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Waste Management Practices And Green Innovation Practices As Drivers Of Business Sustainability Among SMES In Northwestern Nigeria

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ABSTRACT

Environmental sustainability has become an essential strategic priority for Small and Medium Enterprises (SMEs) seeking to balance environmental responsibility with long-term business competitiveness. However, empirical evidence on the contribution of green entrepreneurship practices to environmental sustainability among SMEs in Northwestern Nigeria remains limited. This study examined the influence of waste management practices and green innovation practices on environmental sustainability among SMEs in Kaduna, Kano, Katsina, and Kebbi States, Nigeria. The study was anchored on the Natural Resource-Based View (NRBV) theory and adopted a positivist research philosophy, deductive approach, and cross-sectional survey design. Data were collected from SME owners and managers using a structured questionnaire. A sample of 538 respondents was determined using Cochran's (1977) formula, of which 393 valid responses were analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) in SmartPLS 4.0.1. The measurement model demonstrated satisfactory reliability and validity. The structural model revealed that green innovation practices had a positive and statistically significant effect on environmental sustainability ($\beta = 0.641$, $t = 3.783$, $p < 0.001$), whereas waste management practices had no significant effect ($\beta = 0.040$, $t = 0.053$, $p = 0.957$). The model explained

39.0% of the variance in environmental sustainability ($R^2 = 0.390$) and exhibited satisfactory predictive relevance ($Q^2 = 0.236$). The study concludes that green innovation practices constitute a more effective driver of environmental sustainability than waste management practices among SMEs in Northwestern Nigeria. It recommends that SME owners prioritise investment in environmentally friendly technologies, products, and production processes, while government agencies and relevant stakeholders should strengthen policies and support programmes that promote green innovation to enhance environmental sustainability.

Keywords: Environmental sustainability, green entrepreneurship, green innovation practices, SMEs, waste management practices, Northwestern Nigeria.

1.0 INTRODUCTION

Small and Medium Enterprises (SMEs) play a significant role in economic development through employment creation, income generation, innovation, and poverty reduction. In Nigeria, SMEs account for about 96% of all businesses, contribute approximately 48% of the Gross Domestic Product (GDP), and provide nearly 84% of total employment, making them the backbone of the nation's economy (SMEDAN & NBS, 2021). Despite their substantial contribution, the sustainability of many SMEs remains threatened by increasing environmental challenges, inefficient resource utilization, poor waste management practices, and the slow adoption of environmentally friendly innovations. These challenges not only undermine environmental quality but also reduce firms' long-term competitiveness, operational efficiency, and business sustainability (Suki et al., 2023; Le et al., 2024).

Globally, the growing concern for environmental degradation and climate change has shifted attention towards green entrepreneurship as a strategic approach for achieving sustainable business development. Green entrepreneurship encourages firms to integrate environmentally responsible practices such as effective waste management, green innovation, and sustainable resource utilization into their business operations. Empirical evidence indicates that organizations adopting these practices achieve improved operational efficiency, enhanced environmental performance, and greater long-term competitiveness (Chen & Bashir, 2022; Gomes et al., 2024; Aiguobarueghian et al., 2024). Consequently, business sustainability has increasingly become an important measure of organizational success, reflecting a firm's ability to achieve economic prosperity while minimizing its environmental footprint.

The challenge is particularly evident among SMEs in Northwestern Nigeria, where rapid business growth has not been matched by corresponding improvements in environmental management practices. Many SMEs continue to rely on inefficient waste disposal methods, limited recycling activities, low investment in green technologies, and unsustainable utilization of natural resources. These practices increase production costs, contribute to environmental pollution, and weaken the long-term sustainability of businesses operating in Kaduna, Kano, Katsina, and Kebbi States. Although governments and environmental agencies have introduced policies aimed at promoting sustainable production and environmental protection, the adoption of green entrepreneurship practices among SMEs remains relatively low due to financial constraints, inadequate environmental awareness, limited technological capability, and weak institutional support (Dzomonda, 2022; Dai et al., 2022).

