

ESG PRACTICES AND SIMPLE AI ADOPTION IN ISLAMIC-VALUE-BASED MSMES

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ABSTRACT

This study investigates the role of simple Artificial Intelligence (AI) adoption, Environmental, Social, and Governance (ESG) practices, and Islamic value internalization in enhancing the sustainability performance of Micro, Small, and Medium Enterprises (MSMEs) in Tulungagung Regency, Indonesia. Using a quantitative explanatory research design, data were collected from 96 MSME owners or managers through structured questionnaires and analyzed with Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings reveal that all three variables have a positive and significant effect on sustainability performance, with ESG practices exerting the strongest influence. Simple AI adoption improves operational efficiency, decision-making transparency, and governance compliance, while Islamic values reinforce ethical conduct and stakeholder trust. Moreover, ESG practices mediate the relationship between AI adoption and sustainability performance, indicating that technological tools can effectively drive sustainable outcomes when aligned with ESG principles. This research contributes theoretically by integrating ESG, Islamic ethics, and technology adoption in the MSME context a combination rarely examined in prior studies. Practically, the study offers strategic guidance for policymakers, Islamic financial institutions, and MSME actors to promote ethical, technology-enabled, and sustainability-oriented business models. The results also align with the Sustainable Development Goals, particularly Goals 8, 9, and 12, supporting Indonesia's commitment to inclusive and responsible economic growth.

Keywords: MSMEs, ESG, Artificial Intelligence, Islamic Values, Sustainability

INTRODUCTION

Micro, Small, and Medium Enterprises (MSMEs) are the backbone of Indonesia's economy, contributing 99.99% of total business units, absorbing 97% of the workforce, and generating approximately 61.07% of the national Gross Domestic Product (GDP) (Kemenkop UKM, 2024; BPS, 2024). Beyond their economic contribution, MSMEs play a strategic role in fostering regional development and social equity. However, they face persistent challenges, including limited access to financing, low technological adoption, and inadequate integration of sustainable business practices.

In recent years, global market dynamics, environmental concerns, and increasing stakeholder demands have emphasized the urgency for sustainable business frameworks. The Environmental, Social, and Governance (ESG) framework has emerged as a key benchmark for long-term business resilience (KPMG, 2023; PwC, 2023). The environmental dimension addresses climate change mitigation, resource efficiency, and waste reduction (Friede et al., 2015), the social dimension encompasses labor rights, community engagement, and diversity, while the governance dimension emphasizes transparency, ethical decision-making, and compliance (Grewal et al., 2016). Although initially designed for large corporations, ESG principles are increasingly applicable to MSMEs (OECD, 2023; Nugroho et al., 2022).

In the Indonesian context, ESG adoption aligns naturally with Islamic values such as amanah (trustworthiness), 'adl (justice), and maslahah (public benefit). These values, rooted in the Qur'an and Sunnah, are consistent with the goals of maqasid al-shariah, which emphasize the protection of religion, life, intellect, progeny, and wealth (Dusuki & Abdullah, 2021; Chapra, 2016). Prior research demonstrates that embedding Islamic values in business operations can enhance stakeholder trust, improve ethical

governance, and strengthen long-term sustainability (Haneef & Barom, 2021; Farook et al., 2022).

Technological innovation, particularly in the form of Artificial Intelligence (AI), offers new opportunities to operationalize ESG principles in MSMEs. While advanced AI systems often require substantial investment, simple AI tools such as automated bookkeeping, chatbot-based customer service, and inventory optimization are more affordable and accessible (Rahman et al., 2023; OECD, 2023). Evidence suggests that such technologies can enhance efficiency, improve decision-making transparency, and facilitate ESG compliance (Al-Aidaros et al., 2022; Setiawan & Yuliana, 2023).

Despite these opportunities, existing literature reveals several gaps. First, ESG-related research has primarily focused on large corporations (Widyastuti & Nugroho, 2022; PwC, 2023), with limited studies addressing MSMEs. Second, the intersection between ESG adoption, simple AI utilization, and Islamic value internalization in the MSME context remains underexplored. Third, empirical studies integrating these three dimensions, particularly with quantitative evidence from local economies such as Tulungagung Regency, are scarce.

