t=3.621$, $p<0.001$), supporting H_3 . This indicates that training, regulatory facilitation, digital programs, and other institutional assistance can directly contribute to the operating capacity and performance of SMEs. However, government support did not significantly moderate the ESG performance relationship ($\beta=-0.085$, $t=0.863$, $p=0.388$), and H_5 was not supported. The negative but insignificant interaction coefficient suggests that government assistance does not systematically amplify or suppress the performance benefits of ESG practices. This pattern may reflect differences in program accessibility, relevance, and alignment with sustainability-specific needs, consistent with prior research showing that public support is more effective when closely matched to firm capabilities and accompanied by capacity-building mechanisms ([Budhwar, Varma, & Patel, 2016](#); [Hossain, Ibrahim, & Uddin, 2023](#); [Zhu, Hu, Wu, & Zhang, 2025](#)).

From a theoretical standpoint, these findings support a more nuanced application of the dynamic capabilities theory to emerging market SMEs. The nonsignificant direct and moderating effects of

digital transformation suggest that access to digital tools should not be automatically equated with a fully developed dynamic capability. Rather, competitive value appears to depend on whether digital technologies are systematically embedded in sensing, knowledge absorption, decision-making, and resource reconfiguration processes. Simultaneously, the significant direct effect of government support but non-significant ESG interaction indicates that external institutional resources may improve firm performance without necessarily altering how internal ESG capabilities generate value. Therefore, these results distinguish between direct resource effects and contingent capability effects, instead of assuming that all enabling factors automatically amplify ESG returns.

The practical implications of these findings are significant for SME managers and for institutional actors. For SME owners, the positive direct effect of ESG ($\beta=0.348$, $p=0.002$) indicates that sustainability-oriented behavior can function as a performance lever even when digital transformation and government support do not significantly strengthen the ESG-performance relationship. Therefore, managers should prioritize practical ESG routines that are feasible for smaller firms, including transparent financial recording, responsible resource use, employee welfare, honest customer communication, and community engagement. Digital investment should subsequently focus on integrating these routines into accounting, inventory, customer management, and monitoring systems, rather than merely increasing the number of digital platforms used ([Shalhoob and Hussainey, 2022](#); [Kraus et al., 2022](#)).

For policymakers, the significant direct effect of government support ($\beta=0.342$, $t=3.621$, $p<0.001$) confirms that institutional engagement improves SME outcomes. However, the absence of a significant moderating effect indicates that existing programs should not be assumed to automatically strengthen ESG-related returns. Therefore, policy design should move beyond broad administrative facilitation toward sustainability-specific capability building, such as ESG literacy programs, practical environmental management training, green certification assistance, digital bookkeeping integration, and mentoring that connects sustainability practices with operational and financial decision-making. Such targeted interventions may improve the absorptive capacity and increase the practical relevance of public support ([Hossain et al., 2023](#); [Zhu et al., 2025](#)).

Overall, the findings indicate that ESG and government support contribute directly to SME performance, whereas digital transformation and government support do not significantly alter the strength of the ESG-performance relationship. The model explains 51.3% of the variance in SME performance and demonstrates positive out-of-sample predictive relevance (Q^2 predict = 0.457), suggesting a meaningful explanatory and predictive capacity. Rather than treating digitalization and policy support as automatic ESG amplifiers, SMEs and policymakers should focus on the depth, integration, and sustainability of these enabling mechanisms. This distinction is important for extending the RBV and dynamic capabilities theory in resource-constrained urban SME settings ([Barney, 1991](#)).

5. CONCLUSIONS

5.1 Conclusion

This study concludes that Environmental, Social, and Governance (ESG) practices significantly and positively affect SME performance in Surabaya ($\beta=0.348$, $t=3.137$, $p=0.002$), supporting the strategic value of sustainability-oriented practices. Government support also has a significant positive direct effect on SME performance ($\beta=0.342$, $t=3.621$, $p<0.001$), whereas digital transformation shows a positive but statistically non-significant direct effect at the 5% level ($\beta=0.219$, $t=1.802$, $p=0.072$). Neither digital transformation ($\beta=0.108$, $p=0.155$) nor government support ($\beta=-0.085$, $p=0.388$) significantly moderated the ESG-performance relationship. The model explains 51.3% of the variance in SME performance ($R^2=0.513$, adjusted $R^2=0.487$) and demonstrates a positive predictive relevance (Q^2 predict = 0.457). These results indicate that ESG and institutional support can generate direct performance benefits. However, digital and policy mechanisms should not be assumed to amplify ESG returns unless they are sufficiently integrated with firms' operational and sustainability capabilities.

5.2 Research Limitations

Several limitations must be acknowledged to provide a balanced interpretation of these findings. First, the study employs a cross-sectional design that captures SME conditions at one point in time and may not reflect the long-term evolution of sustainability and digital maturity. Second, the geographic focus is restricted to Surabaya, which may limit the generalizability to SMEs operating in rural areas or different institutional environments. Third, although the final sample of 100 respondents exceeded the minimum requirement of 92 observations indicated by the a priori power analysis, the sample may still not capture the full diversity of the Indonesian SME population. Finally, reliance on self-reported Likert-scale data may introduce common method bias and subjective perception errors compared to objective financial and operational indicators.

5.3 Suggestions and Directions for Future Research

To overcome these limitations, future research should adopt a longitudinal approach to capture how the ESG-performance relationship matures over different economic cycles. Expanding the research scope to include inter-city or rural-urban comparisons in Indonesia would provide a more nuanced understanding of how regional governance and infrastructure influence sustainability dynamics. Qualitative or mixed-method studies are recommended to uncover the specific internal barriers that prevent digital tools from effectively strengthening ESG outcomes. Future empirical models should also explore the role of green knowledge management or managerial literacy as potential mediators to clarify the mechanisms through which awareness translates into tangible gains. Finally, researchers are encouraged to investigate specific SME sub-sectors, such as manufacturing or creative services, to determine whether different industries exhibit unique sensitivities to ESG imperatives and digital integration.

ACKNOWLEDGEMENT

The authors would like to express their gratitude to all SME owners and managers in Surabaya, Indonesia, who participated in this study and provided valuable information for the research. The authors also acknowledge the support from Universitas Airlangga in facilitating the completion of this research.

AUTHOR CONTRIBUTIONS

NAR contributed to the conceptualization, research design, methodology development, data analysis, interpretation of results, and manuscript drafting. DA contributed to the literature review, theoretical framework development, and manuscript revision. DAP contributed to data collection, statistical analysis, and interpretation of empirical findings. ED contributed to validation, manuscript review, and refinement of discussions. ANP contributed to visualization, editing, and final manuscript review. All authors have read and approved the final version of the manuscript.

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