Although previous studies have examined the relationship between green entrepreneurship practices and business sustainability, important research gaps remain. Studies by Suki et al. (2023), Chen and Bashir (2022), Gomes et al. (2024), and Alkaraan et al. (2024) reported that waste management practices, green innovation, and sustainable resource utilization positively influence business sustainability. However, most of these studies were conducted in developed and Asian economies, with limited empirical evidence from SMEs operating in Northwestern Nigeria. Furthermore, existing studies have largely examined these green entrepreneurship dimensions independently rather than integrating them into a comprehensive framework. More importantly, limited attention has been given to the behavioural role of entrepreneurial commitment in explaining how green entrepreneurship practices translate into sustainable business outcomes. Methodologically, many previous studies relied on conventional regression techniques, with relatively few employing Partial Least Squares Structural Equation Modelling (PLS-SEM) to

simultaneously assess the complex relationships among waste management practices, green innovation practices, sustainable resource utilization, entrepreneurial commitment, and business sustainability.

Against this background, this study examines the influence of waste management practices, green innovation practices, and sustainable resource utilization on business sustainability among SMEs in Northwestern Nigeria, with entrepreneurial commitment serving as a mediating variable. By integrating the Natural Resource-Based View (NRBV) and the Theory of Planned Behaviour (TPB), the study provides a comprehensive explanation of how environmentally responsible business practices and entrepreneurial commitment jointly contribute to achieving sustainable business performance in resource-constrained SME environments.

2.0 Literature Review and Hypotheses Development

2.1 Environmental Sustainability

Environmental sustainability refers to the extent to which SMEs minimise the negative environmental effects of their operations while ensuring the responsible use and conservation of natural resources. It focuses on reducing pollution, managing waste effectively, complying with environmental regulations, and integrating environmental considerations into business activities. As environmental challenges continue to intensify, firms are increasingly expected to balance economic objectives with ecological responsibility. Consequently, environmental sustainability has become an essential component of long-term business success and competitiveness (Elkington, 1997; Hart, 1995; Dyllick & Hockerts, 2002; Porter & van der Linde, 1995).

To achieve environmental sustainability, SMEs must adopt environmentally responsible practices across their operations. This includes implementing proper waste management systems, embracing cleaner production technologies, conserving energy and raw materials, and embedding environmental protection into strategic decision-making. These practices reduce environmental degradation while improving operational efficiency and resource productivity. As a result, businesses strengthen their environmental performance, enhance their reputation among stakeholders, and improve their capacity to achieve long-term sustainability objectives (Schaltegger & Wagner, 2011; Bansal & DesJardine, 2014; Schaltegger et al., 2016).

2.2 Waste Management Practices

Waste management practices refer to the systematic activities undertaken by SMEs to minimise waste generation and ensure the environmentally responsible handling of waste throughout their operations. These practices include reducing waste at its source, reusing and recycling materials, and disposing of waste in ways that minimise environmental harm. They help firms improve resource efficiency, lower operating costs, and reduce their environmental impact (Hart, 1995; Porter & van der Linde, 1995). Effective waste management also requires employee participation and the integration of environmental considerations into routine business decisions. By adopting these practices, SMEs can improve operational performance, strengthen environmental responsibility, and enhance long-term business sustainability (Bansal & Roth, 2000; Schaltegger & Wagner, 2011).

2.3 Green Innovation Practices

Green innovation practices refer to the adoption of environmentally friendly products, processes, technologies, and services that reduce environmental impacts while improving business performance. They represent an important dimension of green entrepreneurship because they enable SMEs to achieve economic and environmental objectives simultaneously (Porter & van der Linde, 1995; Schaltegger et al., 2016). Green innovation begins with the development of eco-friendly products and services that meet customer needs with minimal environmental impact. It also involves adopting cleaner technologies and continuously improving production and service processes to reduce energy consumption, waste generation, and resource use (Hart, 1995; Schaltegger & Wagner, 2011). Furthermore, SMEs integrate environmental considerations into product design, invest in sustainability-oriented innovations, and actively seek new solutions that minimise pollution and environmental degradation. Through these

continuous innovation efforts, businesses enhance operational efficiency, strengthen their competitive advantage, and improve long-term business sustainability (Dyllick & Hockerts, 2002; Elkington, 1997).