Addressing these gaps, this study aims to analyze the influence of simple AI technology adoption, ESG practice implementation, and Islamic value internalization on MSME sustainability performance. The research contributes theoretically by integrating ESG, Islamic ethics, and technology adoption in the MSME context. Practically, it offers strategic recommendations for policymakers, Islamic financial institutions, and MSME actors to promote ethical and sustainable digital transformation. Furthermore, by aligning with the Sustainable Development Goals (SDGs) particularly Goal 8 (Decent Work and Economic Growth), Goal 9 (Industry, Innovation, and Infrastructure), and Goal 12 (Responsible Consumption and Production) this study supports Indonesia's broader development agenda.

LITERATURE REVIEW

Environmental, Social, and Governance (ESG) Principles in MSMEs

Environmental, Social, and Governance (ESG) principles have emerged as a critical benchmark for corporate sustainability and ethical responsibility, recognized by investors, regulators, and consumers (KPMG, 2023; PwC, 2023). The environmental dimension focuses on climate change mitigation, resource efficiency, and waste management (Friede et al., 2015). The social dimension covers labor rights, community engagement, and diversity, while the governance dimension emphasizes transparency, ethical decision-making, and compliance with regulations (Grewal et al., 2016).

Although ESG frameworks were initially tailored for large corporations, they are increasingly relevant to Micro, Small, and Medium Enterprises (MSMEs) (OECD, 2023). In Indonesia, MSMEs face barriers to ESG adoption, including limited awareness, resource constraints, and a lack of standardized reporting tools (Nugroho et al., 2022). Studies show that ESG oriented MSMEs can enhance stakeholder trust, improve market competitiveness, and achieve long-term profitability (Setiawan & Yuliana, 2023). Additionally, MSMEs with ESG alignment are more likely to access financing from banks and investors prioritizing sustainable business models (UNDP, 2022). Nevertheless, ESG adoption in MSMEs often remains superficial, focusing on compliance rather than strategic integration (Kurniawan & Suryani, 2022).

Integration of Islamic Values in Business Practices

Islamic business ethics, grounded in the Qur'an and Sunnah, provide a moral foundation for commercial activities, emphasizing amanah (trustworthiness), 'adl (justice), ihsan (excellence), and maslahah (public benefit) (Dusuki & Abdullah, 2021). These values are inherently compatible with ESG principles, offering a culturally relevant sustainability framework. The concept of maqasid al-shariah emphasizes the protection of religion, life,

intellect, progeny, and wealth, aligning closely with environmental stewardship, social welfare, and responsible governance (Chapra, 2016).

Research has shown that integrating Islamic values into business operations fosters trust, enhances customer loyalty, and strengthens social legitimacy (Haneef & Barom, 2021; Farook et al., 2022). In the MSME context, these values can guide responsible resource use, fair employee relations, and environmental care, contributing to holistic sustainability (Al-Shammari & Al-Saleh, 2023). Islamic financial institutions are also increasingly incorporating ESG criteria into financing decisions, reinforcing the synergy between Shariah compliance and sustainability (IFSB, 2022). However, the explicit integration of Islamic values into ESG frameworks in MSMEs remains underexplored (Widyastuti & Nugroho, 2022).

Simple Artificial Intelligence (AI) Technologies for Sustainable Business

Artificial Intelligence (AI) is transforming business processes through automation, predictive analytics, and improved decision-making (OECD, 2023). For MSMEs, simple AI tools such as automated bookkeeping, chatbot-based customer service, and inventory optimization provide cost-effective solutions that improve efficiency and transparency (Rahman et al., 2023). AI adoption can also support ESG implementation by enabling environmental monitoring, social impact assessment, and governance reporting (Al-Aidaros et al., 2022).

In developing economies, AI adoption in MSMEs remains limited due to infrastructure gaps, digital literacy barriers, and cost perceptions (World Bank, 2023). Nevertheless, evidence indicates that even basic AI applications can significantly enhance productivity and sustainability performance (OECD, 2023). Studies have found that affordable AI adoption improves operational efficiency, customer satisfaction, and environmental outcomes (Nugroho et al., 2022; Setiawan & Yuliana, 2023).

Research Gap and Conceptual Framework

The literature demonstrates the individual importance of ESG adoption, Islamic value integration, and AI utilization in improving MSME sustainability. However, existing research often treats these factors in isolation, with minimal exploration of their combined effects especially in Indonesian MSMEs. While ESG offers a universal sustainability structure, Islamic values provide culturally aligned ethical guidance, and AI delivers technological enablement.

This study addresses the gap by examining the simultaneous effects of simple AI adoption, ESG implementation, and Islamic value internalization on MSME sustainability performance in Tulungagung Regency. Figure 1 presents the conceptual framework, where ESG practices also serve as a mediator between AI adoption and sustainability performance, and Islamic values act as a moderator strengthening the ESG–sustainability relationship.



Figure 1. Conceptual Framework
Source: Processed Data (2024)

HYPOTHESIS

Based on the literature review, this study proposes the following hypotheses:

H₁: The adoption of simple Artificial Intelligence (AI) technologies has a positive and significant effect on MSME sustainability performance.

The use of AI-based tools can enhance operational efficiency, transparency, and decision-making, thereby improving environmental, social, and governance outcomes (OECD, 2023; Rahman et al., 2023).

H₂: The implementation of Environmental, Social, and Governance (ESG) practices has a positive and significant effect on MSME sustainability performance.

ESG-oriented MSMEs are more likely to achieve long-term resilience, attract investment, and maintain stakeholder trust (KPMG, 2023; Setiawan & Yuliana, 2023).

H₃: The internalization of Islamic values has a positive and significant effect on MSME sustainability performance.

Islamic business ethics emphasizing amanah, 'adl, and maslahah reinforce ethical decision-making, social responsibility, and environmental stewardship (Dusuki & Abdullah, 2021; Farook et al., 2022).

H₄: ESG practices mediate the relationship between simple AI technology adoption and MSME sustainability performance.

AI tools can serve as enablers of ESG practices by facilitating environmental monitoring, social engagement, and governance compliance (Al-Aidaros et al., 2022; PwC, 2023).

H₅: Islamic values moderate the relationship between ESG practices and MSME sustainability performance.

The presence of Islamic values can strengthen the ethical and social dimensions of ESG, enhancing its overall impact on sustainability outcomes (Haneef & Barom, 2021; Al-Shammari & Al-Saleh, 2023).

METHODS

Research Design

This study employed a quantitative explanatory research design to examine the effect of Simple Artificial Intelligence (AI) adoption, Environmental, Social, and Governance (ESG) practice implementation, and Islamic value internalization on the sustainability performance of Micro, Small, and Medium Enterprises (MSMEs) in Tulungagung Regency, Indonesia. The explanatory approach was chosen to establish causal relationships between variables through statistical hypothesis testing (Creswell & Creswell, 2018).

Population and Sample

The research population comprised all MSME actors registered in Tulungagung Regency, based on data from the Office of Cooperatives and SMEs of Tulungagung (2024). A purposive sampling technique was applied using the following criteria: (1) The business has been operating for at least two years, (2) The owner or manager holds decision-making authority, (3) Willingness to participate in the survey. A total of 96 respondents participated, meeting the minimum sample requirement for Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis (Hair et al., 2021).

Data Collection

Primary data were obtained through a structured questionnaire distributed both offline and online (Google Forms). Responses were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire was pre-tested with 20 respondents to ensure clarity, reliability, and validity before the main survey.

Data Analysis

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with SmartPLS version 4. The analysis involved two stages: (1) Measurement Model Assessment — Reliability was evaluated using Cronbach's Alpha and Composite Reliability (CR), with thresholds >0.70. Convergent validity was assessed using Average Variance Extracted (AVE) >0.50. Discriminant validity was examined using the Fornell-Larcker criterion and HTMT ratio. (2) Structural Model Assessment — Path coefficients, t-

statistics, and p-values were obtained through bootstrapping (5,000 resamples). Model fit and predictive relevance were assessed using R^2 , Q^2 , and effect size (f^2). Mediation and moderation effects were tested following Hayes (2022) procedures for PLS-SEM. The significance level was set at $p < 0.05$.