2.4 Waste Management Practices and Business Sustainability

Empirical evidence consistently demonstrates that waste management practices are important drivers of business sustainability because they improve resource efficiency, reduce environmental pollution, and enhance firms' long-term competitiveness. Aiguobarueghian et al. (2024) found that integrating circular economy principles such as waste reduction, reuse, recycling, and recovery improves environmental performance while creating economic value through cost reduction and resource efficiency. Similarly, Mia (2025) reported that effective waste management practices significantly enhance sustainability performance and promote the adoption of green business practices. In the manufacturing sector, Asha'Ari et al. (2023) further established that waste management practices positively influence business sustainability regardless of firm age, indicating that sustainability outcomes depend more on the effective implementation of waste management systems than on organisational maturity.

Further evidence supports the strategic role of waste management in achieving sustainable business outcomes. Islam et al. (2024) observed that effective waste management contributes to circular economy adoption by reducing waste generation, improving resource utilisation, and supporting environmental sustainability. Likewise, Khan and Gull (2025) found that ineffective waste management is associated with poor environmental performance, highlighting the importance of management commitment in promoting sustainable business practices. Although these studies provide strong evidence that waste management practices enhance business sustainability, they were largely conducted in developed or Asian economies, with limited empirical evidence from SMEs in Northwestern Nigeria. In addition, previous studies have given little attention to the behavioural role of entrepreneurial commitment in explaining how waste management practices translate into business sustainability. Therefore, the following hypothesis is proposed:

H_1: Waste management practices have no significant positive effect on business sustainability among SMEs in Northwestern Nigeria.

2.4 Green Innovation Practices and Environmental Sustainability

Green innovation practices have been widely recognised as important drivers of business sustainability because they enable firms to develop environmentally friendly products, adopt cleaner production technologies, and improve operational efficiency. Suki et al. (2023) found that green innovation significantly enhances business sustainability, with green intellectual capital and green supply chain management further strengthening this relationship. Similarly, Gomes et al. (2024) reported that SMEs with strong environmental practices are more likely to adopt green process, product, and organisational innovations, leading to improved sustainability performance. In the Ghanaian mining sector, Suleman et al. (2024) also established that green innovation serves as a significant mechanism through which green human resource practices improve economic, environmental, and social performance.

Further evidence confirms that green innovation contributes to sustainable business performance under different organisational contexts. Alshammari and Alshammari (2023) observed that green innovation positively influences environmental sustainability, particularly when supported by a favourable innovation climate and strong organisational capabilities. Likewise, Le et al. (2024) found that green innovation mediates the relationship between corporate social responsibility and sustainable development, while Khan et al. (2022) demonstrated that environmental knowledge strengthens the effectiveness and acceptance of green innovation practices. Although these studies provide substantial evidence that green innovation enhances business sustainability, most were conducted in Asia, Europe, and the Middle East, with limited empirical evidence from SMEs in Northwestern Nigeria. Moreover, previous studies have paid little attention to the role of entrepreneurial commitment in explaining how green innovation practices translate into sustainable business outcomes. Therefore, the following hypothesis is proposed:

H2: Green innovation practices have no significant positive effect on business sustainability among SMEs in Northwestern Nigeria.

2.6 Theoretical and Conceptual Framework

This study is anchored on the Natural Resource-Based View (NRBV) theory developed by Hart (1995), which posits that firms achieve sustainable competitive advantage by developing valuable environmental capabilities that improve both economic and environmental performance. The theory provides a suitable foundation for explaining how waste management practices and green innovation practices function as strategic resources that enhance business sustainability among SMEs in Northwestern Nigeria. From the NRBV perspective, effective waste management improves resource efficiency and reduces environmental impacts, while green innovation enables firms to develop cleaner products, processes, and technologies that strengthen competitiveness and long-term sustainability (Hart, 1995; Hart & Dowell, 2011).