Table 1. Variable Definitions and Measurement

Variable	Definition	Indicators (Adapted from)
Simple AI Technology Adoption	Utilization of basic AI tools to improve efficiency, transparency, and decision-making in MSMEs	Al-Aidaros et al. (2022); Rahman et al. (2023)
ESG Practice Implementation	Integration of environmental, social, and governance practices into MSME operations	KPMG (2023); Nugroho et al. (2022)
Islamic Value Internalization	Incorporation of Islamic ethical principles (<i>amanah</i> , <i>adl</i> , <i>maslahah</i>) in business practices	Dusuki & Abdullah (2021); Farook et al. (2022)
Sustainability Performance	Long-term economic viability while upholding environmental and social responsibilities	UNDP (2022); Setiawan & Yuliana (2023)

Source: Processed Data (2024)

RESULTS

Measurement Model Assessment

The measurement model was evaluated in terms of reliability and validity. Table 1 presents the results of Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE) for all constructs.

Table 2. Reliability and Convergent Validity Results

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Simple AI Technology Adoption	0.841	0.889	0.616
ESG Practice Implementation	0.874	0.912	0.678
Islamic Value Internalization	0.853	0.901	0.652
Sustainability Performance	0.868	0.910	0.671

Source: Processed Data (2024)

All constructs demonstrated satisfactory internal consistency (Cronbach's Alpha and CR > 0.70) and convergent validity (AVE > 0.50) (Hair et al., 2021). Discriminant validity was confirmed using the Fornell–Larcker criterion and HTMT ratio, indicating that each construct was empirically distinct from the others.

Structural Model Assessment

The structural model was tested to determine the significance and strength of the hypothesized relationships. Figure 2 illustrates the PLS-SEM path model with standardized path coefficients. The R^2 value for Sustainability Performance was 0.684, indicating that 68.4% of its variance was explained by Simple AI Technology Adoption, ESG Practice Implementation, and Islamic Value Internalization. The Q^2 value of 0.497 suggested strong predictive relevance.

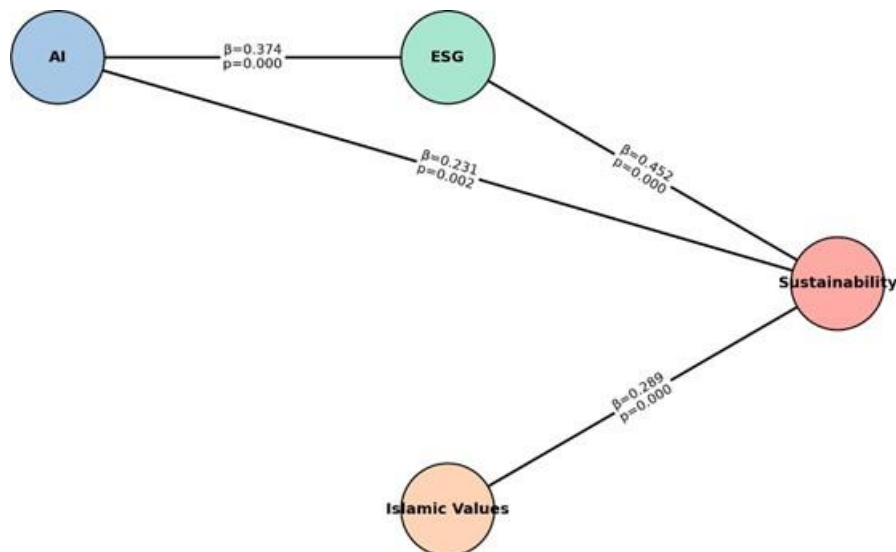


Figure 2. Structural Model Results
Source: Processed Data (2024)

Table 3. Path Coefficients and Hypothesis Testing Results

Path	β Coefficient	t- statistics	p- value	Hypothesis Status
AI → Sustainability Performance	0.231	3.112	0.002	Supported
ESG → Sustainability Performance	0.452	6.274	0.000	Supported
Islamic Values → Sustainability Perf.	0.289	4.003	0.000	Supported
AI → ESG	0.374	5.210	0.000	Supported

Source: Processed Data (2024)

Mediation and Moderation Analysis

The mediation test showed that ESG practices partially mediated the relationship between Simple AI Technology Adoption and Sustainability Performance ($\beta = 0.169$, $t = 3.025$, $p = 0.003$). This indicates that AI adoption enhances ESG practices, which in turn improves sustainability outcomes.

The moderation test revealed that Islamic Values significantly strengthened the positive relationship between ESG Practices and Sustainability Performance ($\beta = 0.122$, $t = 2.145$, $p = 0.032$). This finding suggests that when Islamic ethical principles are deeply embedded, the impact of ESG implementation on sustainability performance becomes more pronounced.