Guided by the NRBV, the conceptual framework proposes that waste management practices and green innovation practices are the independent variables, while business sustainability is the dependent variable. The framework assumes that SMEs that effectively minimise waste and adopt environmentally friendly innovations are more likely to improve both their economic and environmental sustainability. Accordingly, the study examines the direct influence of waste management practices and green innovation practices on business sustainability among SMEs in Northwestern Nigeria. Figure 2.1 presents the conceptual framework of the study.

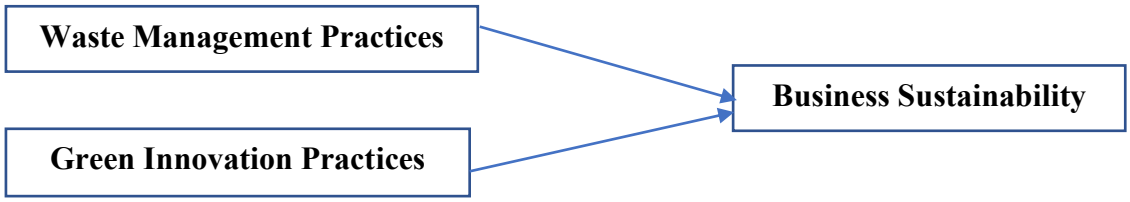

Figure 1: Conceptual Framework

3.0 METHODOLOGY

This study adopted a positivist research philosophy, a deductive approach, and a cross sectional survey design to examine the influence of waste management practices and green innovation practices on business sustainability among SMEs in Northwestern Nigeria. Data were collected from SME owners and managers in Kaduna, Kano, Katsina, and Kebbi States using a structured questionnaire. Since the population was considered infinite, Cochran's (1977) formula was used to determine a sample size of 538 respondents selected through a multistage sampling technique. The questionnaire was measured on a five-point Likert scale and validated through expert review and a pilot study. Data were analysed using SmartPLS version 4.0.1, where descriptive statistics summarised the data and PLS-SEM was used to assess the measurement and structural models. Reliability and validity were established using factor loadings, Cronbach's alpha, Composite Reliability, AVE, the Fornell-Larcker criterion, and the HTMT ratio, while the hypotheses were tested using bootstrapping with 5,000 resamples at a 5% level of significance.

4.0 RESULTS AND DISCUSSION OF FINDINGS

4.1 Descriptive Statistics

The respondents were fairly distributed across the four selected states, with Kano recording the highest proportion (29.4%), followed by Katsina (24.9%), while Kaduna and Kebbi each accounted for 22.7%. Most respondents were male (65.6%), aged between 25–34 years (34.4%), possessed a Bachelor's degree (36.4%), and had 1–5 years of business experience (33.7%), indicating that the respondents were well positioned to provide reliable information on green entrepreneurship practices and business sustainability. Similarly, the descriptive statistics show that all constructs recorded mean scores above 3.50 (Mean = 3.676–3.780), indicating a generally high level of agreement with the study items. The standard deviations (0.406–0.505) suggest low response variability, while the skewness (-0.131 to -0.369) and

kurtosis (-0.092 to -0.331) values fall within the acceptable threshold of ±1, confirming that the data are approximately normally distributed and suitable for PLS-SEM analysis.

4.2 Assessment of Measurement Model

Before evaluating the hypothesised relationships, the measurement model was assessed to establish the adequacy of the study constructs. Consistent with the guidelines of Hair et al. (2025), the assessment examined indicator reliability, internal consistency reliability, convergent validity, and discriminant validity to confirm that the measurement scales were reliable and valid for subsequent structural model analysis.

Constructs' Reliability and Convergent validity

Table 1 presents the results of the measurement model assessment. The factor loadings ranged from 0.575 to 0.883, indicating that all retained indicators contributed adequately to their respective constructs. Environmental Sustainability recorded the highest indicator loadings (0.776–0.883), followed by Green Innovation Practices (0.575–0.865) and Waste Management Practices (0.650–0.834). Internal consistency reliability was also satisfactory, with Cronbach's alpha values ranging from 0.782 to 0.845 and composite reliability (rho_a) values ranging from 0.807 to 0.846, exceeding the recommended threshold of 0.70. Likewise, the Average Variance Extracted (AVE) values ranged from 0.535 to 0.684, surpassing the minimum criterion of 0.50 and confirming convergent validity. Figure 1 illustrates the revised measurement model after the assessment process, showing that the constructs satisfied the required reliability and validity criteria for subsequent structural model analysis.

Table 1:

Factor Loadings, Reliability and Convergent Validity

Construct	Items	Factor Loading	Cronbach's Alpha	Composite Reliability (rho_a)	AVE
Environmental Sustainability (ENS)	ENS1	0.827	0.845	0.846	0.684
	ENS2	0.820			
	ENS3	0.776			
	ENS4	0.883			
Green Innovation Practices (GIP)	GIP1	0.700	0.782	0.807	0.535
	GIP2	0.778			
	GIP3	0.706			
	GIP4	0.865			
	GIP6	0.575			
Waste Management Practices (WMP)	WMP1	0.677	0.786	0.835	0.537
	WMP2	0.669			
	WMP3	0.812			
	WMP4	0.650			
	WMP5	0.834			

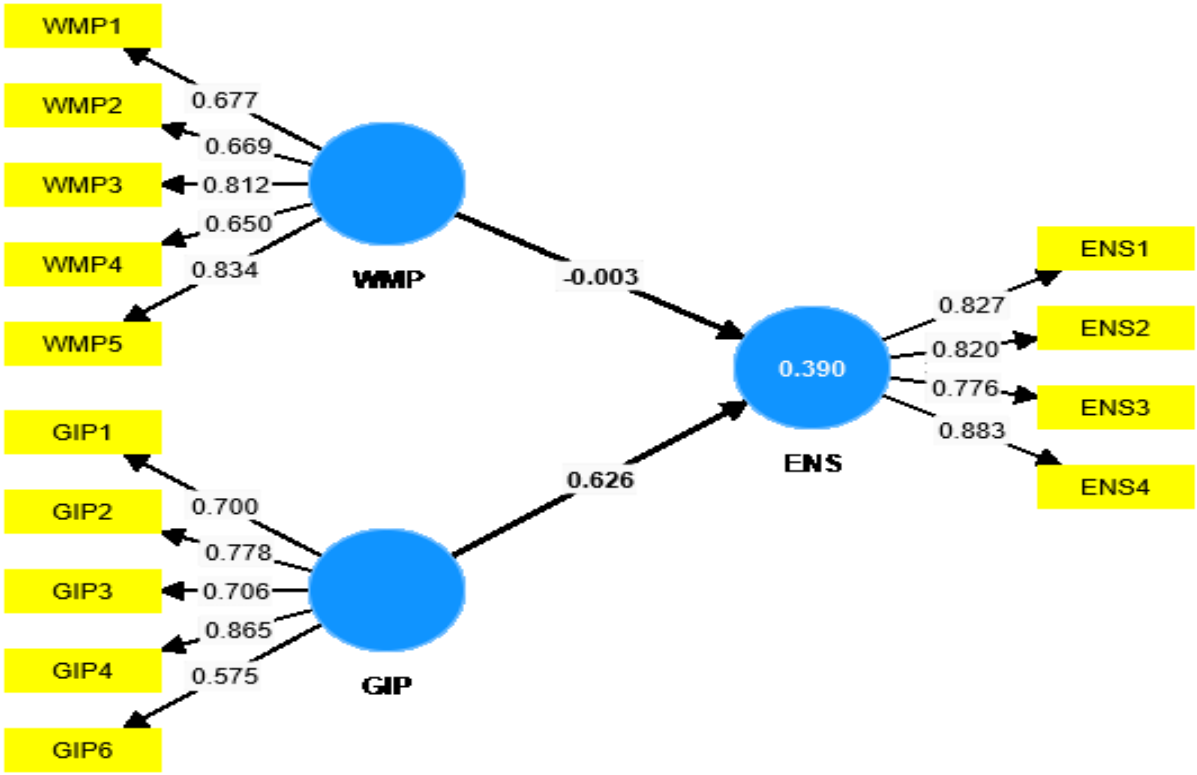

Figure 1: Revised Measurement Model

Discriminant Validity

Table 2 presents the Fornell-Larcker criterion for assessing discriminant validity. The results indicate that the square root of the AVE for Environmental Sustainability (0.827), Green Innovation Practices (0.731), and Waste Management Practices (0.732) is greater than the corresponding inter-construct correlations. This demonstrates that each construct shares more variance with its own indicators than with other constructs, confirming that the latent variables are empirically distinct. Therefore, the measurement model satisfies the Fornell-Larcker criterion, providing evidence of adequate discriminant validity in line with the recommendations of Fornell and Larcker (1981) and Hair et al. (2025).

Table 2:

Fornell-Larcker criterion

Constructs	ENS	GIP	WMP
ENS	0.827		
GIP	0.624	0.731	
WMP	0.412	0.662	0.732

4.3 Assessment of Structural Model

After establishing the reliability and validity of the measurement model, the structural model was assessed to test the hypothesised relationships. This was done by examining the path coefficients and their corresponding bias-corrected confidence intervals.

As presented in Table 3 and Figure 2, Green Innovation Practices exerted a positive and statistically significant effect on Environmental Sustainability ($\beta = 0.641$, $t = 3.783$, $p < 0.001$), leading to the rejection of H2. This finding indicates that SMEs that adopt environmentally friendly innovations