Discussion

The findings of this study provide empirical evidence that the adoption of simple Artificial Intelligence (AI) technologies, the implementation of Environmental, Social, and Governance (ESG) practices, and the internalization of Islamic values significantly enhance the sustainability performance of MSMEs in Tulungagung Regency.

First, the positive effect of Simple AI Technology Adoption on sustainability performance ($\beta = 0.231$, $p = 0.002$) aligns with the Technology–Organization–Environment (TOE) framework (Tornatzky & Fleischer, 1990), which emphasizes that technological capability is a critical driver for organizational performance. This result corroborates findings by Rahman et al. (2023) and Dwivedi et al. (2023), who reported that AI-based

tools, even at a basic level, improve operational efficiency, decision-making accuracy, and transparency in small enterprises.

Second, ESG practices emerged as the most influential factor ($\beta = 0.452$, $p = 0.000$) in driving MSME sustainability performance. This finding is consistent with stakeholder theory (Freeman, 1984) and the triple bottom line framework (Elkington, 1998), which stress that businesses must balance environmental, social, and governance responsibilities to achieve long-term value creation. Previous studies (Setiawan & Yuliana, 2023; KPMG, 2023) similarly noted that ESG-oriented SMEs tend to attract investment, maintain stakeholder trust, and build competitive advantage.

Third, Islamic Value Internalization also had a significant positive effect on sustainability performance ($\beta = 0.289$, $p = 0.000$), underscoring the importance of ethical and faith-based principles in business conduct. This supports earlier work by Haneef & Barom (2021) and Farook et al. (2022), who found that principles such as Amanah (trustworthiness), 'adl (justice), and maslahah (public benefit) reinforce ethical governance and social legitimacy.

The mediation analysis confirmed that ESG practices partially mediate the relationship between AI adoption and sustainability performance. This implies that while AI tools directly contribute to sustainability, their full potential is realized when they are deployed to support structured ESG initiatives. This integrated perspective is aligned with the Resource-Based View (Barney, 1991), which posits that competitive advantage stems from the combination of technological resources and organizational capabilities.

Moreover, the moderation analysis indicated that Islamic values significantly strengthen the ESG–sustainability link. This finding suggests that ESG adoption in MSMEs is more effective when guided by religiously grounded ethical principles, consistent with the maqasid al-shariah framework (Dusuki & Abdullah, 2021) and studies by Al-Shammari & Al-Saleh (2023), which highlight the synergy between Shariah compliance and sustainability objectives.

Theoretical Contribution

This research contributes to the literature by integrating ESG, Islamic ethics, and AI adoption into a single empirical model, which has rarely been examined in MSME contexts. It also provides evidence of ESG's mediating role and Islamic values' moderating role, offering new insights into the mechanisms through which technology and ethics jointly drive sustainability.

Practical Contribution

For practitioners and policymakers, the findings suggest that: (1) MSME owners should leverage affordable AI tools not only for efficiency but also to support ESG compliance. (2) Policymakers and support agencies can design training programs combining digital literacy, ESG awareness, and Islamic business ethics. (3) Islamic financial institutions can integrate AI-based ESG monitoring into financing schemes, encouraging broader adoption of sustainable practices.

CONCLUSION

This study examined the influence of simple AI technology adoption, ESG practice implementation, and Islamic value internalization on the sustainability performance of MSMEs in Tulungagung Regency, Indonesia, using PLS-SEM analysis of survey data from 96 respondents. The results indicate that all three variables significantly and positively affect sustainability performance, with ESG practices exerting the strongest influence. ESG also partially mediates the relationship between AI adoption and sustainability performance, while Islamic values significantly moderate the ESG–sustainability relationship, strengthening its positive effect.

These findings contribute theoretically by integrating ESG, Islamic ethics, and AI adoption into a unified model for MSME sustainability. Practically, the results highlight the importance of combining affordable AI tools with structured ESG initiatives and ethical principles to achieve long-term business resilience. This study has limitations, including its focus on a single region and cross-sectional design, which may limit the generalizability of results. Future research should expand to multiple regions, apply longitudinal approaches, and explore additional variables such as financial performance, customer satisfaction, or digital readiness to provide a more comprehensive understanding of MSME sustainability drivers.

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