are more likely to improve their environmental sustainability through cleaner production processes, efficient resource use, and reduced environmental impact. The finding is consistent with Suki et al. (2023), who reported that green innovation significantly enhances business sustainability. It also supports the findings

of Gomes et al. (2024), who observed that environmentally sustainable practices encourage the adoption of green innovations that improve sustainability performance. Similarly, the result agrees with Suleman et al. (2024), Alshammari and Alshammari (2023), and Le et al. (2024), who concluded that green innovation strengthens environmental and business sustainability across different organisational contexts.

In contrast, Waste Management Practices had a positive but statistically insignificant effect on Environmental Sustainability (β = 0.040, t = 0.053, p = 0.957), resulting in the acceptance of H1. This finding suggests that waste management practices alone do not significantly improve environmental sustainability among SMEs in Northwestern Nigeria. The result contradicts the findings of Aiguobarueghian et al. (2024), who found that effective waste management enhances environmental performance through circular economy practices. It also differs from Mia (2025), Asha'Ari et al. (2023), and Islam et al. (2024), who reported that waste reduction, recycling, and responsible waste handling significantly improve sustainability outcomes. A plausible explanation is that many SMEs in the study area may adopt waste management practices at a basic level, without sufficient investment in structured environmental systems or advanced waste treatment technologies capable of producing measurable sustainability outcomes. Figure 2 presents the structural model and the hypothesised relationships among the study constructs.

Table 3:

Path coefficients

Hypotheses	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
GIP -> ENS	0.641	0.166	3.783	0.000
WMP -> ENS	0.040	0.106	0.053	0.957

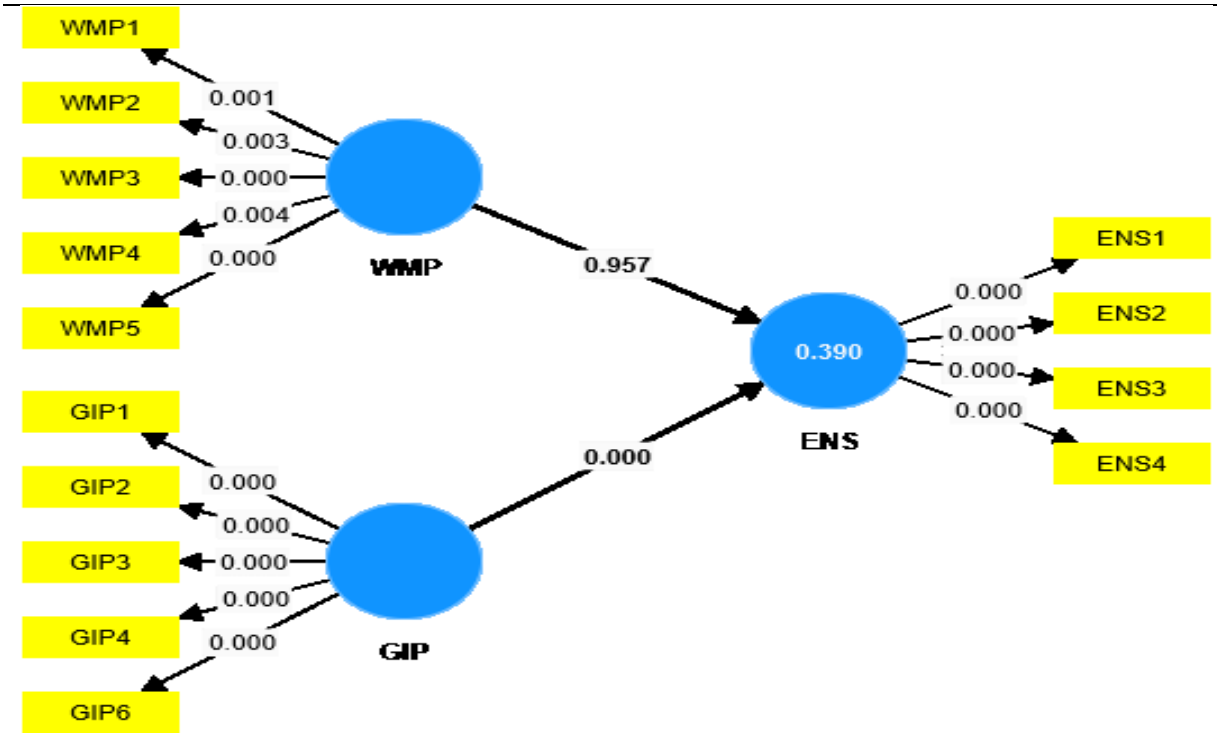

Figure 2: Structural Model

Table 4 presents the bias-corrected bootstrap confidence intervals for the hypothesised relationships. The confidence interval for Green Innovation Practices → Environmental Sustainability (β = 0.641, Bias = 0.012, 95% CI = 0.219–0.893) does not include zero, confirming that the relationship is positive and statistically significant. In contrast, the confidence interval for Waste Management Practices → Environmental Sustainability (β = 0.040, Bias = 0.046, 95% CI = −0.240–0.154) includes zero, indicating

that the relationship is not statistically significant. These findings further validate the bootstrapping results, providing additional evidence that Green Innovation Practices significantly enhance Environmental Sustainability, whereas Waste Management Practices do not exert a significant effect among SMEs in Northwestern Nigeria (Hair et al., 2025).

Table 4:

Confidence intervals bias corrected

Hypotheses	Sample mean (M)	Bias	2.5%	97.5%
GIP -> ENS	0.641	0.012	0.219	0.893
WMP -> ENS	0.040	0.046	-0.240	0.154

Beyond hypothesis testing, the quality of the structural model was assessed using collinearity (VIF), effect size (f^2), coefficient of determination (R^2), and predictive relevance (Q^2), following the recommendations of Hair et al. (2025). As presented in Table 5, the VIF values for Green Innovation Practices (1.781) and Waste Management Practices (1.781) were below the recommended threshold of 3.3, indicating the absence of multicollinearity. The effect size results further showed that Green Innovation Practices exerted a moderate effect on Environmental Sustainability ($f^2 = 0.361$), whereas Waste Management Practices had no meaningful effect ($f^2 = 0.000$). These findings are consistent with the hypothesis testing results, which revealed that only Green Innovation Practices significantly influenced Environmental Sustainability.

The structural model also demonstrated satisfactory explanatory and predictive capability. Environmental Sustainability recorded an R^2 value of 0.390 (Adjusted $R^2 = 0.362$), indicating that Green Innovation Practices and Waste Management Practices jointly explained 39.0% of the variance in Environmental Sustainability, representing a moderate level of explanatory power (Hair et al., 2025). Likewise, the Stone-Geisser's Q^2 value of 0.236 for Environmental Sustainability exceeded zero, confirming that the model possesses adequate predictive relevance. Overall, the results indicate that the structural model is free from collinearity issues and has satisfactory explanatory and predictive power for explaining Environmental Sustainability among SMEs in Northwestern Nigeria.

Table 5:

Quality Criterion for Structural Model

Assessment	Relationship/Construct	Value
Collinearity (VIF)	GIP → ENS	1.781
	WMP → ENS	1.781
Effect Size (f^2)	GIP → ENS	0.361
	WMP → ENS	0.000
Coefficient of Determination (R^2)	Environmental Sustainability (ENS)	0.390
Adjusted R^2	Environmental Sustainability (ENS)	0.362
Predictive Relevance (Q^2) (Blindfolding)	Green Innovation Practices (GIP)	0.000
	Waste Management Practices (WMP)	0.000
	Environmental Sustainability (ENS)	0.236

5.0 Theoretical and Practical Implications

The findings of this study provide both theoretical and practical contributions to the understanding of business sustainability among SMEs. Theoretically, the significant positive effect of Green Innovation Practices on Environmental Sustainability supports the Natural Resource-Based View (NRBV), which posits that environmentally oriented capabilities constitute strategic resources that enhance sustainable competitive advantage. However, the insignificant effect of Waste Management Practices suggests that basic waste management activities alone may not be sufficient to improve environmental sustainability without complementary innovation capabilities. Practically, the findings imply that SME owners and

managers should prioritise investments in green technologies, eco-friendly product development, and cleaner production processes to enhance environmental sustainability. Likewise, policymakers and support agencies should strengthen policies, incentives, and capacity-building programmes that promote green innovation adoption while improving the quality and effectiveness of waste management systems among SMEs in Northwestern Nigeria.

6.0 CONCLUSION

This study examined the influence of Waste Management Practices and Green Innovation Practices on Environmental Sustainability among SMEs in Northwestern Nigeria. The findings revealed that Green Innovation Practices have a positive and significant effect on Environmental Sustainability, whereas Waste Management Practices have a positive but insignificant effect. These results suggest that improving environmental sustainability among SMEs depends more on the adoption of innovative green technologies, processes, and products than on conventional waste management practices alone. The study therefore concludes that promoting green innovation is essential for achieving sustainable business outcomes and recommends that SMEs, policymakers, and relevant stakeholders strengthen investments and support for environmentally friendly innovations to enhance long-term environmental sustainability in the region.

7.0 RECOMMENDATIONS

Based on the objectives and empirical findings of this study, the following recommendations are made:

i. SME owners and managers should strengthen waste management practices by adopting systematic waste reduction, reuse and recycling initiatives to improve environmental sustainability and resource efficiency.
ii. SMEs should invest in green innovation practices through the adoption of environmentally friendly products, cleaner production technologies and sustainable operational processes, as these have been found to significantly enhance environmental sustainability.
iii. Government agencies, SMEDAN and environmental regulatory bodies should provide technical support, incentives and capacity-building programmes that encourage SMEs to adopt green innovation practices and environmentally responsible business operations.
iv. Relevant stakeholders, including business associations and development partners, should promote environmental awareness and facilitate access to green technologies that enable SMEs to improve their environmental sustainability and long-term competitiveness.

8.0 Limitations and Suggestions for Further Studies

This study has some limitations. First, the cross-sectional design captured respondents' perceptions at a single point in time and therefore could not examine changes in environmental sustainability over time. Second, the study was limited to SMEs operating in Kaduna, Kano, Katsina and Kebbi States, which may restrict the generalisability of the findings to other regions of Nigeria. In addition, the study relied on self-reported questionnaire data, which may be subject to respondents' personal perceptions despite the validity and reliability procedures undertaken.

Future studies should employ longitudinal or mixed-methods designs to provide deeper insights into the relationship between green entrepreneurship practices and business sustainability. Similar studies should also be conducted in other sectors and geopolitical zones of Nigeria. Furthermore, future research may incorporate additional variables such as environmental orientation, green entrepreneurial orientation, institutional support or environmental awareness to provide a broader understanding of the factors influencing business sustainability among SMEs.

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